

**FIAT**

**FIAT X1/9**

**Service manual**

**1974 thru 1978**

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**FIAT MOTORS OF NORTH AMERICA, INC.**



X-1/9

**SERVICE  
MANUAL**

**1974 thru 1978**

GENERAL INFORMATION  
MAINTENANCE  
TUNE-UP

ENGINE

CLUTCH

TRANSMISSION  
DIFFERENTIAL

BRAKES

STEERING SYSTEM

SUSPENSION AND WHEELS

ELECTRICAL

BODY

ELECTRICAL SYSTEM  
TROUBLE SHOOTING

## FOREWORD

This manual has been written to provide basic information for the proper servicing of the X 1/9 passenger car.

The information is grouped in sections. Each section is identified by two-digit numbers. Each section covers the service procedures for the individual groups and sub-groups. They are identified by a number. The root of the number is taken from the general sub-group code now being used for the Parts Catalog and the Service Time Schedule. This number identifies the service time schedule operation, parts catalog sheet for the part covered by the service procedure, and the service procedure.

For the time being, sections in the Parts Catalog are identified by a letter code in place of a two-digit number. Each tab index page contains the correlation between the two codes.

### HOW TO USE THE MANUAL

The information identification number consists of five digits, as follows;

- a) The first two digits identify the section.
- b) The third digit designates the group within the section and is used in conjunction with the first two.
- c) The last two digits indicate an assembly or task consisting of several parts. This number identifies the sub-group. It refers to the sub-group in both the Parts Catalog and the Service Time Schedule.

Find the information required as follows:

- 1) Find the tab index page for the information on the first page of the manual.
- 2) Find the group and sub-group for the information on the table of contents on the tab index page.
- 3) Locate the sub-group containing the information by means of the page number opposite the sub-group.

### UPDATING THE MANUAL

—Revision sheets are supplied together with a revised "Composition of the Manual" sheet.

—Revision sheets can be of two types:

- 1) Replacement sheets: In this case the new sheet will carry the same page number as the old one. The bottom right side will read "Supersedes page . . . dated . . ."
- 2) Complementary sheets on topics already dealt with: In this case the additional sheet will carry the same sub-group number as the sheet on which the topic has been first dealt with. The page number will be followed by a small letter suffix.

Example: If additional information is needed for information on page 2, the new sheet will be 2a.

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# GENERAL INFORMATION — MAINTENANCE — 00

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### General Information



## ENGINE

Engine type .....	128 AS.040.4
Cycle .....	Four-stroke, gasoline
No. of cylinders .....	Four
Bore .....	3.39 in. (86mm)
Stroke .....	2.19 in. (55.5mm)
Displacement .....	78.7 cu. in. (1290cc)
Compression ratio .....	8.5 to 1
Horsepower rating, S.A.E. net .....	66.5 HP
at .....	6,000 rpm
Torque rating, S.A.E. net .....	67¼ ft. lbs.
at .....	4,000 rpm
Arrangement .....	central, transversally mounted
<b>VALVE MECHANISM</b>	
Intake	
opens .....	10° B.T.D.C.
Closes .....	54° A.B.D.C.
Exhaust	
opens .....	54° B.B.D.C.
closes .....	10° A.T.D.C.
Valve clearance:	
—for checking valve timing .....	0.020 in. (0.50mm)
—operation clearance, engine cold:	
Intake .....	0.012 in. (0.30mm)
Exhaust .....	0.016 in. (0.40mm)

### FUEL SYSTEM

Feeding by mechanical pump.

Carburetor: vertical, downdraft WEBER 32DMTRA200 with starting device (vacuum-operated butterfly valve choke, accelerating pump, and mechanically-controlled opening of secondary throttle.

Intake manifold with hot water header for mixture pre-heating, at idle.

Fuel filter in feed line from pump to carburetor. Paper cartridge air cleaner with silencer.

### LUBRICATON SYSTEM

Forced circulation by gear pump and pressure limiting valve. Full-flow cartridge oil filter.

Normal oil pressure 64 to 85 psi (4.5 to 6 kg/cm) at 212° F (100° C).

### COOLING SYSTEM

Radiator and expansion tank. Water circulated by centrifugal pump. Controlled by thermostat on cylinder head outlet duct. Thermostat begins to open at 165° F to 170° F (73° to 77° C).

Four-bladed fan, driven by electric motor. Controlled by thermostatic switch in radiator. Thermostatic switch cut-in about 194° F (90° C).

### EMISSION CONTROL SYSTEMS

Engine fuel feed system provided with fuel recirculation (closed circuit) and evaporative emission control system.

Crankcase emission control system (closed circuit) by recirculation of blow-by gases and oil vapors.

Exhaust emission control system (reduces air pollution from exhaust gases) separate from the crankcase emission control system.

## General Information

### CHASSIS

type 128 AS

### CLUTCH

Dry, single-plate type, with diaphragm spring release mechanism. Hydraulic control.

Clutch pedal free-play about 1¼ in. (30mm).

### TRANSMISSION

Four forward speeds, synchromeshed, and reverse. Gear shift lever on floor tunnel.

Gear Ratios:

—first, synchromeshed	3.583 to 1
—second, synchromeshed	2.235 to 1
—third, synchromeshed	1.459 to 1
—fourth, synchromeshed	0.959 to 1
—reverse	3.714 to 1

### DIFFERENTIAL

Differential and final drive gears housed in transmission main case. Final drive by cylindrical, helical-toothed gears. Final drive ratio 4.076 to 1 (13/53).

Drive to rear wheels by half-axle swing shafts through constant velocity joints, three-lobe type inboard and ball-type outboard.

### BRAKES

Dual hydraulic system on four wheels, independent at front and rear. Disk type brakes front and rear.

Mechanical hand brake acting on rear wheel calipers.

### WHEELS AND TIRES

Disk wheels with rim type	4½JX13
Radial tires, size	145HR-13
Inflating pressure	front 26psi—rear 29psi

### STEERING

Rack and pinion type.

Ratio:

—number of steering wheel turns about	3
—corresponding rack travel	4.6 in. (117mm)

Turning circle diam. about 32 ft. 10 in. (10m)  
Steering column of the breakaway mount type with 2 universal joints. Independent and symmetric track rods to each wheel. Sealed for life joints.

### FRONT SUSPENSION

Independent wheel type. Lower control arms consisting of a cross rod and reaction strut. Sealed for life joints. Telescopic knuckle pillars incorporated in double-action hydraulic shock absorbers. Coil springs and co-axial buffers.

Caster angle, unladen car	+6°30' to +7°30'
Camber, unladen car	0° to -1°
Toe-in, unladen car	+0.080 to +0.240 in. (+2 to +6mm)

### REAR SUSPENSION

Independent wheel type. Lower control arms and telescopic knuckle pillars incorporated in double acting hydraulic shock absorbers. Coil springs and co-axial buffers. Adjustable cross tie rods.

Camber, unladen car	-1°10' to -2°10'
Toe-in, unladen car	+0.360 to +0.510 in. (9 to 13mm)

### ELECTRICAL SYSTEMS

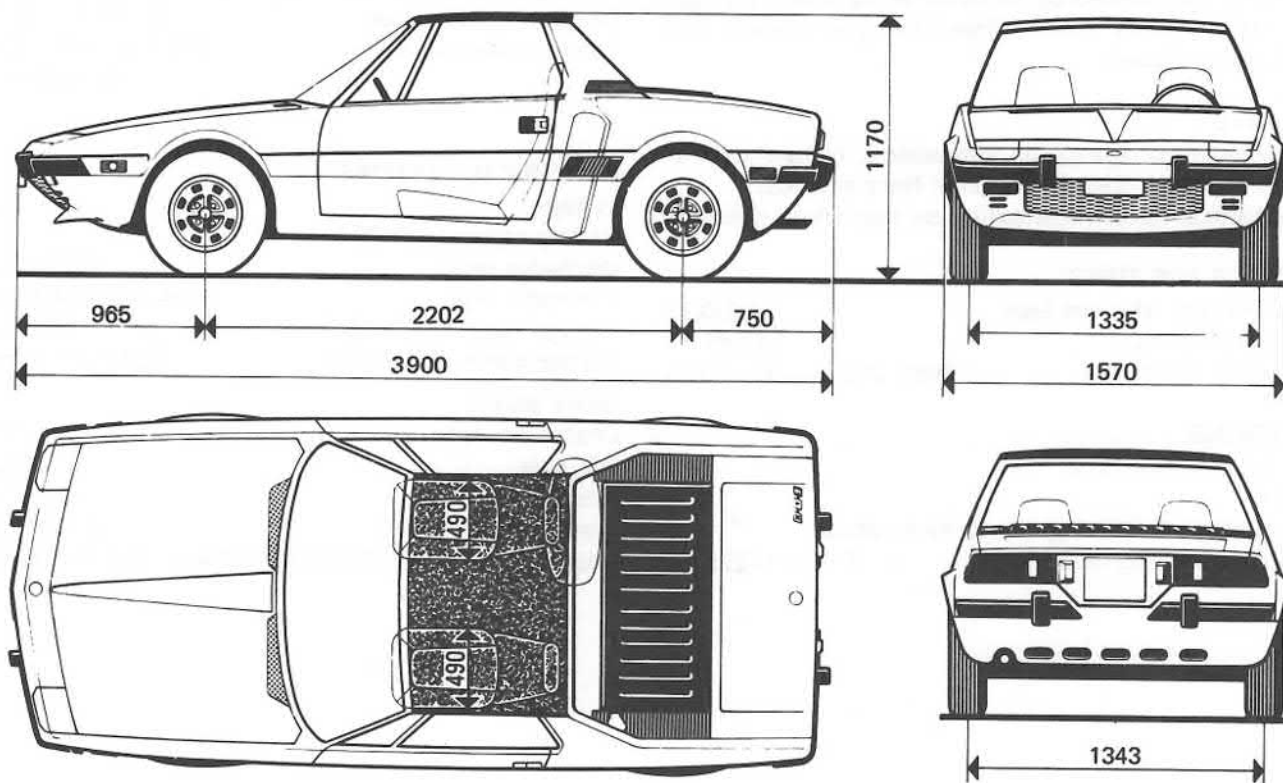
Voltage	12V
Battery capacity (at 20 hr. discharge rate)	60 Amp/hr
Alternator type	A124-14V-44A Var. 3
Voltage regulator, BOSCH type	AD1/14V
Starter motor, FIAT type	E84-0.8/12Var.1
Spark plugs:	
Champion, type	N9Y
AC, type	42XLS
Marelli, type	CW 7 LP
Thread size (metric)	M14 x 1.25
Gap	0.020 to 0.024 in. (0.5 to 0.6mm)

## WEIGHTS — PERFORMANCES

Curb weight (with water, oil, fuel, spare wheel, tool kit, and accessories): .....	2,010 lbs.
Seating capacity .....	2
Carrying capacity .....	2 persons & 130 lbs
Gross weight, fully laden .....	2,440 lbs.
Speed, maximum, on flat road with good surface (run-in and fully laden):	
—First gear .....	28 mph. (45kph)
—Second gear .....	47 mph. (75kph)
—Third gear .....	72 mph. (115kph)
—Fourth gear .....	103 mph. (165 kph)
—Reverse .....	31 mph. (50kph)

### DIMENSIONS (METRIC)

mm.	490	750	965	1174	1335	1343	1570	2202	3900
in.	19.3	29.5	38.0	46.1	52.5	52.9	61.8	86.7	153.5



**The maximum height is referred to the unladen car.**



## General Information

### Capacities — Model X 1/9

UNIT	QUANTITY			REFILL
	lt	kg	U.S. Units	
Fuel Tank	46	—	12 gals.	Leaded or lead free gasolines with octane rating of at least 91 (Research Method)
Radiator, cylinder jackets and heating system	6.50	—	6 4/5 qts.	Water (*)
Engine sump and filter (**)	4.25	3.825	4 1/3 qts.	see table below
Transmission and axle	3.15	2.85	3 1/3 qts.	SAE 90 (not EP) containing anti-wear additives
Steering box	0.140	0.127	1/3 pt.	SAE 90 EP oil to MIL-L-2105B
Constant-speed joints (sockets and boots each)	—	0.095	1/5 pt.	Lithium-base grease, with molybdenum disulphide N.L.G.I. No. 2
Brake control hydraulic system				
front	0.160	0.160	1/3 pt.	DOT 3 Motor Vehicle Brake Fluid to F.M.V.S.S. No. 116
rear	0.160	0.160	1/3 pt.	
Clutch control hydraulic system	0.180	0.180	2/5 pt.	Same as brake circuit

	Temperature	Solvent in bottle
Windshield washer bottle	above 0° C (32° F)	3%
	down to -10° C (14° F)	50%
	below -10° C (14° F)	100%
		Pure water plus high quality windshield washer solvent

TEMPERATURE	UNIGRADE OIL	MULTIGRADE OIL
Below -15° C (5° F)	VS 10 W (SAE 10W)	—
Between -15° C (5° F) and 0° C (32° F)	VS 20 W (SAE 20W)	10 W-30
Between 0° C (32° F) and 35° C (95° F)	VS 30 (SAE 30)	20 W-40
Above 35° C (95° F)	VS 40 (SAE 40)	20 W-40

Do not mix oils of different brands or grades.

(\*) When temperature is close to 32° F (0° C) change to good commercial grade anti-freeze mixture.

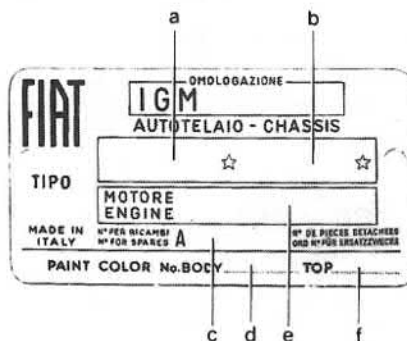
(\*\*) Total capacity including sump, filter, and lines is 5 1/2 qts U.S. (4.5 kg). The amount indicated in the table is the requirement for periodic oil changes.

## Identification Data

### IDENTIFICATION PLATE

The plate is located on the right side of the front trunk.

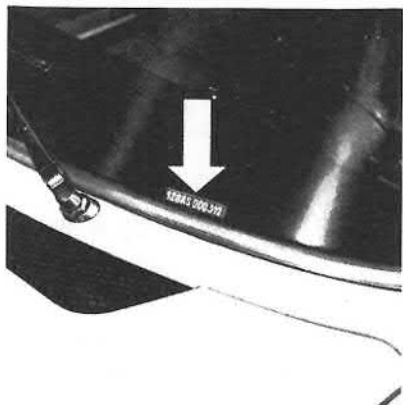
- a—Chassis type (128 AS)
- b—Chassis number
- c—Order number of spares
- d—Body paint color number
- e—Engine type (128 AS.040.4)
- f—Top paint color number



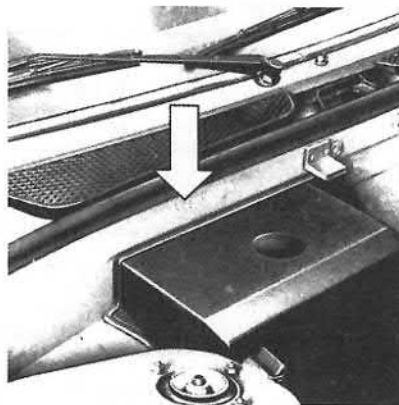
**Engine Type and Identification Number** — This is punched on crankcase, flywheel end.



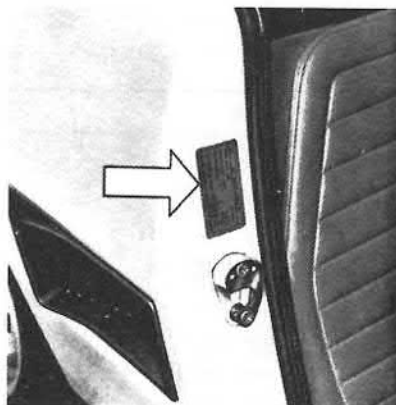
**F.M.V. Safety Standard 115 Tag** — This has type of vehicle and chassis number. It is located on fascia top between instrument cluster and windshield.



**Chassis Type and Identification Number** — This is punched on front trunk rear cross rail (permanent structure) right side.

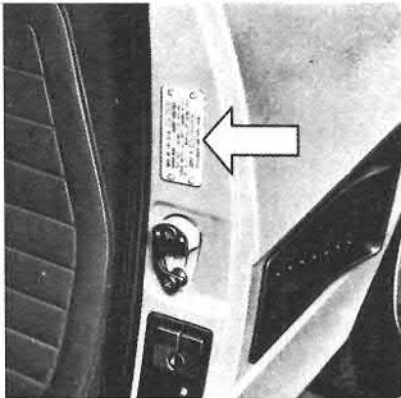


**F.M.V. Safety Standard 110 Tag** — This has tire data and car capacity. It is located on right door pillar.



## General Information

**F.M.V. Safety Standard Conformity Tag** — This has month and year of manufacture, gross vehicle weight rating, gross axle weight rating, chassis number and car type. It is located on left door pillar.



### SPARE PARTS

When placing orders for parts, be sure to supply the following information:

- Car model (commercial description).
- Chassis type and number.
- Engine type and number.
- Number of spares.
- Part number of the item being ordered (as listed in Parts Catalog).

Orders are basically processed according to the part numbers.

**F.M.V. Regulation Conformity Tag** — This has air pollution control specifications for correct engine tune-up and adjustments. It is located on lower side of engine hood.



### CAR KEYS

Two sets of two keys are supplied with each car.

—one for the ignition.

—one for doors and glove box, hood and trunk.

An identification number is stamped in the key head. Duplicates can be made on tool Ap5013 if this number is known.

## Maintenance

### Every 300 miles (500km) or weekly

- Engine oil: check level
- Cooling system: check level
- Brake and clutch fluid reservoirs: check level
- Tires: check pressure

### Every 3,000 miles (5,000)

- Constant velocity joints/steering linkage/suspension articulation rubber boots and caps: check efficiency
- Battery: check electrolyte level
- Windshield washer: check level, clean, adjust

### Every 6,000 miles (10,000km)

- Engine oil and filter: change oil (engine warm) and filter

NOTE: for stop and go (city) or dusty areas change oil and filter every 3,000 miles (5,000km)

- Air cleaner: replace cartridge
- Fuel filter: replace unit and check line tightness
- Drive belts: Alternator/water pump: check and adjust, change if necessary
- Air pump: check, change if necessary
- Ignition distributor: lubricate through wick, check and adjust breaker contacts, change if necessary, check condenser, change if necessary
- Ignition timing, dwell angle and CO concentration: check and adjust as required
- Clutch: check and adjust
- Tires: check for wear, rotate
- Battery: inspect posts and clamps
- Body: lubricate various items
- Wheel alignment: check and adjust if necessary
- Road test: check operation of engine, transmission, clutch, steering, and brakes

### Every 12,000 miles (20,000km)

- Valve clearance: adjust
- Spark plugs: change

- Ignition distributor: clean, check and change if necessary cap and rotor, change breaker contacts and condenser

- Carburetor: check throttle/choke valves and control linkages, adjust as required

- Air pump filter: change cartridge

- Exhaust emission control system: check lines, manifold valves, and air pump, change as required

- Fuel evaporative emission control: check components and change as required

- Crankcase emission control system: clean, wash, and check

- Vacuum hoses and connections: check condition and tightness, change as required

- Transmission and axle oil: check level

- Cooling system hoses and connections: check tightness and change as required

- Front and rear suspensions: check joints and fasteners

- Constant velocity joints (outboard); check lubrication, add grease if required

- Brakes: check for wear and hand brake effectiveness

- Electrical system: check lights, instruments, horn and wiper for proper operation

- Accessories, seat belt anchorages, heating and defrosting controls: check for proper operation

### Every 24,000 miles (40,000km)

- Activated carbon trap: change

- Ignition distributor: change cap and rotor, check advance mechanism and change if necessary

- Spark control modulation device (diaphragm unit, valves, lines): check components and change as required

- Ignition system wiring: check condition of wires and connections, change as required

- Transmission and axle: change oil

- Starter motor and alternator: check

## Tune-Up

This section contains information needed to perform a tune-up of the engine. Perform the tasks in this section according to the MAINTENANCE chart.

Example: If doing tune-up at 6,000 miles, clean spark plugs. If doing tune-up at 12,000 miles, change spark plugs.

### SPARK PLUGS

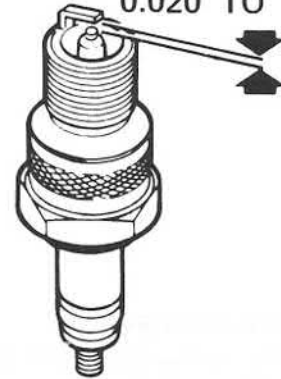
Remove plugs. Inspect plugs for condition. Clean or replace plugs.

Adjust gap of plugs.

Gap—0.020 to 0.024 in (0.5 to 0.6mm)

NOTE: If you are going to check valve clearance leave plugs out until clearance is adjusted.

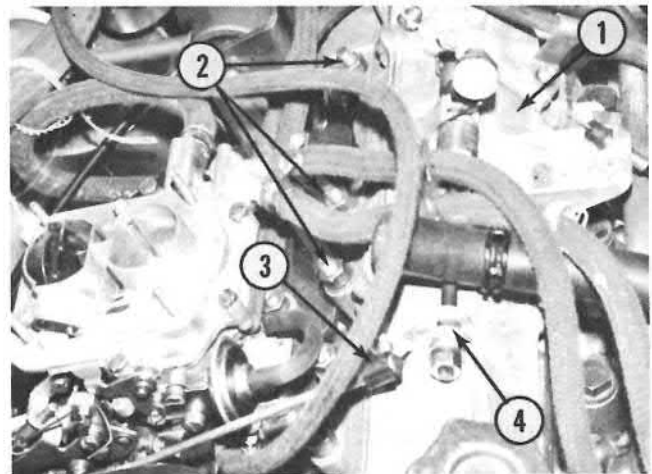
WIRE GAGE  
0.020 TO 0.024



### VALVE CLEARANCE

Remove air cleaner. Disconnect throttle rod (3) from control (4) on valve cover (1). Disconnect hoses to provide clearance. Remove 6 nuts (2) holding cover. Remove cover (1).

1. Cover. 2. Nuts. 3. Throttle rod. 4. Control.

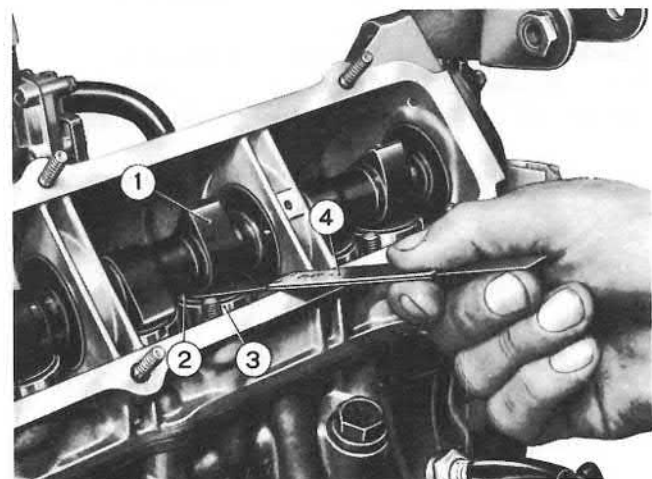


Turn crankshaft until lobe on camshaft for valve being checked is pointing up and at right angle to valve. Measure clearance between camshaft and tappet plate.

Clearance: Intake — 0.012 in. (0.30mm)

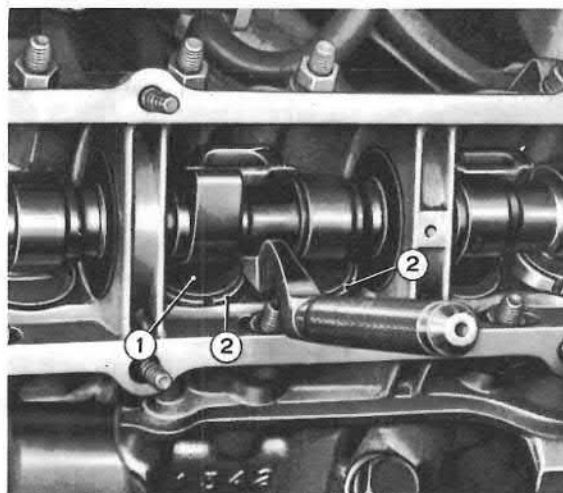
Exhaust — 0.016 in. (0.40mm)

1. Lobe. 2. Plate. 3. Tappet. 4. Feeler gauge.



Adjust clearance as necessary by replacing tappet plates (1).  
 After adjusting, install camshaft cover.  
 Connect throttle rod and hoses.  
 Install air cleaner. Install spark plugs.

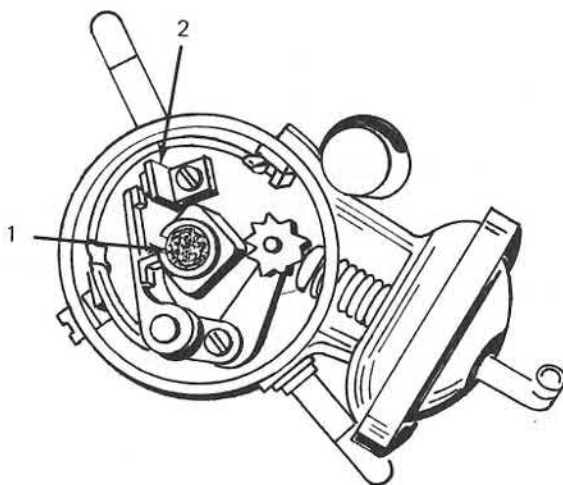
1. Tappet plate.
2. Tool.



### IGNITION DISTRIBUTOR

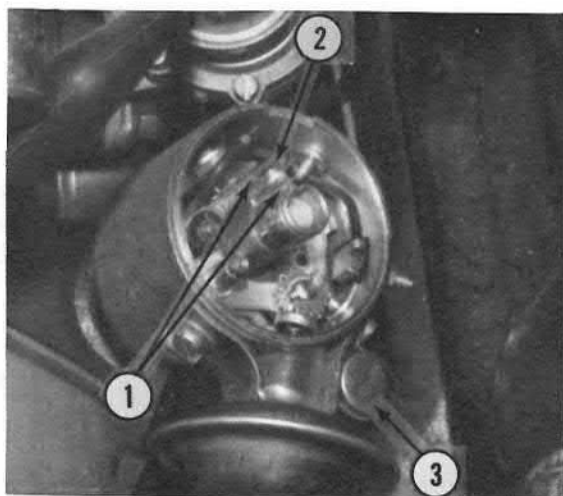
Release 2 spring clips holding cap on distributor. Remove cap and rotor. Clean and inspect cap and rotor. Replace cap and rotor as necessary. Lubricate distributor by adding a little oil thru wick.

1. Wick.
2. Contact points.



Check contact points (1) for wear and damage.  
 Check point gap (2).  
 Gap—0.015 to 0.017 in. (0.37 to 0.43mm)  
 Adjust point gap.  
 Check condenser (3). Replace as necessary.  
**NOTE:** Replacement of contact points should be performed on the bench with the distributor removed.

1. Contact point.
2. Point gap.
3. Condenser.

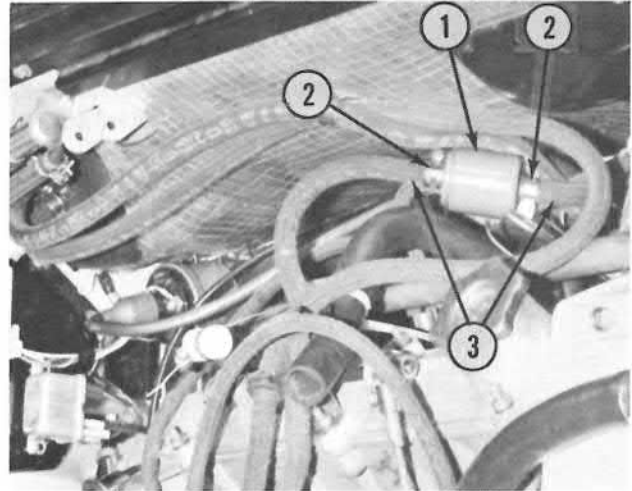


**FUEL FILTER**

Replace filter (1) by loosening clamps (2) and disconnecting hoses (3).

Check fuel lines for tightness.

1. Fuel filter.    2. Clamps.    3. Fuel hoses.

**AIR CLEANER**

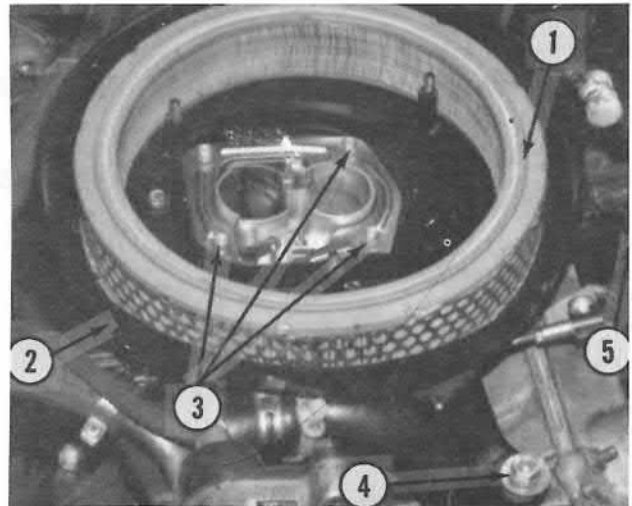
Remove 3 nuts holding cover.

Remove 4 nuts (3) holding air cleaner (2) to carburetor. Remove nut (4) holding bracket to camshaft cover. Disconnect hose (5) and hose to bottom of air cleaner from air cleaner. Disconnect hose from carburetor cooling fan. Remove air cleaner.

Replace cartridge (1). Clean air cleaner.

NOTE: Install air cleaner after adjusting carburetor.

1. Cartridge.    2. Air cleaner.    3. Nuts.    4. Nut.  
5. Hose.

**ENGINE OIL**

With engine warm, drain oil from engine. Remove oil filter (1).

Coat seal on filter with engine oil. Thread filter on by hand until seal touches plate. Turn filter down  $\frac{3}{4}$  turn more. Fill oil.

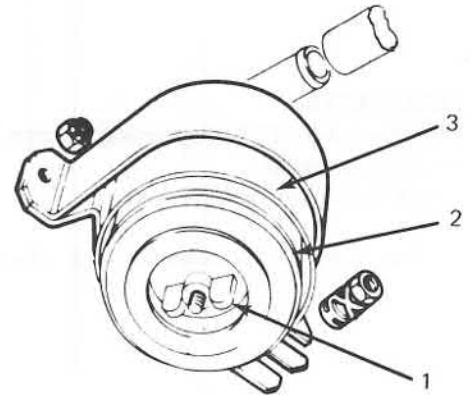
1. Oil Filter.



**AIR PUMP FILTER**

Remove wing nut (1) on bottom of filter housing (3).  
Remove filter (2). Install new filter. Tighten nut.

1. Wing nut. 2. Filter. 3. Housing.

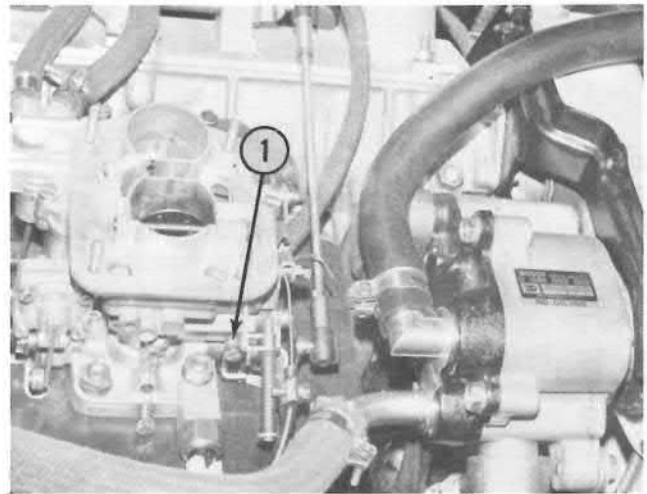
**IGNITION TIMING**

Hook up tune-up equipment such as scope and Dwell-Tach.

Start car. Allow engine time to warm up.

Using tach check idle speed. Set idle speed at 850 rpm. Adjust carburetor.

1. Idle speed adjustment screw.

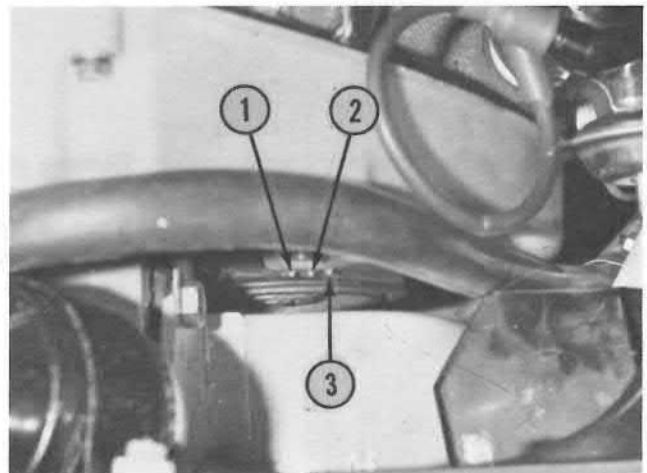


Using dwell meter, check dwell.

Dwell should be 55°. Adjust contact points as necessary.

Using strobe light, check ignition timing. Timing should be 0° (TDC). If necessary, loosen nut on distributor clamp and adjust distributor.

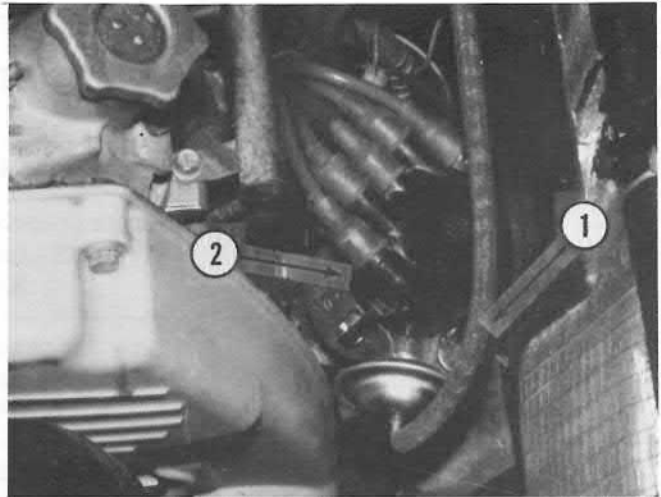
1. 0° (TDC). 2. 5°. 3. 10°.





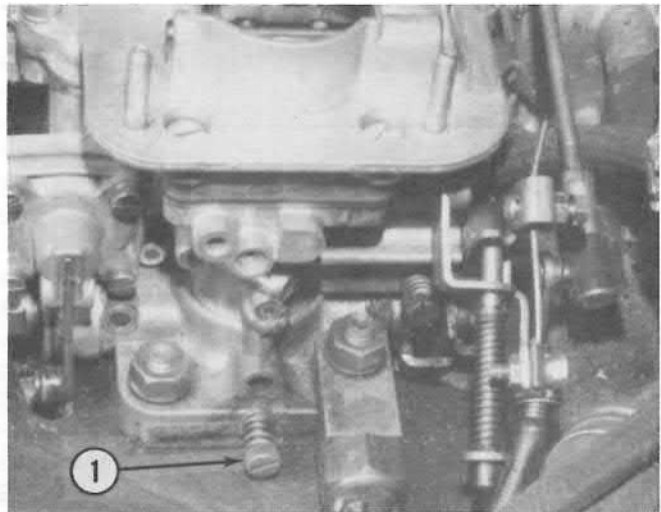
Disconnect vacuum line (1) from distributor (2). Check that ignition timing moves to about 10° advance. Connect vacuum line to distributor. Check that timing returns to 0° (TDC) in about 7 seconds.

1. Vacuum line.
2. Distributor.



Hook up exhaust analyzer. Check CO reading on analyzer. CO should be 0.5% to 1.5%. Adjust mixture metering screw (1) on carburetor as necessary.

1. Mixture metering screw.



## Maintenance — Model X 1/9

### FIAT LUBRICANT SPECIFICATIONS

FIAT TYPE	INTERNATIONAL DESIGNATION	APPLICATION
VS 40 Oil (minimum above 32° F (0° C); max. above 95° F (35° C))	Low ash content detergent oil Type MS-Level MIL-L-2104 B SAE 40	Crankcase
VS 30 Oil (minimum above 32° F (0° C); max. below 95° F (35° C))	Low ash content detergent oil Type MS-Level MIL-L-2104 B SAE 30	Crankcase
VS 20 Oil (minimum above 32° F (-15° C) and 32° F (0° C))	Low ash content detergent oil Type MS-Level MIL-L-2104 B SAE 20	Crankcase
VS 10 W Oil (minimum below 5° F (-15° C))	Low ash content detergent oil Type MS-Level MIL-L-2104 B SAE 10 W	Crankcase Starting motor
W 90/M Oil	SAE 90 EP-meets MIL-L-2105 B requirements	Steering housing
ZC 90 Oil	Mechanical transmission oil, SAE 90 (not EP), containing anti-wear additives	Transmission and differential
S.A.I. Oil	Mineral antifreeze oil, containing greasiness additives	Hydraulic shock absorbers
MR 2 Grease	Lithium-based grease N.L.G.I.-No. 3	Constant-speed joint recess and protection boot
MR 3 Grease	Lithium-based grease N.L.G.I.-No. 3	Generator - Hand brake - Ignition distributor - Clutch-control Hydraulic brake control - Control arm and steering rod joints
MR 2 Grease	Special castor oil and sodium soap-based grease, loaded with graphite and Mo S2. Must be compatible with brake fluid and rubber parts of brake circuit	Brake Calipers
Special blue label fluid	HD fluid for hydraulic brake circuit SAE J 1703	Hydraulic brake circuit

# ENGINE — 10

PARTS CATALOG CODE	SERVICE MANUAL & SERVICE TIME SCHEDULE CODE		Page
—	10	Specifications-Tightening Reference .....	15
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A4.09	104.09	Fan .....	79
—	10A	Tool Equipment .....	81

**Engine: Specifications**  
**CYLINDER BLOCK-CON-RODS**

DESCRIPTION	IN.	MM
Cylinder bore diameter .....		
Cylinder bores are graded into classes with 0.0004" (0.01mm) progression.	3.3858 to 3.3878	86.000 to 86.050
Auxiliary shaft bushing seats, diameters:		
—drive end .....	1.5236 to 1.5248	38.700 to 38.730
—inside end .....	1.3794 to 1.3805	35.036 to 35.066
Crankshaft main bearing seat diameter .....	2.1459 to 2.1465	54.507 to 54.520
Length of rear main bearing seat between thrust ring seats .....	0.8716 to 0.8740	22.140 to 22.200
Big-end bearing housing diameter .....	1.9146 to 1.9152	48.630 to 48.646
Thickness of standard big-end bearing .....	0.0603 to 0.0606	1.531 to 1.538
Range of undersize big-end bearings for service .....	0.010, 0.020, 0.030, 0.040	0.254, 0.508, 0.762, 1.016
Big-end bearings:		
—fit clearance .....	0.0014 to 0.0034	0.036 to 0.086
Small-end bore diameter .....	0.9425 to 0.9438	23.939 to 23.972
Small-end bushing O.D. ....	0.9455 to 0.9465	24.016 to 20.041
Small-end bushing fit, interference .....	0.0017 to 0.0040	0.044 to 0.102
Small-end bushing ream bore, fitted		
Grade 1 .....	0.8663 to 0.8664	22.004 to 22.007
Grade 2 .....	0.8664 to 0.8665	22.007 to 22.010
Piston pin-small-end bushing fit:		
—clearance of new parts .....	0.0004 to 0.0006	0.010 to 0.016
Maximum misalignment between c/l's of connecting rod small-end and big-end:		
—measured at 4.92" (125mm) from the shank .....	±0.0039	±0.10

## PISTONS — PINS — RINGS

DESCRIPTION	IN.	MM
Diameter of standard service pistons, measured at right angles to C/L of piston pin: —at 1.08" (27.5mm) from piston skirt edge		
Class A .....	3.3835 to 3.3839	85.920 to 85.930
Class C .....	3.3842 to 3.3846	85.960 to 85.970
Class E .....	3.3850 to 3.3854	85.980 to 85.990
Oversize piston range .....	0.0079, 0.0157, 0.0236	0.2, 0.4, 0.6
Piston boss bore diameter		
Grade 1 .....	0.8660 to 0.8661	21.996 to 21.999
Grade 2 .....	0.8661 to 0.8662	21.999 to 22.002
Piston ring groove width		
Top groove .....	0.0604 to 0.0612	1.535 to 1.555
Center groove .....	0.0799 to 0.0807	2.030 to 2.050
Bottom groove .....	0.1562 to 0.1570	3.967 to 3.987
Standard piston pin diameter		
Grade 1 .....	0.8658 to 0.8659	21.991 to 21.994
Grade 2 .....	0.8659 to 0.8660	21.994 to 21.997
Oversize piston pin range for service .....	0.0079	0.2
Piston ring thickness		
—first: compression ring .....	0.0582 to 0.0587	1.478 to 1.490
—second: oil ring .....	0.0779 to 0.0783	1.978 to 1.990
—third: oil ring with oilways and expander .....	0.1545 to 0.1553	3.925 to 3.947
Piston fit in bore, measured at right angle to pin, 1.08" (27.5mm) from piston skirt edge		
—clearance of new parts .....	0.0020 to 0.0028	0.050 to 0.070
Piston pin in boss: clearance of new parts .....	0.0001 to 0.0003	0.002 to 0.008
Piston ring fit (side clearance)		
—first: compression ring, clearance of new parts .....	0.0018 to 0.0030	0.045 to 0.077
—second: oil ring, clearance of new parts .....	0.0016 to 0.0028	0.040 to 0.072
—third: scraper ring, clearance of new parts .....	0.0008 to 0.0024	0.020 to 0.062
Ring end gap in bore:		
—first: compression ring .....	0.0118 to 0.0177	0.30 to 0.45
—second: oil ring .....	0.0118 to 0.0177	0.30 to 0.45
—third: scraper ring .....	0.0098 to 0.0157	0.25 to 0.40
Oversize piston ring range, for service .....	0.0079, 0.0157, 0.0236	0.2, 0.4, 0.6

## Engine: Specifications

### CYLINDER HEAD

DESCRIPTION	IN.	MM
Valve guide bore .....	0.5886 to 0.5896	14.950 to 14.977
Outside diameter of valve guide .....	0.5921 to 0.5928	15.040 to 15.058
Valve guide oversize on O.D., for service .....	0.0079	0.2
Inside diameter of valve guides, fitted in cylinder head .....	0.3158 to 0.3165	8.022 to 8.040
Valve guide fit in head: —interference .....	0.0025 to 0.0043	0.063 to 0.108
Valve stem diameter .....	0.3139 to 0.3146	7.974 to 7.992
Valve stem fit in valve guide: —clearance of new parts .....	0.0012 to 0.0026	0.030 to 0.066
Valve seat angle in cylinder head .....	45° ±5'	
Valve face angle .....	45° 30' ±5'	
Valve head diameter		
intake .....	1.4173±0.0059	36±0.15
exhaust .....	1.2205±0.0059	31±0.15
Max. valve run-out on a full turn, guided on stem, with dial indicator set at center of contact face .....	0.0012	0.03
Width of valve seats in cylinder head (contact surface): —intake and exhaust, about .....	0.0787	2
Inside diameter of valve seats in cylinder head		
intake .....	1.1811	30
exhaust .....	1.0531	26.75
Lift on C/L of valve (without play) .....	0.3839	9.75
Diameter of tappet bores in head .....	1.4567 to 1.4577	37.000 to 37.025
Outside diameter of tappets .....	1.4557 to 1.4565	36.975 to 36.995
Fit clearance between tappets and bores in head .....	0.0002 to 0.0020	0.005 to 0.050
Thickness of cap plates: basic dimension .....	0.1575±0.0005	4±0.012

### VALVE SPRINGS

	INNER SPRING	OUTER SPRING
Spring height under a load of 85.5 lbs. (38.9kg)		
mm .....	—	36
in. ....	—	1.417
Spring height under a load of 32.71 lbs. (14.9kg)		
mm .....	31	—
in. ....	1.220	—
Minimum allowable load referred to the above height		
kg .....	13.5	36
lbs. ....	29.8	79.3

## VALVE MECHANISM — CAMSHAFT

DESCRIPTION	IN.	MM
Diameter of bearing bores in head:		
—drive end .....	1.1807 to 1.1816	29.989 to 30.014
—intermediate, drive side .....	1.8890 to 1.8900	47.980 to 48.005
—middle .....	1.8968 to 1.8976	48.180 to 48.205
—intermediate, flywheel side .....	1.9047 to 1.9057	48.380 to 48.405
—flywheel end .....	1.9126 to 1.9136	48.580 to 48.605
Diameter of camshaft journals:		
—drive end .....	1.1787 to 1.1795	29.944 to 29.960
—intermediate, drive side .....	1.8872 to 1.8878	47.935 to 47.950
—middle .....	1.8951 to 1.8957	48.135 to 48.150
—intermediate, flywheel side .....	1.9030 to 1.9035	48.535 to 48.350
—flywheel end .....	1.9108 to 1.9114	48.535 to 48.550
Fit between bores in head and camshaft journals:		
—fit clearance		
drive end .....	0.0011 to 0.0028	0.029 to 0.070
intermediate, drive side .....	0.0012 to 0.0028	0.030 to 0.070
middle .....	0.0012 to 0.0028	0.030 to 0.070
intermediate, flywheel side .....	0.0012 to 0.0028	0.030 to 0.070
flywheel end .....	0.0012 to 0.0028	0.030 to 0.070

## AUXILIARY SHAFT

Diameter of bushing bores in crankcase:		
—drive end .....	1.5236 to 1.5248	38.700 to 38.730
—inside end .....	1.3794 to 1.3805	35.036 to 35.066
Inside diameter of bushings finished in bores:		
—drive end .....	1.4041 to 1.4049	35.664 to 35.684
—inside end .....	1.2598 to 1.2606	32,000 to 32,020
Diameter of shaft journals:		
—drive end .....	1.4013 to 1.4023	35.593 to 35.618
—inside end .....	1.2575 to 1.2583	31.940 to 31.960
Fit between bushings and bores in crankcase .....	interference fit at all times	
Fit between bushings and shaft journals:		
—fit clearance		
drive end .....	0.0018 to 0.0036	0.046 to 0.091
inside end .....	0.0016 to 0.0031	0.040 to 0.080

## Engine: Specifications

### CRANKSHAFT — MAIN BEARINGS

DESCRIPTION	IN.	MM
Main bearing journal standard diameter .....	1.9994 to 2.0002	50.785 to 50.805
Main bearing seat bore .....	2.1459 to 2.1465	54.507 to 54.520
Standard main bearing insert thickness .....	0.0718 to 0.0721	1.825 to 1.831
Main bearing inserts, for service .....	Std. 0.01, 0.02, 0.03, 0.04 U.S.	Std. 0.254, 0.508, 0.762, 1.016 U.S.
Crankpin standard diameter .....	1.7913 to 1.7920	45.498 to 45.518
Main bearing-to-journal fit: —clearance of new parts .....	0.0016 to 0.0033	0.040 to 0.085
Length of rear main bearing journal, shoulder-to-shoulder .....	1.0620 to 1.0640	26.975 to 27.025
Width of rear main bearing seat, between thrust ring seats .....	0.8716 to 0.8740	22.140 to 22.200
Rear main bearing seat thrust ring thickness .....	0.0909 to 0.0929	2.310 to 2.360
Thickness of oversize thrust rings .....	0.0959 to 0.0979	2.437 to 2.487
Crankshaft end play, thrust ring installed: —clearance of new parts .....	0.0021 to 0.0104	0.055 to 0.265
Max. misalignment of main bearing journals .....	0.0012*	0.03*
Max. misalignment of crankpins to main bearings journals .....	±0.014	±0.35
Max. out-of-round of crankshaft journals and crankpins, after grinding .....	0.0002	0.005
Max. taper of crankpins and journals, after grinding .....	0.0002	0.005
Squareness of flywheel resting face to crankshaft centerline: —Max allowable tolerance with dial indicator set laterally at a distance of about 1 11/32" (34mm) from crankshaft rotation axis .....	0.0010	0.025
Flywheel: —parallel relationship of driven plate face to crankshaft mounting face: max. allowable tolerance .....	0.0039	0.10
—squareness of above faces to rotation axis: Max. allowable tolerance .....	0.0039	0.10

\*Total indicator reading



## FUEL SYSTEM

### CARBURETOR

Type .....	WEBER 32 DMTRA 200			
	PRIMARY BARREL IN.	MM	SECONDARY BARREL IN.	MM
Bore .....	1.260	32	1.260	32
Main venturi .....	0.866	22	0.866	22
Main jet .....	0.043	1.10	0.043	1.10
Idle jet .....	0.018	0.45	0.024	0.60
Main air corrector .....	0.079	2.00	0.077	1.95
Idle air corrector .....	0.043	1.10	0.28	0.70
Accelerator pump jet .....	0.020	0.50	—	—
Emulsion tube type .....	F 30			
Extra fuel device jet .....	—	—	0.027	0.70
Extra fuel device jet .....	—	—	0.033	0.85
Choke type .....	throttle valve			
Partial opening of primary throttle valve (choke-on) .....	0.035" to 0.394" (0.90 to 10mm)			
Needle valve seat .....	0.059 in. (1.50mm)			
Float valve: distance between float and cover with gasket, in vertical position .....	0.24 in. (6mm)			

## Engine: Specifications

### LUBRICATION

#### OIL PUMP

Type .....	gear
Pump Drive .....	by auxiliary shaft
Oil pressure relief valve .....	built into oil pump
Clearance between gears upper side and cover mating face .....	0.0008 to 0.0041 in. (0.020 to 0.105mm)
Clearance between gears and pump housing inside wall .....	0.0043 to 0.0071 in. (0.11 to 0.18mm)
Full flow oil filter with by-pass .....	cartridge type
Low oil pressure indicator sending unit .....	electric
Oil pressure at 185° F (85° C) .....	64 to 85.4 psi (4.5 to 6 kg/cm)

#### COOLING SYSTEM

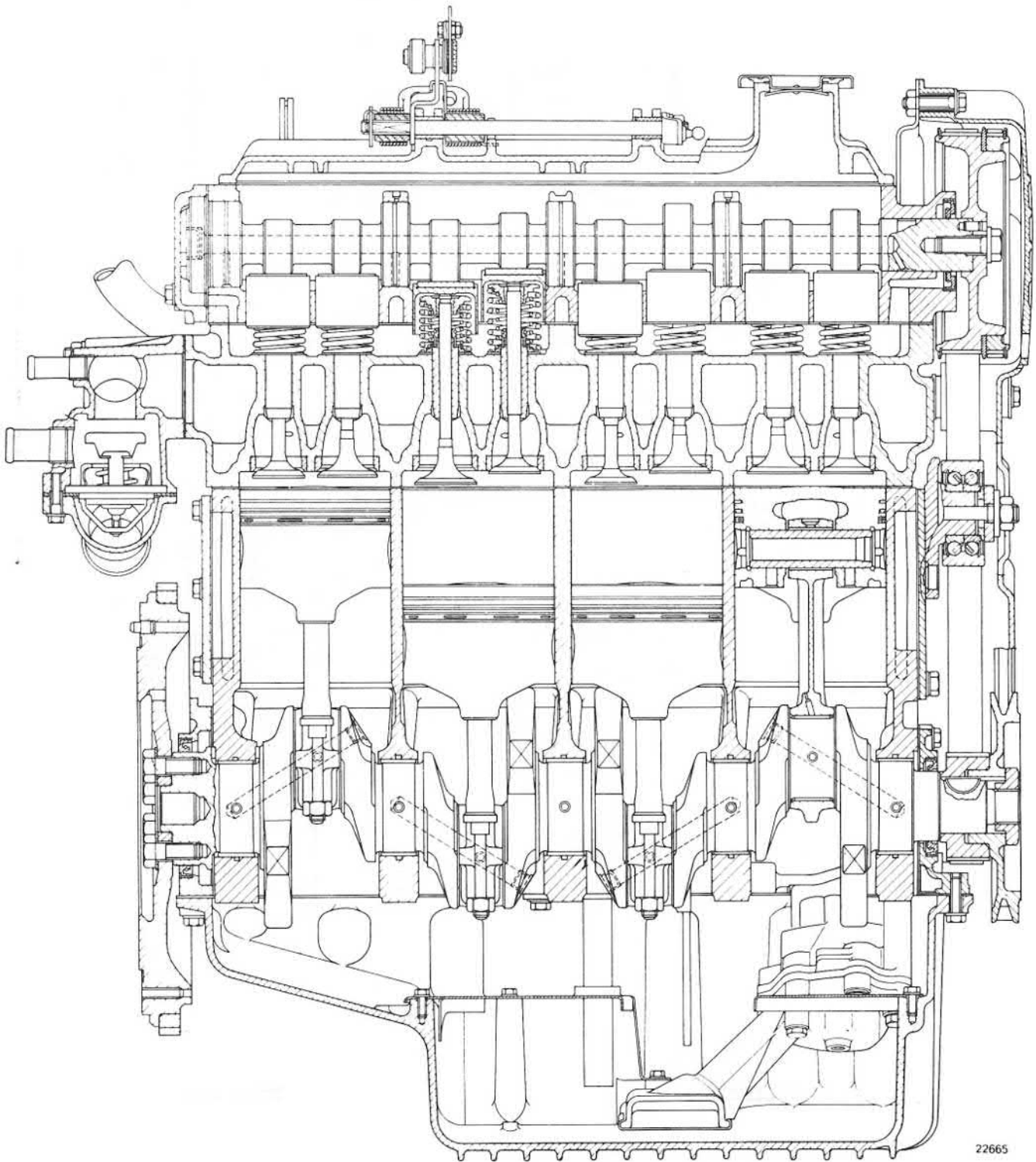
##### WATER PUMP

Type .....	centrifugal, vane type
Pump Drive .....	Vee belt
Fit between impeller vans and pump housing .....	0.031 to 0.051 in. (0.8 to 1.3mm)
Radiator cooling fan drive .....	electric motor
Thermostat —begins opening at .....	176° to 183° F (80° to 84° C)
—opening at 205° F (96° C) .....	not less than 0.314 in. (8mm)
Water temperature indicator .....	electric (tell tale)
Radiator cap valve opening pressure .....	11 psi (0.8 kg/cm)

## Engine: TIGHTENING REFERENCE

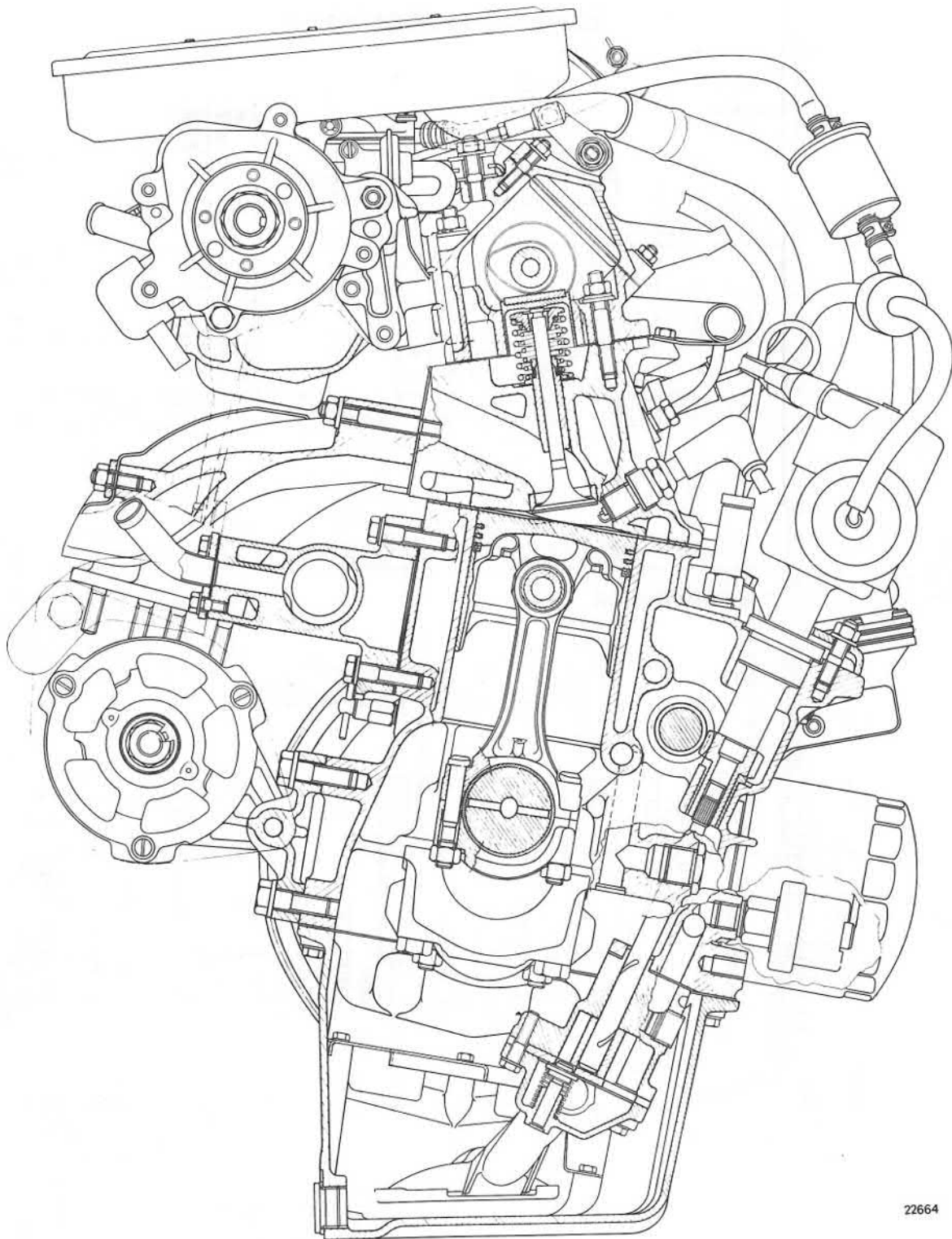
DESCRIPTION	THREAD (METRIC)	MATERIAL	TORQUE	
			FT. LBS.	kgm
<b>ENGINE</b>				
Self-locking bolt, flywheel to crankshaft .....	M 10 x 1.25	R 120	61	8.5
Bolt, breather duct to crankcase .....	M 8	R 80 Znt	18	2.5
Nut, connecting rod cap bolt .....	M 9 x 1	R 80 (Bolt R 100)	36	5
Bolt, driven sprocket to camshaft .....	M 10 x 1.25	R 120	61	8.5
Bolt, cylinder head hold-down .....	M 12 x 1.25	R 100 (washer Sint. M 8 F and 40 Cmt 3)	69	9.5
Nut, cylinder head studs .....	M 12 x 1.25	R 80 Znt (Washer Sint. M 8 F and 40 Cmt 3) (Stud R 100)	69	9.5
Nut, upper to lower cylinder head .....	M 8	R 50 Znt (Stud R 80 Znt)	14.5	2
Self-locking bolt, main bearing caps .....	M 10 x 1.25	R 100	58	8
Nut, drive pulley on crankshaft .....	M 20 x 1.5	R 50 Znt (Crank- shaft Ch 70-50-03)	101	14
Nut, bearing to belt tensioner support .....	M 10 x 1.25	R 50 Znt (Stud R 100 Znt)	32.5	4.5
Nut, intake and exhaust manifold .....	M 8	R 50 Znt (Stud R 80 Znt)	22	3
Bolt, oil pump and fuel pump shaft driven gear ..	M 10 x 1.25	R 120	61	8.5
Nut, upper bracket to water pump .....	M 8	R 50 Znt (Stud R 80 Znt)	18	2.5
Nut, alternator to lower support .....	M 10 x 1.25	R 50 Znt (Bolt R 80 Znt)	36	5
Nut, alternator lower support to crankcase .....	M 10 x 1.25	R 50 Znt (Stud R 80 Znt)	36	5
Self-locking nut, alternator to upper bracket bolt .....	M 10 x 1.25	R 50 Znt (Bolt R 80 Znt)	36	5
<b>POWER PLANT MOUNTING</b>				
Nut for bolt rubber pad to crossmember, engine end .....	M 10 x 1.25	R 50 Znt (Bolt R 100 Cdt)	25.3	3.5
Bolt, crossmember, transmission end .....	M 8	R 100 Cdt	14.4	2
Nut, rubber pad to transmission assembly .....	M 8	R 50 Znt (Stud R 80 Znt)	18	2.5
Bolt, rubber pad to transmission assembly .....	M 8	R 80 Znt	18	2.5
Bolt, power plant anchor rod .....	M 8	R 50 Cdt	10.8	1.5
Bolt, rubber pad to crossmember .....	M 8	R 80 Znt	18	2.5

**Engine: Specifications**



22665

**LONGITUDINAL SECTION OF ENGINE THROUGH CYLINDERS**



22664

**CROSS SECTION OF ENGINE THROUGH CYLINDER**

## Power Plant Mounts

### POWER PLANT REMOVAL

Disconnect battery cables (in front luggage compartment).

Loosen fuel cap.

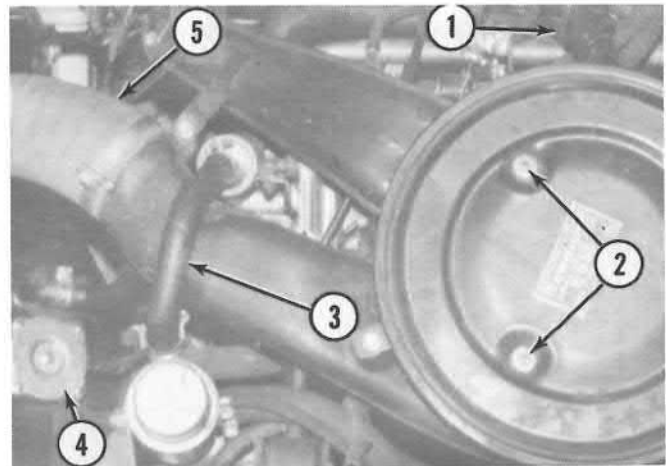
Drain cooling system. Remove cap (4) from expansion tank.

Disconnect hose (3) from air injection valve. Disconnect hose (1) from air cleaner. Loosen clamp holding fresh air duct (5) to fan.

Remove 3 nuts (2) and washers holding cover on air cleaner. Remove 4 nuts holding air cleaner on carburetor.

Remove nut holding bracket on air cleaner to engine. Disconnect hose from bottom of air cleaner. Remove air cleaner with fresh air duct.

1. Hose.    2. Nuts.    3. Hose.    4. Cap.  
5. Fresh air duct.



Disconnect hose (1) between air pump (2) and filter. Disconnect hose (3) from air pump.

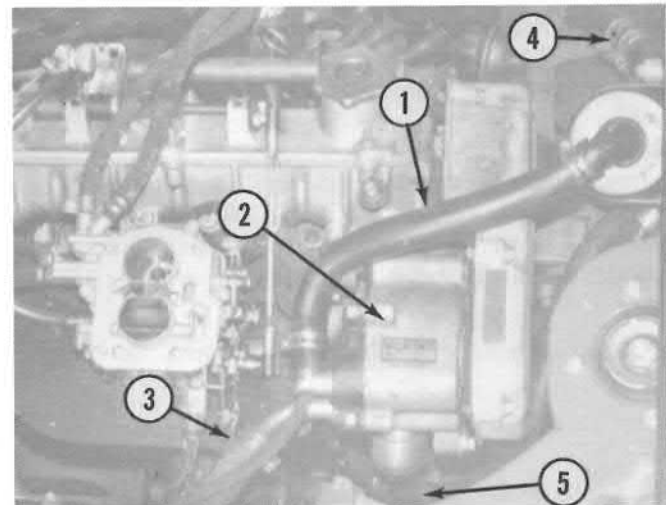
Separate heater return hose (5) at coupling joint (4).

Disconnect heater hose from pump.

Disconnect wires from alternator.

Remove 2 bolts holding louvered protection panel below carbon trap in rear firewall.

1. Hose.    2. Air pump.    3. Hose.    4. Coupling.  
5. Heater Hose.



Disconnect choke linkage (2) from carburetor.

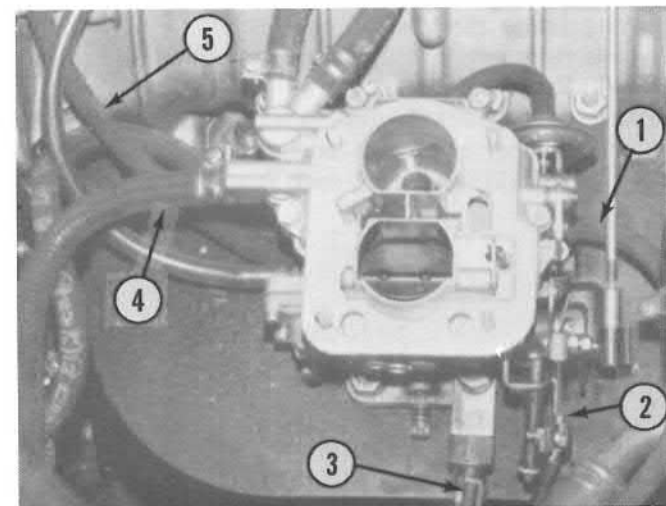
Disconnect hoses (1 and 5) from carburetor base.

Disconnect wires (3) from carburetor. Disconnect vent hose (4) from carburetor.

Disconnect wires from coil to distributor at distributor.

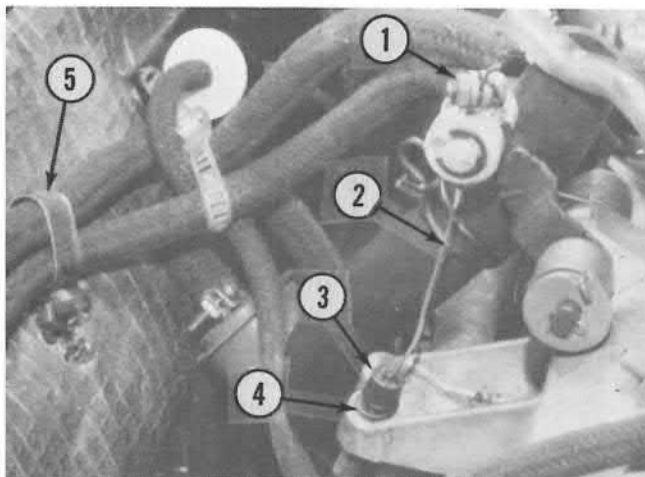
Disconnect wires from oil pressure and water temperature sending units. Disconnect wires from starter.

1. Hose.    2. Choke linkage.    3. Wires.    4. Vent hose.  
5. Hose.



Remove clamp (5) holding fuel lines to firewall. Disconnect fuel feed and return hoses from firewall. Remove stop bolt (1) from accelerator cable (2). Slide seal (3) off cable. Remove retainer clip (4) from cable sheath. Remove cable from support.

1. Stop bolt.
2. Accelerator cable.
3. Seal.
4. Retainer clip.
5. Clamp.

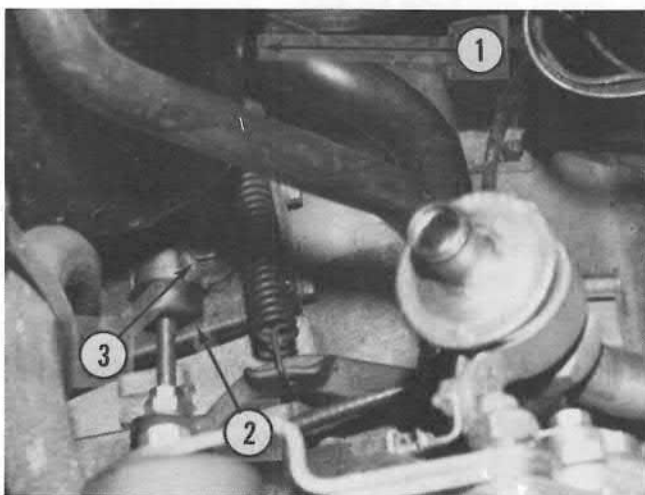


Remove bolts holding expansion tank (1) at top and bottom. Lift tank and allow water to drain into engine. Disconnect hoses from tank at thermostat. Remove tank.

Disconnect 2 hoses from thermostat.

Remove cotter pin holding rod from operating cylinder in clutch shaft. Loosen 2 bolts (3) holding operating cylinder (2) to transmission. Open bleed screw on cylinder and allow rod to retract. Swing cylinder out of way.

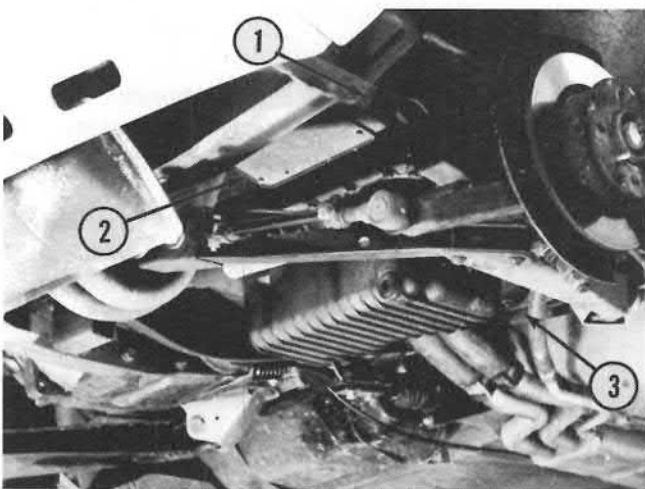
1. Expansion tank.
2. Operating cylinder.
3. Bolt.



Working under the car;

Remove remaining bolt holding louvered panel in rear firewall. Remove panel.

Remove heat shield (2) behind alternator. Remove 3 panels (3) from bottom of engine compartment. Remove panels (1) inboard of each rear wheel.



1. Wheel panels.
2. Heat shield.
3. Engine panel.

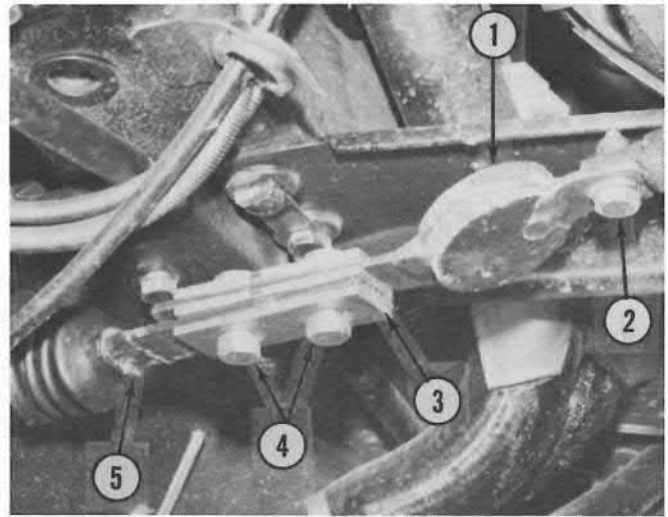
## Power Plant Mounts

Drain transmission/differential.

Disconnect connectors for back-up light and seat belt interlock system. Remove clamps as necessary to allow wires to come out with engine.

Loosen nurlled nut on speedometer cable. Remove cable from differential. Secure cable out of way. Remove bolts (4) holding gearshift linkage (3) to shifting tube (5). Loosen bolt (2) at transmission end of flexible link (1). Swing link to side.

1. Flexible link.    2. Bolt.    3. Gearshift linkage.  
4. Bolts.    5. Shifting tube.



Remove bolt holding ground strap (6) at body.

Straighten tabs on exhaust manifold flange.

Remove 4 nuts and locktab plates.

Remove 2 bolts (1) from upper bracket (4) at left end of muffler (2).

Remove 2 nuts holding center support (3) for muffler to crossmember. Remove muffler.

Remove 2 nuts and bolt holding upper bracket (4) to differential case. Remove bracket.

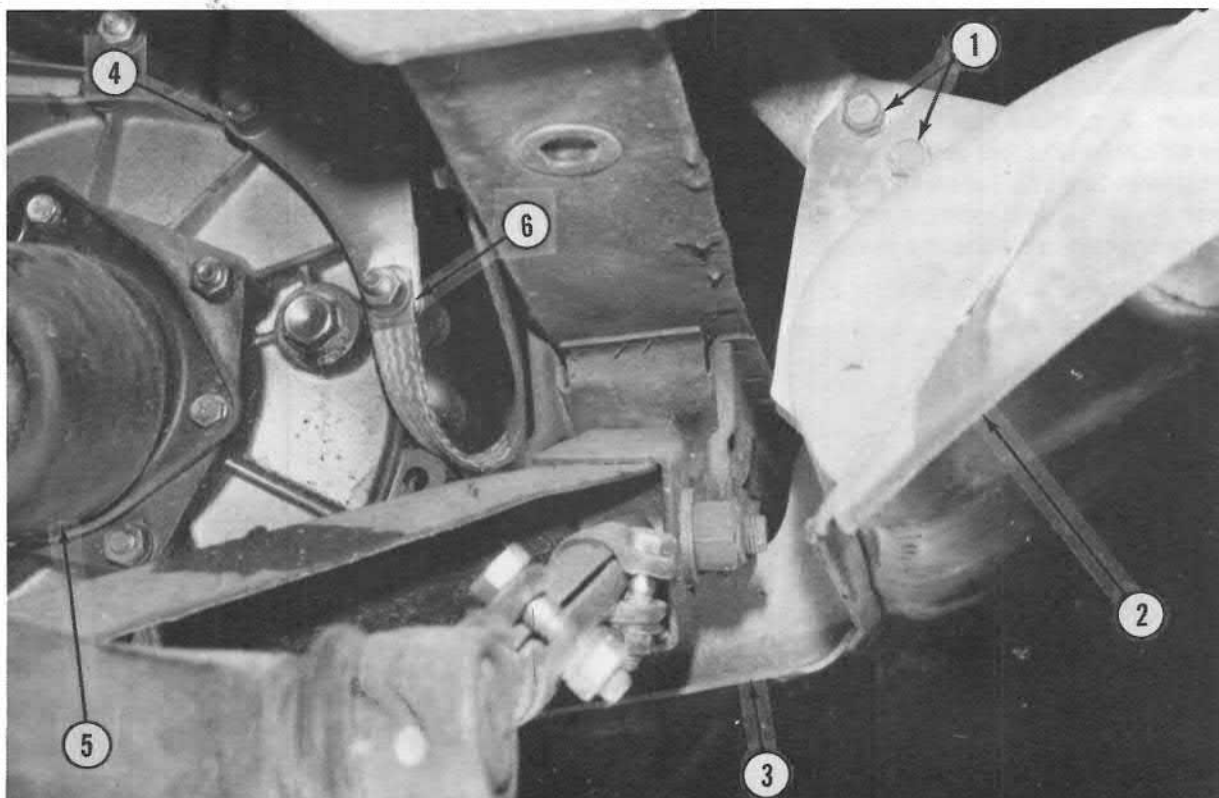
Remove 3 bolts holding retaining ring for axle boot (5) on left side.

Remove 3 bolts holding retaining ring for axle boot on right side.

Slide boots away from differential. Drain excess oil.

CAUTION: Be careful of sharp edges on sheet metal.

1. Bolts.    2. Muffler.    3. Center support.    4. Upper bracket.    5. Axle boot.    6. Ground strap.





Remove nut securing bracket for hand brake cable (7) at forward end of each suspension control arm (3). Record number of shims (4) at each suspension control arm (3) mounting point.

Remove 4 bolts (6), nuts, and shims (4) securing control arms (3) to body. Swing arm downward out of their brackets (5).

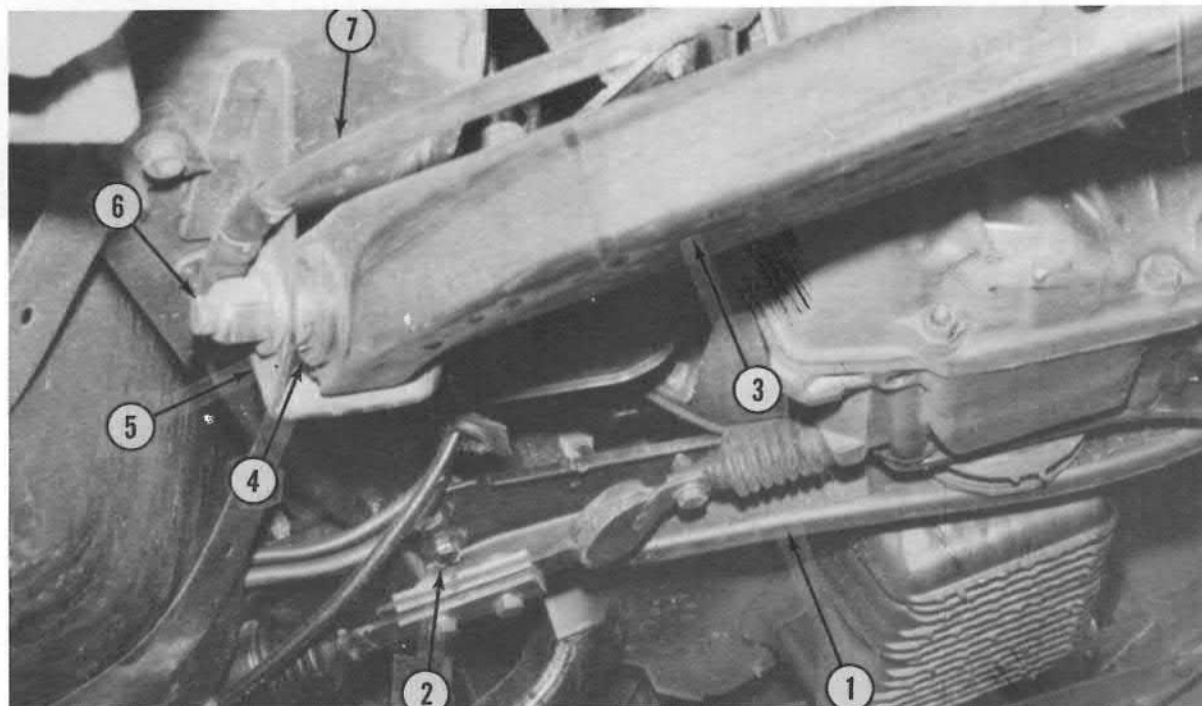
Move control arms away from differential until axles are free of differential. Secure axles to control arms. NOTE: The suspension assemblies may be removed by removing wheels and brake calipers and 3 nuts securing shock absorbers at top.

Straighten lock tabs on 2 bolts (2) on each end of lower crossmember (1). Loosen the bolts.

Lower car until engine is resting on a support.

Remove bolts thru lower crossmember (1).

1. Crossmember. 2. Bolts. 3. Control Arm. 4. Shims. 5. Bracket 6. Bolts. 7. Handbrake cable.

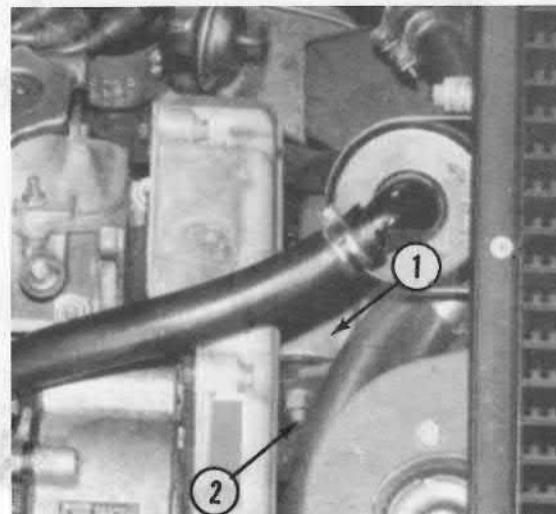
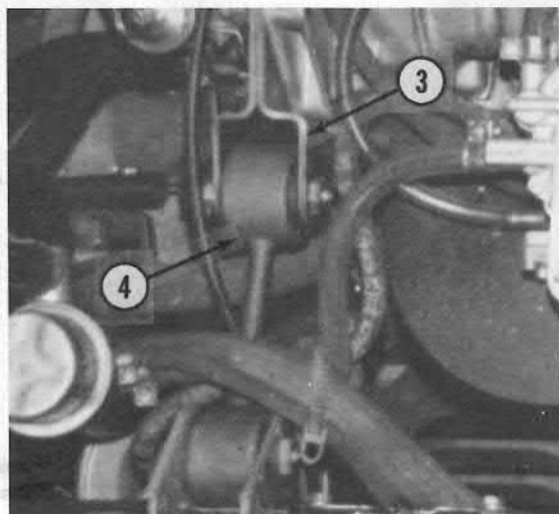


From above, disconnect reaction rod (4) from bracket (3) on engine.

Remove bolt thru (2) front engine mount (1). Raise car slightly and rock engine transmission assembly to clear front engine mount (1). Carefully raise car while supporting engine.

To reinstall power plant, reverse removal procedures. Refer to Tightening Reference for torque values. Fill up transmission and cooling system. Run engine and check for leaks.

1. Front engine mount. 2. Bolt. 3. Bracket. 4. Reaction rod.



## Crankcase and Cylinder Head

### CYLINDER HEAD

#### REMOVING CYLINDER HEAD

(Engine IN CAR)

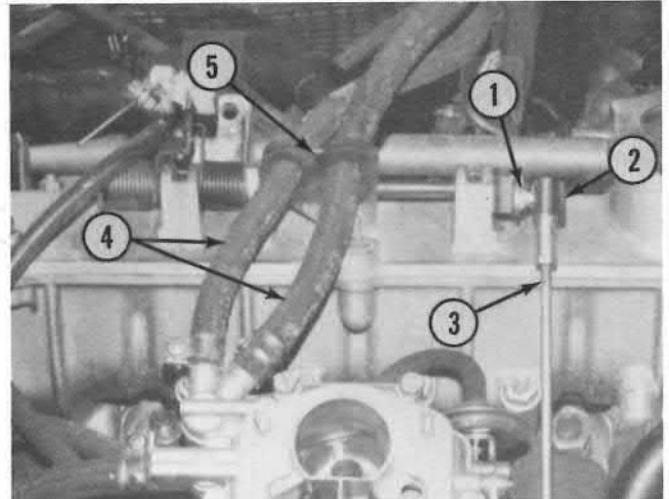
Drain cooling system. Remove air cleaner.

Disconnect 2 fuel hoses (4) from carburetor.

Pull hoses and grommets out of bracket (5).

Slide spring clip (2) down off ball connector (1) for accelerator rod (3). Disconnect rod (3) from ball connector.

1. Ball connector.    2. Spring clip.    3. Accelerator rod.  
4. Fuel hoses.    5. Bracket.



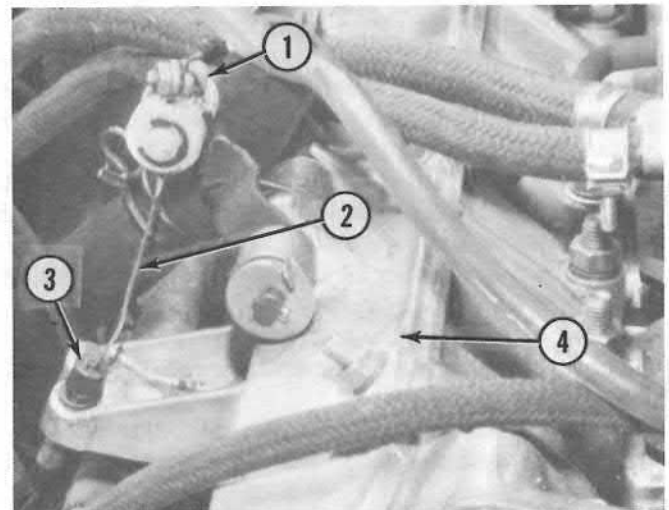
Disconnect spark plug cables.

Disconnect vacuum hose for distributor from fitting in head.

Remove stop bolt (1) from accelerator cable.

Slide seal (3) off cable (2). Remove clip holding cable on valve cover (4). Remove cable.

1. Stop bolt.    2. Cable.    3. Seal.    4. Valve cover.

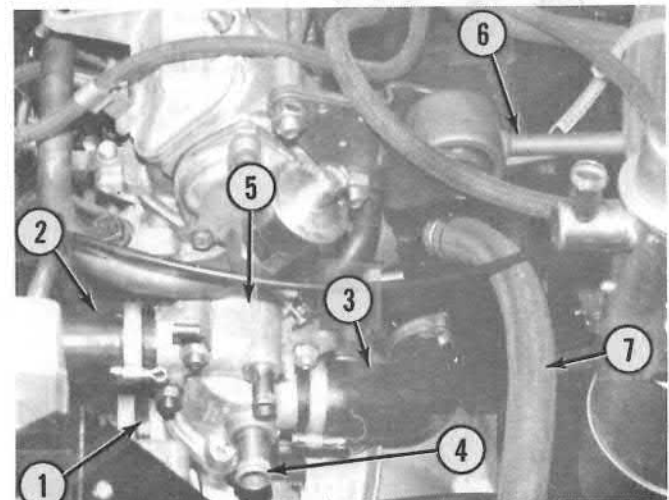


Disconnect water outlet hose (1), inlet hose (2), pump-to-union hose (3), and expansion tank hose (4) from union (5).

Remove bolt holding reaction rod (6) in bracket. Move rod out of way.

Disconnect hose (8) from exhaust shroud.

1. Outlet hose.    2. Inlet hose.    3. Pump-to-union hose.  
4. Tank hose.    5. Union.    6. Reaction rod.  
7. Hose.



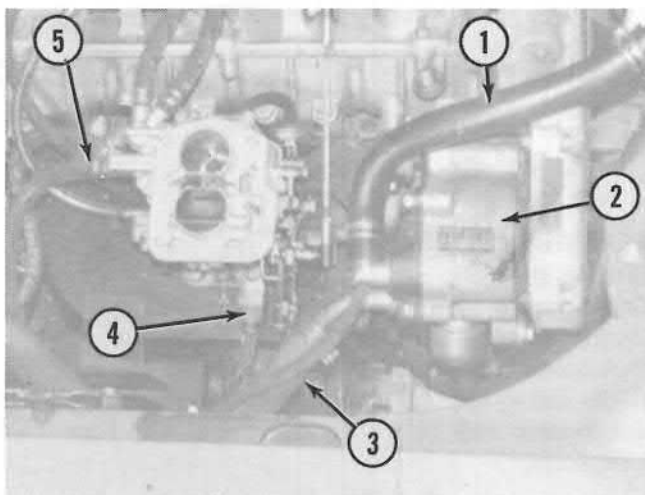
Disconnect wires to thermostatic switch (4) on carburetor.

Disconnect evaporative hose (5) from carburetor.

Disconnect hoses (1 and 3) from air pump (2).

Disconnect exhaust muffler from flange on exhaust manifold.

1. Hose. 2. Air pump. 3. Hose.  
4. Thermostatic switch. 5. Hose.



Remove bolts and washers holding timing cover (1). Remove right lower guard from under engine.

Remove lower bolt holding cover. Remove cover (1).

Loosen lower bolt on alternator (5). Loosen bolt thru alternator adjusting bracket (6). Remove alternator and water pump drive belt (4).

Remove 2 bolts thru rear of air pump (8) and support brackets (7). Loosen bolt thru top of air pump. Move pump and remove drive belt.

Loosen nut on tensioner pulley (2). Remove timing belt (3).

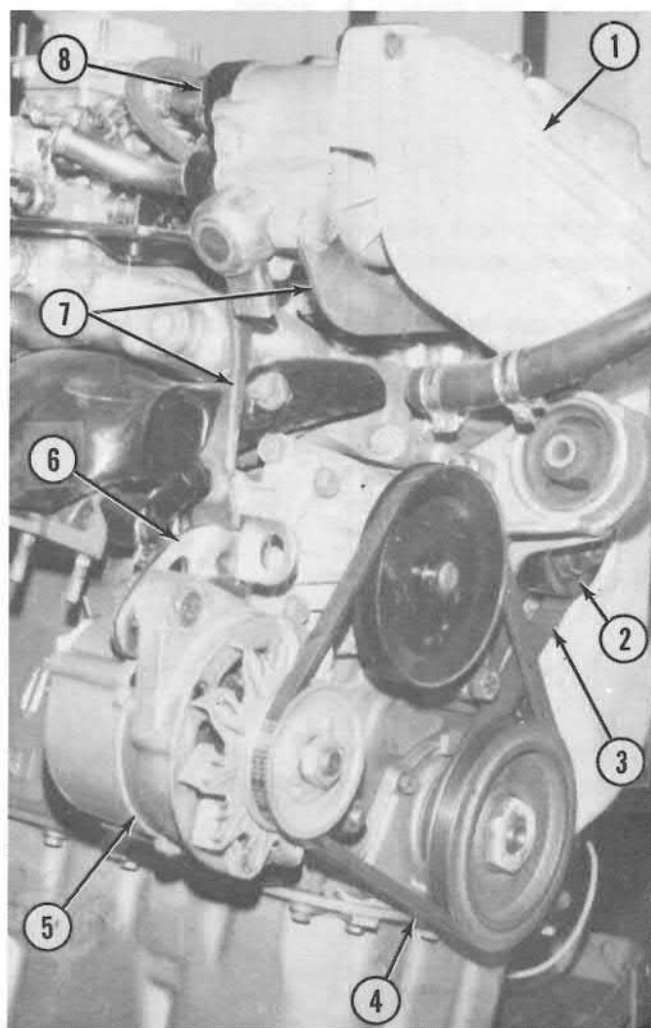
Remove lower bolt thru belt guard.

Remove cylinder head to crankcase bolts and nuts.

Remove cylinder head.

NOTE: Remove carburetor, intake, and exhaust manifolds with cylinder head. Remove these from head on bench.

1. Timing cover. 2. Tensioner pulley. 3. Timing belt.  
4. Drive belt. 5. Alternator. 6. Bracket.  
7. Brackets. 8. Air pump.

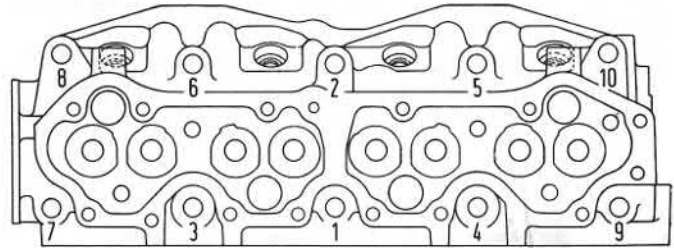


## Crankcase and Cylinder Head

To reinstall head, reverse removal procedures. Always use a new gasket between head and crankcase. Refer to Tightening Reference for torque values. Torque cylinder head bolts and nuts in sequence shown in two steps;

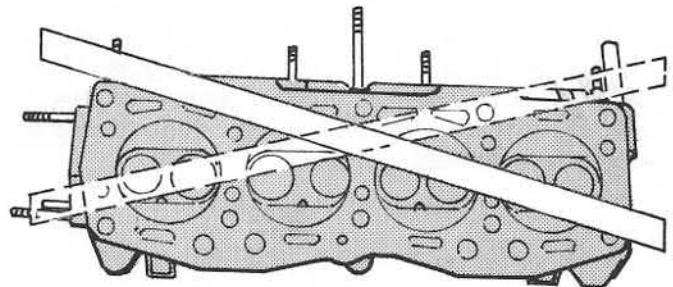
1st step—torque to about 29 ft. lbs.

2nd step—torque to 61.5 ft. lbs.



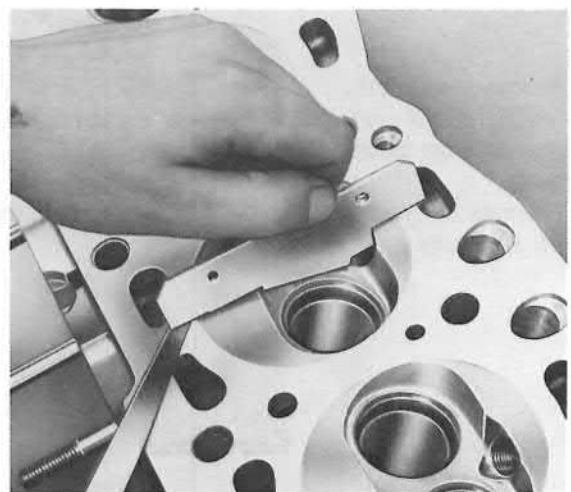
### CHECKING CYLINDER HEAD GASKET SURFACE

Using a straightedge, check the head for distortion. Lay the straightedge across the diagonals of the gasket surface and also lengthwise in the middle. The gap between the head and the straightedge must not exceed 0.002 inch. If gap exceeds this reface the cylinder head gasket surface. Do not remove more material than necessary. Check depth of combustion chambers to make sure it has not been reduced below allowable limits.



### CHECKING DEPTH OF COMBUSTION CHAMBERS

Place gauge A.96216 in center of combustion chamber. Check gap between gauge and head gasket surface. Use a feeler gauge. Gap should not exceed 0.01 in. (0.25mm).

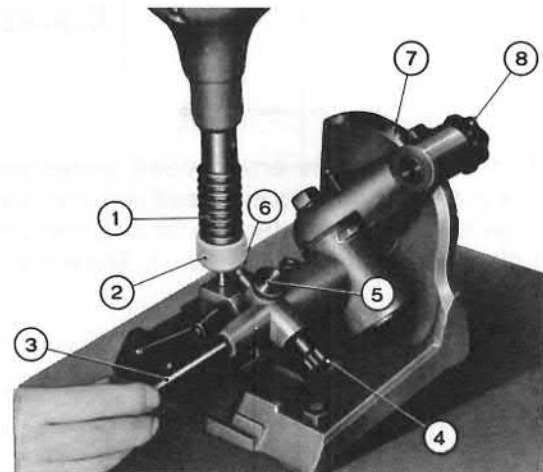


## INSPECTING AND REFACING VALVE SEATS AND VALVES

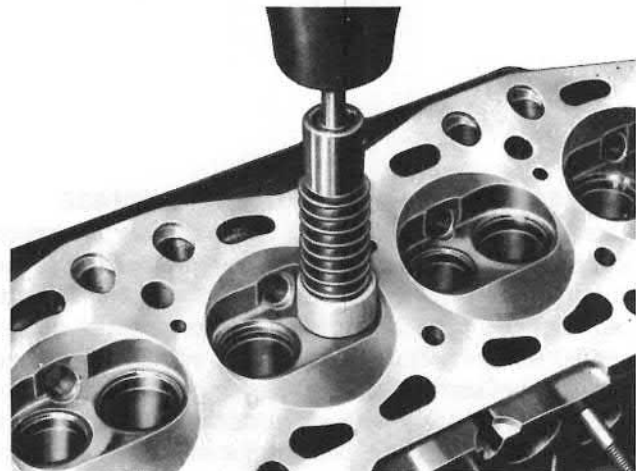
The valve seats in cylinder head must not have evidence of pitting on contact face. If pitted, they must be refaced as follows:

Make sure grinding stones have a taper of  $45^\circ \pm 5'$ . If necessary, dress grinding stones.

1. Mandrel.
2. Stone.
3. Control lever.
4. Tool feed knob.
5. Lock screw.
6. Tool.
7. Graduated scale.
8. Angle adjustment knob.



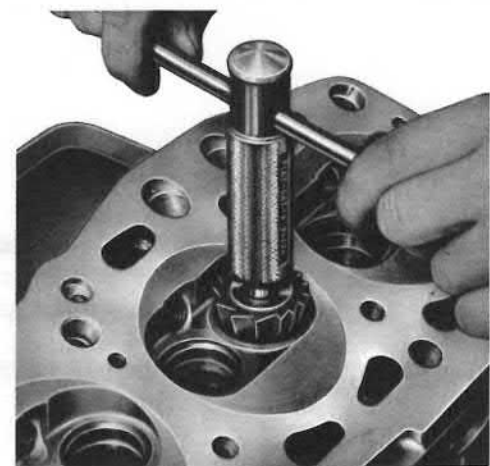
Select a pilot which has minimum clearance between it and valve guide. Place pilot in valve guide. Place stone in mandrel. Place mandrel in grinder. Grind valve seats. Make sure grinder is not turned on with stone in contact with seat.



### Narrow seat width.

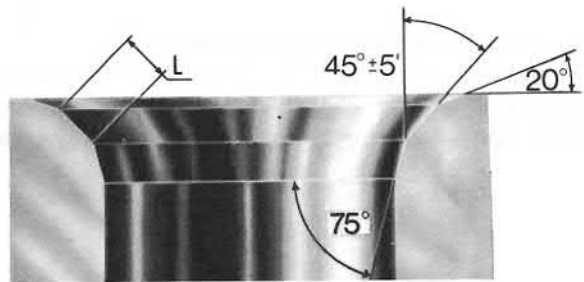
Install a  $20^\circ$  valve seat reamer on mandrel. Insert mandrel on pilot. Turn on grinder. Carefully narrow seat.

Remove  $20^\circ$  reamer. Install  $75^\circ$  reamer. Turn on grinder. Carefully narrow seat.

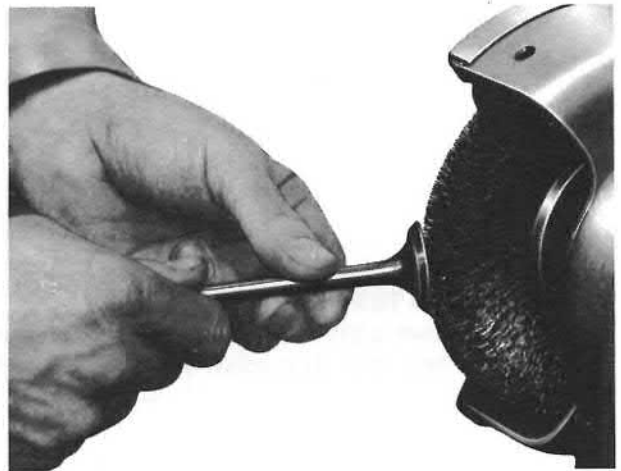


## Crankcase and Cylinder Head

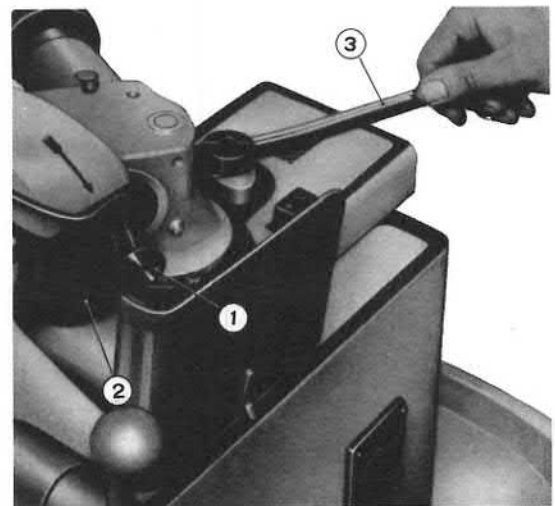
Use both 20° and 75° reamers alternately until seat width of about 0.0787 in. (2mm) is obtained.  
L = 0.0787 in. (2mm).



Valve stem must not be distorted or cracked. If necessary replace valve.  
Clean carbon from valves. Use wire brush.

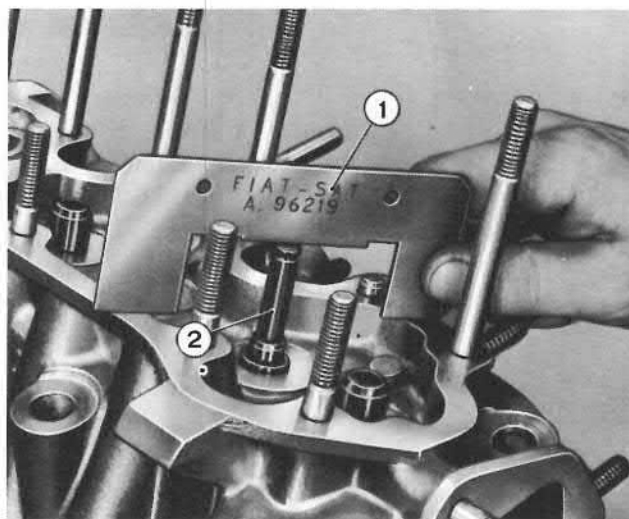


If valve face is worn or damaged, reface valves.  
Install valve in grinder. Set grinder for the specified angle of 45° 30' ± 5' upon completion of grinding.  
Remove only enough material to true up surfaces.  
After refacing, check that the thickness of valve at edge of head is not less than 0.02 in. (0.5mm).  
If necessary to grind valve stem tip to remove traces of dishing, remove only what is strictly necessary.



1. Valve. 2. Grinding stone. 3. Control lever.

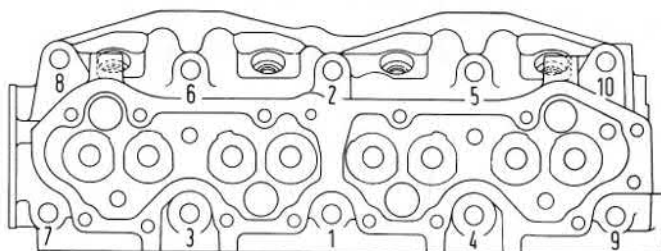
Install valves in seat in cylinder head.  
Using gauge A.96219, check that stem tip just touches control surface of gauge. If there is interference between stem and gauge reduce stem height by grinding.



1. Gauge.    2. Valve stem.

#### CYLINDER HEAD TORQUEING SEQUENCE

Torque hold down bolts and nuts in sequence shown.  
Torque bolts and nuts in gradual steps to 69 ft. lbs.  
(9.5kgm).



## Crankcase and Cylinder Head

### CRANKCASE

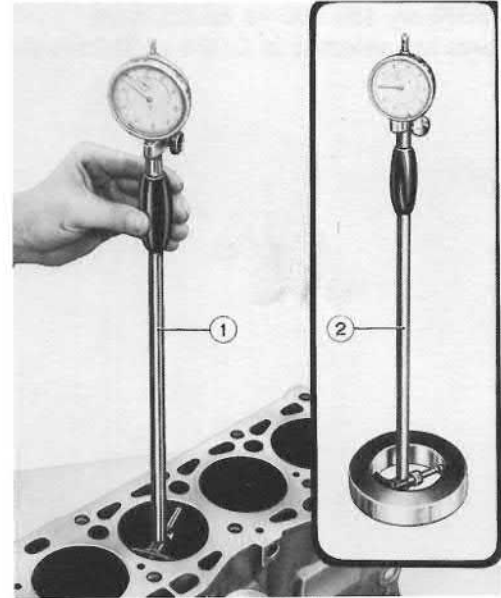
#### CRANKCASE

##### Checking Cylinder Bores

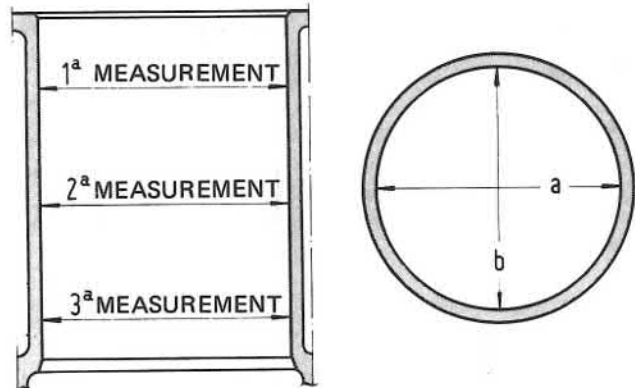
Carefully examine cylinder bore surface. If only slight scoring or scratches are found, dress bores. Use extra fine emery cloth wrapped around a hone.

Make sure piston clearance in bore does not exceed 0.006 in. (0.15mm).

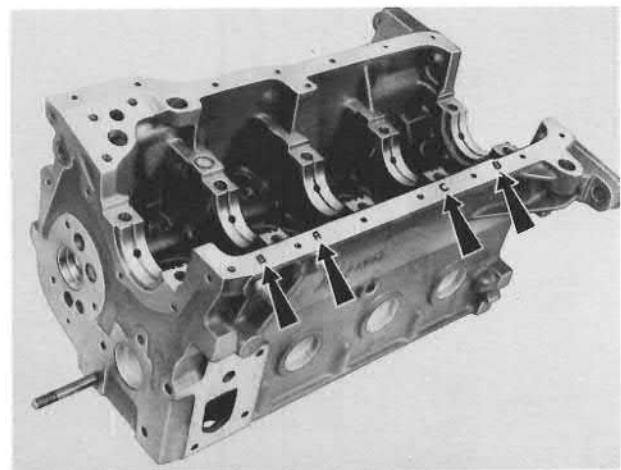
1. Dial gauge.
2. Ring gauge.



Zero dial indicator using ring gauge A.96139.  
Check cylinder bores at three points both lengthwise and crosswise.

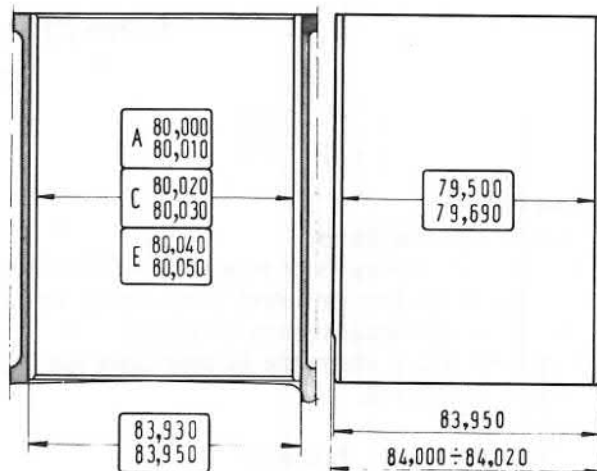


The bore class is indicated by letters stamped on the bottom of crankcase.

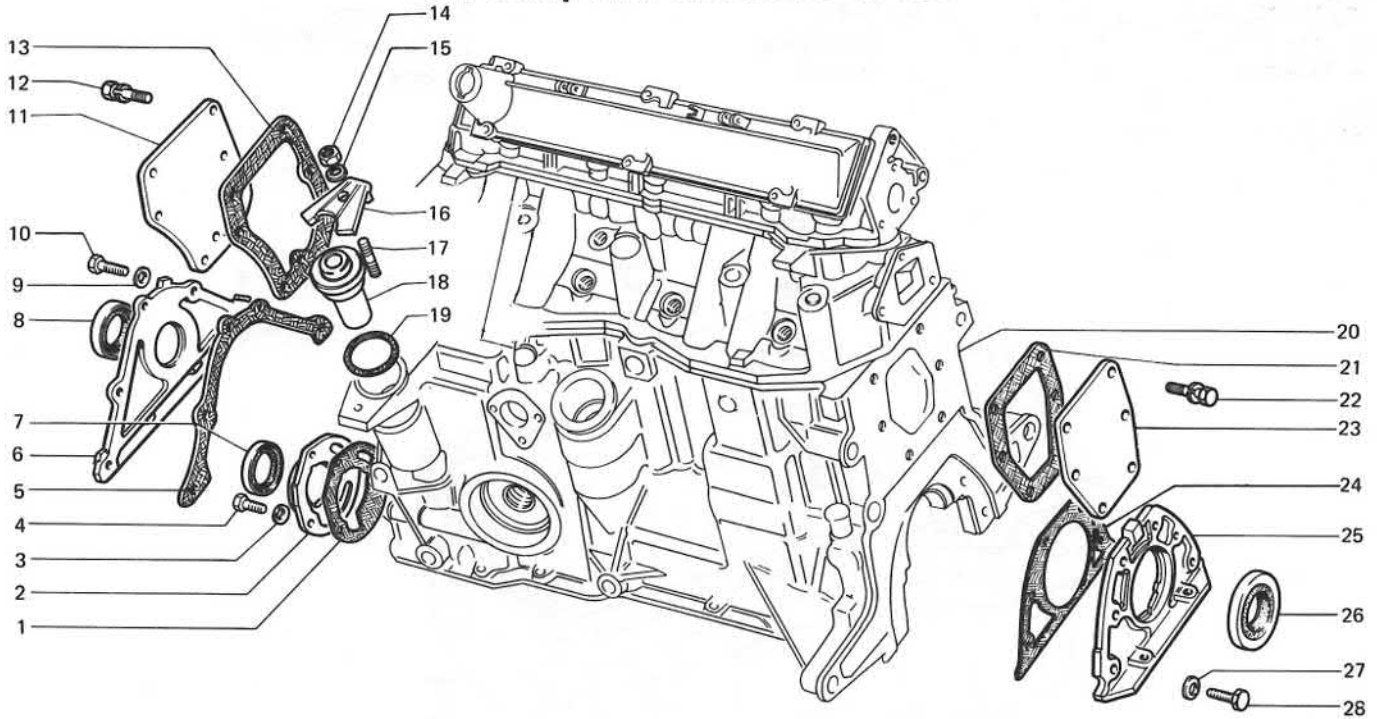




Cylinder bore diameter may vary from 3.3858 to 3.3878 in. (86.000 to 86.050mm).  
 Bores are selected in 0.004 in (0.01mm) classes.



### Oil Sump and Crankcase Covers

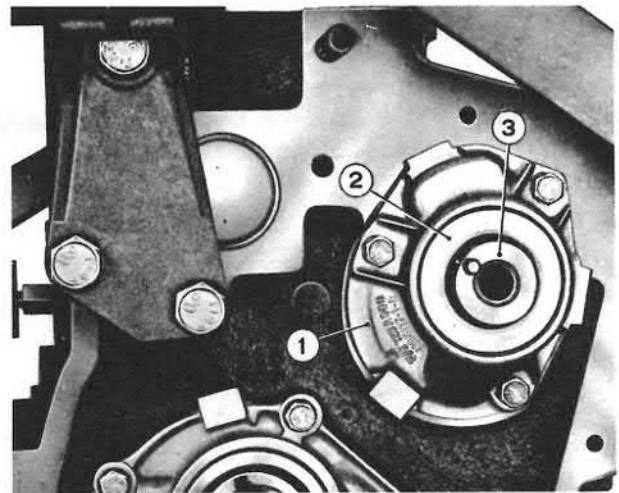


#### CRANKCASE COVERS

- |           |                     |                     |
|-----------|---------------------|---------------------|
| 1. Gasket | 11. Cover           | 20. Crankcase       |
| 2. Cover  | 12. Bolt and washer | 21. Gasket          |
| 3. Washer | 13. Gasket          | 22. Bolt and washer |
| 4. Bolt   | 14. Nut             | 23. Cover           |
| 5. Gasket | 15. Washer          | 24. Gasket          |
| 6. Cover  | 16. Bracket         | 25. Cover           |
| 7. Seal   | 17. Stud            | 26. Seal            |
| 8. Seal   | 18. Cover           | 27. Washer          |
| 9. Washer | 19. Gasket          | 28. Bolt            |
| 10. Bolt  |                     |                     |

#### Auxiliary shaft seal cover.

- |           |          |           |
|-----------|----------|-----------|
| 1. Cover. | 2. Seal. | 3. Shaft. |
|-----------|----------|-----------|

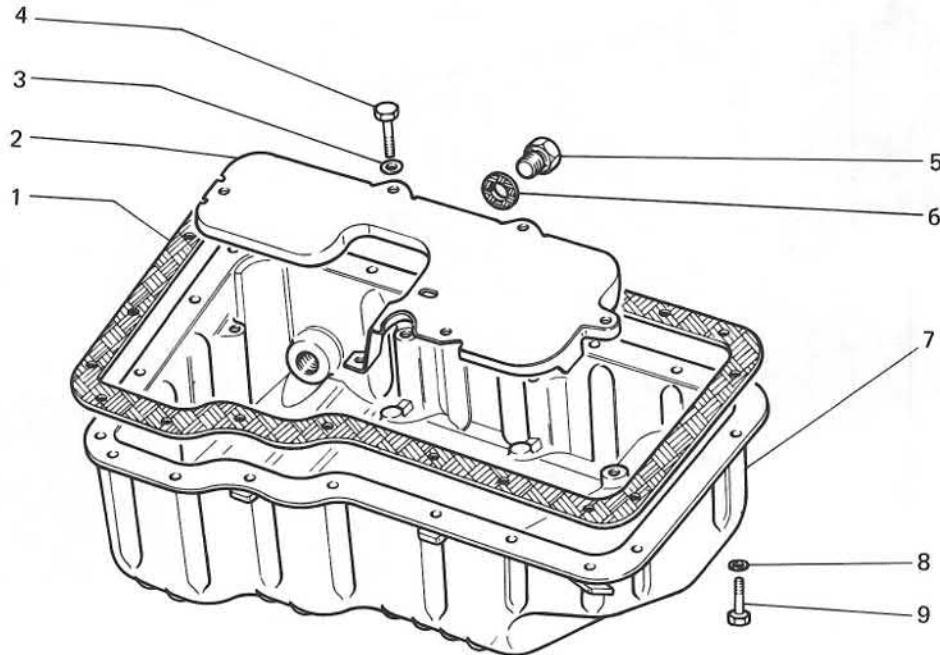


**OIL SUMP COVERS**

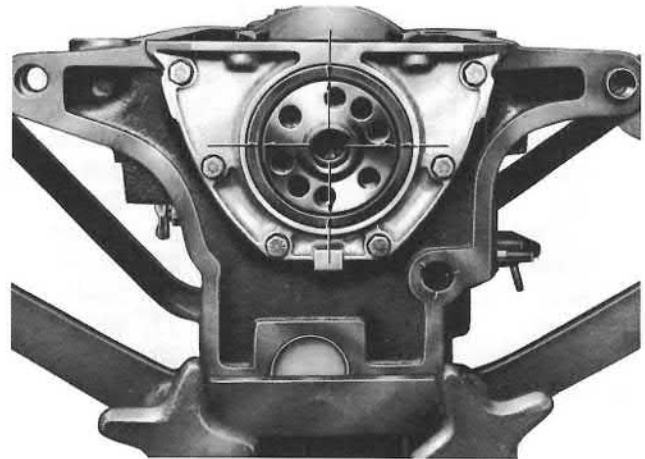
- 1. Gasket
- 2. Cover
- 3. Washer

- 4. Bolt
- 5. Drain plug
- 6. Gasket

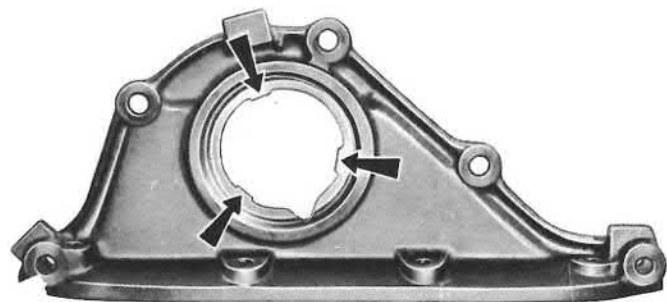
- 7. Oil sump
- 8. Washer
- 9. Bolt



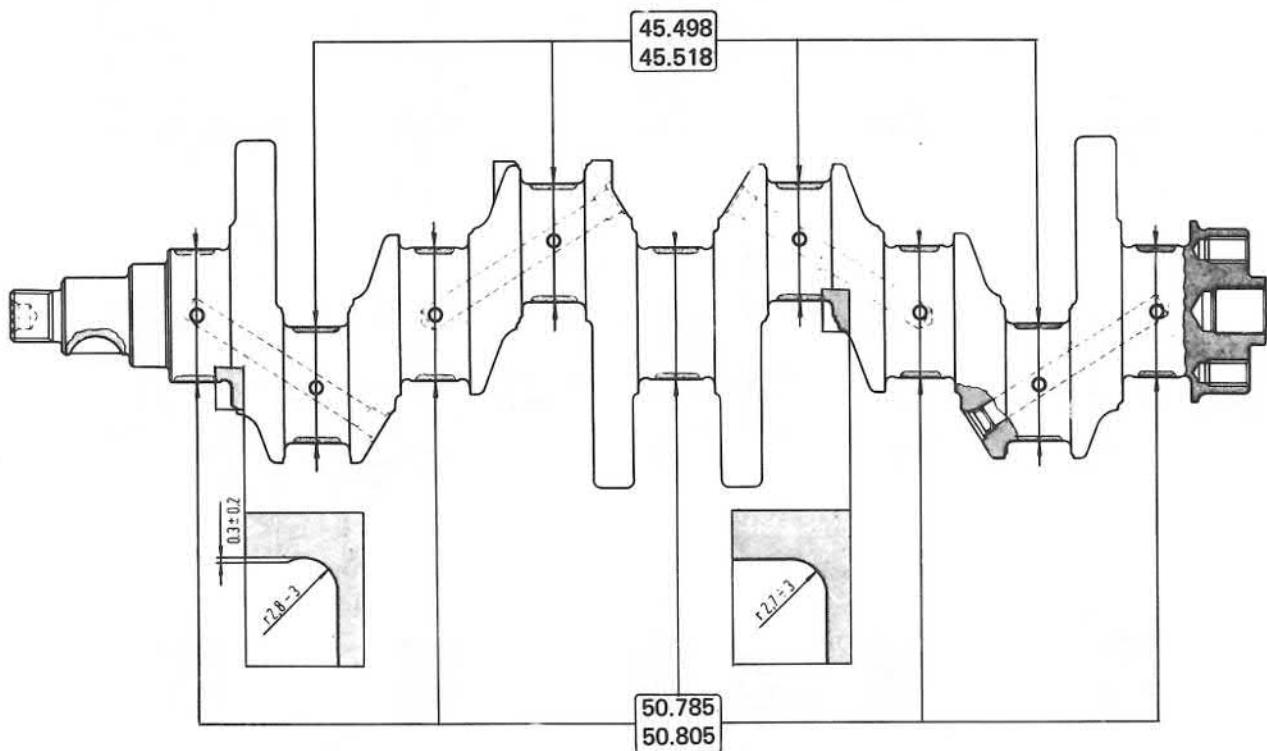
Crankshaft oil seal, flywheel end.  
 Arrows indicate that distance between cover gasket and crankshaft should be equal all around.



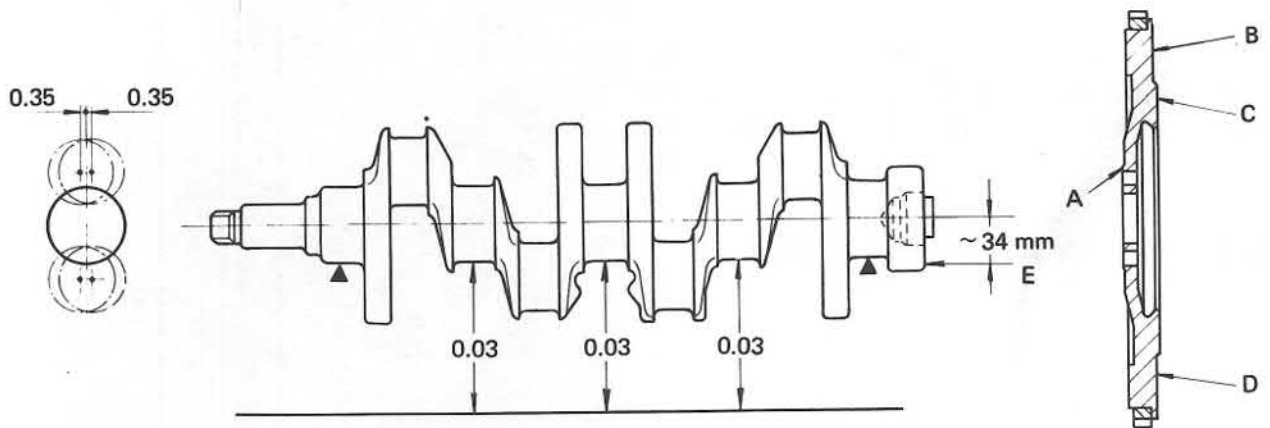
Crankshaft cover, timing gear end.  
 Arrows show indexes for checking centering of cover with respect to crankshaft.



### Crankshaft and Flywheel

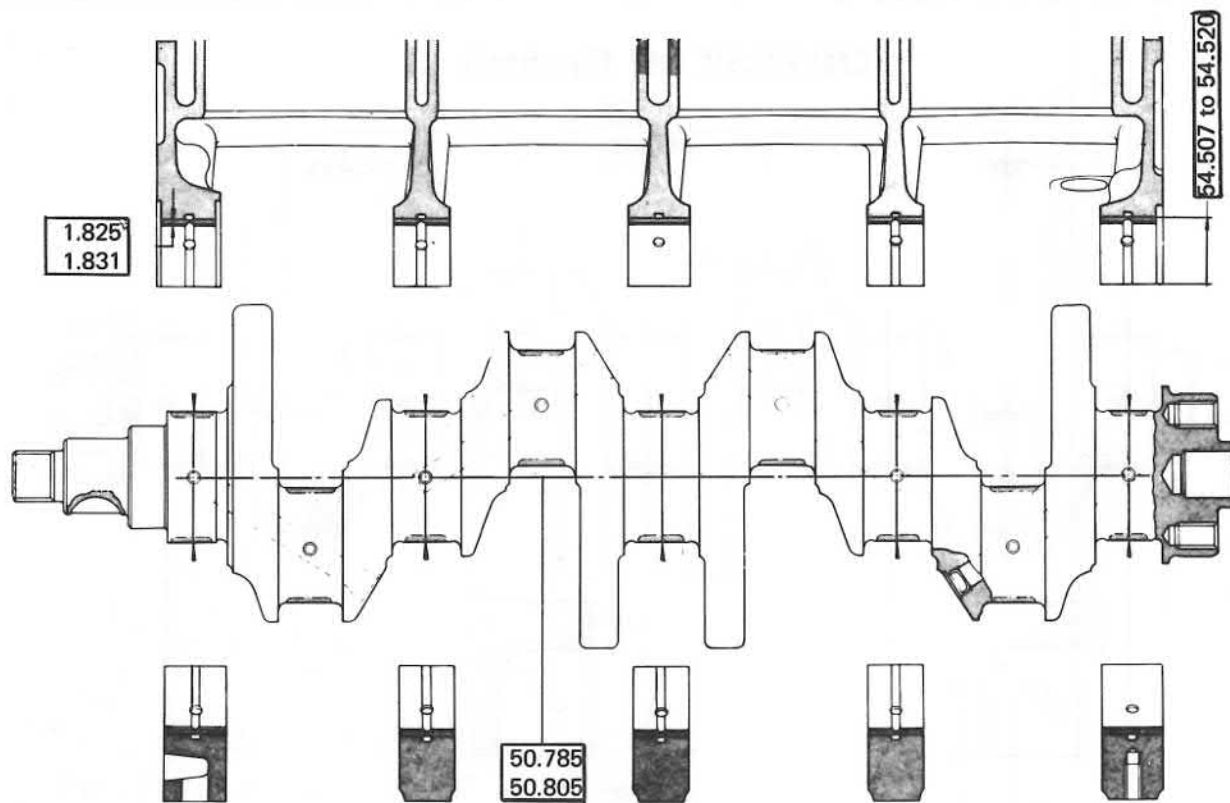


Main data of crankshaft journals, crankpins, and shoulder radius.



Maximum allowable misalignment of journals and crankpins, and diagram for checking flywheel contact surfaces with clutch disc and crankshaft flange.

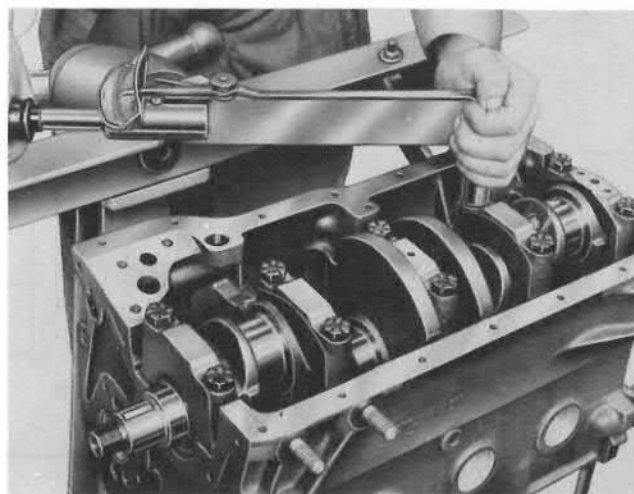
(A-B-C-E=points for checking alignment and squareness with respect to rotation axis; D=crankshaft-flywheel-clutch assembly balancing holes)



Main data of crankshaft journals, main bearings, saddle bores, and thrust rings

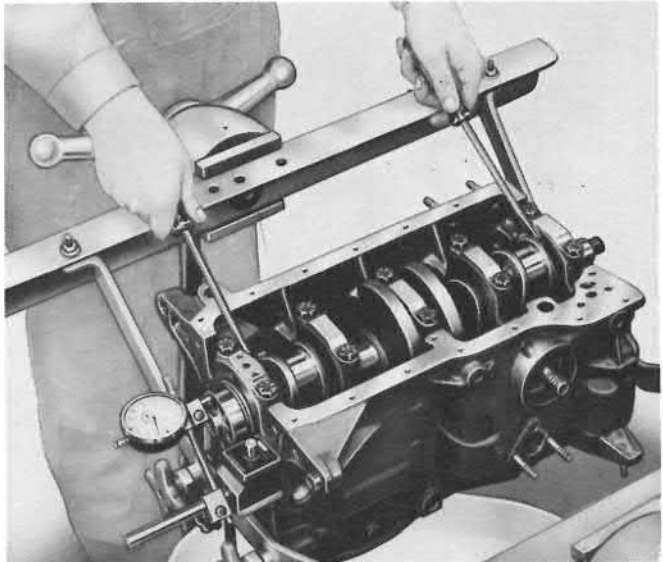
Clearance between crankshaft journals and bearing should be 0.0020 to 0.0037 in. (0.050 to 0.095mm)

Torque cap screws for main bearings to 58 ft. lbs (8kgm).



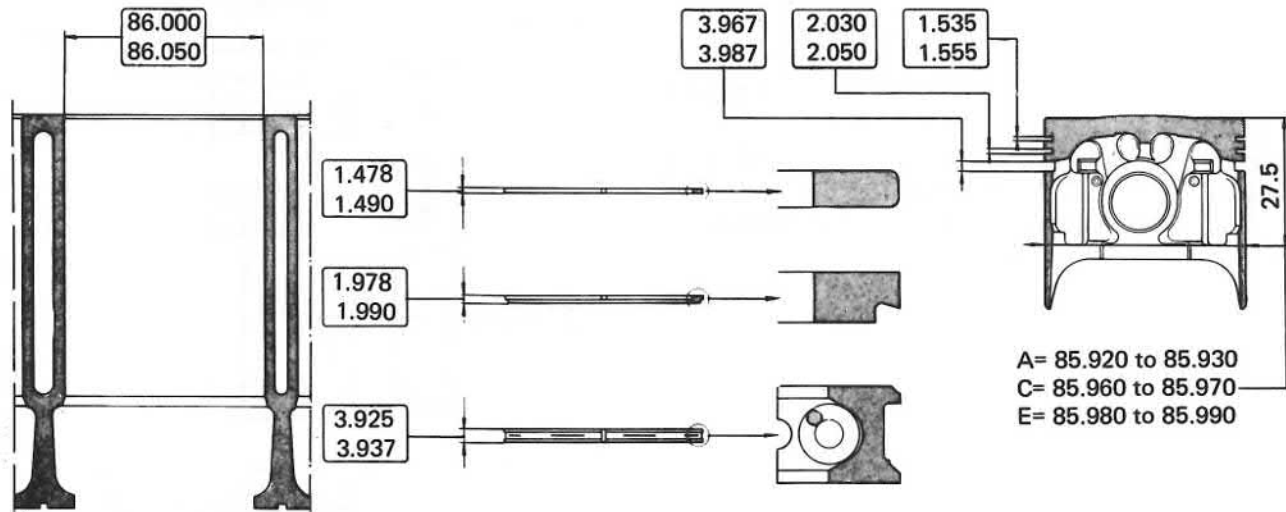
## Crankshaft and Flywheel

Check crankshaft end play.  
End play should be 0.0021 to 0.0104 in (0.055 to 0.265mm).  
If necessary, install oversize thrust rings.



## Connecting Rods and Pistons

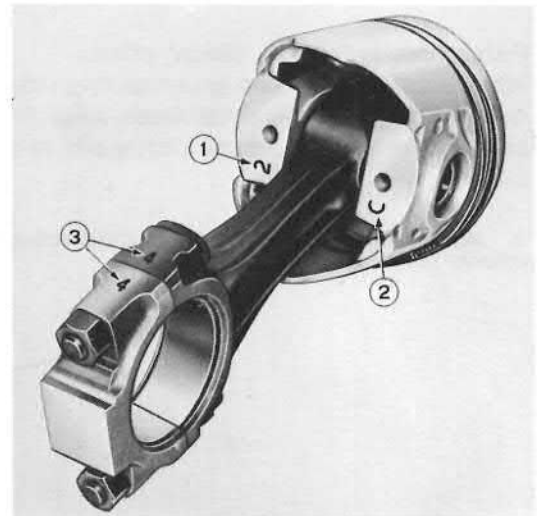
### PISTONS-CONNECTING RODS



Main data of cylinder bore, piston, and rings.

Piston class and piston bore class are identified by letter and number stamped on underside of piston bosses. Piston pin class is stamped on pin surface.

1. Piston boss bore class.
2. Piston class letter.
3. Matching number of connecting rod to cylinder.

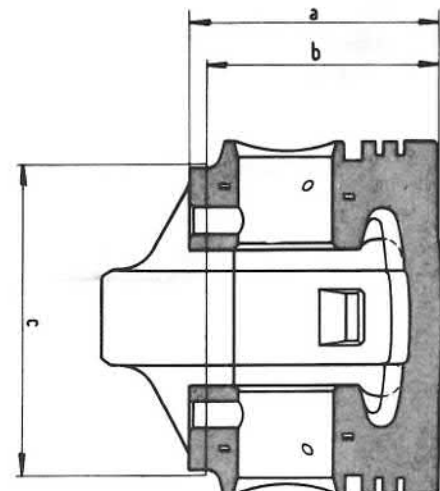


### CHECKS

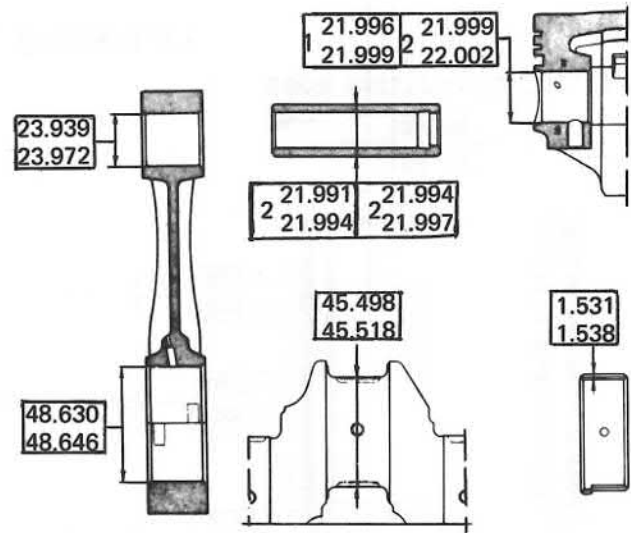
Before assembling, check weight of four pistons. Pistons must have same weight within  $\pm 0.088$  oz. ( $\pm 2.5$ g).

If necessary, remove metal from base of piston by milling. Maximum metal than can be removed is 0.177 in. (4.5mm). Milling diameter should be limited to 2.775 in. (70.5mm).

- a = 2.232 in. (56.70mm) nominal piston height.
- b = 2.055 in. (52.20m) minimum height after milling.
- c = 2.775 in. (70.50mm) maximum milling diameter.

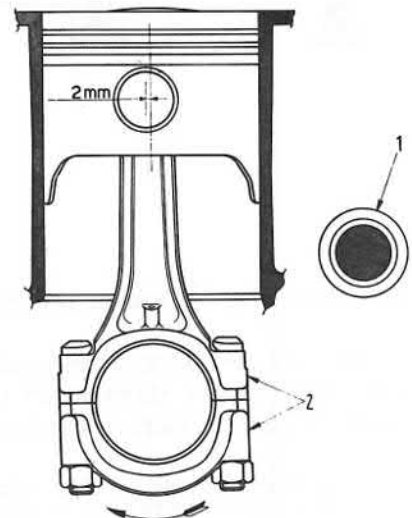


Piston pin clearance in boss bore is 0.0001 to 0.0003 in. (0.002 to 0.008mm).  
 Piston pin clearance in bushing in small end is 0.0004 to 0.0006 in. (0.010 to 0.016mm).  
 The fit clearance between crankpins and bearings is 0.0014 to 0.0034 in. (0.036 to 0.085mm).



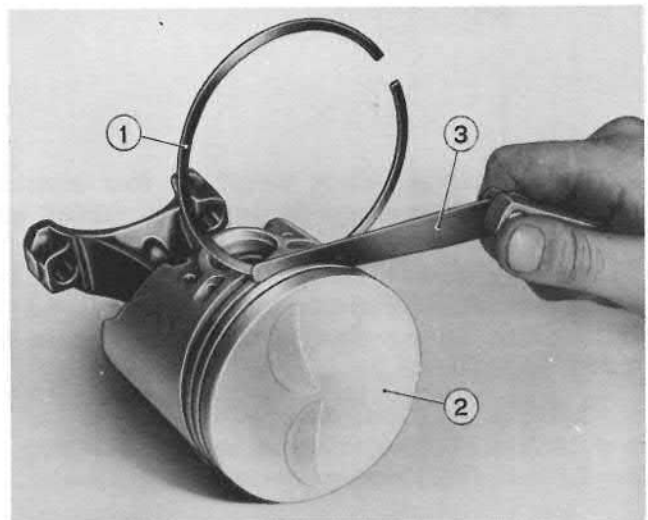
Piston bore is 0.08 in. (2mm) offset.  
 When assembling piston to connecting rod, make sure number on connecting rod faces away from side of piston bore offset. Secure piston pin in piston with lockring.

1. Auxiliary shaft.
2. Location of connecting rod to cylinder matching number.



Before installing rings on pistons, push rings down in groove. Check clearance with feeler gauge. See specifications.

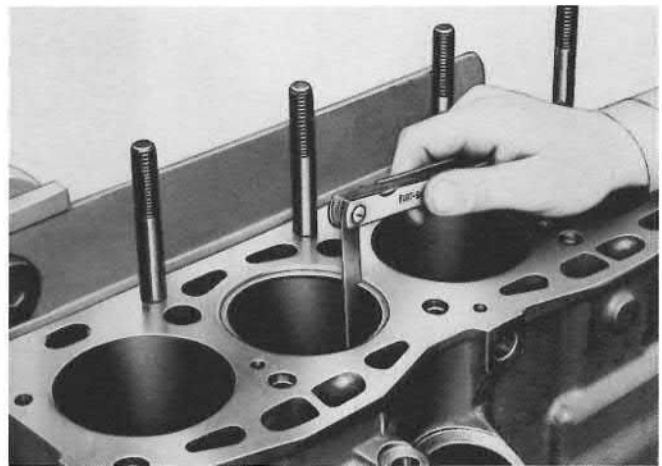
1. Ring.
2. Piston.
3. Feeler gauge.





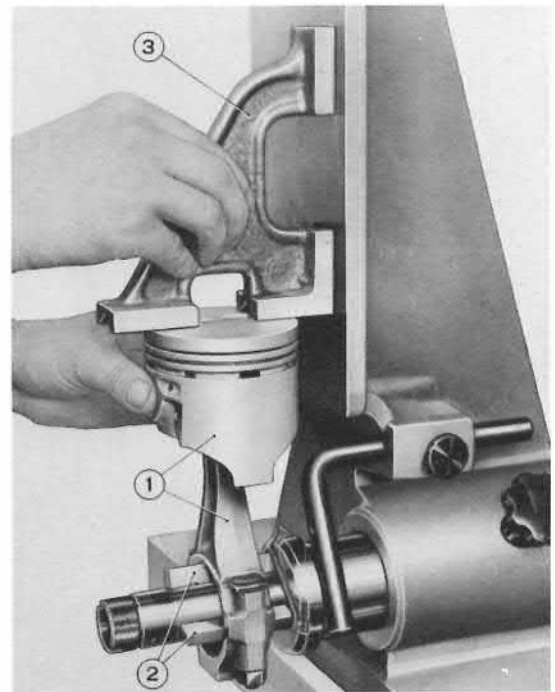
## Connecting Rods and Pistons

Push rings squarely into cylinder bores.  
Using feeler gauge, check ring end gap.  
See specifications.  
When installing rings, stagger end gaps 120° apart.

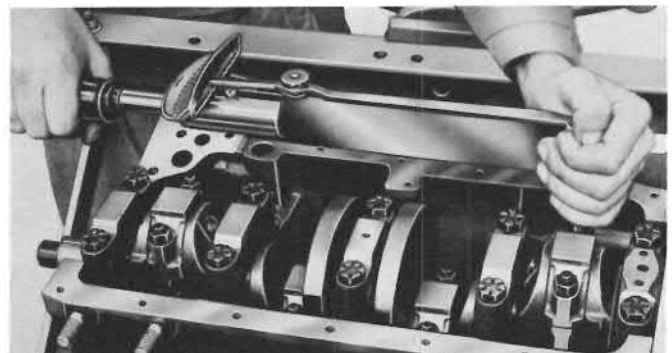


Before installing connecting rod-pin-piston assembly in cylinder, check alignment of big-end and small-end c/l's measured at 4.92 in. (125mm) from shank. Maximum allowable misalignment is  $\pm 0.0039$  in. ( $\pm 0.10$ mm).

1. Piston assembly.
2. Expansion blades.
3. Square gauge.



Install assemblies in cylinders according to number stamped on connecting rods and caps. Install them with numbers facing toward auxiliary shaft. Torque big-end cap nuts to 36 ft. lbs (5 kgm).





## Camshaft Mechanism

### REPLACING TIMING BELT

Set engine on T.D.C., firing on No. 4 cylinder. Check crankshaft pulley timing mark at T.D.C. on pulley cover. Check camshaft timing pulley mark aligned with cast finger of support, visible through hole in cover. Put car in 4th gear and apply hand brake.

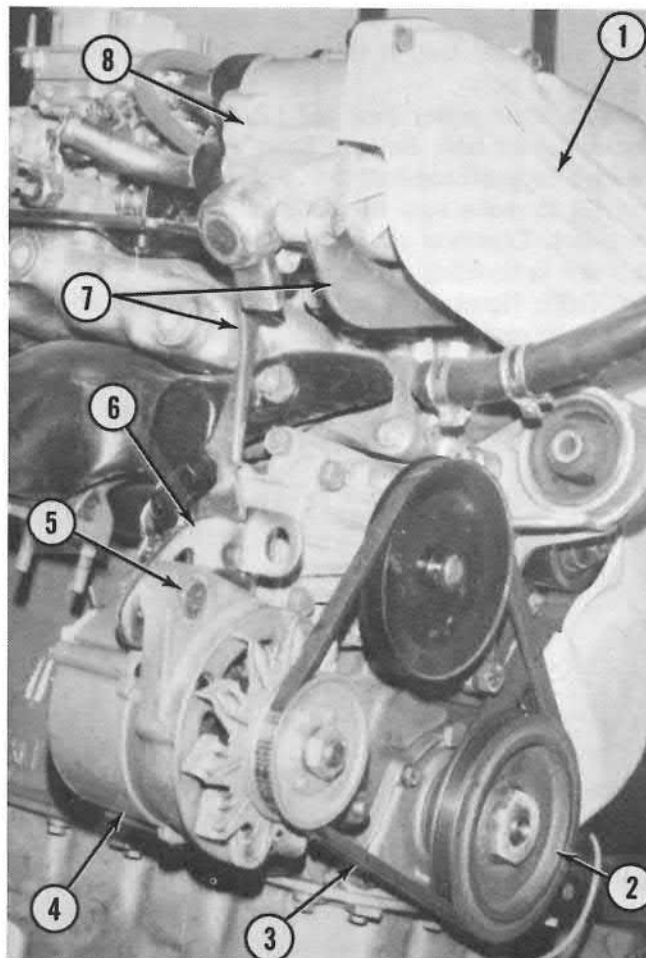
**CAUTION:** If cam is turned independently of engine, valves may hit pistons. This will result in engine damage.

Remove bolts and washers holding timing cover (1). Remove right guard from under engine. Remove lower bolt holding cover. Remove cover (1).

Loosen lower bolt on alternator (4). Loosen bolt (5) thru alternator adjusting bracket (6). Remove water pump and alternator drive belt (3). Remove water pump drive pulley (2) from crankshaft.

Remove 2 bolts thru rear of air pump (8) and support brackets (7). Loosen bolt thru top of air pump. Move pump and remove drive belt.

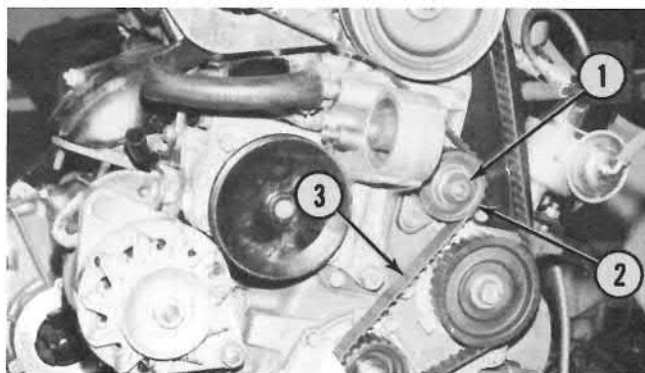
- |                  |                  |                       |
|------------------|------------------|-----------------------|
| 1. Timing cover. | 2. Drive pulley. | 3. Drive belt.        |
| 4. Alternator.   | 5. Bolt.         | 6. Adjusting bracket. |
| 7. Brackets.     | 8. Air pump.     |                       |



Remove cam cover. Check that cam lobes of No. 4 cylinder are pointing up. Remove distributor. Loosen idler pulley lock nut (1). Push in on support and tighten lock nut. Remove belt (3), starting at idler pulley (2).

Install new belt. Start at crankshaft pulley. Twist belt gently to position it around crankshaft pulley. Do not kink belt.

- |              |                  |                 |
|--------------|------------------|-----------------|
| 1. Lock nut. | 2. Idler pulley. | 3. Timing belt. |
|--------------|------------------|-----------------|

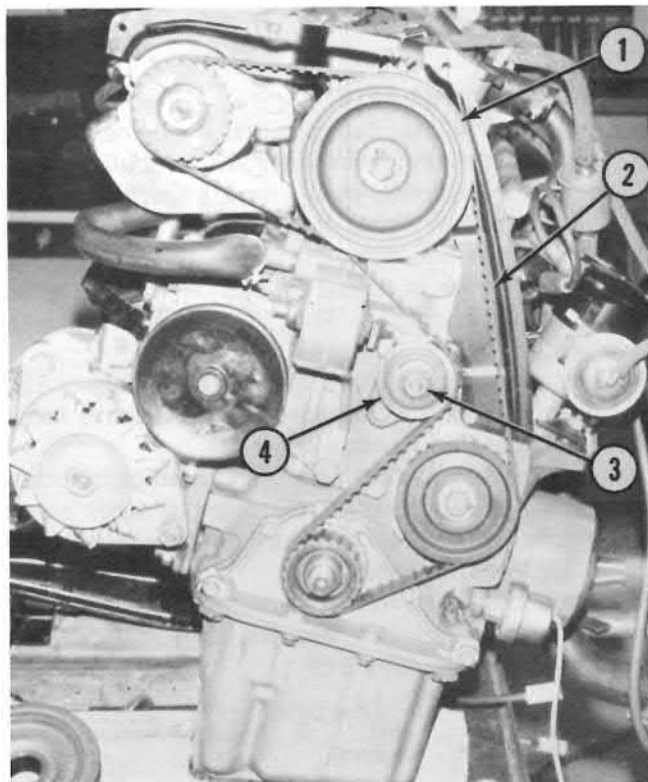


Keep slack out of belt. Slip belt (2) over camshaft pulley (1). Camshaft pulley may have to be turned slightly to align slots with belt cogs. Install belt on idler pulley (4) last. If this is difficult, recheck belt. Do not pry belt.

Release idler pulley lock nut (3) and retighten after tension is on belt. Release hand brake and push car forward (in gear) one-half turn. Release idler pulley lock nut (3) to make sure all slack is removed. Retighten lock nut. Continue pushing car forward until No. 4 cylinder is on firing stroke, cam lobes up.

**CAUTION:** Never push car backward in gear or allow engine to rock backward while pushing car. Slack will develop in belt, allowing belt to jump timing.

1. Camshaft pulley.    2. Belt.    3. Lock nut.  
4. Idler pulley.



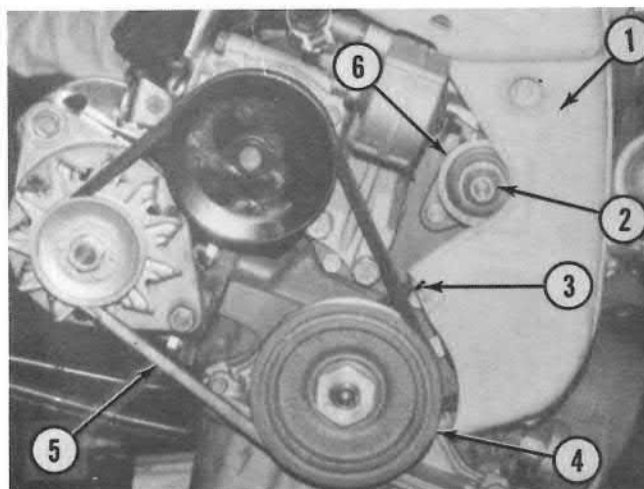
Place belt cover on car. Make sure crankshaft timing mark is on T.D.C. (3). Check that camshaft mark is exactly on pointer. If good, torque nut (2) on tensioner pulley (6) to 32.5 ft. lbs.

Install pulley (4) on crankshaft. Install drive belt (5) on air pump. Install drive belt (5) for water pump and alternator. Adjust belt tension.

Install timing gear cover (1). Install lower right guard. Install cam cover.

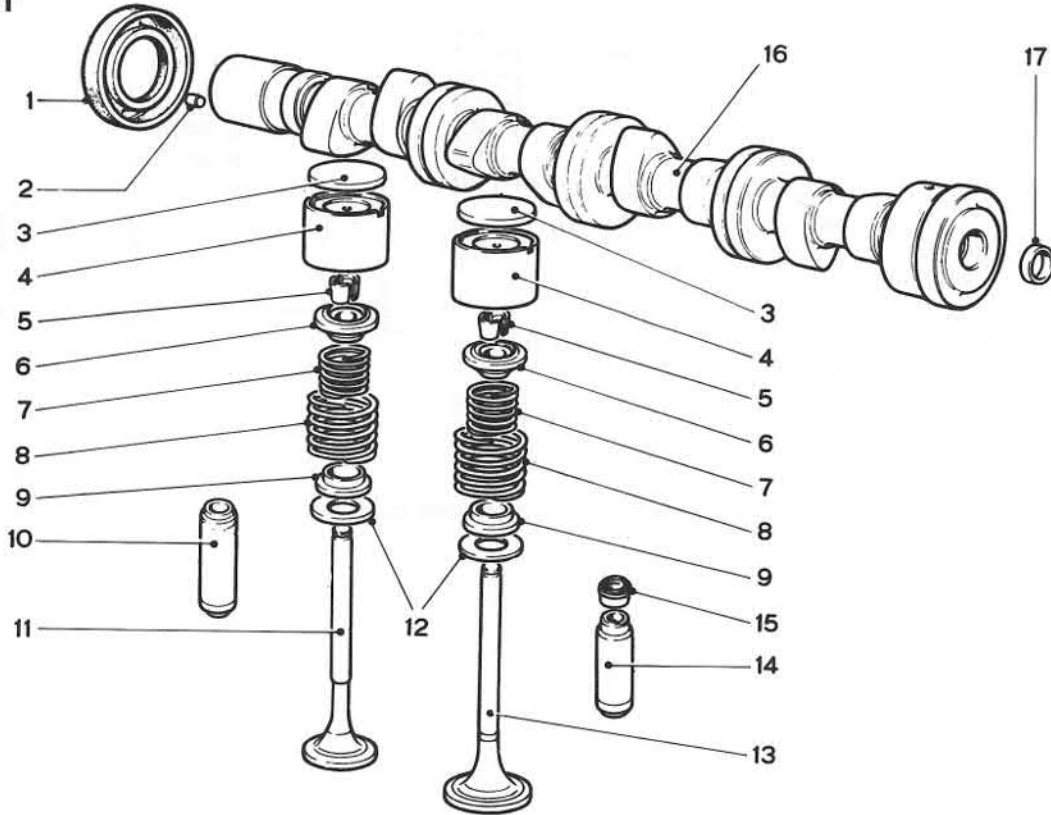
Install distributor. Make sure distributor is set on No. 4 cylinder.

1. Timing gear cover.    2. Lock nut.    3. T.D.C. mark.  
4. Drive pulley.    5. Drive belt.    6. Tensioner pulley.



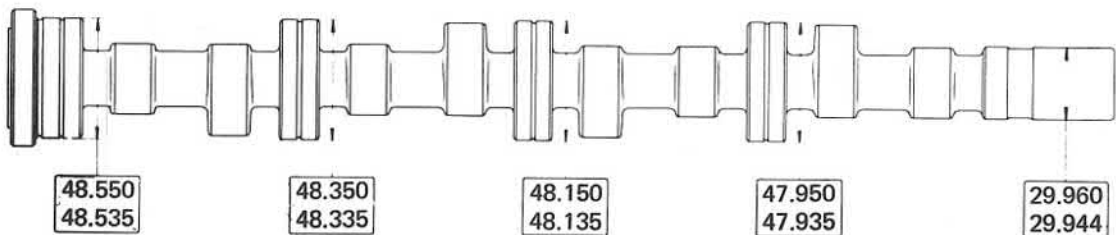
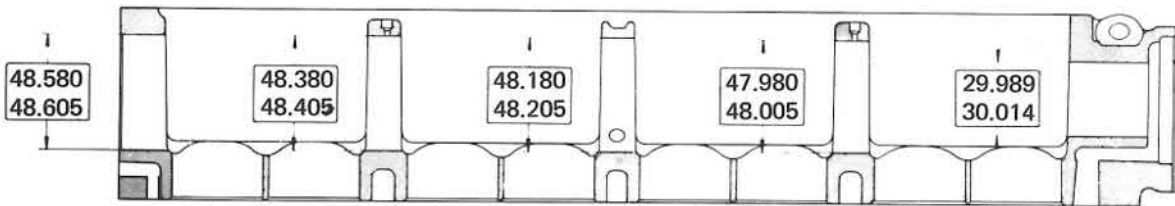
### Valve Mechanism

CAMSHAFT



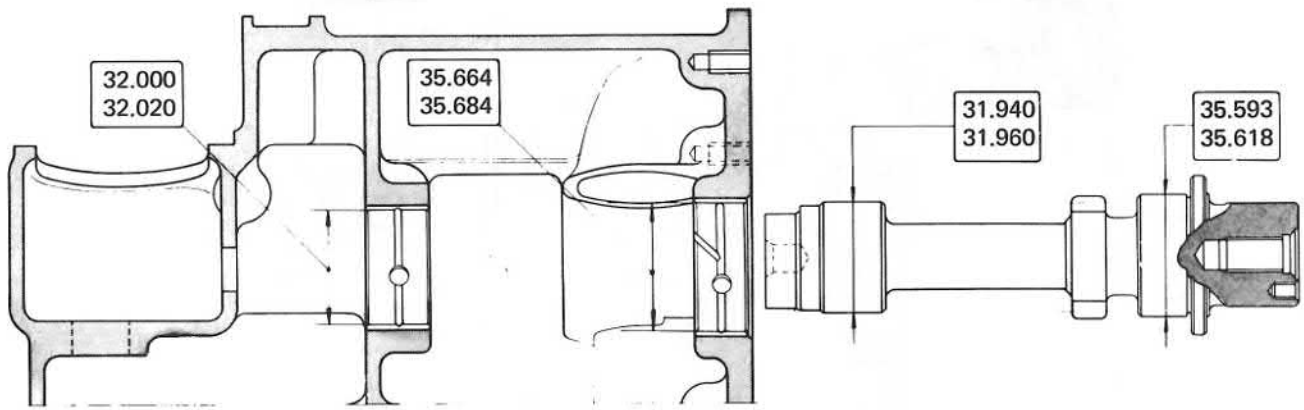
**EXPLODED VIEW OF VALVE MECHANISM COMPONENTS.**

- |  |                         |                        |
|--|-------------------------|------------------------|
| 1. Seal                                | 7. Inner spring         | 13. Intake valve       |
| 2. Dowel                               | 8. Outer springs        | 14. Intake valve guide |
| 3. Plates of adjusting valve clearance | 9. Lower cups           | 15. Oil seal           |
| 4. Tappets                             | 10. Exhaust valve guide | 16. Camshaft           |
| 5. Locks                               | 11. Exhaust valve       | 17. Welch plug         |
| 6. Upper cups                          | 12. Flat washer         |                        |



Main data on camshaft and bores in housing.

**AUXILIARY SHAFT**



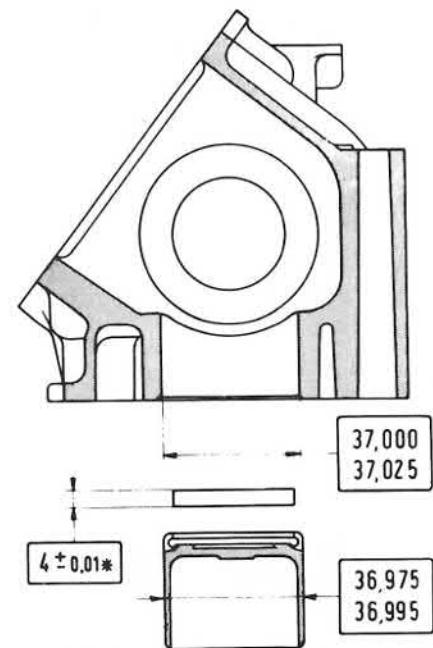
**Main data of auxiliary shaft and bushing.**

## Valve Mechanism

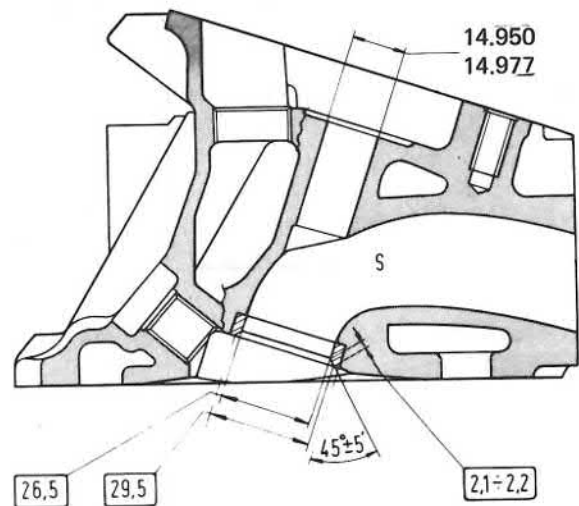
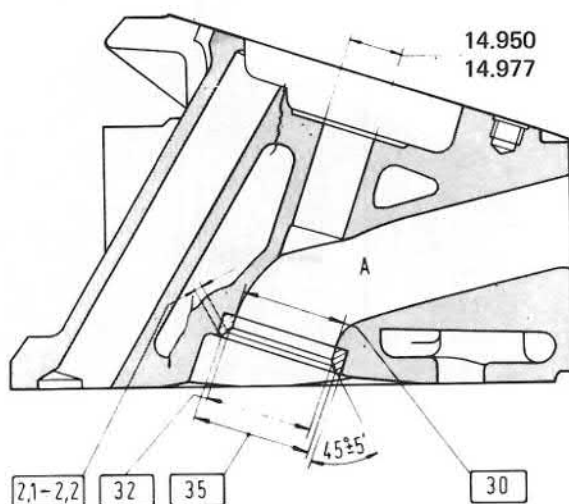
### REPLACING TAPPETS AND VALVE GUIDES

Make sure tappet plate surface in contact with lobes on camshaft is glass-like and shows no signs of dishing or pitting.

Check tappet diameter and tappet bore diameter in housing. Tappet clearance in bore should be 0.002 to 0.020 in. (0.005 to 0.050mm)

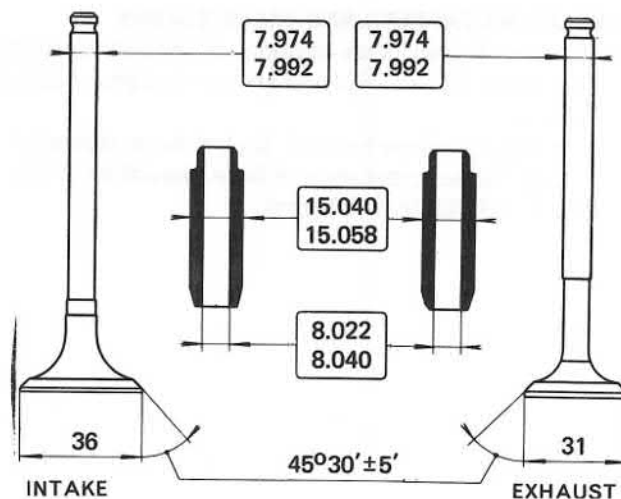


Valve guides are press fitted in their bores. Interference should be 0.0025 to 0.0043 in. (0.063 to 0.08mm). Valve guides are available for service in the standard size and 0.008 in. (0.2mm) oversize.



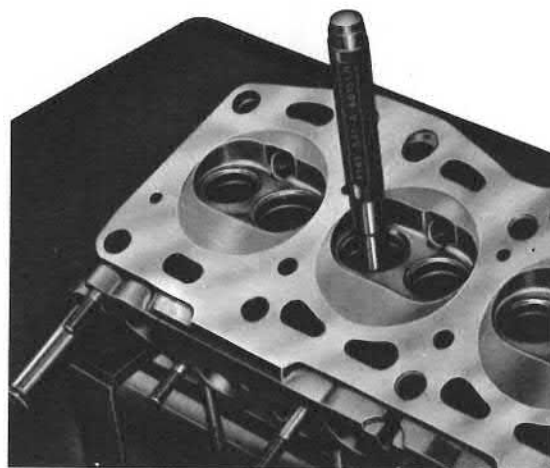
## Model X 1/9

Valve stem to valve guide fit clearance is 0.0012 to 0.0026 in. (0.030 to 0.066mm).



Replace valve guides if scored or worn. If clearance between valve guide and stem is excessive, replace guide.

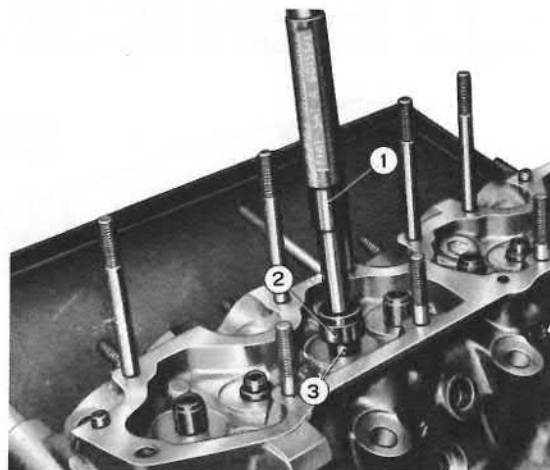
Use driver A.60153 to remove guide.



When installing guides use drive A.60153 and spacer A.60153/6A for intake valve guides.

Use driver A.60153 and spacer A.60153/6S for exhaust guides.

1. Driver.
2. Spacer for intake valve guide.
3. Valve guide.

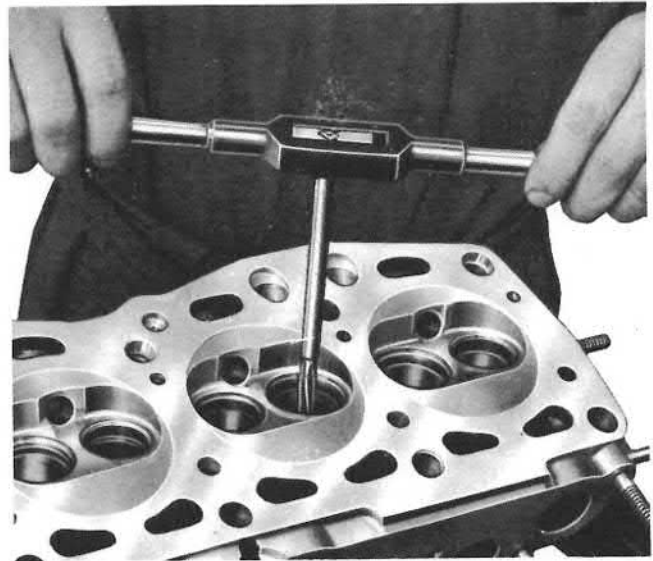




## Valve Mechanism

Replacement guides have inner diameter prefinished to size.

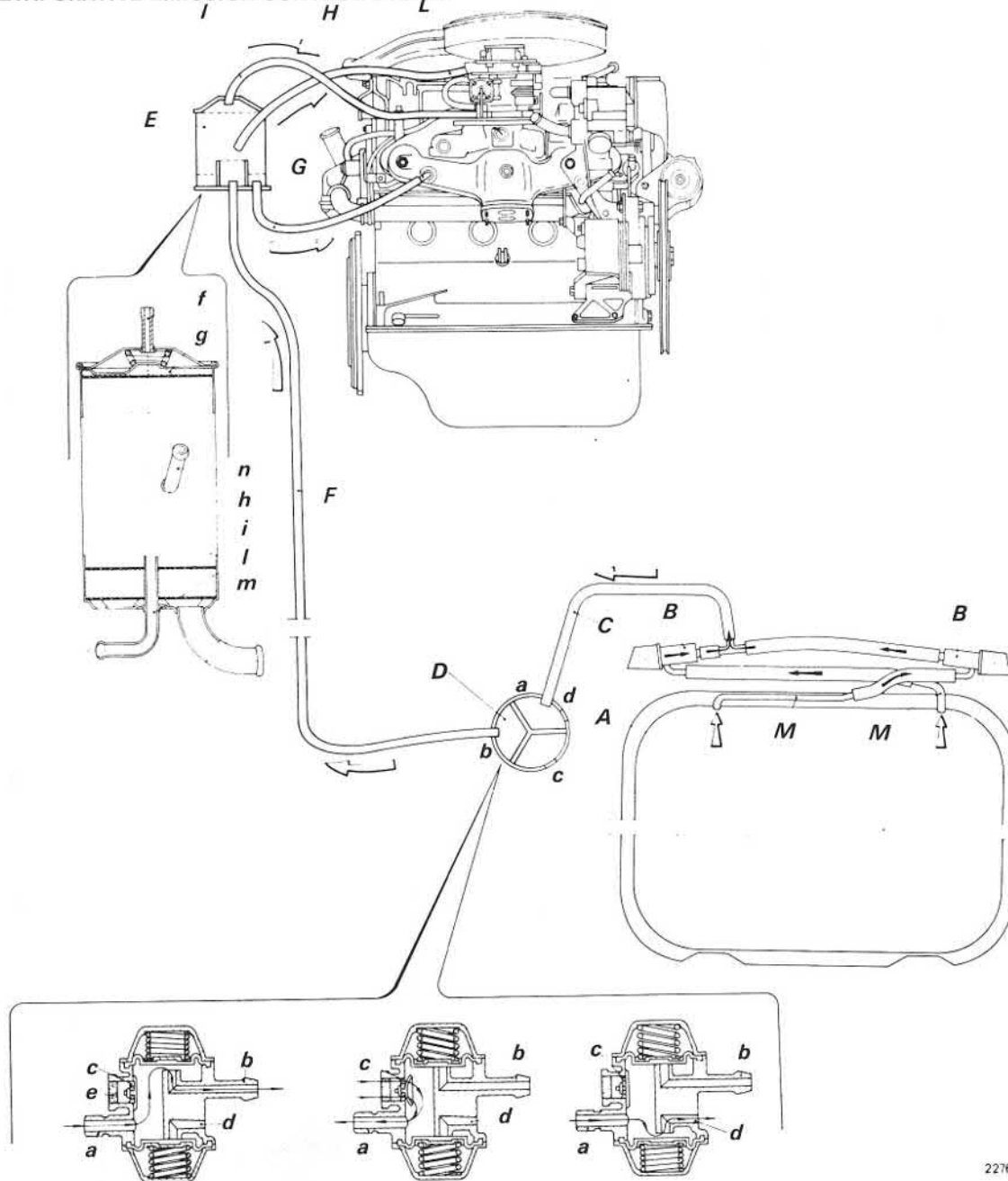
If press fitting causes minor fault, refinish guide. Use reamer A.90310.





## Fuel Tank and Lines

### FUEL EVAPORATIVE EMISSION CONTROL SYSTEM



**Position 1.**  
From fuel tank to activated carbon vapor trap.

**Position 2.**  
Air from ambient into tank.

**Position 3 (safety).**  
Vapor from tank to ambient (excess pressure in the tank).

- A. Fuel tank.
- B. Liquid vapor separator.
- C. Line from separator to 3-way valve.
- D. 3-way control valve.
- E. Activated carbon trap.
- F. Line from 3-way valve to carbon trap.
- G. Hot air purge tube.
- H. Exhaust manifold.

- I. Line from carbon trap to carburetor (downstream of throttle).
- L. To carburetor bowl.
- M. Lines between separator and fuel tank.
- a. From fuel tank.
- b. To activated carbon trap.
- c. Fuel tank air inlet.

- d. Safety outlet.
- e. Air filter.
- f. To carburetor (downstream of throttle).
- g. Synthetic filter.
- h. Activated carbon.
- i. Air purge paper filter.
- l. Fuel vapor inlet from tank.
- m. Hot air purge inlet.
- n. Fuel vapor inlet from carburetor.

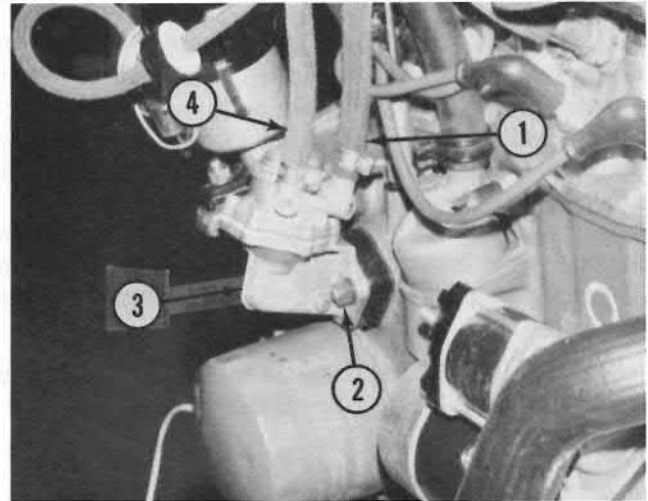


## Fuel Pump and Lines

### FUEL PUMP REMOVAL

Remove clamps on fuel inlet (1) and outlet (4) lines. Disconnect lines from pump (3). Remove two nuts (2) and washers holding pump to engine. Remove pump. Remove two gaskets and insulator.

1. Inlet line. 2. Nut. 3. Pump. 4. Outlet line.



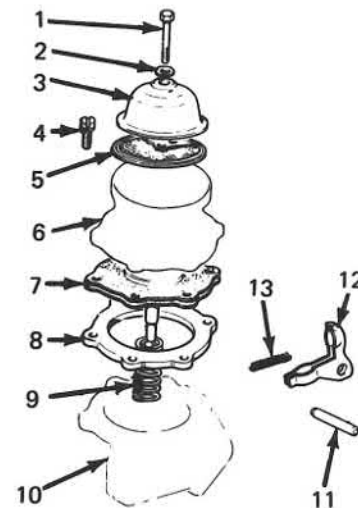
### INSPECTIONS

#### Check

- attachment screws (4) of upper and lower bodies and cover screw (1) for looseness.
- lines for clogging or deterioration.
- filter for clogging or deterioration.
- diaphragm and control lever springs for weakness or distortion.
- diaphragm for hardening or cracking.

Oil control lever and pivot when reassembling. Lightly coat new gaskets with grease. Always use new gaskets.

1. Cover screw. 2. Lockwasher. 3. Cover.  
 4. Screw. 5. Filter. 6. Upper body.  
 7. Diaphragm. 8. Spacer. 9. Spring.  
 10. Lower body. 11. Pivot Pin. 12. Control lever.  
 13. Spring.



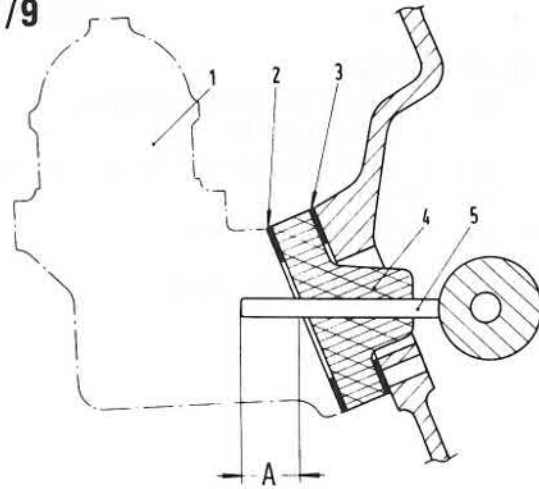
**Model X 1/9****ADJUSTMENT**

Place gasket (2) on engine. Place insulating support (4) on engine. Place an 0.012 in. (0.3mm) gasket (3) on support. Install rod (5) in engine.

Check that dimension A is 0.59 to 0.61 in. (15 to 15.5mm). Install a thicker or thinner gasket (3) to meet this dimension.

After adjusting the dimension, place gasket (3) on engine. Place insulating support (4) on engine. Place gasket (2) on support. Install rod (5) in engine. Install fuel pump.

**NOTE:** Gaskets (3) are supplied in 0.012, 0.027, and 0.047 in. (0.3, 0.7, and 1.2mm) thickness.



1. Pump.    2. Gasket between pump and support.  
3. Gasket between support and crankcase.    4. Insulating support.  
5. Rod.

## Carburetor and Air Cleaner

### FLOAT LEVEL SETTING

Check that needle valve (2) is screwed down in housing.

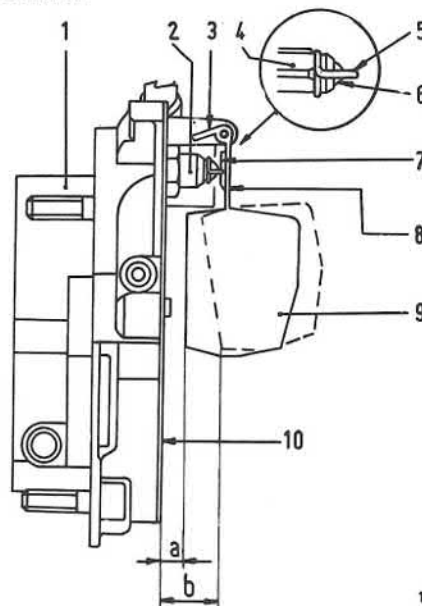
Check that float (9) is free of dents or punctures. Check that float can turn freely on its hinge.

$a=0.236$  in. (6mm)=distance between float and cover with gasket, in vertical position.

$b=0.590$  in. (15mm)=maximum distance of float from cover face with gasket.

$b-a=0.354$  in. (9mm)=float travel.

- |                      |                  |                  |
|----------------------|------------------|------------------|
| 1. Carburetor cover. | 2. Needle valve. | 3. Lug.          |
| 4. Valve needle.     | 5. Return hook.  | 6. Movable ball. |
| 7. Tang.             | 8. Float arm.    | 9. Float.        |
|                      |                  | 10. Gasket.      |



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### IDLE SPEED ADJUSTMENT

Connect a tachometer to engine.

Start engine and warm it up.

Check that idle speed is according to specification on tag.

If necessary, adjust idle speed screw.

### IDLE CO ADJUSTMENT

Connect a tachometer to engine.

Insert sample probe of CO tester in tailpipe.

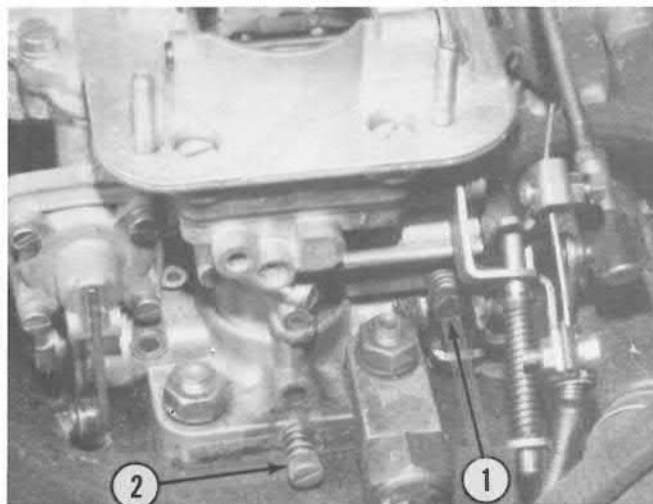
Start engine and warm it up.

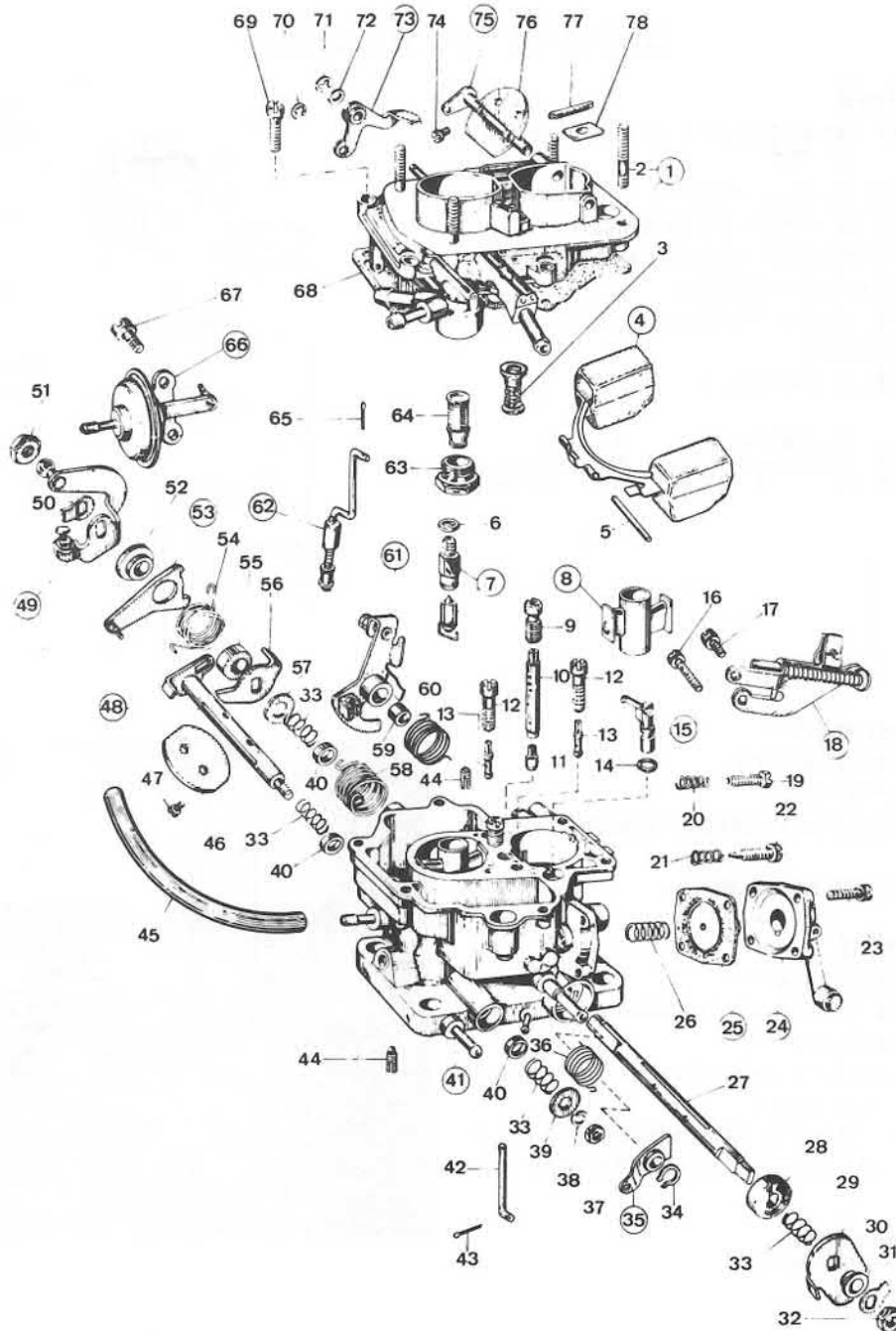
Check that idle speed is according to specification tag.

If necessary adjust idle speed.

Check that CO is according to specification tag. If necessary adjust idle mixture screw. Recheck idle speed.

- |                                   |
|-----------------------------------|
| 1. Idle speed adjustment screw.   |
| 2. Idle mixture adjustment screw. |





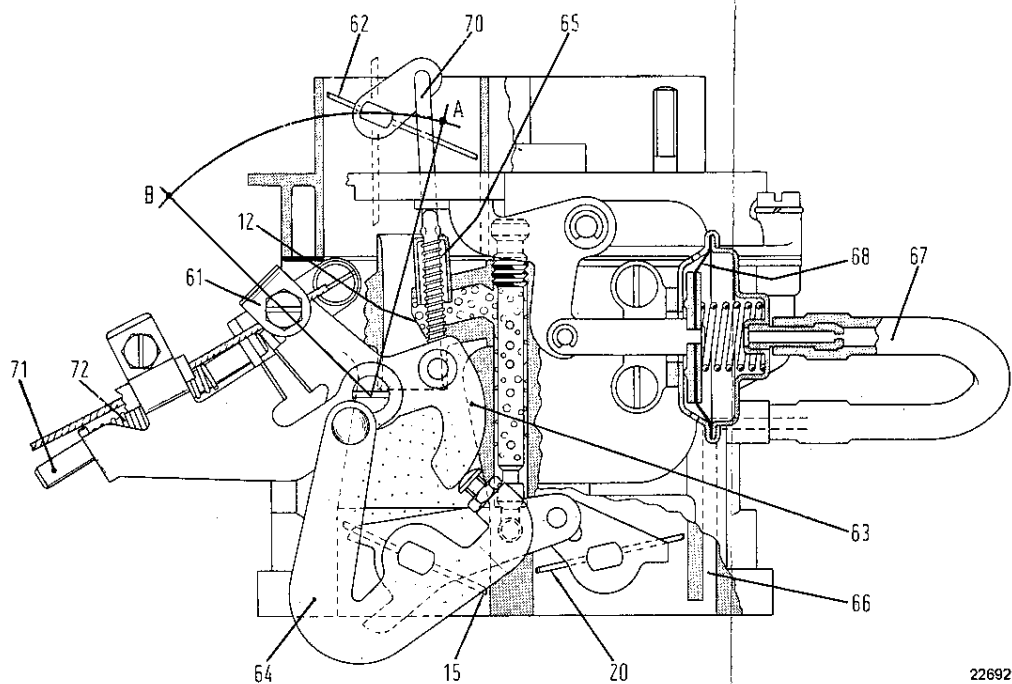
### EXPLODED VIEW OF CARBURETOR

- |                              |                             |                                   |                   |                            |
|------------------------------|-----------------------------|-----------------------------------|-------------------|----------------------------|
| 1. Carburetor cover          | 17. Screw                   | 34. Ring                          | 49. Lever         | 65. Cotter pin             |
| 2. Stud                      | 18. Support                 | 35. Rod                           | 50. Lockwasher    | 66. Choke override         |
| 3. Bowl vent valve           | 19. Idle screw              | 36. Spring                        | 51. Nut           | 67. Screw                  |
| 4. Float                     | 20. Spring                  | 37. Nut                           | 52. Bushing       | 68. Cover gasket           |
| 5. Pin                       | 21. Spring                  | 38. Lockwasher                    | 53. Lever         | 69. Screw                  |
| 6. Gasket                    | 22. Idle mixture screw      | 39. Washer                        | 54. Spring        | 70. Ring                   |
| 7. Needle valve              | 23. Screw                   | 40. Bushing                       | 55. Bushing       | 71. Ring                   |
| 8. Venturi                   | 24. Accelerator pump cover  | 41. Carburetor body               | 56. Primary shaft | 72. Washer                 |
| 9. Air metering jet          | 25. Diaphragm               | 42. Lever                         | 57. Washer        | 73. Choke override control |
| 10. Emulsion tube            | 26. Spring                  | 43. Cotter pin                    | 58. Spring        | 74. Screw                  |
| 11. Main Jet                 | 27. Throttle shaft, primary | 44. Secondary throttle stop screw | 59. Bushing       | 75. Choke throttle shaft   |
| 12. Idle jet holder          | 28. Bushing                 | 45. Hose                          | 60. Spring        | 76. Choke throttle         |
| 13. Idle jet                 | 29. Lever                   | 46. Throttle                      | 61. Lever         | 77. Plug                   |
| 14. Gasket                   | 30. Bushing                 | 47. Screw                         | 62. Rod           | 78. Dust cover             |
| 15. Acceleration pump nozzle | 31. Lockwasher              | 48. Secondary throttle shaft      | 63. Lifter plug   |                            |
| 16. Screw                    | 32. Nut                     |                                   | 64. Lifter        |                            |
|                              | 33. Spring                  |                                   |                   |                            |



### Carburetor and Air Cleaner

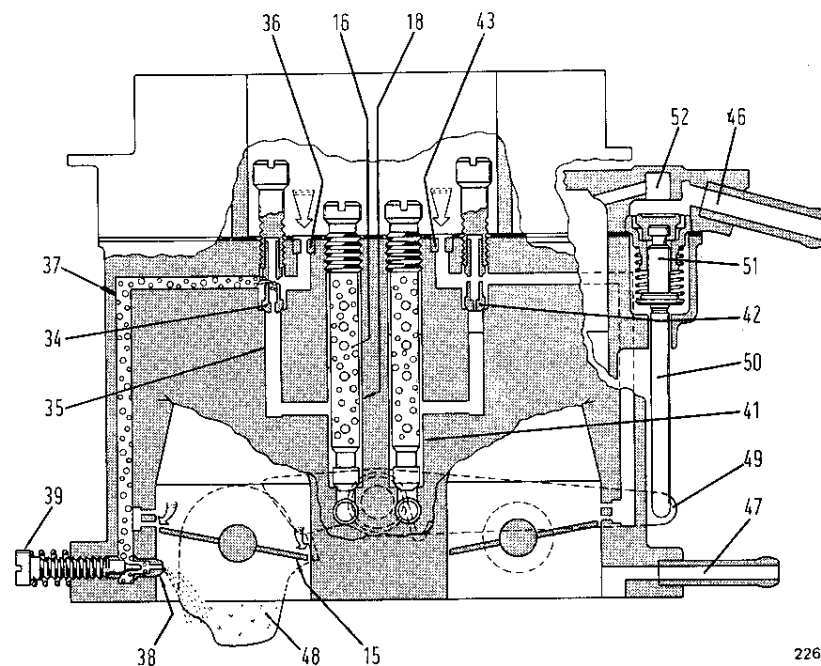
#### CHOKE



A. Choke « off » - B. Choke « on ».

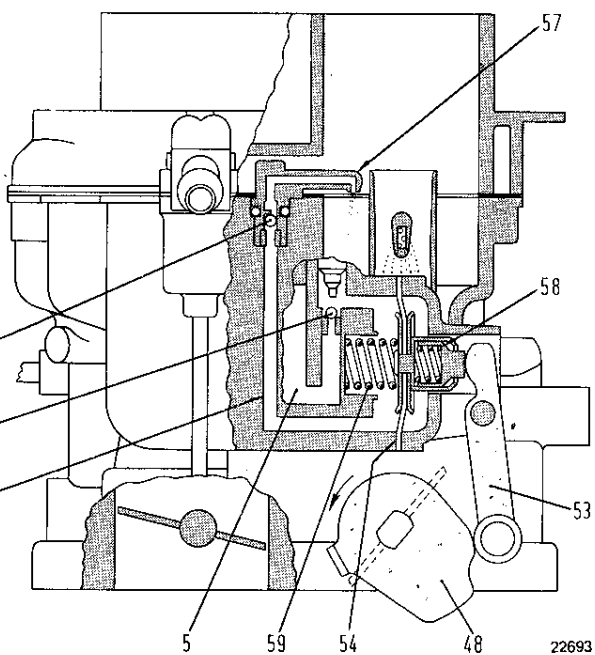
22692

#### IDLE AND TRANSFER



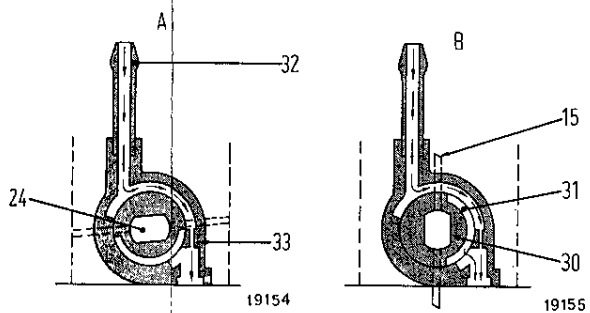
22696

#### ACCELERATING PUMP



22693

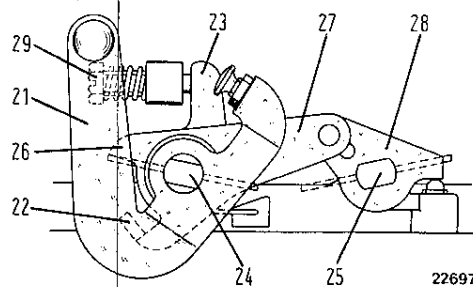
#### RECIRCULATING DEVICE OF BLOW-BY GASES



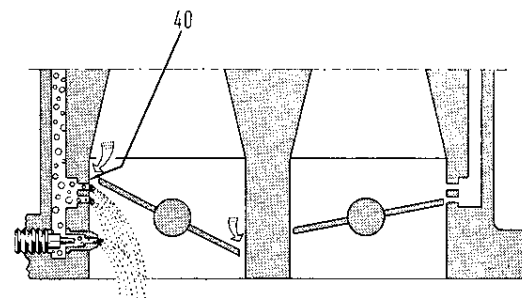
19154

19155

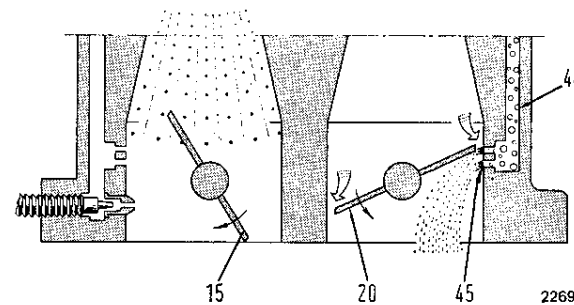
#### DIFFERENTIAL OPENING DEVICE OF THROTTLE VALVES



22697

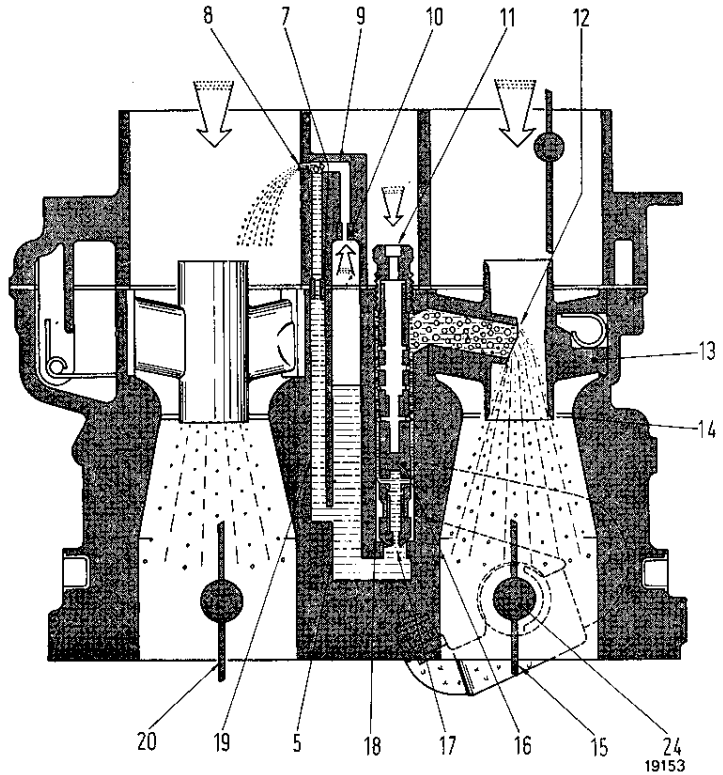
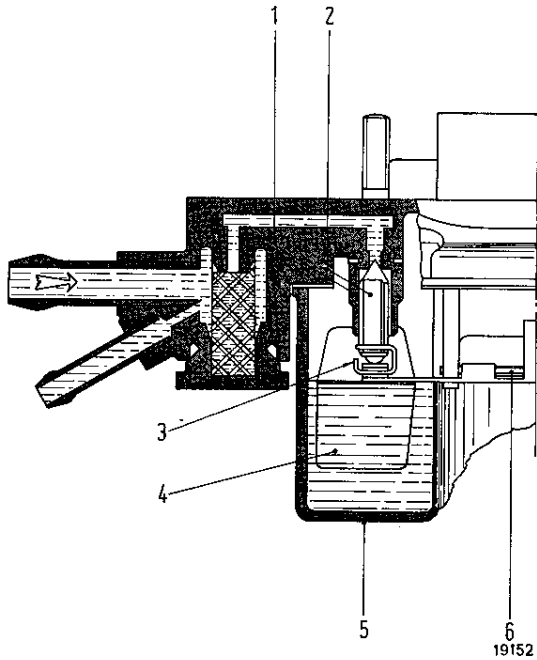


22694



22695

**CRUISE**



1. Needle valve.
2. Valve needle.
3. Needle return hook.
4. Float.
5. Fuel bowl.
6. Float hinge pin.
7. Calibrated bushing for power fuel passage at high speed.
8. Power fuel calibrated orifice.
9. Power mixture air passage.
10. Air passage calibrated bushing.
11. Main air bleeder jet.
12. Spray tube.
13. Auxiliary Venturi.
14. Primary Venturi.
15. Primary throttle valve.
16. Emulsion tube.
17. Main jet.
18. Main jet well.
19. Power fuel passage at high speed.
20. Secondary throttle valve.
21. Throttles operating lever.
22. Lug.
23. Primary shaft sector.
24. Primary shaft.
25. Secondary shaft.
26. Idler lever butt.

27. Idler lever.
28. Secondary shaft actuating lever.
29. Screw and lock nut, locating primary throttle valve.
30. Rotary valve.
31. Blow-by gas passage slot.
32. Blow-by gas duct.
33. Calibrated orifice for blow-by gas suction at idle.
34. Main idling jet.
35. Idling fuel passage.
36. Idling air calibrated bushing.
37. Main idling fuel passage.
38. Idling mixture calibrated bushing.
39. Idling mixture adjusting screw.
40. Primary throat transfer orifices.
41. Secondary well.
42. Secondary idling jet.
43. Secondary air passage calibrated bushing.
44. Fuel passage.
45. Secondary throat transfer orifices.
46. Duct, conveying bowl vapors to activated carbon filter.
47. Suction duct, gasoline vapors from activated carbon filter.
48. Cam, controlling accelerator pump and closing bowl vapors discharge duct.

49. Idler lever.
50. Control rod, valve 51.
51. Valve, gasoline vapors discharge from fuel bowl.
52. Fuel bowl vapors discharge duct.
53. Accelerating pump actuating lever.
54. Accelerating pump diaphragm.
55. Accelerating pump fuel passage.
56. Accelerating pump delivery valve.
57. Accelerating pump spray nozzle.
58. Accelerating pump delivery extension spring.
59. Diaphragm spring.
60. Ball valve.
61. Choke actuating lever.
62. Choke throttle valve.
63. Fast idle primary throttle opening cam.
64. Throttles operating lever.
65. Calibrated spring.
66. Vacuum passage.
67. Vacuum line.
68. Vacuum diaphragm device.
69. Choke mixture leaning throttle lever.
70. Throttle valve rod.
71. Actuating pin, lever 61.
72. Spring for pin 71.

## Carburetor and Air Cleaner

### AIR CLEANER REMOVAL AND INSTALLATION

Loosen clamp holding air line (3) to non-return valve (7). Disconnect line from valve. Move line out of the way.

Loosen clamp (5) holding fresh air duct (4) to carburetor cooling fan (6).

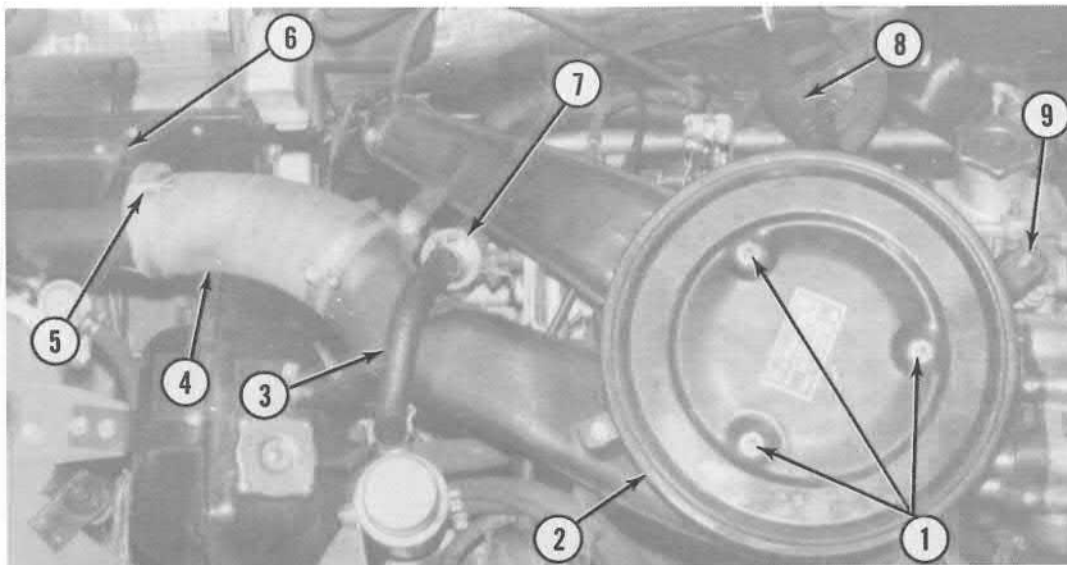
Remove 3 nuts (1) and washers holding cover (2) on air cleaner. Remove cover.

Remove nut and washer holding bracket (9) on air cleaner to valve cover.

Disconnect by-pass hose (8) from air cleaner. Disconnect hose from bottom of air cleaner.

Remove 4 nuts holding air cleaner to carburetor. Remove air cleaner and fresh air duct.

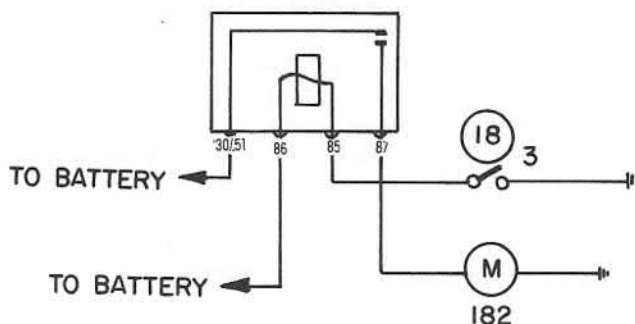
1. Nuts. 2. Air cleaner cover. 3. Airline. 4. Air duct. 5. Clamp. 6. Cooling fan. 7. Non-return valve.  
8. By-pass hose. 9. Bracket.



## CARBURETOR COOLING FAN

The cooling fan is controlled by a thermostatic switch in the carburetor and a relay mounted on the fan support.

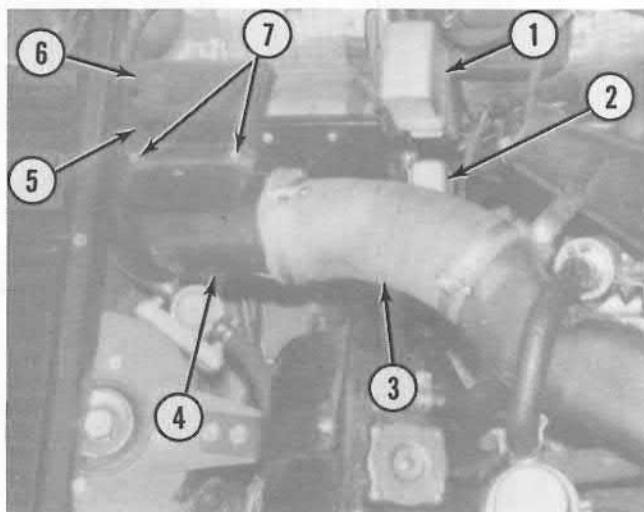
NOTE: Numbers in circles refer to schematic in Electrical-55.



## COOLING FAN REMOVAL AND INSTALLATION

Disconnect wire from terminal 87 of fan relay (2).  
Remove fan relay and voltage regulator (1).  
Loosen clamp and disconnect flexible fresh air duct (3) from fan duct (4).  
Remove 2 nuts (right front side of support) and 2 bolts (left rear side of support) holding support to car.  
Remove fan and support (5).  
Remove 4 screws (7) holding fresh air duct to fan.  
Remove 4 screws holding fan to support.  
Install in reverse order. Make sure black wire from fan is under mounting nut for fan relay.

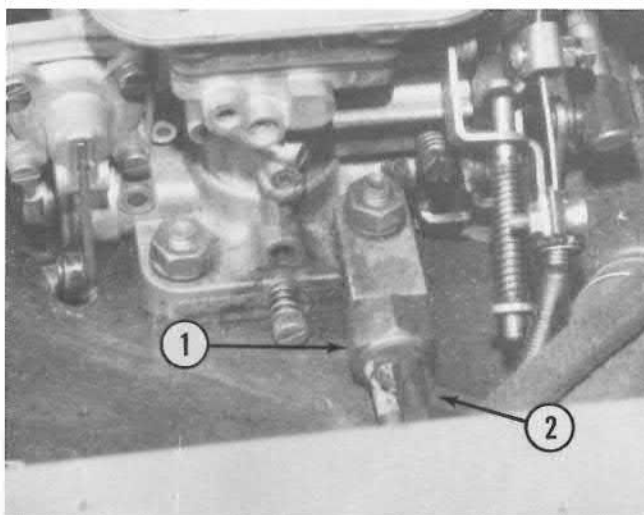
- |               |               |                    |
|---------------|---------------|--------------------|
| 1. Regulator. | 2. Fan relay. | 3. Fresh air duct. |
| 4. Fan Duct.  | 5. Support.   | 6. Fan.            |
|               |               | 7. Screws.         |



## THERMOSTATIC SWITCH REMOVAL

Disconnect wires from switch.  
Unscrew and remove switch.

- |            |           |
|------------|-----------|
| 1. Switch. | 2. Wires. |
|------------|-----------|

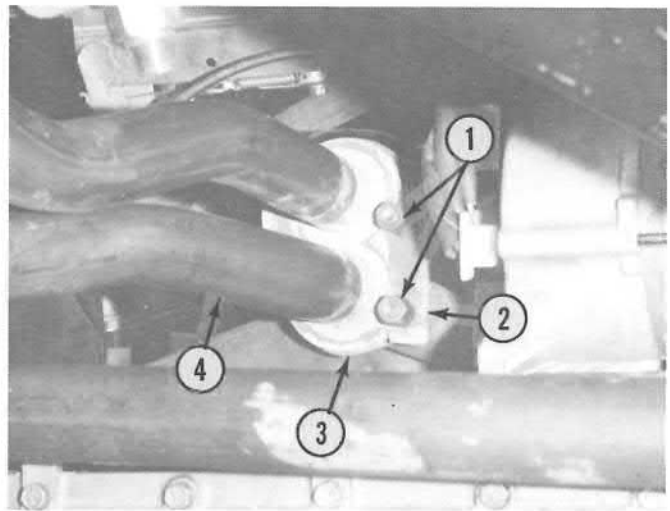


## Exhaust Pipe

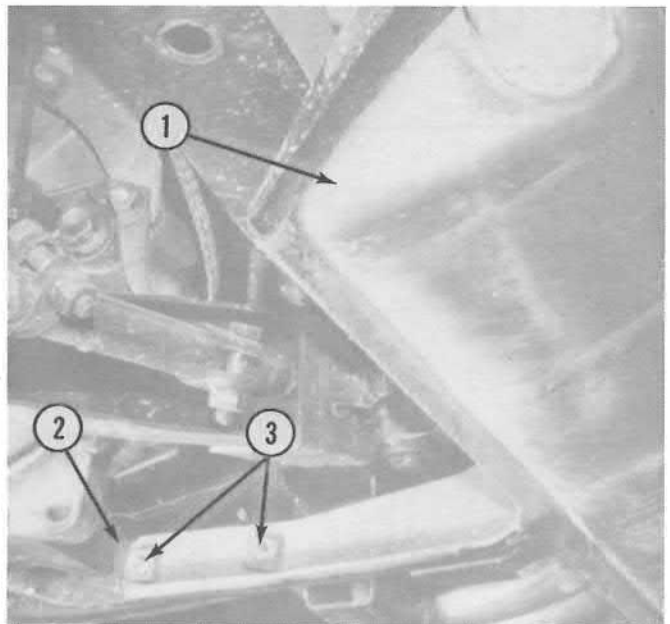
### REMOVAL

Remove 4 nuts (1) and lockplate (2) holding pipe (4) to flange (3) on exhaust manifold.

1. Nuts.
2. Lockplate.
3. Flange.
4. Exhaust pipe.

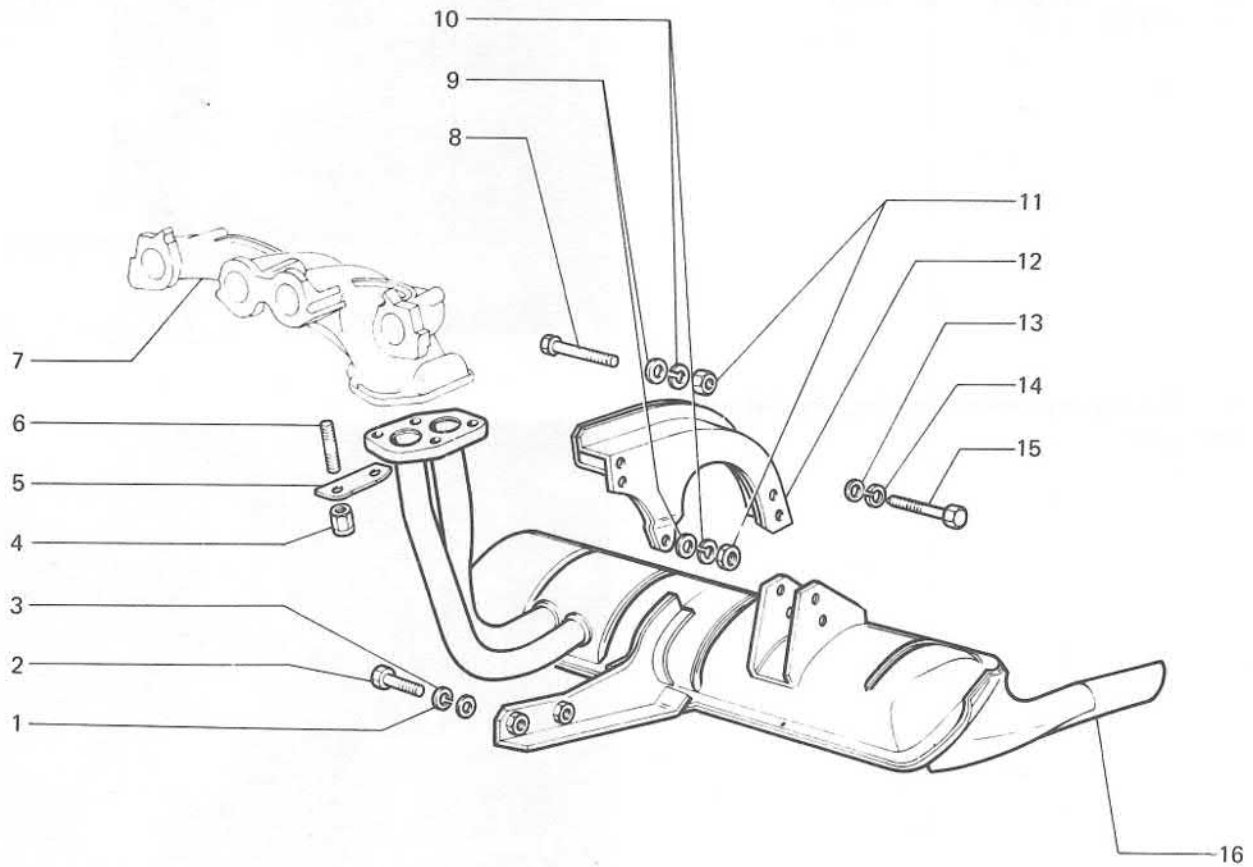


Remove 2 bolts and washers holding bracket to top of exhaust pipe.



Remove 2 bolts (3) and washers holding exhaust pipe (1) to crossrail (2). Remove exhaust pipe.

1. Exhaust pipe.
2. Crossrail.
3. Bolts.

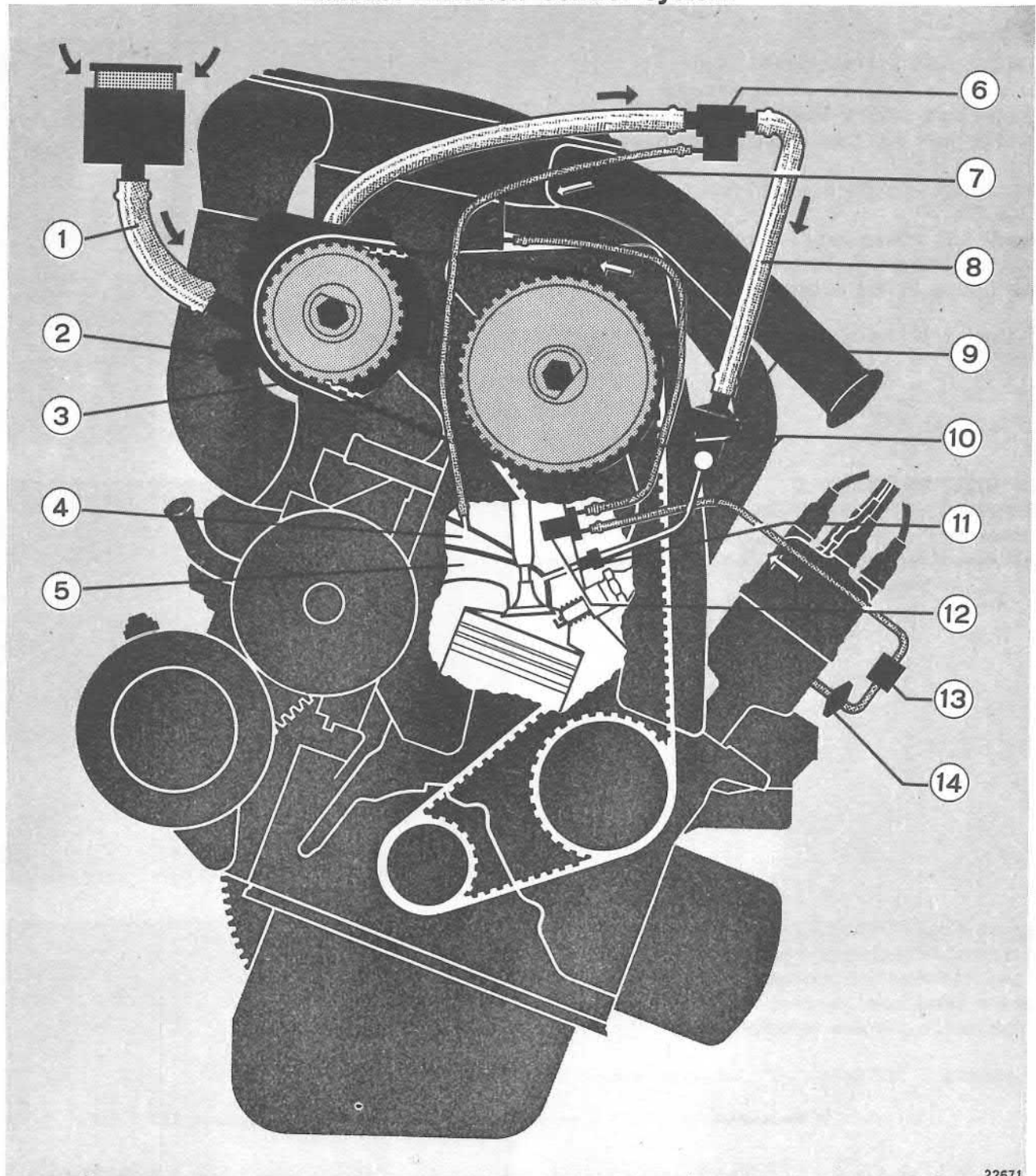


**EXHAUST PIPE**

- 1. Intake manifold
- 2. Bolt
- 3. Washer
- 4. Lockwasher
- 5. Nut
- 6. Support bracket

- 7. Bolt
- 8. Exhaust pipe
- 9. Bolt
- 10. Nut
- 11. Lockplate
- 12. Stud

## Exhaust Emission Control System



22671

### EXHAUST EMISSION CONTROL SYSTEM

- |                                   |  |
|-----------------------------------|--|
| 1. Intake line with filter        | 8. Air distributor line                        |
| 2. Pump discharge safety valve    | 9. Non-return valve                            |
| 3. Air pump                       | 10. Vacuum line for carburetor diaphragm       |
| 4. Intake manifold                | 11. Air injector                               |
| 5. Exhaust manifold               | 12. Vacuum control thermovalve                 |
| 6. Diverter valve                 | 13. Delay valve                                |
| 7. Vacuum line for diverter valve | 14. Distributor advance diaphragm control unit |

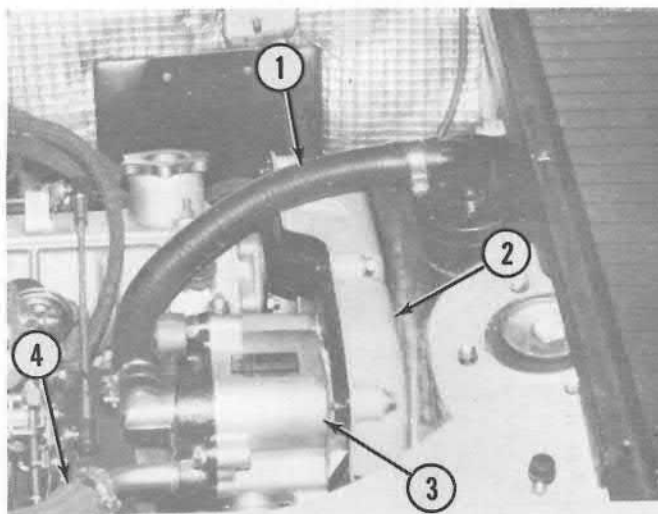
## Model X 1/9

### AIR PUMP

#### REMOVAL AND INSTALLATION

Disconnect hoses (1 and 4) from air pump.  
Remove bolts holding timing cover (2).  
Remove lower bolt from under engine. Remove cover (2).  
Remove bolts holding support brackets to rear of air pump (3).  
Remove bolt holding pump to bracket.  
Disconnect drive belt. Remove pump.  
Install pump in reverse order.

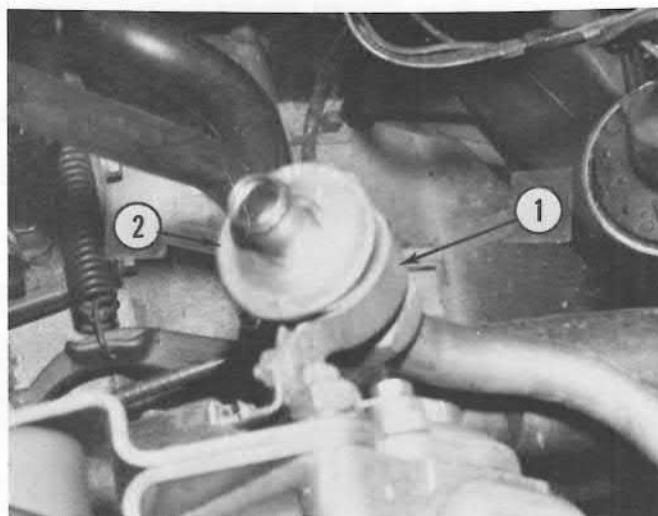
1. Hose.
2. Timing cover.
3. Air pump.
4. Hose.



### AIR INJECTION MANIFOLD REMOVAL AND INSTALLATION

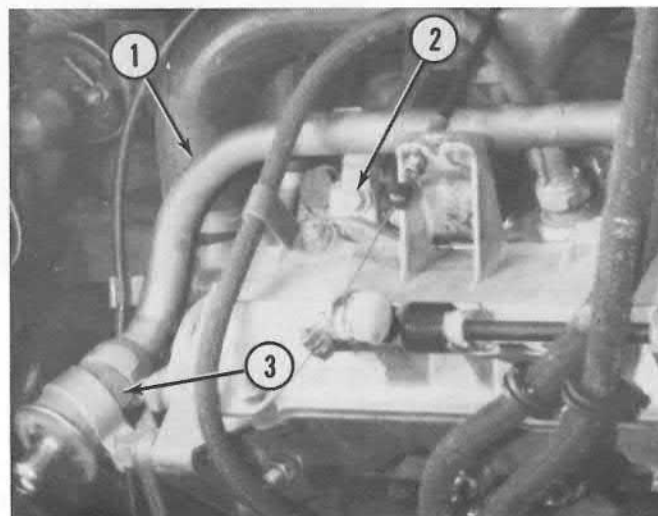
Remove air cleaner for access.  
Remove bolt and nut holding clamp (1) on non-return valve (2) to bracket on engine.

1. Clamp.
2. Non-return valve.



Remove 2 bolts (2) holding manifold (1) to engine.  
Disconnect 4 injectors from engine.  
Remove manifold with non-return valve (3).  
Remove valve from manifold.  
Install manifold in reverse order.

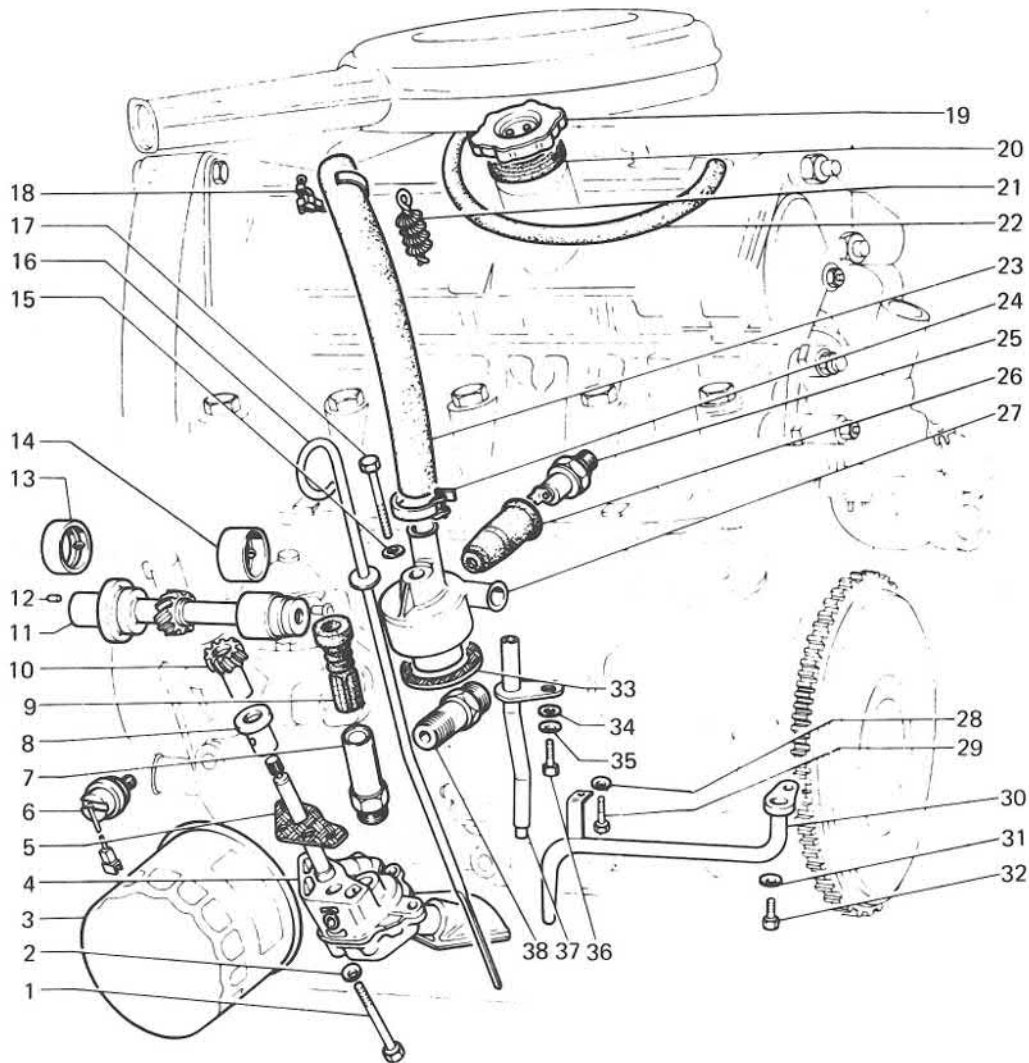
1. Manifold.
2. Bolts.
3. Non-return valve.





## Lubrication

### EXPLODED VIEW OF ENGINE LUBRICATION SYSTEMS COMPONENTS

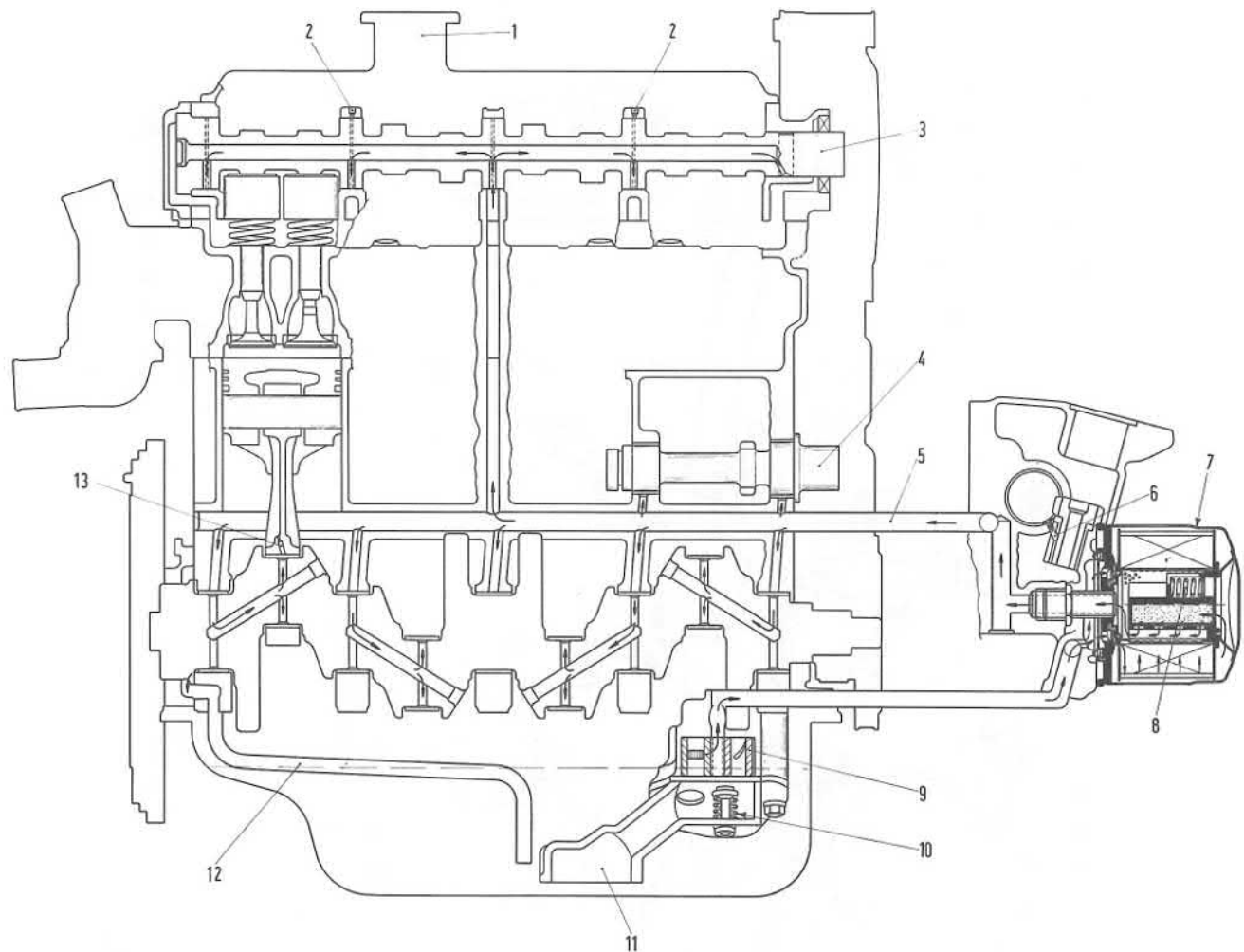


1. Bolt
2. Washer
3. Filter
4. Oil pump
5. Gasket
6. Sending unit
7. Pipe
8. Bushing
9. Seal
10. Gear

11. Shaft
12. Pin
13. Bushing
14. Bushing
15. Washer
16. Dip stick
17. Bolt
18. Clamp
19. Oil cap
20. Gasket

21. Flame trap
22. Hose
23. Hose
24. Clamp
25. Switch
26. Boot
27. Boot
28. Washer
29. Bolt

30. Pipe
31. Washer
32. Bolt
33. Gasket
34. Washer
35. Lockwasher
36. Bolt
37. Pipe
38. Connector



### ENGINE LUBRICATION DIAGRAM

- |  |  |
|--|--|
| 1. Oil filler pipe                                 | 8. By-pass valve                       |
| 2. Oil mist outlets for camshaft lobes and tappets | 9. Oil pump                            |
| 3. Camshaft  | 10. Oil pressure relief valve          |
| 4. Auxiliary units drive shaft                     | 11. Oil pump suction pipe              |
| 5. Filter to engine components oil line            | 12. Oil return pipe                    |
| 6. Oil pump and distributor drive gear oil duct    | 13. Oil mist outlet for cylinder walls |
| 7. Full-flow oil filter                            |  |

## Lubrication

### OIL PUMP REMOVAL

#### (Engine in Car)

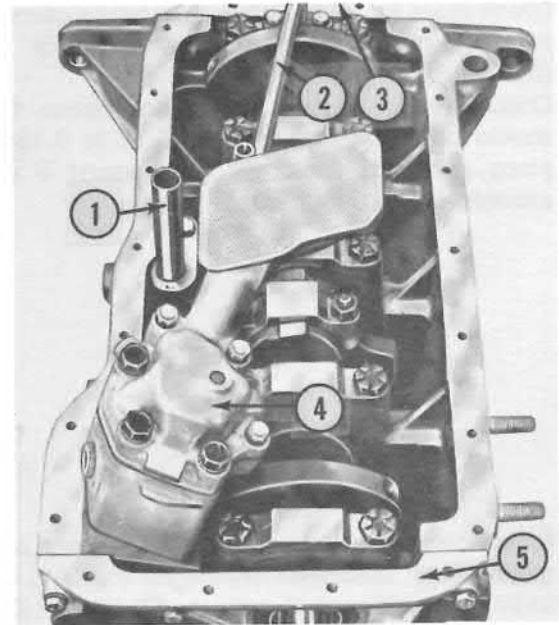
Install support tool on engine.

Remove crossrail supporting engine.

Drain oil sump. Remove bolts and washers holding sump to engine.

Remove 3 bolts and washers holding oil pump to engine. Remove pump with suction pipe.

1. Oil return pipe from breather body.
2. Oil return pipe from rear saddled bore.
3. Flywheel and cover plate.
4. Oil pump.
5. Timing gear end cover plate.

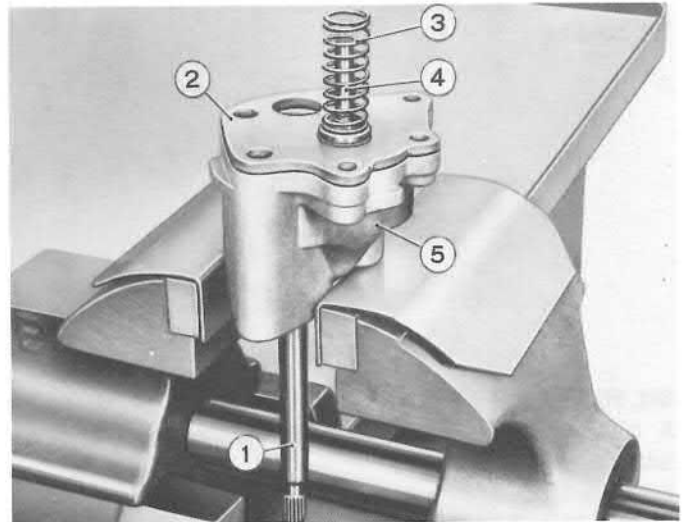


### INSPECTION

Clean all parts. Blow parts dry with compressed air. Check housing (5) and cover (2) for cracks.

Check suction pipe and oil duct for clogging. Blow clear with compressed air. Make sure dirt and residues are removed from between relief valve (4) and pump housing (5).

1. Pump shaft.
2. Cover.
3. Valve spring.
4. Relief valve.
5. Housing.



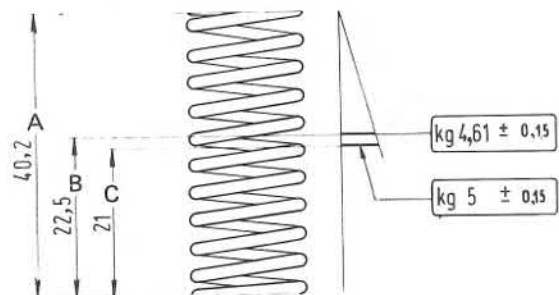
Check spring for relief valve for cracks and loss of elasticity.

Check spring load.

A=seated length

B=seated length

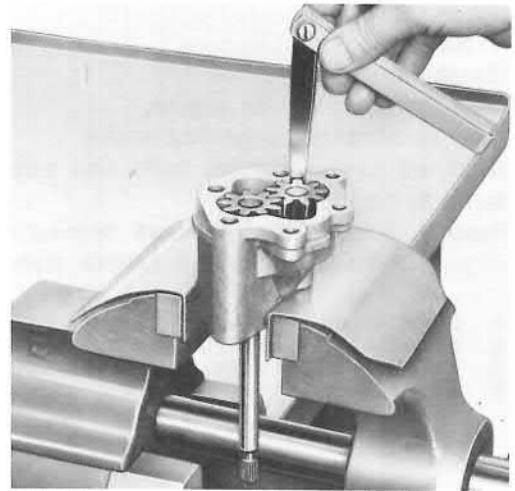
C=minimum length of working spring



## Model X 1/9

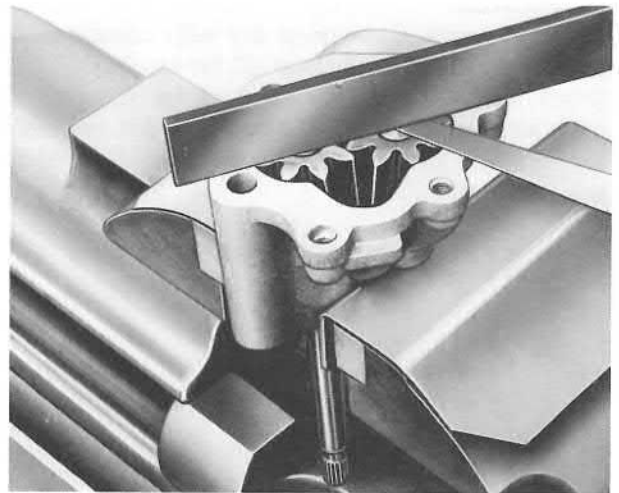
Check gears for wear. Backlash between gears is 0.006 in. (0.15mm). Maximum permissible is 0.01 in. (0.25mm).

Check gear for tooth to housing clearance. Clearance should be 0.004 to 0.007 in. (0.11 to 0.18mm). Replace gear and housing (if necessary) if clearance exceeds 0.01 in. (0.25mm).



Check clearance between top face gears and cover mating face. Clearance should be 0.008 to 0.041 in. (0.020 to 0.105mm). If more than 0.006 in. (0.15mm), replace gears or pump.

When oil pump is assembled turn drive shaft and check for binding.



### OIL FILTER REPLACEMENT

A clean filter is necessary to ensure good engine lubrication.

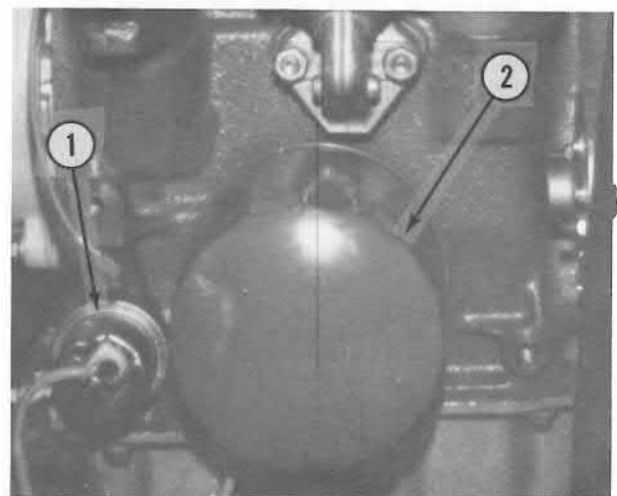
Remove filter.

Before installing, coat seal with engine oil.

Thread filter on by hand until seal touches plate.

Thread filter down  $\frac{3}{4}$  turn more.

1. Oil pressure sending unit.
2. Oil filter.



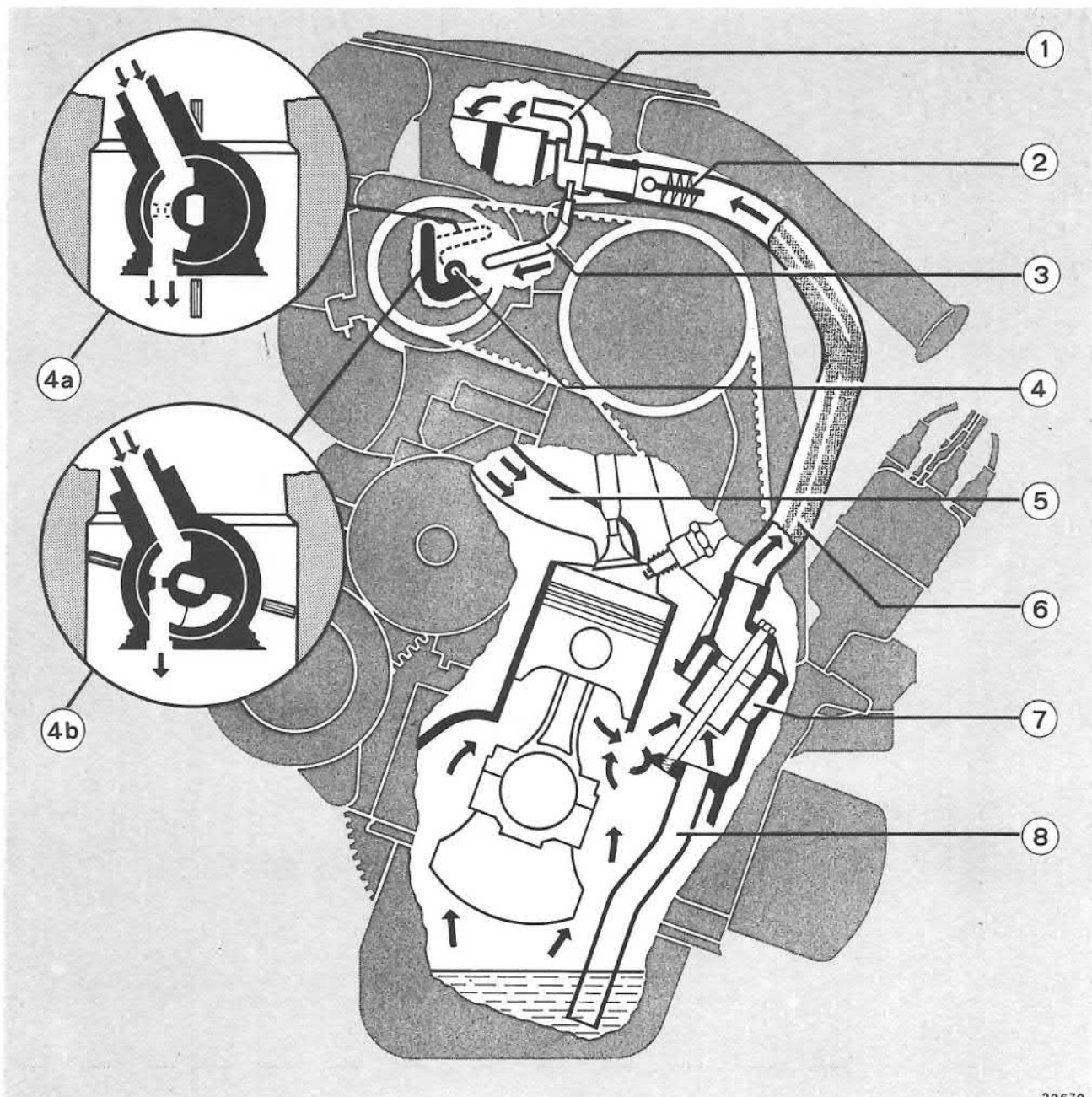
## Lubrication

### CRANKCASE EMISSION CONTROL SYSTEM

This system ensures that all blow-by gasses and oil fumes are drawn into the inlet manifold and burnt in the cylinders.

(See detail 4b) At closed throttle the gasses are drawn into the intake manifold through the calibrated orifice of the control valve incorporated in the carburetor.

(See detail 4a) At wide open throttle, part of the gasses are drawn into the intake manifold through the open duct of the control valve. The remaining gasses flow directly to the clean side of the air filter.





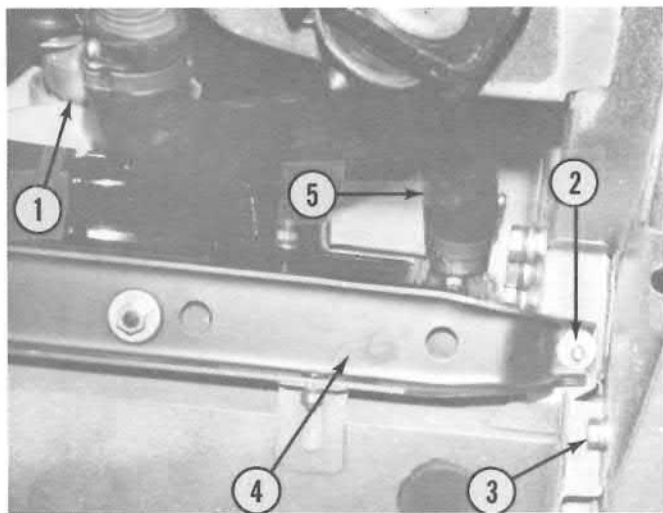
## Radiator

### REMOVAL

Drain cooling system.

Remove 3 lower screws holding grill to crossrail (4). Loosen 4 nuts holding plate to body. Remove plate. Disconnect hoses (5) to radiator. Disconnect connector for fan and wires from thermostatic switch. Remove bolt (3) and nut (2) holding crossrail (4) at each side. Lower radiator out of car. Be carefully of fan.

1. Fan.    2. Nut.    3. Bolt.    4. Crossrail.  
5. Hose.

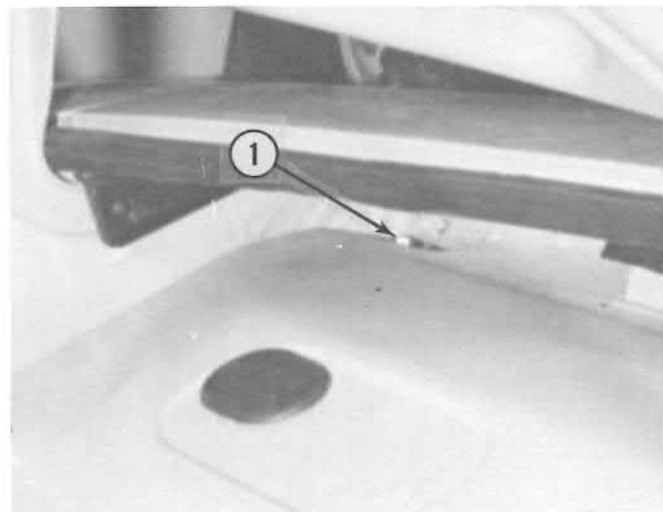


### INSPECTING COOLING SYSTEM

Fill radiator and expansion tank. Open heater controls. Start car. Open bleeder on top of radiator.

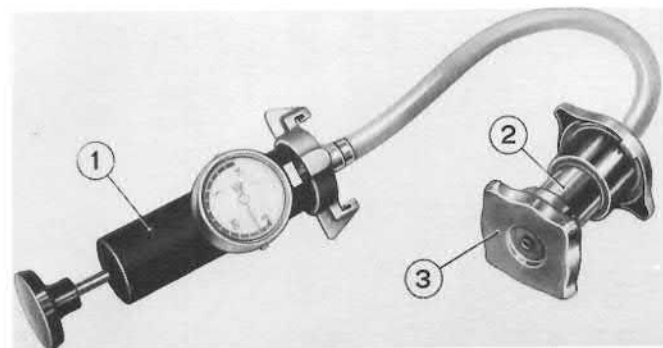
NOTE: Bleeder is accessible from inside the front luggage compartment.

1. Bleeder.



Connect tester to radiator cap. Build up pressure. Check that vent opens at 11 psi (0.8kg/sq.cm.).

1. Tester.    2. Union.    3. Cap.







## Water Pump and Ducts

### WATER PUMP

#### REMOVAL AND INSTALLATION

Remove protective panels from bottom right side of engine.

Remove alternator (3) and drive belt.

Disconnect hoses from water pump (2).

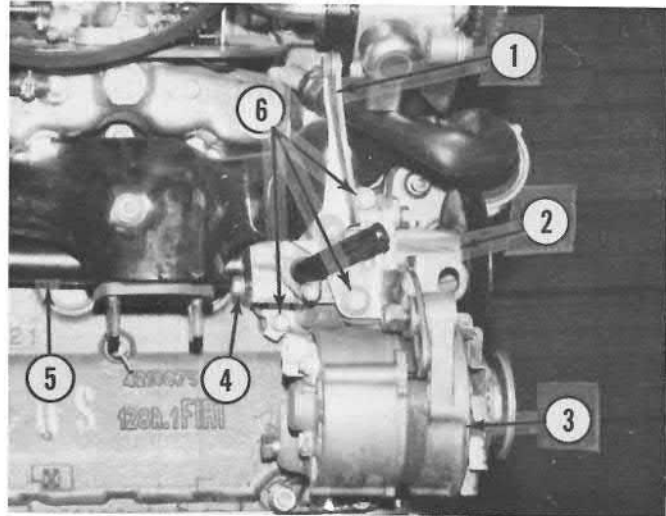
Remove 3 nuts (4) and washers holding pipe (5) to pump (2).

Remove bolt holding support (1) for air pump to water pump.

Remove 4 bolts (6) holding water pump (2) to engine.

Remove pump.

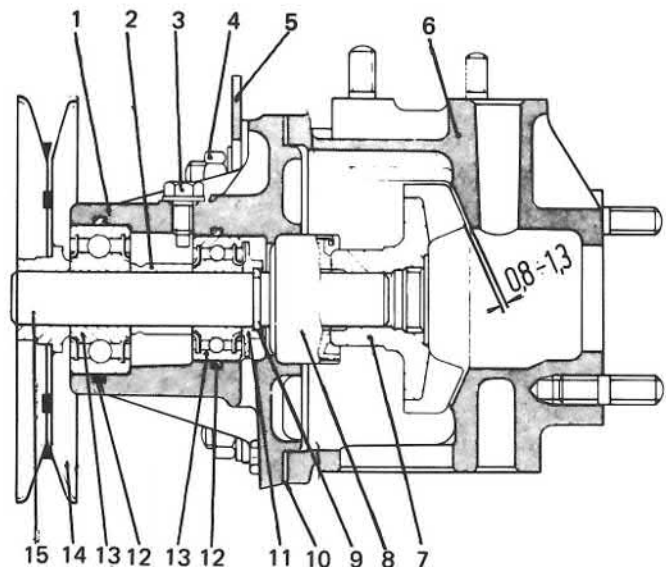
1. Support.      2. Water pump.      3. Alternator.  
4. Nut.      5. Pipe.      6. Bolts.



#### Longitudinal section of water pump

1. Pump cover
2. Spacer
3. Screw
4. Cover to housing nuts
5. Bracket
6. Housing
7. Impeller
8. Seal
9. Snap ring
10. Gasket
11. Shoulder ring
12. Grommets
13. Ball bearing
14. Pulley
15. Pump shaft

NOTE: Fit clearance between impeller (7) and pump housing (6) should be 0.03 to 0.051 in. (0.8 to 1.3mm).

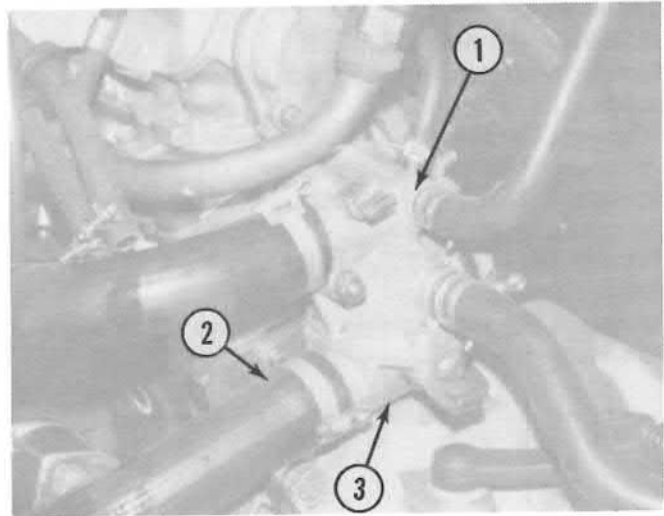


## Model X 1/9

### THERMOSTAT REMOVAL

Drain enough water to lower level below union (1).  
Remove air cleaner.  
Disconnect hose (2) from bottom of union. Remove 3  
bolts and washers holding cover (3) to union (1).  
Remove thermostat and gaskets.

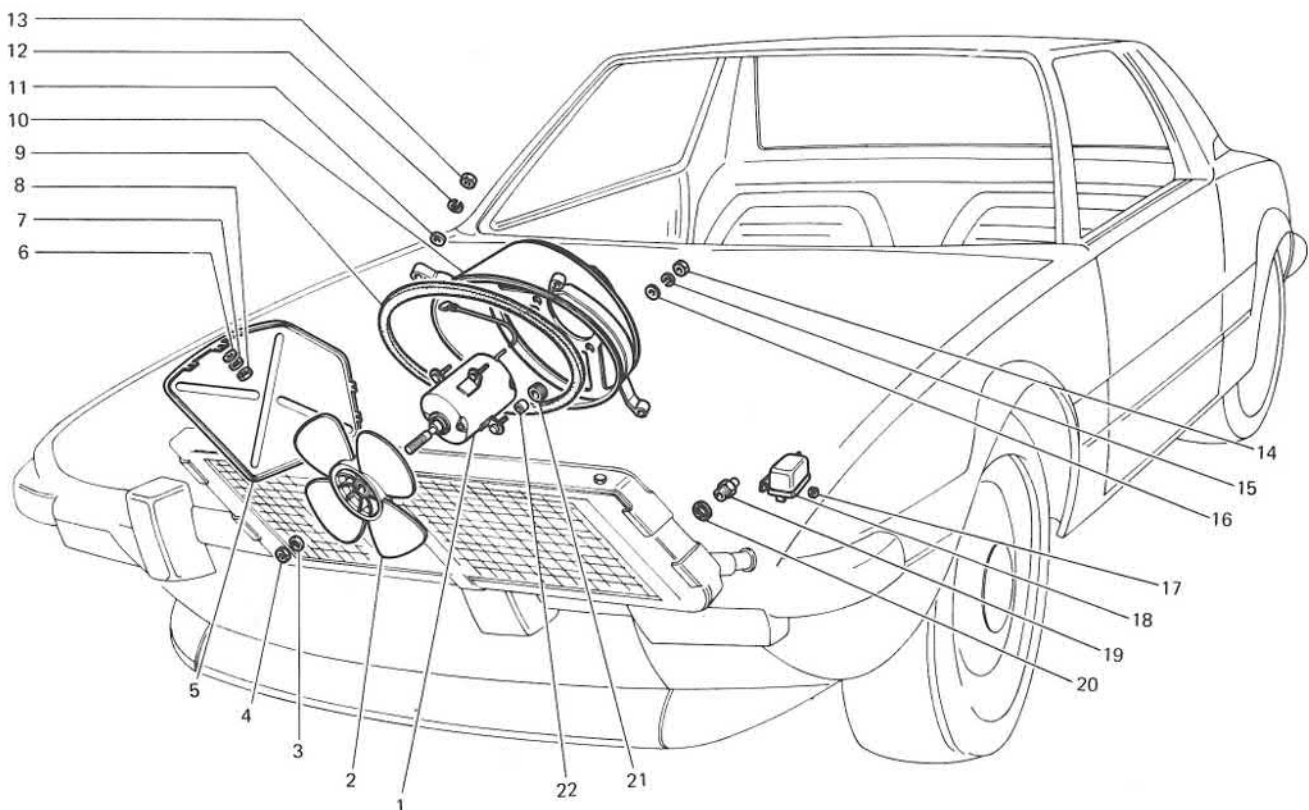
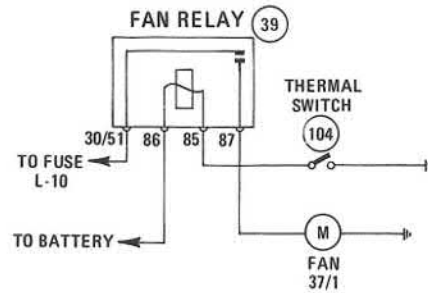
1. Union.    2. Hose.    3. Cover.



## Fan

### ELECTRIC FAN OPERATION

The electric fan is controlled by a relay. The relay is controlled by a thermostatic switch. When water temperature is 194° F (90° C) or above the switch closes. This connects the fan to power thru fuse L. The fan continues to run until the temperature drops below 185° F (85° C).



### EXPLODED VIEW OF FAN REMOVAL

- |               |                |                         |
|---------------|----------------|-------------------------|
| 1. Fan motor  | 9. Gasket      | 16. Washer              |
| 2. Fan        | 10. Conveyor   | 17. Nut                 |
| 3. Washer     | 11. Washer     | 18. Relay               |
| 4. Nut        | 12. Lockwasher | 19. Thermostatic switch |
| 5. Plate      | 13. Nut        | 20. Gasket              |
| 6. Washer     | 14. Nut        | 21. Lockring            |
| 7. Lockwasher | 15. Lockwasher | 22. Spacer              |
| 8. Nut        |                |                         |



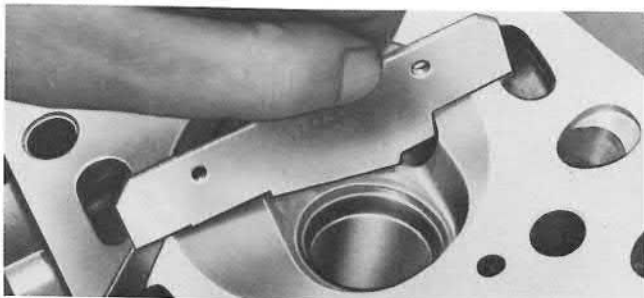
## Tool Equipment



A.60153 Remover and installer, valve guides in cylinder head.



A.90310 Reamer, valve guide bore.



A.96216 Gauge, checking depth of combustion chambers.



A.96219 Gauge, checking height of valve stem.

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# CLUTCH - 18

18

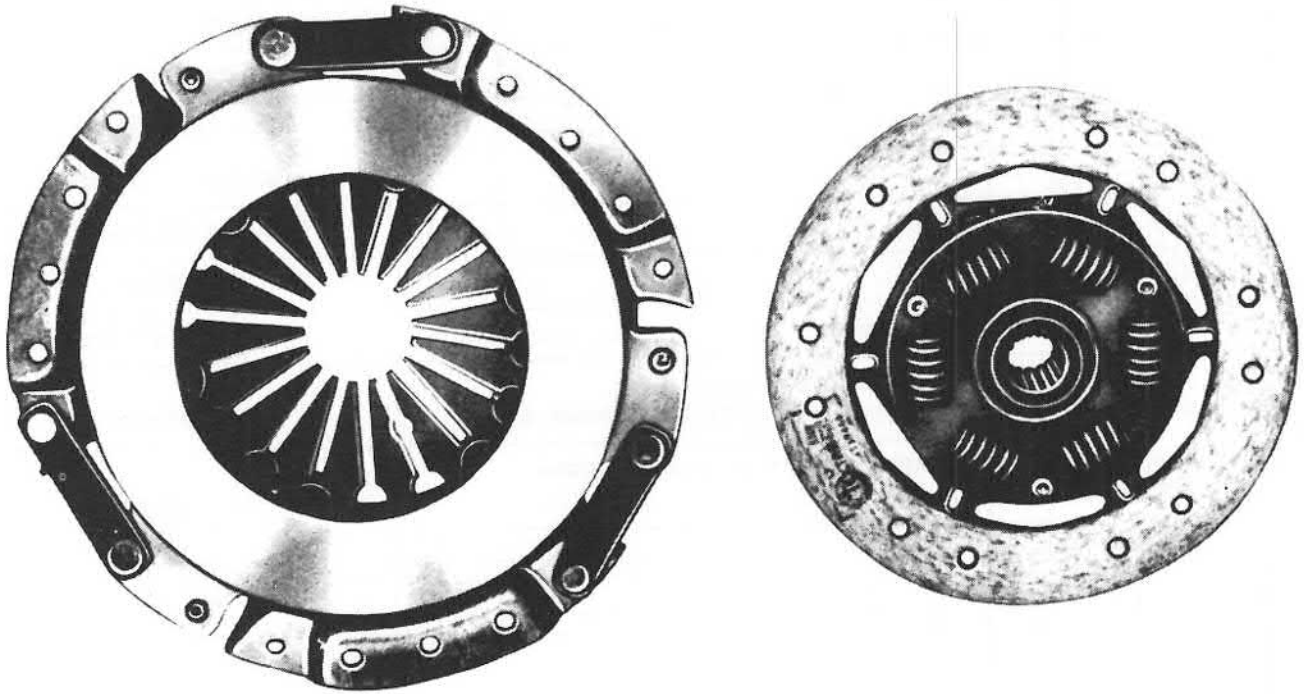
PARTS CATALOG CODE	SERVICE MANUAL & SERVICE TIME SCHEDULE CODE		Page
—	18	Specifications-Tightening Reference .....	83
B1.02	181.02	Clutch Release Hydraulic Control .....	85
B1.03	181.03	Master Cylinder .....	88
B1.04	181.04	Operating Cylinder .....	89
B1.05	181.05	Clutch .....	90

## Clutch SPECIFICATIONS

Type .....	single plate, dry
Control .....	hydraulic
Release mechanism .....	diaphragm spring
Clutch disc .....	with friction linings
Lining O.D. ....	7.145 in. (181.5mm)
Lining I.D. ....	5 in. (127mm)
Maximum runout of clutch disc linings .....	0.01 in. (0.25mm)
Clutch pedal free travel, corresponding to a clearance of 0.079 in (2mm) between diaphragm spring and release sleeve, about .....	1 in. (25mm)
Travel of release spring corresponding to a minimum pressure plate displacement of 0.071 in (1.8mm) .....	0.335 in. (8.5mm)
Master cylinder bore .....	$\frac{3}{4}$ in.
Operating cylinder bore .....	$\frac{3}{4}$ in.

## TIGHTENING REFERENCE

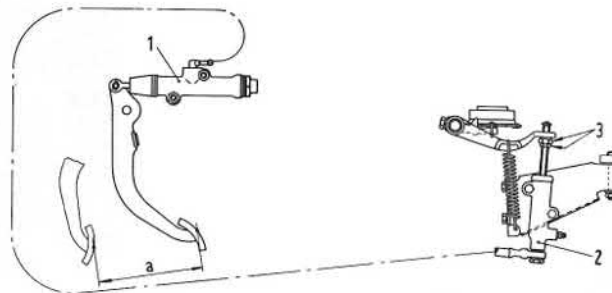
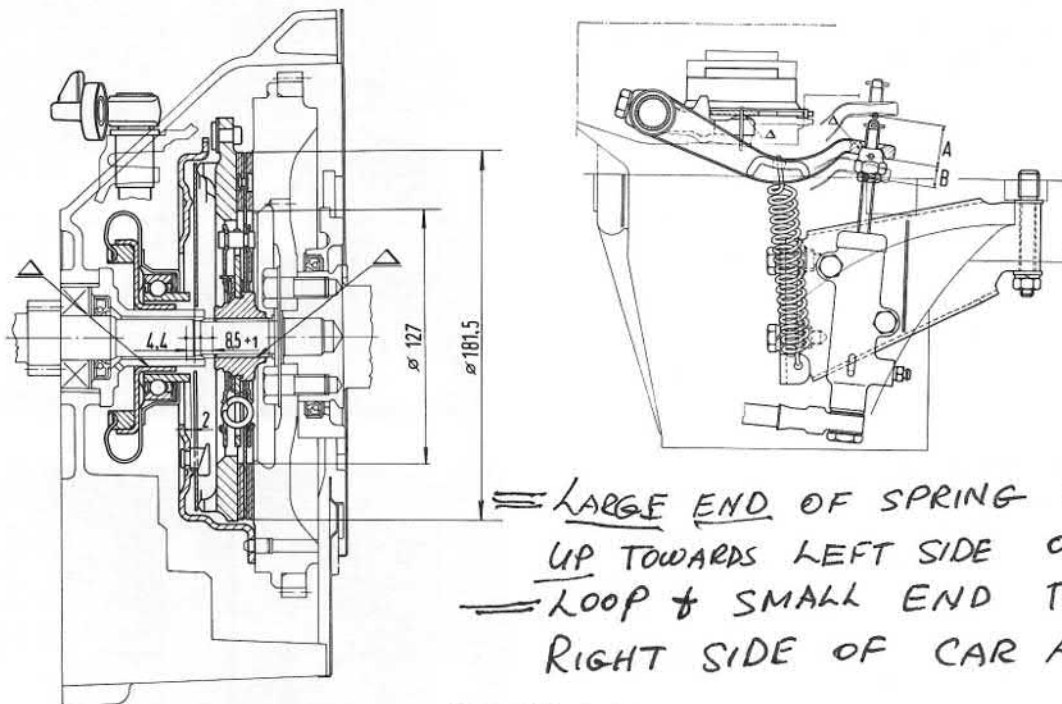
DESCRIPTION	THREAD (METRIC)	MATERIAL	TORQUE	
			FT. LBS.	kgm
Bolt, clutch to flywheel .....	M 6	R 100 Cdt	10.8	1.5
Bolt, clutch release fork .....	M 8	R 80 Znt	18	2.5
Nut, operating cylinder piston adjustment .....	M 8	R 50 Znt (shank R 50 Ind Znt)	18	2.5
Bolt, operating cylinder .....	M 8	R 80 Znt	18	2.5
Bolt, operating cylinder support plate to transmission case .....	M 8	R 80 Znt	18	2.5
Stud nut, operating cylinder support plate to transmission case .....	M 8	R 50 Znt (stud R 80 Znt)	18	2.5



**CLUTCH COVER AND CLUTCH DISC WITH LININGS**



## Clutch Release Hydraulic Control



### SECTION OF CLUTCH ASSEMBLY AND THRUST PAD.

- 0.079 in. (2mm) — Gap obtained by adjusting release control rod.
- 0.173 in. (4.4mm) — Maximum displacement from wear of driven plate linings.
- 0.335 in. (8.5mm) — Release travel.
- 5 in. (127mm) — Lining I.D.
- 7.145 in. (181.5mm) — Lining O.D.
- △ Lubrication points

### CLUTCH RELEASE HYDRAULIC CIRCUIT.

1. Master cylinder
  2. Operating cylinder
  3. Nut and counter nut, clutch release travel adjustment.
- a — 6.692" (170mm) Pedal release travel.

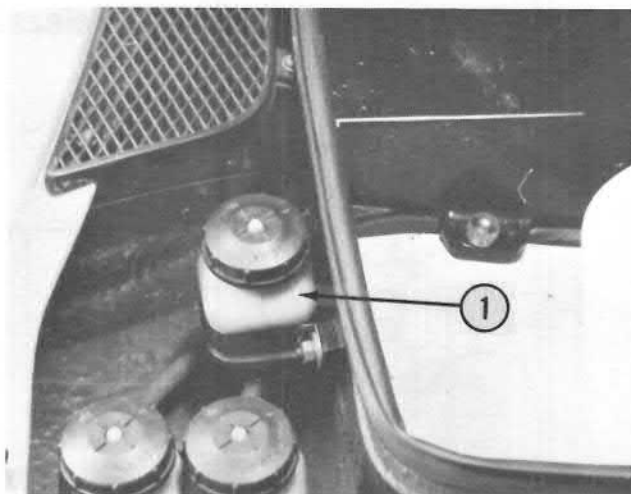
### SECTION THRU FORKED LEVER AND RELEASE SLEEVE.

- A — 1¼ in. (28.5mm) Declutching travel corresponding to a driven plate displacement of not less than 0.071 in. (1.8mm) and a bearing clearance of 0.079 in. (2mm).
- B — ½ in. (12.5mm) Travel of clutch release lever as a result of plate lining wear.

**FLUID CHECK**

Check fluid level in reservoir. Fluid level should be up to neck of reservoir.

If level is low check lines for leaking. Check master cylinder and operating cylinder.

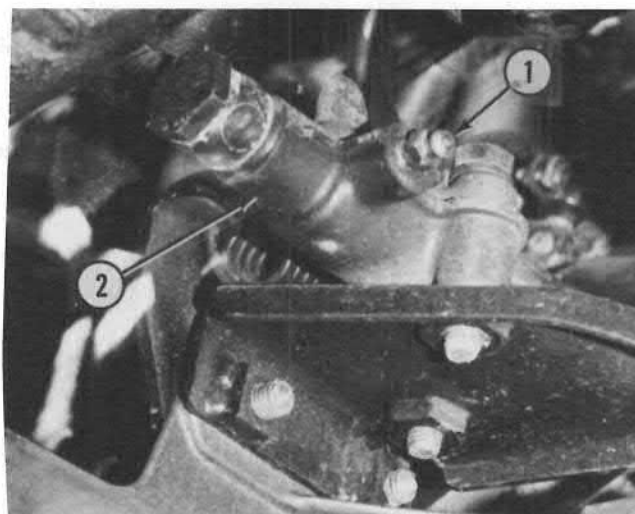
**BLEEDING CLUTCH CIRCUIT**

Connect a bleeder hose to bleeder screw on operating cylinder. Place other end of hose in container filled with fluid. Loosen screw on operating cylinder.

Push pedal in and release it until all air bubbles stop.

Push pedal in and hold it down. Remove hose. Tighten bleeder screw. Fill reservoir.

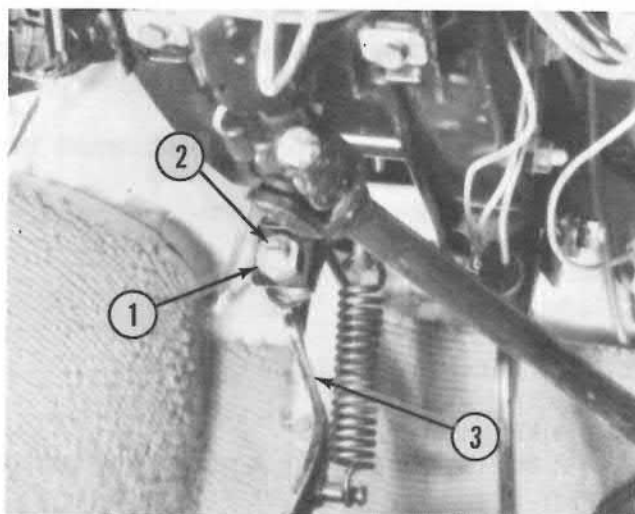
1. Bleeder screw. 2. Operating cylinder.

**CLUTCH PEDAL RELEASE TRAVEL**

The clutch pedal travel should be about 6.692 in. (170mm).

If travel is not right, loosen nut (1). Turn screw (2) out to reduce travel. Turn screw (2) in to increase travel.

1. Locknut. 2. Adjustment screw. 3. Clutch pedal.



## Clutch Release Hydraulic Control

### OPERATING CYLINDER ADJUSTMENT

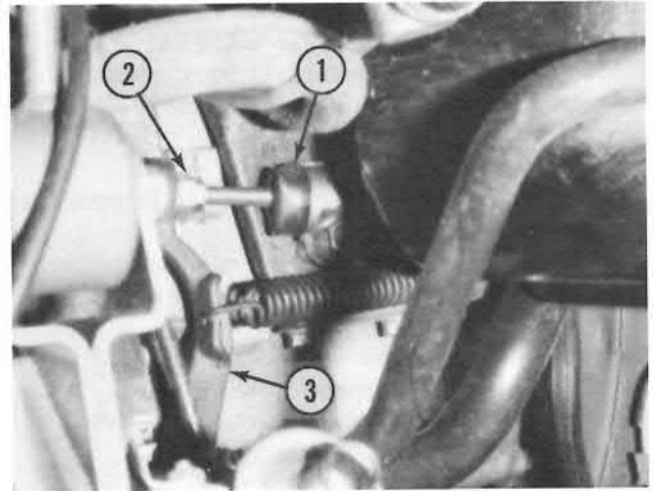
Measure from floor to clutch pedal. Push clutch in until pressure is felt.

Measure from floor to clutch pedal again. The difference should be about 1¼ in.

pedal again. The difference should be about 1¼ in. If travel is not right adjust the operating cylinder rod end.

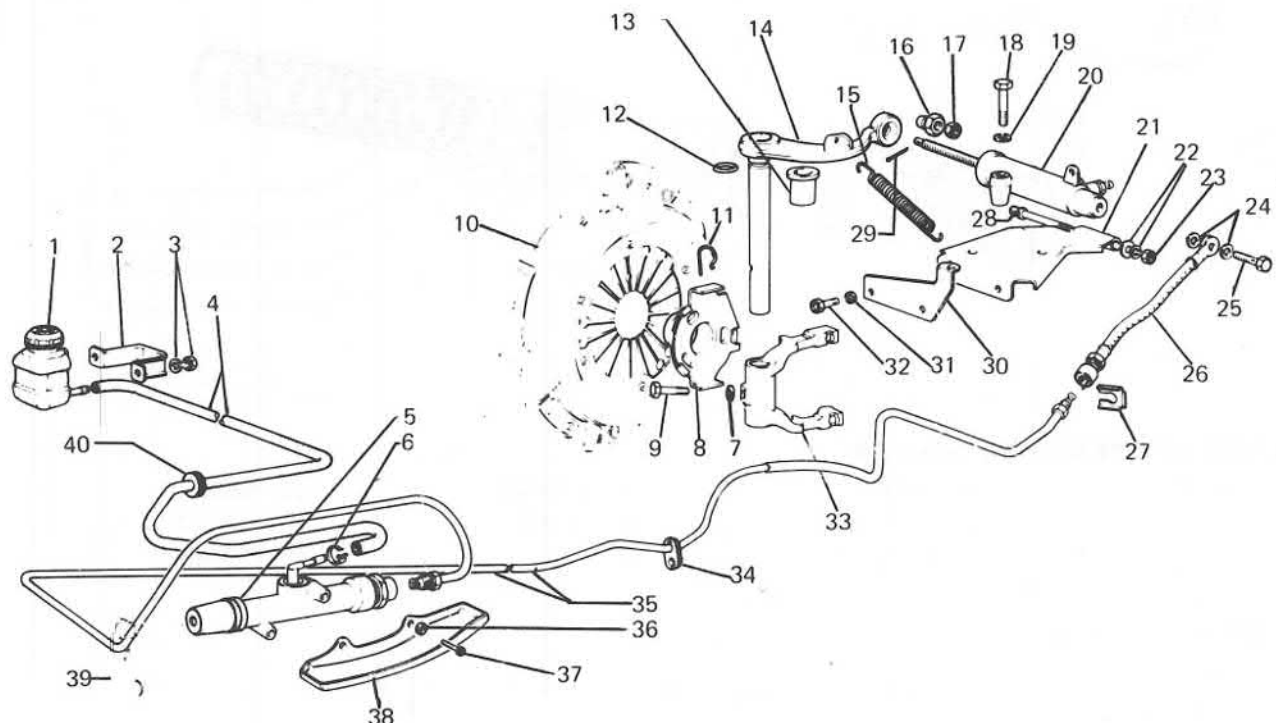
NOTE: To insure proper adjustments, the car must be driven on a road test.

1. Operating cylinder. 2. Adjustment nut. 3. Throw out bearing shaft.



### CLUTCH RELEASE CONTROL COMPONENTS

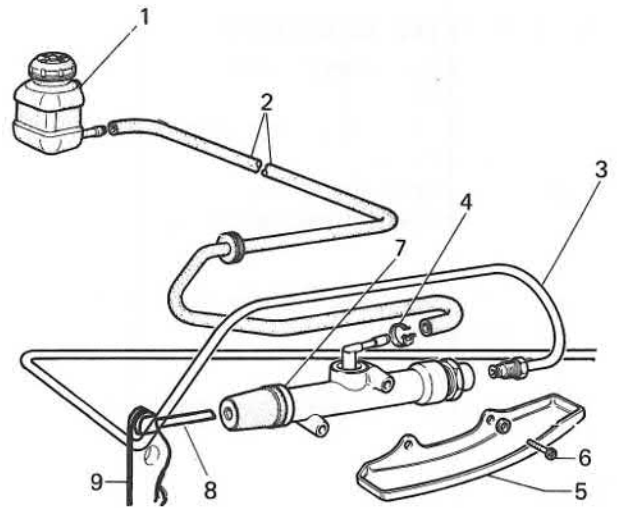
- |                       |                        |                 |
|-----------------------|------------------------|-----------------|
| 1. Reservoir          | 14. Shaft              | 27. Clip        |
| 2. Bracket            | 15. Spring             | 28. Bolt        |
| 3. Lockwasher and nut | 16. Nut                | 29. Cotter pin  |
| 4. Tube               | 17. Nut                | 30. Bracket     |
| 5. Master cylinder    | 18. Bolt               | 31. Washer      |
| 6. Clamp              | 19. Washer             | 32. Bolt        |
| 7. Washer             | 20. Operating cylinder | 33. Fork        |
| 8. Throw out bearing  | 21. Bracket            | 34. Rubber ring |
| 9. Bolt               | 22. Washer             | 35. Tube        |
| 10. Clutch            | 23. Nut                | 36. Washer      |
| 11. Spring            | 24. Gasket             | 37. Screw       |
| 12. Seal              | 25. Connector          | 38. Cover       |
| 13. Bushing           | 26. Hose               | 39. Pedal       |



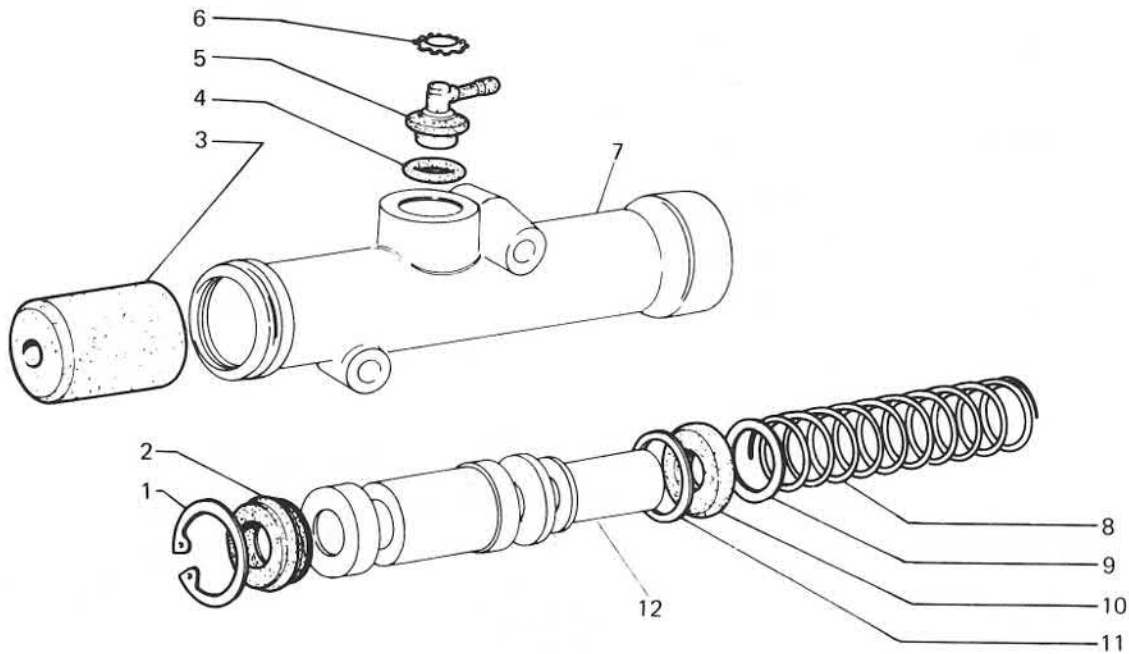
## Master Cylinder

### REMOVAL AND INSTALLATION

Remove steering column. Refer to 412.01.  
 Disconnect tube from master cylinder. Cap tubes.  
 Remove two bolts and washers holding cylinder to support plate.  
 Pull cylinder out and off rod.  
 Remove clamp holding hose on cylinder. Remove hose.  
 Drain oil into container.  
 Connect hose to new cylinder. Use new clamp.  
 Position cylinder on support plate.  
 Make sure rod is in cylinder.  
 Connect tube to cylinder.  
 Install bolts thru cylinder and brake cylinder.  
 Fill reservoir. Operate clutch and check for leaks.  
 Bleed clutch control circuit.  
 Install steering column.



- |               |          |              |           |
|---------------|----------|--------------|-----------|
| 1. Reservoir. | 2. Hose. | 3. Tube.     | 4. Clamp. |
| 5. Bracket.   | 6. Bolt. | 7. Cylinder. | 8. Rod.   |
| 9. Pedal.     |          |              |           |



### EXPLODED VIEW OF MASTER CYLINDER

- |             |              |             |             |
|-------------|--------------|-------------|-------------|
| 1. Lockring | 4. Gasket    | 7. Cylinder | 10. Seal    |
| 2. Seal     | 5. Connector | 8. Spring   | 11. Gasket  |
| 3. Boot     | 6. Lockplate | 9. Seal     | 12. Plunger |

## Operating Cylinder

### REMOVAL AND INSTALLATION

Remove union (3) from cylinder (2).

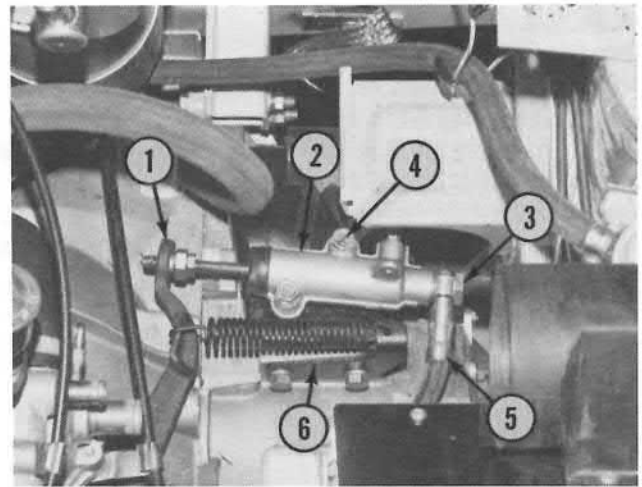
Remove split pin from end of cylinder rod thru shaft (1), shaft (1).

Hold back on shaft against spring. Remove two bolts (4) and washers holding cylinder to support plate (6). Pull cylinder out. Slowly release spring.

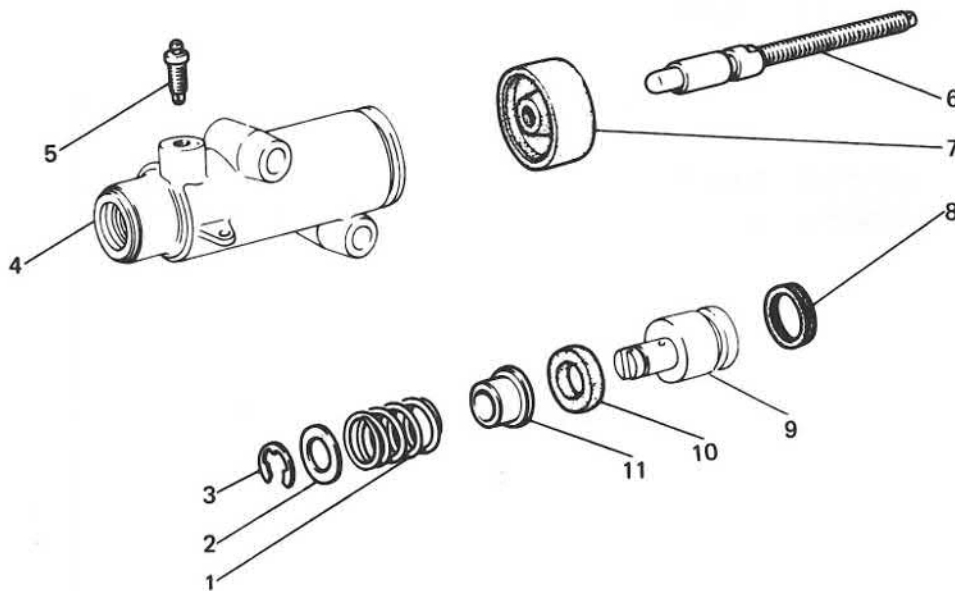
Position cylinder (2) on support plate (6) with rod thru shaft (1). Pry back on spring.

Install two bolts (4) and washers thru cylinder. Install split pin thru rod. Place new gasket on union (3). Place union thru hose (5). Place another new gasket on union (3). Install union in cylinder.

Bleed cylinder. Adjust cylinder. Fill reservoir.



1. Throw out bearing shaft. 2. cylinder. 3. Union.  
4. Bolt. 5. Hose. 6. Support plate.



### EXPLODED VIEW OF OPERATING CYLINDER

- |             |                   |             |
|-------------|-------------------|-------------|
| 1. Spring   | 4. Housing        | 7. Boot     |
| 2. Washer   | 5. Bleeding screw | 8. Seal     |
| 3. Lockring | 6. Rod            | 9. Piston   |
|             |                   | 10. Seal    |
|             |                   | 11. Bushing |

## Clutch

### REMOVAL AND INSTALLATION

Remove transmission.

Mark clutch position on flywheel (1).

Remove retaining bolts. Remove clutch.

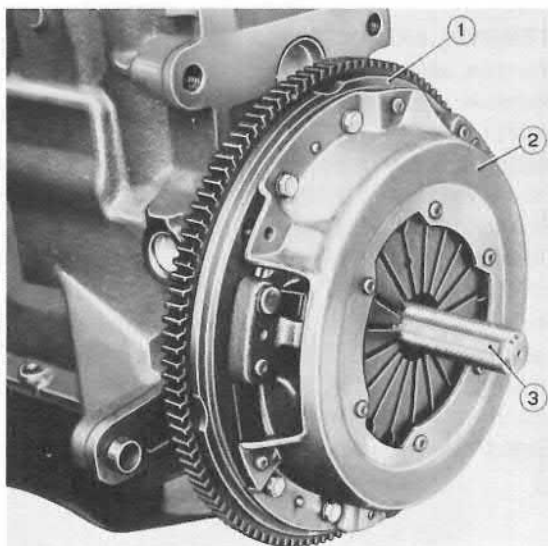
When installing clutch, place the protruding part of the hub next to the transmission.

Before tightening clutch to flywheel bolts, center disc.

Use tool A.70210. Torque bolts to 11 ft. lbs. (1.5kgm)

Reinstall transmission.

1. Flywheel.    2. Clutch assembly.    3. Tool



## 18A Tool Equipment



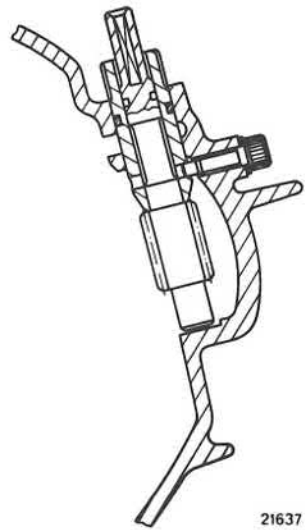
- A. 70210 Pilot, aligning driven plate.

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# TRANSMISSION—DIFFERENTIAL—21/27

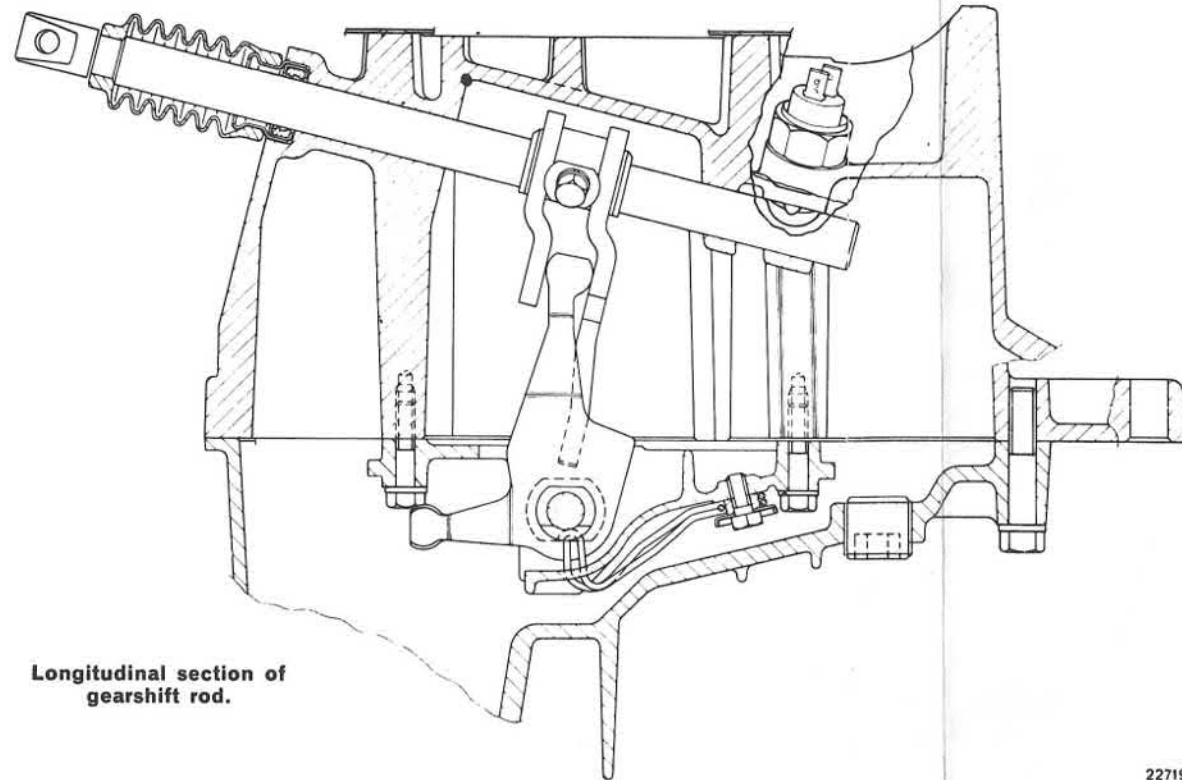
PARTS CATALOG CODE	SERVICE MANUAL SERVICE TIME SCHEDULE CODE		
—	21-27	Specifications-Tightening Reference .....	91
		<b>Gr. 212-TRANSMISSION</b>	
B2.01	212.01	Transmission Assembly .....	93
B2.07	212.07	Outer Gearshift Controls .....	103
		<b>Gr. 274-DIFFERENTIAL</b>	
B4.01	274.01	Axle Shafts .....	105
B4.04	274.04	Differential Gear Train .....	109
	21A-27A	Tool Equipment .....	114

**21**  
**27**

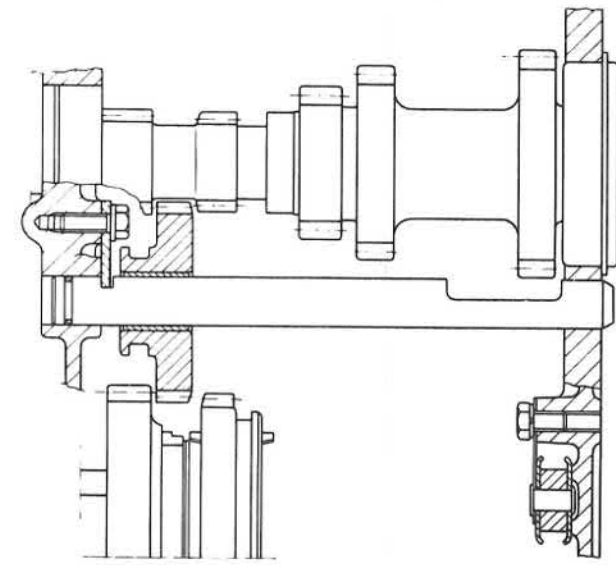


21637

Speedometer sprocket support section.

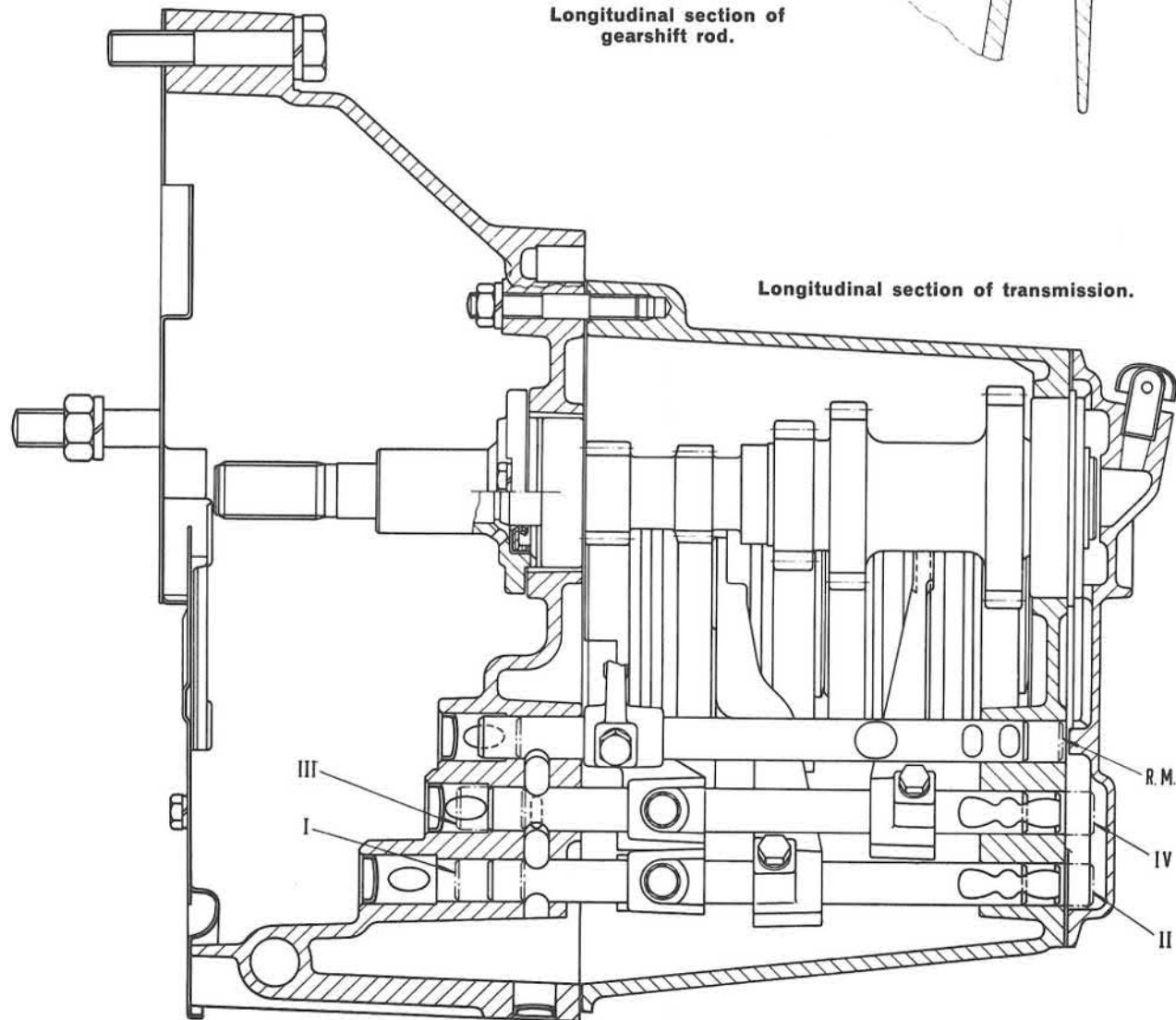


Longitudinal section of gearshift rod.



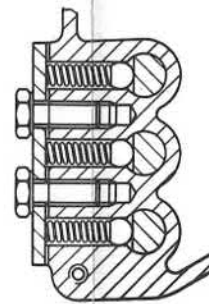
22465

Section through reverse idler gear.



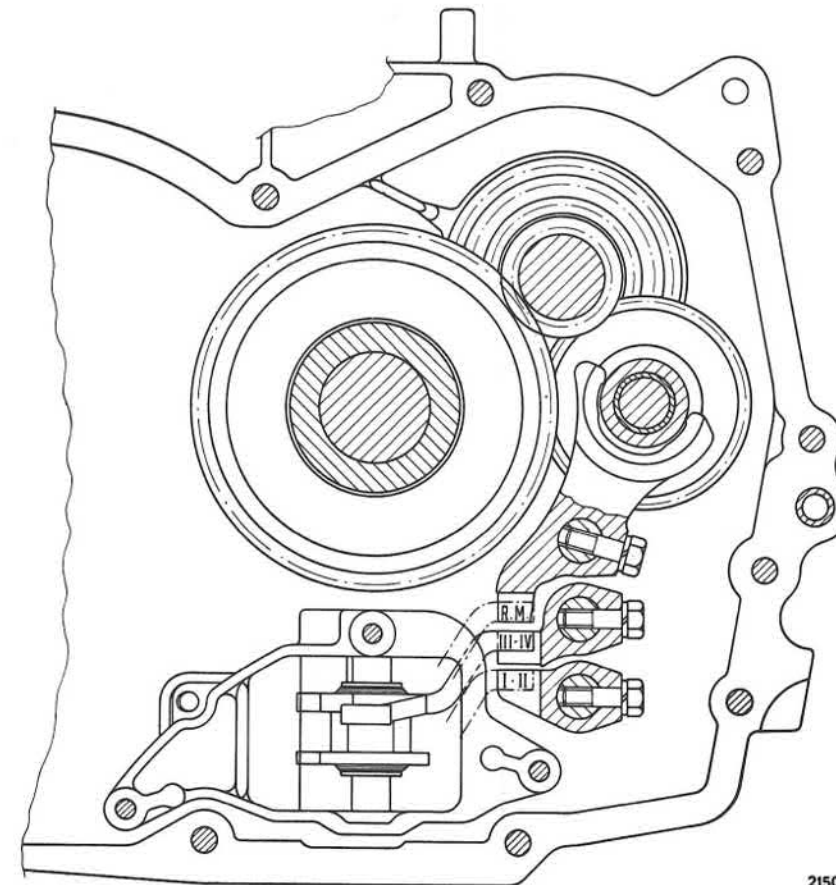
Longitudinal section of transmission.

22719



21638

Section through detent springs for gear control rods.



21505

Section through gear control lugs.

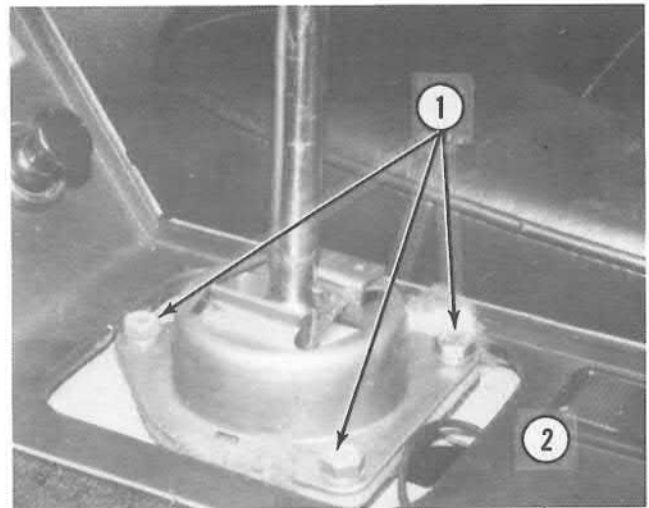


## Outer Gearshift Control

### REMOVAL AND INSTALLATION

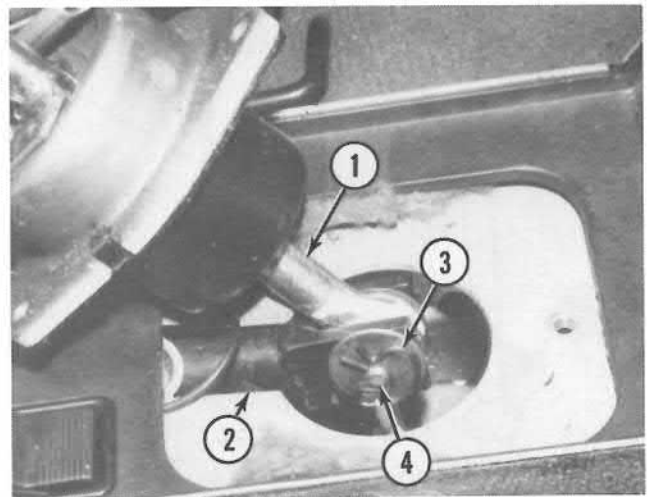
Remove dust boot off support.  
Remove 3 bolts (1) and washers holding support (2) in car. Lift support.

1. Bolts.
2. Support.



Remove pin (3) holding rod (2) to gear shift-lever (1).  
Remove dowel (4), bushing, and washer. Lift gearshift lever (1) out of car.

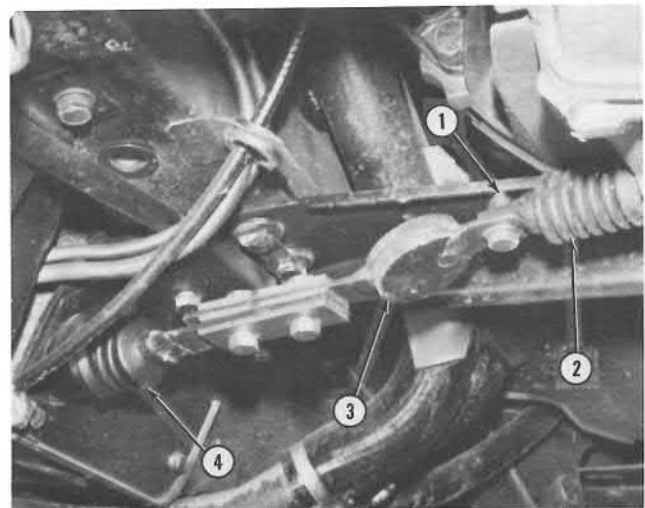
1. Gearshift lever.
2. Rod.
3. Cotter pin.
4. Dowel.



Remove bolt (1) and nut holding flexible rod (3) to transmission rod (2). Remove boot (4). Pull rod out of car from rear.

To install gearshift controls, reverse the above procedure.

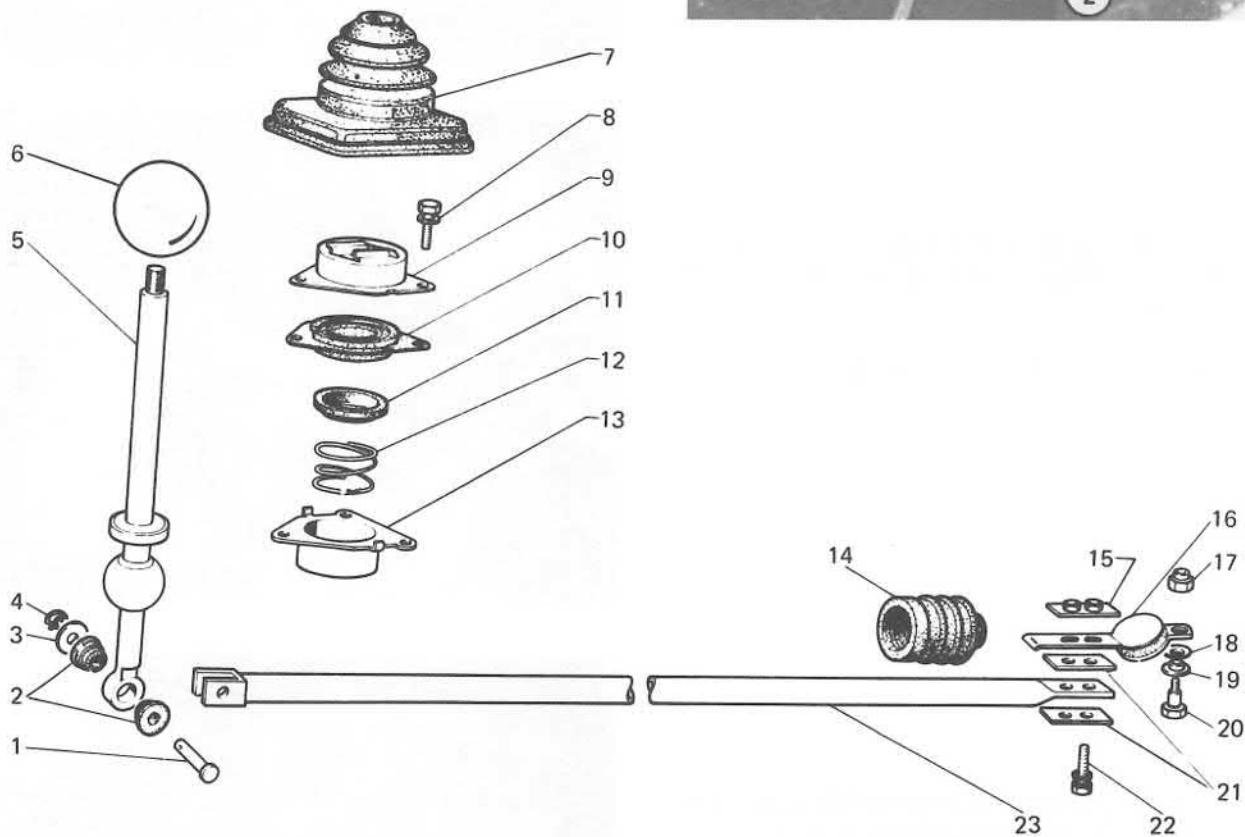
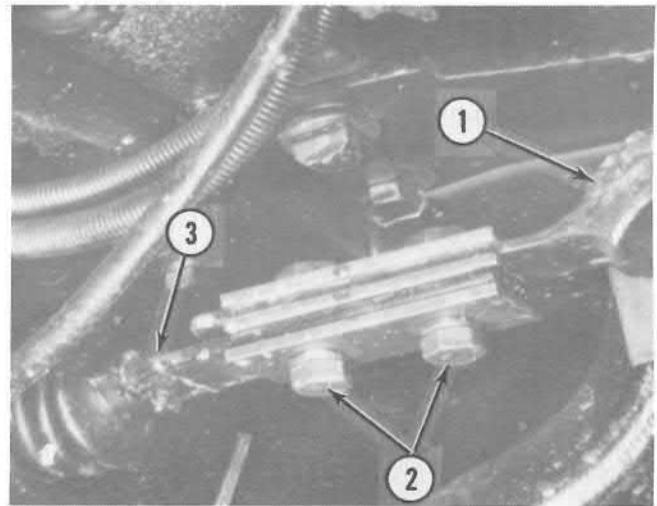
1. Bolt.
2. Transmission rod.
3. Flexible rod.
4. Boot.



### ADJUSTING GEARSHIFT LINKAGE

Place the transmission in neutral. Loosen two bolts (2) holding rod (3) to flexible rod (1). Shift flexible rod (1) in the elongated holes until gearshift lever is in center of guide plate and is straight up and down. Tighten bolts (2).

1. Flexible rod. 2. Bolts. 3. Rod.



### GEARSHIFT CONTROL ASSEMBLY

- |                    |                 |                  |             |
|--------------------|-----------------|------------------|-------------|
| 1. Dowel           | 7. Boot         | 13. Support      | 19. Bushing |
| 2. Rubber bushing  | 8. Bolt         | 14. Boot         | 20. Bolt    |
| 3. Washer          | 9. Guide        | 15. Plate        | 21. Plate   |
| 4. Cotter pin      | 10. Cap         | 16. Flexible rod | 22. Bolt    |
| 5. Gearshift lever | 11. Ball socket | 17. Nut          | 23. Rod     |
| 6. Knob            | 12. Spring      | 18. Lockwasher   |             |

## Axle Shafts

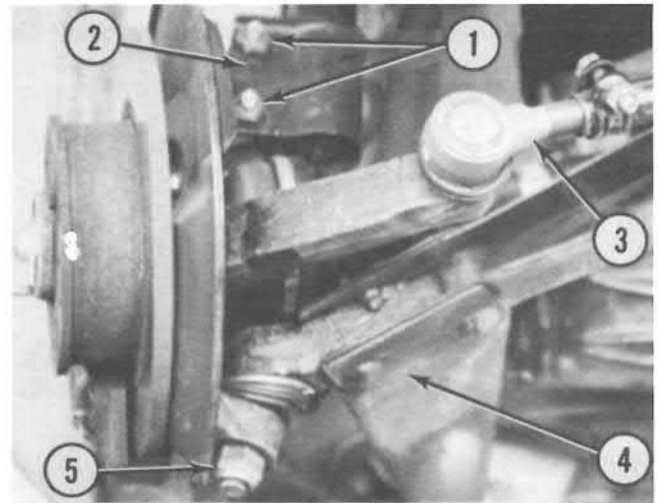
### REMOVAL AND INSTALLATION

Remove wheel. Remove 2 bolts and nuts (1) holding shock absorber (2) to pillar.

Remove nut (5) holding ball joint for control arm (4) in pillar. Remove ball joint from pillar.

Remove nut holding ball joint for strut (3) in pillar. Remove ball joint from pillar.

- |                 |                    |               |
|-----------------|--------------------|---------------|
| 1. Nut.         | 2. Shock absorber. | 3. Strut rod. |
| 4. Control arm. | 5. Nut.            |               |

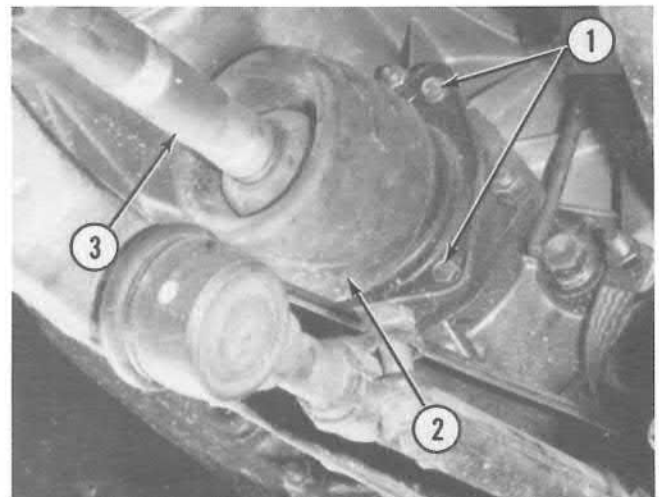


Drain some oil from transmission.

Remove 3 bolts (1) and washers holding oil seal boot (2) to differential.

Pull axle shaft and wheel hub out of differential.

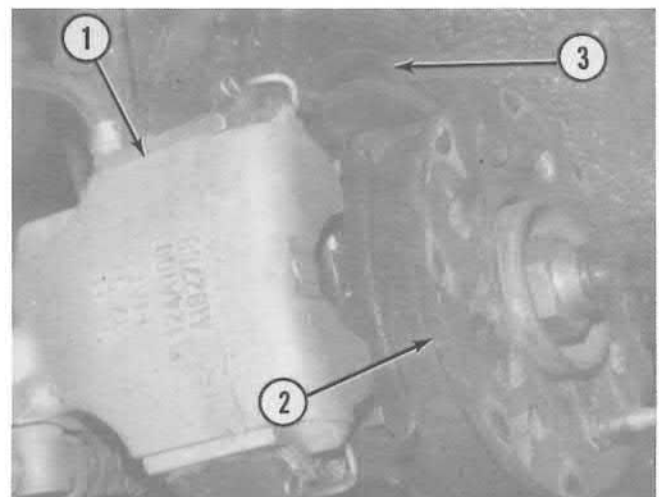
- |           |                   |                |
|-----------|-------------------|----------------|
| 1. Bolts. | 2. Oil seal boot. | 3. Axle shaft. |
|-----------|-------------------|----------------|



Remove brake caliper (1) and support bracket from pillar.

Remove bolts holding plate (2) and disc (3) to hub. Remove plate and disc.

- |             |           |          |
|-------------|-----------|----------|
| 1. Caliper. | 2. Plate. | 3. Disc. |
|-------------|-----------|----------|

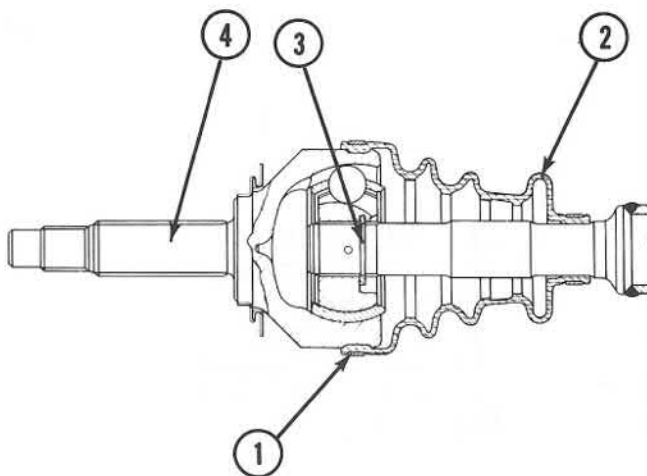


Remove clamp (1) holding boot (2) to constant-speed joint. Pull boot back to uncover joint. Clean grease off joints.

Remove lockring (3) from constant-speed joints. Use pliers.

Remove axle shaft from joints.

- 1. Clamp.
- 2. Boot.
- 3. Lockring.
- 4. Constant-speed joint.



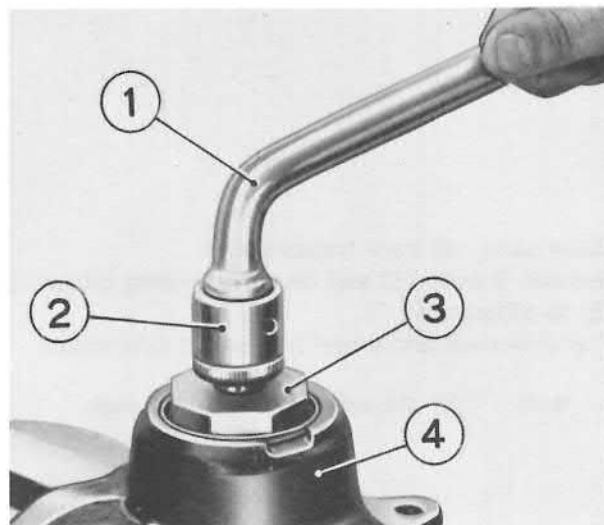
Remove hub nut and washer.

Pull constant-speed joint out of hub.

Using a press remove hub from pillar.

Remove ring nut holding bearing in pillar. Use tool A.57123. Remove bearing from pillar. Use tool 8015.

- 1. Lever.
- 2. Socket.
- 3. Ring nut tool.
- 4. Pillar.

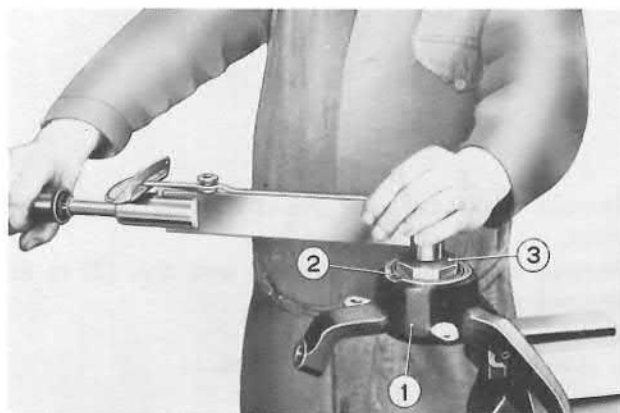


Install bearing in pillar. Use tool 8015.

Screw a new ring nut in pillar to hold bearing. Torque nut to 43 ft. lbs. (6kgm). Use tool A.57123 and torque wrench.

NOTE: Always use a new ring nut after disassembling pillar.

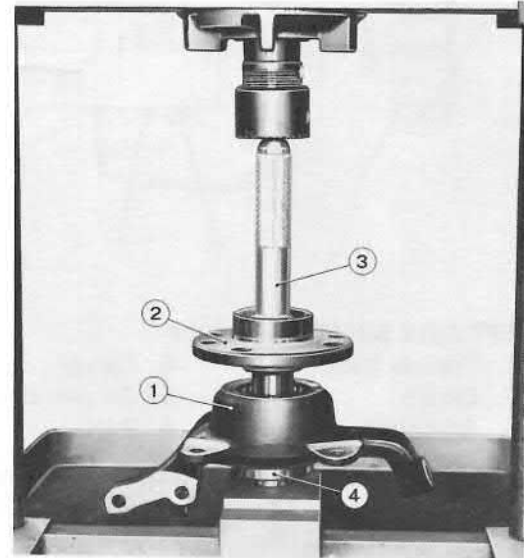
- 1. Pillar.
- 2. Ring nut.
- 3. Tool.



## Axle Shafts

Press hub (2) into pillar (1).  
 Install constant-speed joint in hub.  
 Install washer and hub nut. Torque nut to 101 ft. lbs.  
 (14kgm).  
 Stake hub nut.

1. Pillar. 2. Hub. 3. Driver. 4. Tool.



Install brake disc and plate. Secure disc with 2 bolts.  
 Install brake caliper and support bracket.  
 Install axle shaft in constant-speed joint (1).  
 Install snap ring (2). Make sure snap ring is seated  
 correctly in groove in axle shaft. Move shaft in and out  
 to make sure snap ring is in groove.

1. Constant-speed joint. 2. Snap ring.

Grease constant-speed joint sockets and boot. Use no  
 more than 3 $\frac{3}{8}$  ozs. of grease. Install boot over joint.  
 Install clamp.

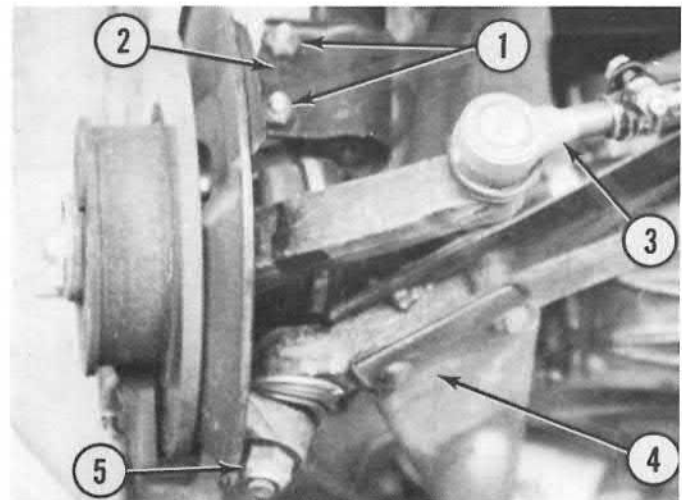
Place axle shaft in differential. Place ball joint of  
 control arm (4) in pillar. Secure ball joint with nut (5).  
 Place ball joint of strut rod (3) in pillar. Secure ball  
 joint with nut.

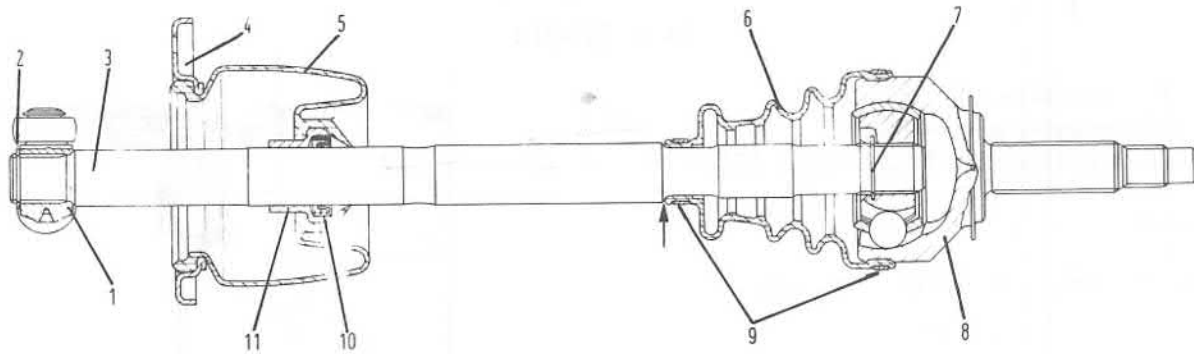
Install 2 bolts and nuts (1) thru pillar and shock  
 absorber (2).

Torque suspension bolts with car laden. Refer to  
 Specifications, 44.

Install 3 bolts and lockwashers holding oil seal boot  
 to differential.

1 Nut. 2. Shock absorber. 3. Strut rod.  
 4. Control arm. 5. Nut.



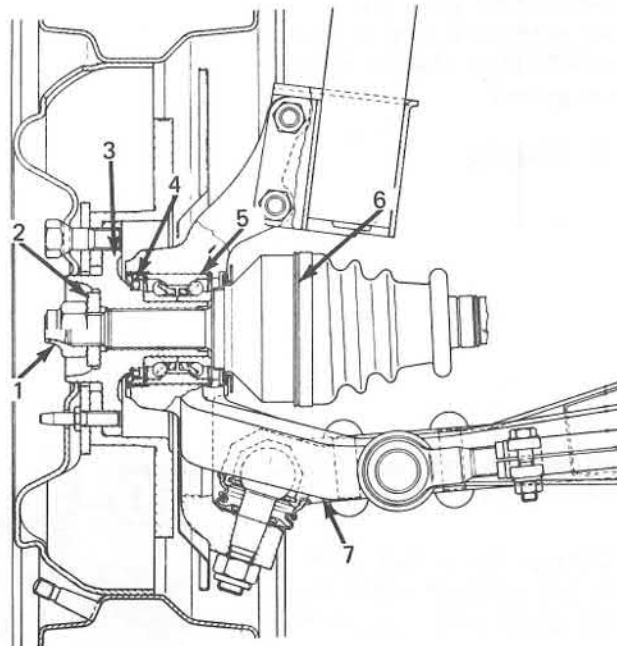


**LEFT AXLE SHAFT ASSEMBLY**

- |                  |                  |                         |                  |
|------------------|------------------|-------------------------|------------------|
| 1. Tripode joint | 4. Flange        | 7. Snap ring            | 10. Sealing ring |
| 2. Circlip       | 5. Oil seal boot | 8. Constant-speed joint | 11. Bushing      |
| 3. Axle shaft    | 6. Boot          | 9. Boot clamps          |                  |

Arrow indicates shoulder which boot (6) should be in contact with after installation.

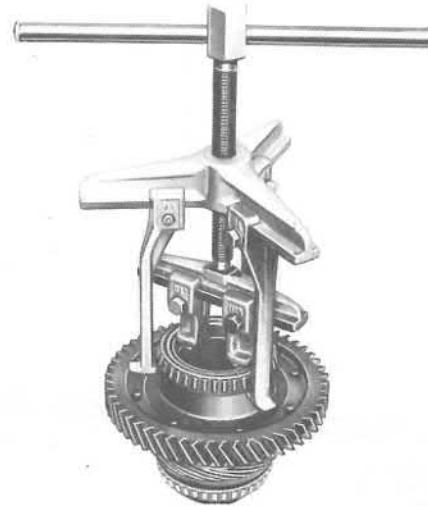
1. Hub nut
2. Washer
3. Hub
4. Bearing ring nut
5. Bearing
6. Constant-speed joint
7. Pillar



## Differential Gear Train

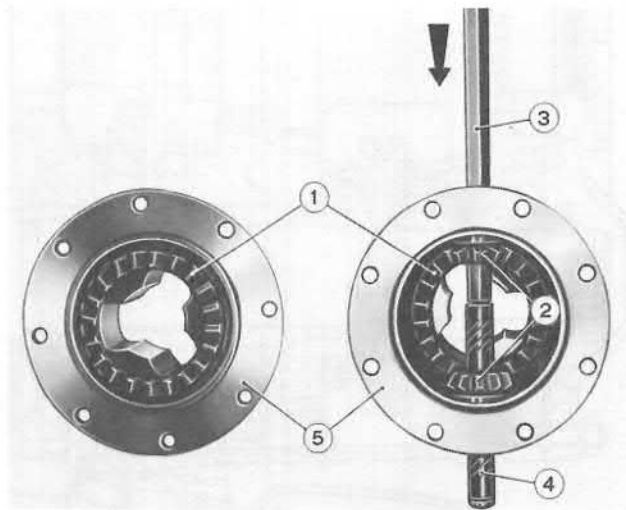
### DISASSEMBLY AND ASSEMBLY

Remove inner race of bearings from half-cases. Use three-arm puller with extraction brackets.



Remove eight bolts holding half-cases together.  
Remove lockplate from pinion shaft.  
Drive pinion shaft out of half case.  
Remove side gear, pinion gears, and thrust washers.

1. Side gears.    2. Pinion gears.    3. Driver.  
4. Pinion shaft.    5. Half-cases.



Wash all parts.

Check teeth for damage and wear. Check contact pattern.

Check pinion shaft and pinion bores for damage.

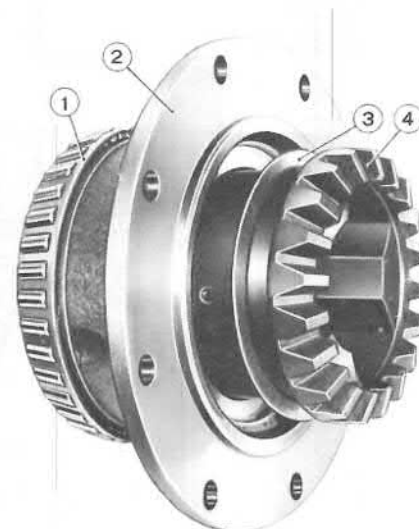
Check side gears and counter bores in half cases for damage.

Check bearings for wear or damage.

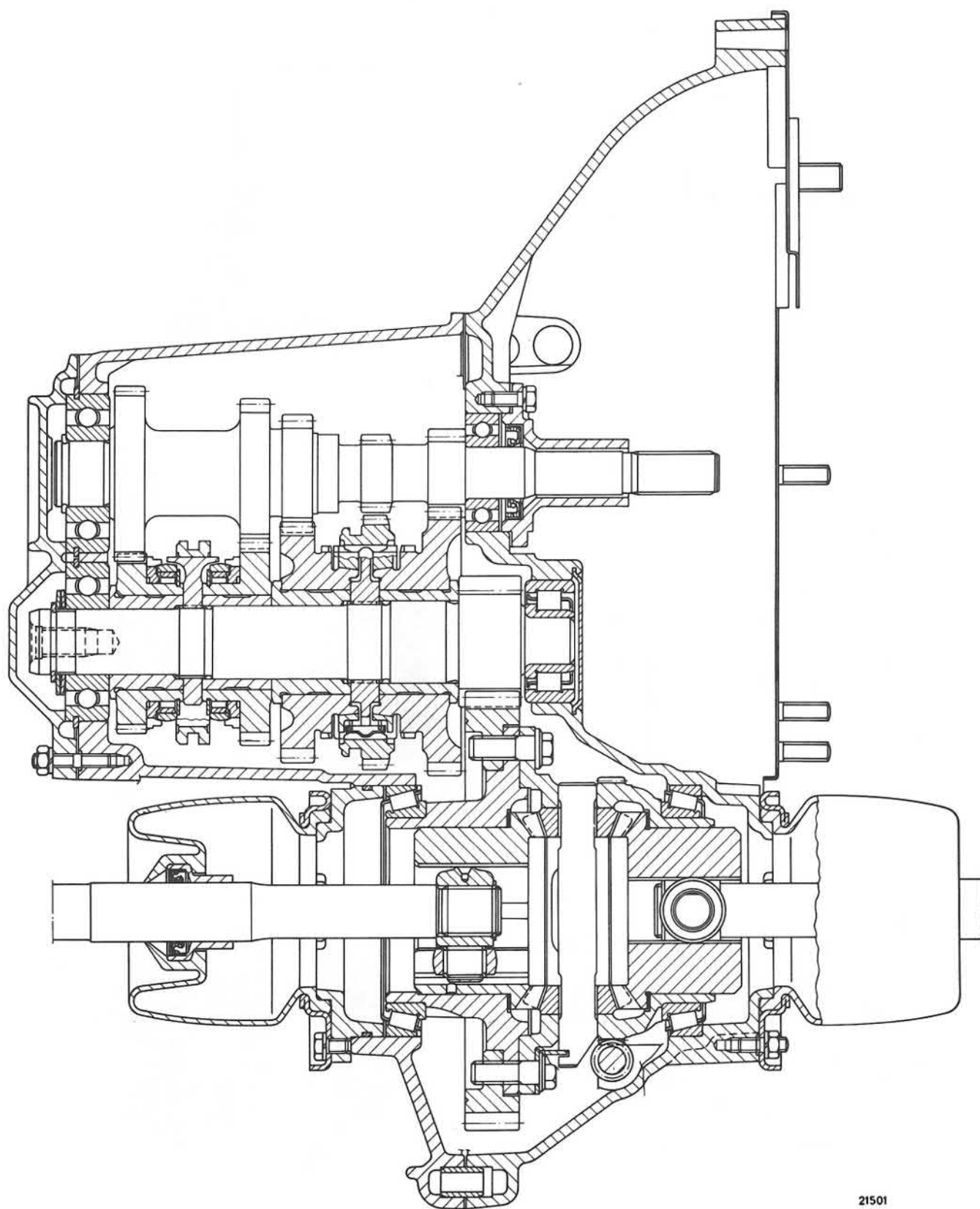
Check thrust washers for wear or damage.

Repair or replace damaged parts.

1. Bearing.    2. Half-case.    3. Thrust ring.  
4. Side gear.



**DIFFERENTIAL SECTION**





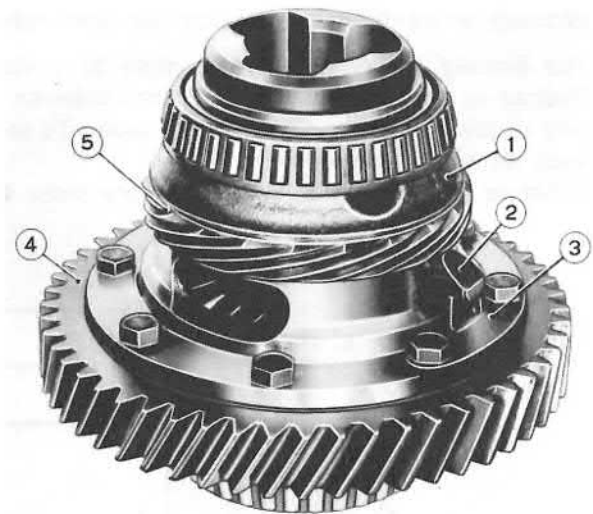
## Differential Gear Train

Place thrust washer and side gear in half case carrying speedometer drive teeth. Place pinions in case. Install pinion shaft in case.

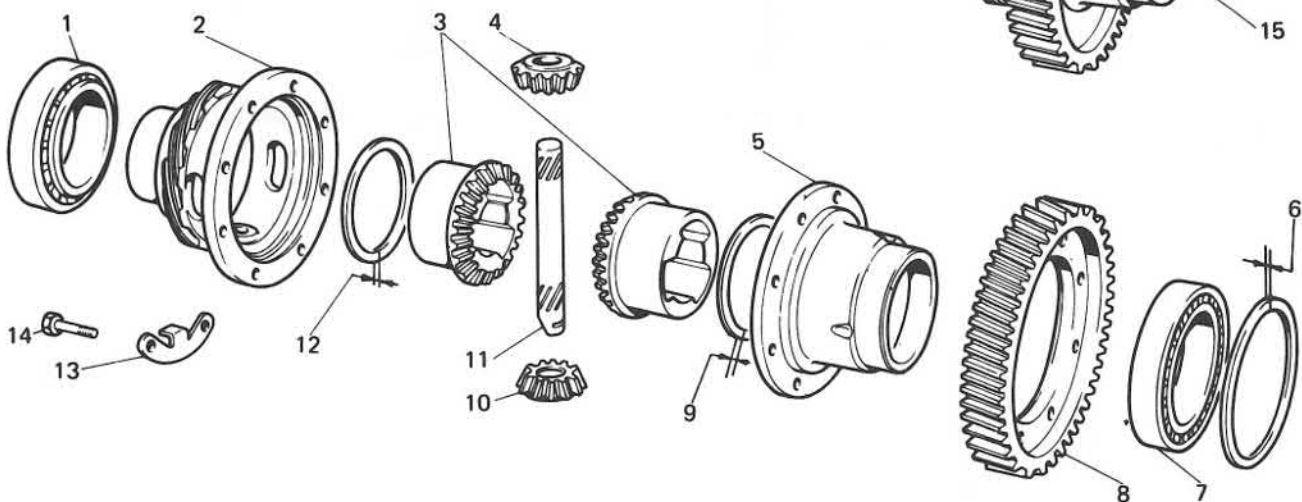
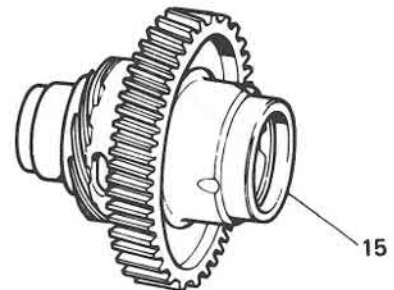
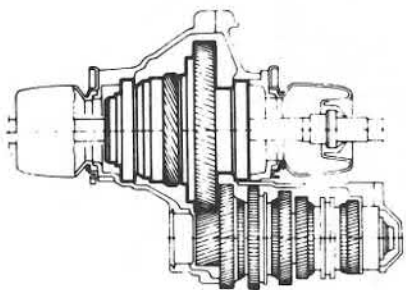
Place side gear and thrust washer in other half case. Place cases together, Align reference marks.

Place ring gear on case. Place lockplate for pinion shaft in place. Install eight bolts. Torque bolts to 51 ft. lbs. (7kgm).

Check backlash between side gears and pinions. Backlash must not exceed 0.004 in. (0.1mm)  
Install two bearings on case. Use proper driver on inner rings of bearings.



1. Half-case.    2. Pinion shaft.    3. Lock plate.  
4. Ring gear.    5. Speedometer teething.



### EXPLODED VIEW OF DIFFERENTIAL ASSEMBLY

- |                |              |                  |                    |
|----------------|--------------|------------------|--------------------|
| 1. Bearing     | 5. Half case | 9. Thrust washer | 13. Lockplate      |
| 2. Half case   | 6. Ring      | 10. Pinion gear  | 14. Bolt           |
| 3. Sun gear    | 7. Bearing   | 11. Pinion shaft | 15. Gears and case |
| 4. Pinion gear | 8. Ring gear | 12. Thrust ring  |                    |

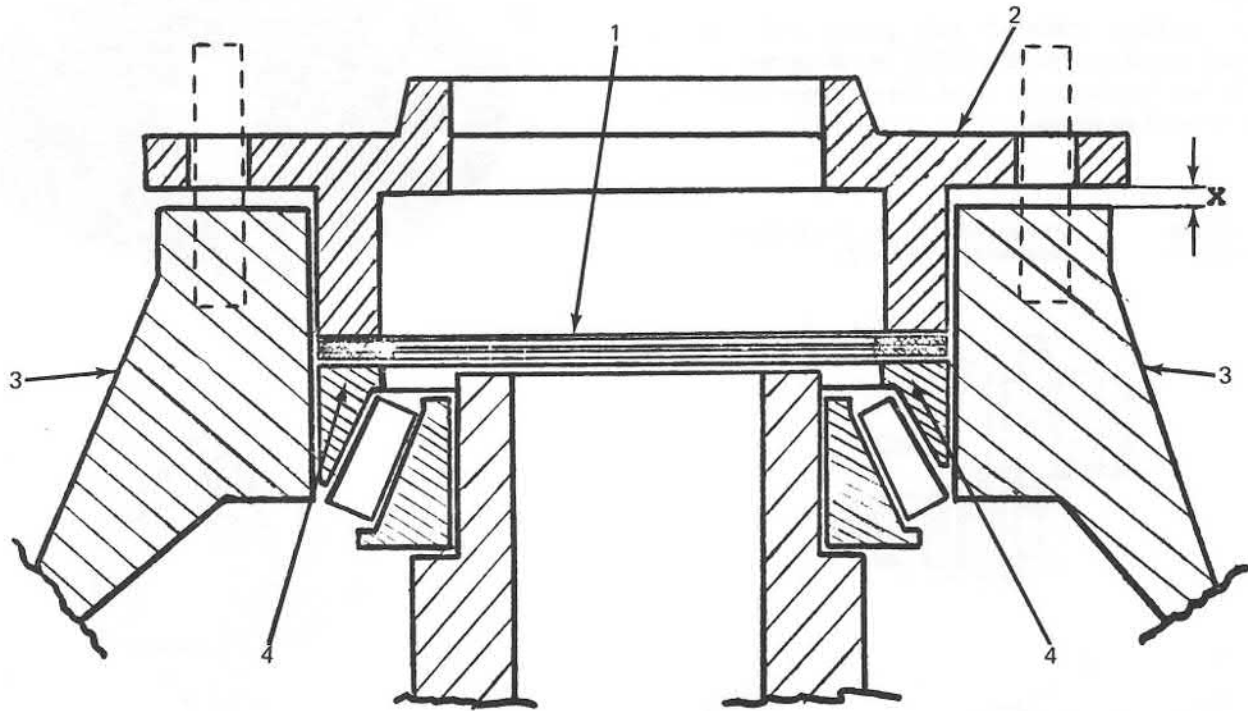
**DIFFERENTIAL BEARING SETTING**

NOTE: Bearing preload must not be changed unless the bearings or transmission housing has been replaced.

The bearing on the differential must be preloaded. Preload is obtained by placing shims between outer ring of the bearing and the sealing cover. To set preload, do one of the following:

If fixture A.95655 is not available, place outer ring of

carrier bearing in its seat. Place shims on top of bearing. Place retaining flange on shims. Using feeler gauge measure clearance between flange and transmission housing. If clearance is not 0.003 to 0.005 in. (0.08 to 0.12mm), add or remove shims to obtain this clearance. Install two nuts on studs thru flange and tighten nuts. Turn transmission one full turn to set bearings. Loosen nuts and check clearance. Install nuts on studs. Torque nuts to 18 ft. lbs. (2.5kgm).



1. Shims. 2. Retaining flange. 3. Transmission housing. 4. Bearing.

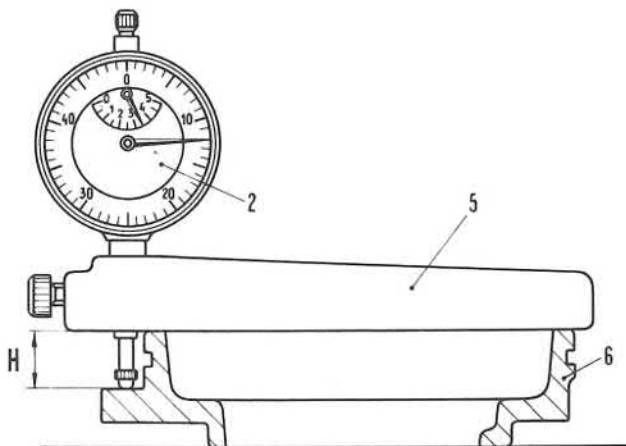
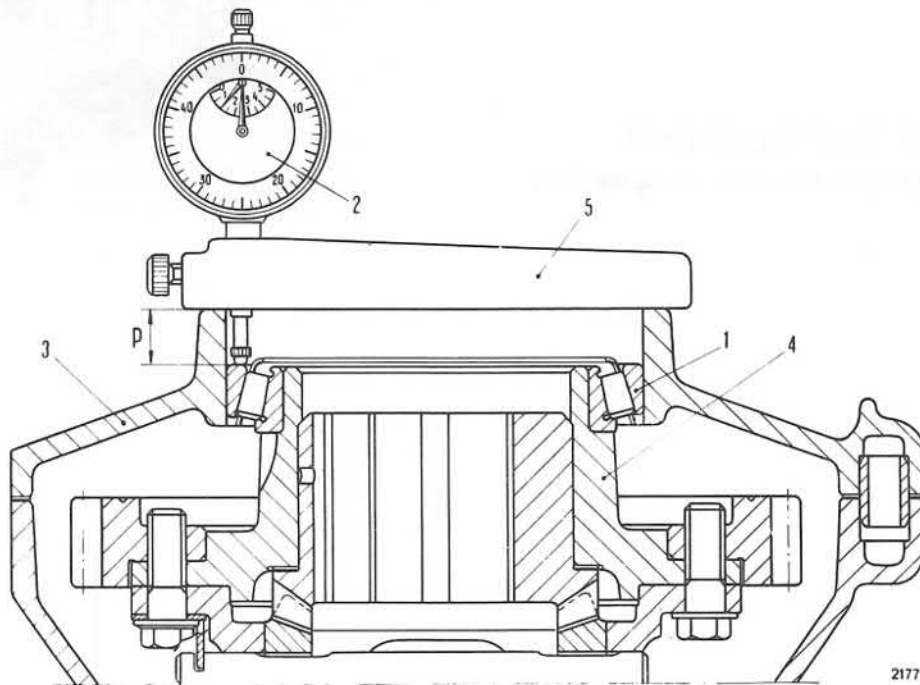
## Differential Gear Train

If fixture A.95655 is available, apply a load of 770 lbs. (350kg) to settle bearings. Place fixture A.95655 with dial indicator on surface for sealing cover. Set dial indicator finger against outer ring of bearing. Zero indicator.

Without changing the indicator, place fixture on sealing cover with finger on cover and case surface. Value on indicator is difference between distance "P" and height "H".

Add 0.0031 in. (0.08mm) to value on indicator to determine thickness of shims. Choose a shim with a thickness as close as possible to this value.

NOTE: Shims are supplied in the following thicknesses; 0.0196, 0.0236, 0.0275, 0.0315, 0.0354, 0.0394, 0.0433 in. (0.50, 0.60, 0.70, 0.80, 0.90, 1.00, 1.10mm).



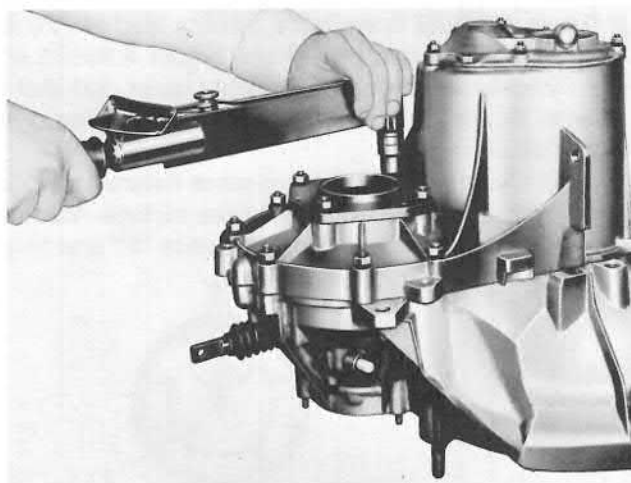
1. Bearing
2. Dial indicator
3. Transmission case
4. Differential case
5. Tool A.95655

6. Sealing cover

P=Distance between mounting surface for cover (6) and outer ring of bearing (1).

H=Height of sealing cover.

Place shim on outer ring of bearing. Install cover.  
Torque attaching nuts to 18 ft. lbs. (2.5kgm).



**21A-27A Tool Equipment**  
**A.70284 Compressor, countershaft spring washers**

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# B R A K E S — 3 3

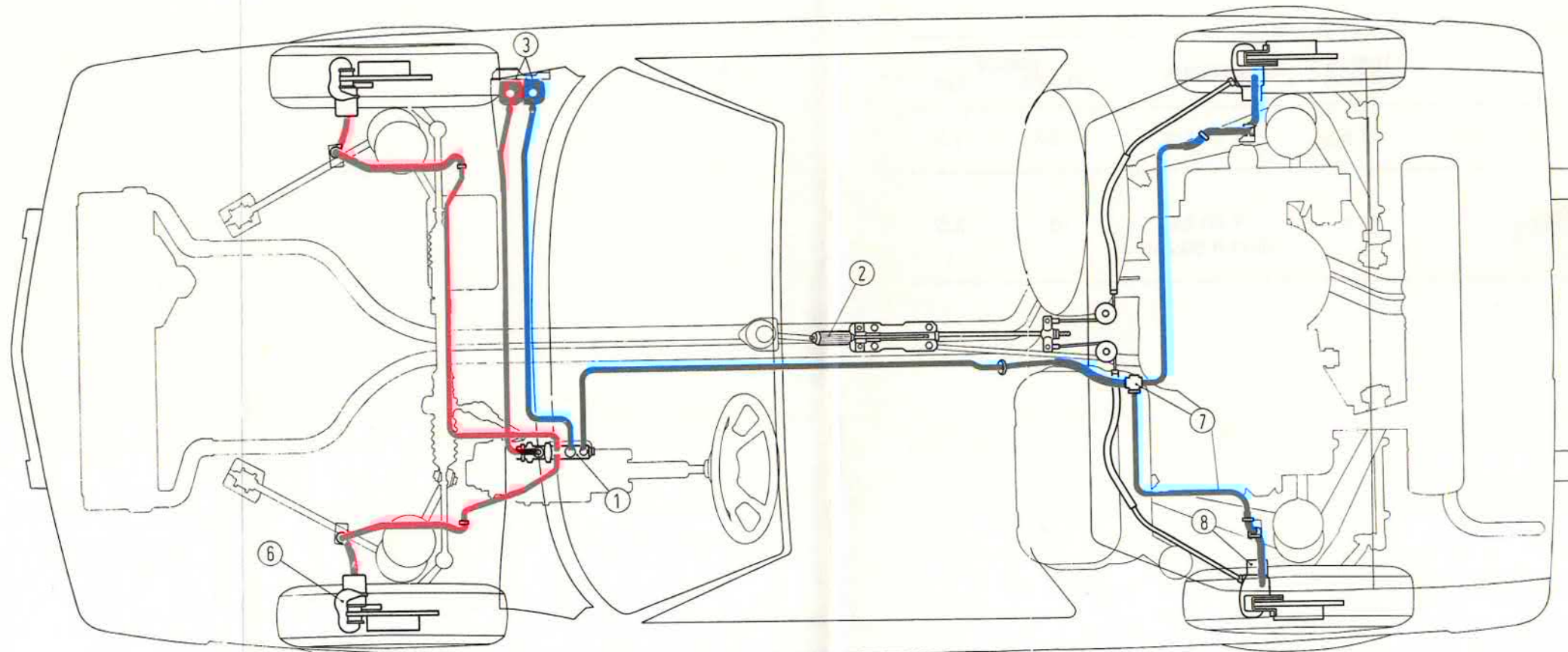
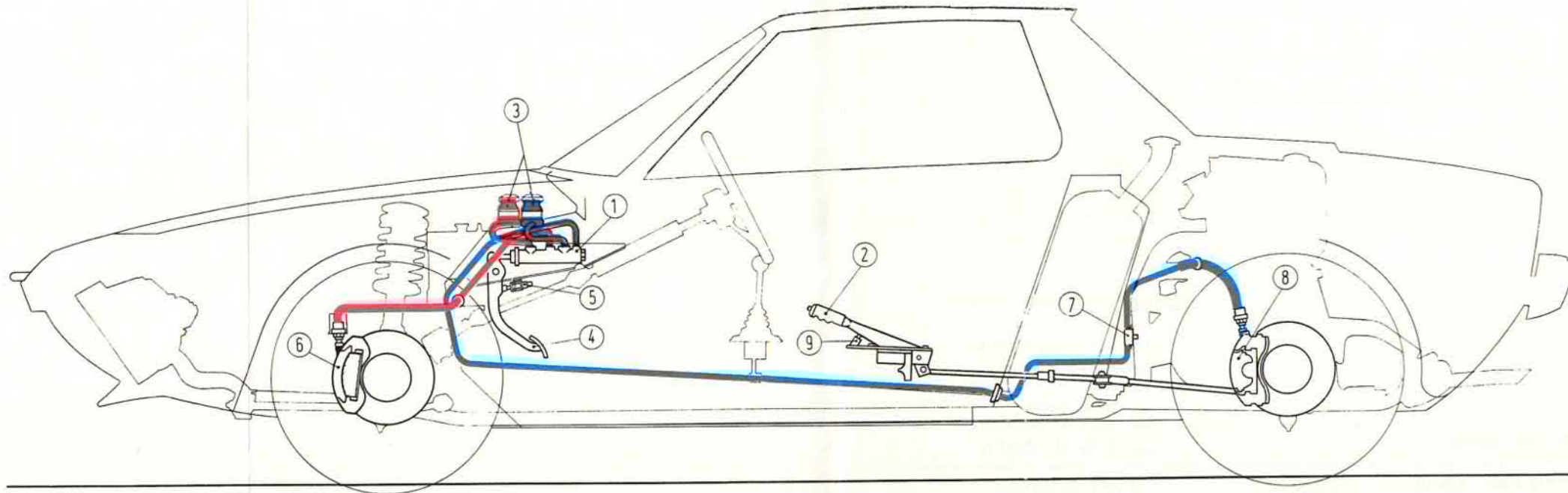
<b>PARTS CATALOG CODE</b>	<b>SERVICE MANUAL &amp; SERVICE TIME SCHEDULE CODE</b>		<b>Page</b>
—	33	Specifications-Tightening Reference .....	115
		<b>Gr. 331-WHEEL BRAKES</b>	
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<b>C1.30/.32</b>	<b>331.30/.32</b>	Front and Rear Wheel Brakes .....	119
<b>C1.31</b>	<b>331.31</b>	Front Brake Calipers .....	121
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<b>C1.35</b>	<b>331.35</b>	Hand Brake .....	125
—	33A	Tool Equipment .....	125

## Brakes SPECIFICATIONS

Type .....	Disc brakes on four wheels
<b>FRONT AND REAR</b>	
Brake discs:	
— diameter .....	8.937 in. (227mm)
— thickness, nominal .....	0.392 to 0.400 in. (9.95 to 10.15mm)
— thickness, minimum after refacing .....	0.368 in. (9.35mm)
— thickness, minimum from wear .....	0.354 in. (9mm)
— max. runout (indicator reading) .....	0.0059 in. (0.15mm)
Brake calipers .....	floating type, single cylinder
Wheel cylinder bore .....	Front 1.772 in. (48mm) Rear 1.338 in. (34mm)
Lining clearance adjustment .....	automatic
Distance between inner faces of pads, not below .....	0.413 in. (10.5mm)
Minimum permissible thickness of lining pads, about .....	0.079 in. (2mm)


## TIGHTENING REFERENCE


DESCRIPTION	THREAD (METRIC)	MATERIAL	TORQUE	
			FT. LBS.	kgm
Bolt, hand brake support .....	M 8	R 50 Cdt	10.8	1.5
Nut, brakes master cylinder to pedal system support .....	M 8	R 50 Znt (Bolt R 50 Znt)	18	2.5



**HYDRAULIC BRAKES AND HAND BRAKE SYSTEM**

- 1. Master cylinder
- 2. Hand brake lever
- 3. Brake fluid reservoir
- 4. Brake pedal
- 5. Stop light switch
- 6. Front brake calipers
- 7. Rear brake "T" connection
- 8. Rear brake calipers
- 9. Hand brake indicator switch

 FRONT WHEEL BRAKES

 REAR WHEEL BRAKES

## Hydraulic Brake System

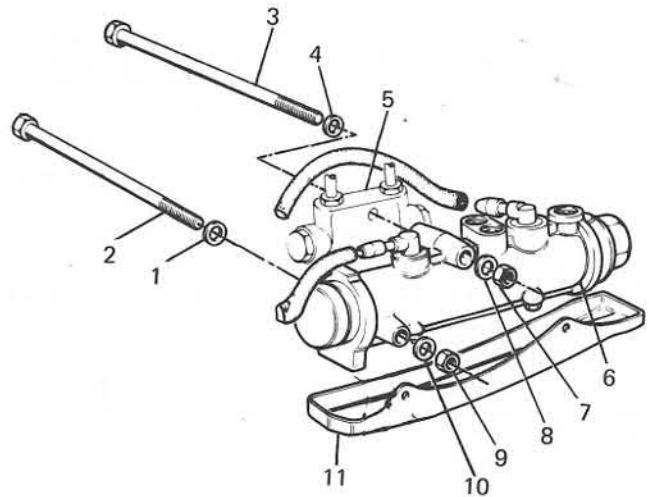
### BRAKE MASTER CYLINDER

#### REMOVAL AND INSTALLATION

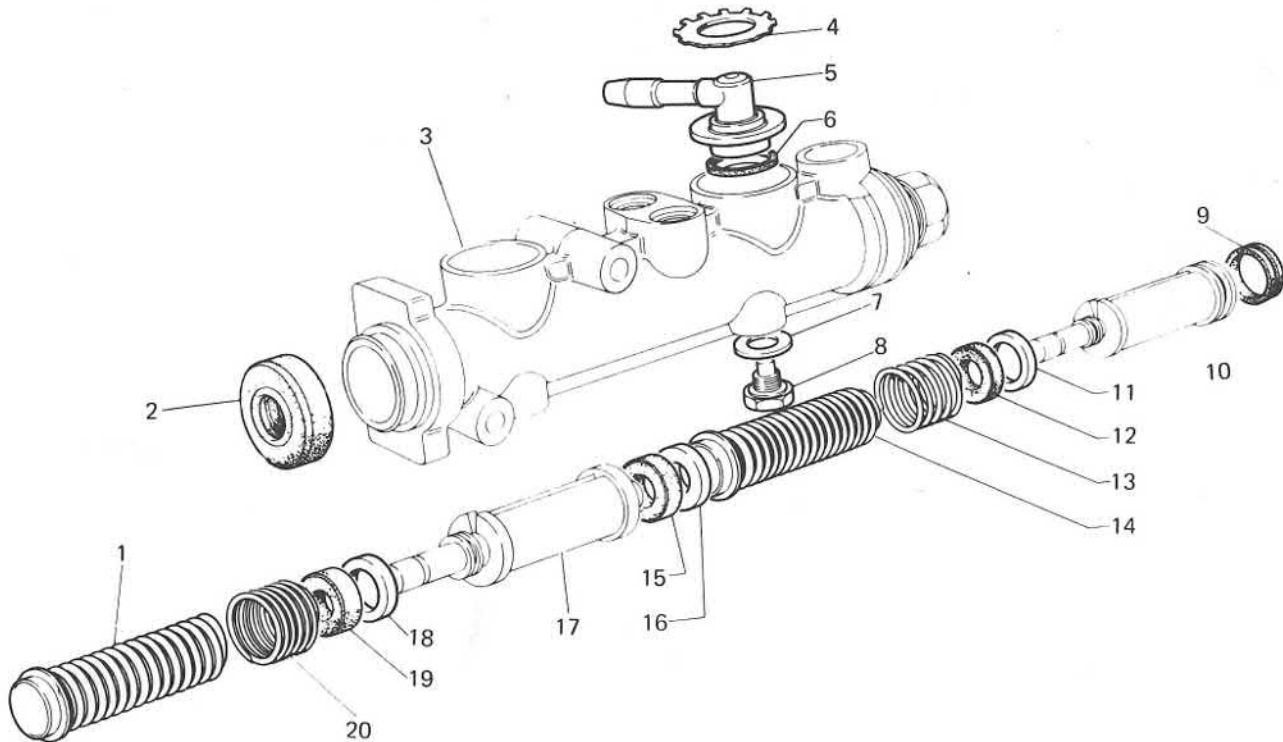
Remove steering column. Refer to 412.01.  
Disconnect hoses from reservoir.  
Remove nuts and washers holding cylinder to support.  
Pull cylinder off rod. Remove hoses from cylinder and switch assembly. Drain fluid into container.  
When installing cylinder, make sure you connect hoses properly. Bleed brake system.

#### OVERHAUL

Carefully inspect cylinder bore and piston surfaces. They should have a mirror-like finish without any kind of roughness. The cylinder bore can be honed to prevent leaks or excessive wear of seals and pistons. Do not increase size of bore.



- |            |                     |             |              |
|------------|---------------------|-------------|--------------|
| 1. Washer. | 2. Bolt.            | 3. Bolt.    | 4. Washer.   |
| 5. Switch. | 6. Master cylinder. | 7. Nut.     |              |
| 8. Washer. | 9. Nut.             | 10. Washer. | 11. Support. |



#### EXPLODED VIEW OF MASTER CYLINDER

- |               |            |            |            |
|---------------|------------|------------|------------|
| 1. Spring     | 6. Gasket  | 11. Spacer | 16. Spacer |
| 2. Boot       | 7. Gasket  | 12. Seal   | 17. Piston |
| 3. Housing    | 8. Screw   | 13. Spring | 18. Spacer |
| 4. Lockplate  | 9. Gasket  | 14. Spring | 19. Seal   |
| 5. Connection | 10. Piston | 15. Seal   | 20. Spring |



### BLEEDING HYDRAULIC SYSTEM

Fill reservoirs with proper fluid.

Clean all bleeder screws. Remove dust caps.

Connect bleeder hose to fitting on caliper. Submerge other end of hose in clean container filled with brake fluid.

Loosen bleeder screw a few turns.

Press brake pedal quickly, Release pedal and allow it to return slowly.

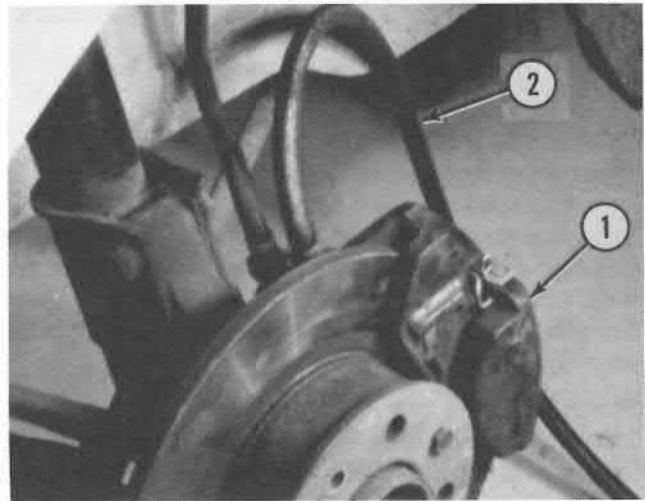
Repeat until all air bubbles stop.

Press brake pedal and hold it down.

Remove bleeder hose and tighten bleeder screw. Clean up spilled fluid.

Install dust caps.

Repeat for other wheels. Make sure fluid level in reservoirs are filled.



1. Caliper. 2. Bleeder hose.

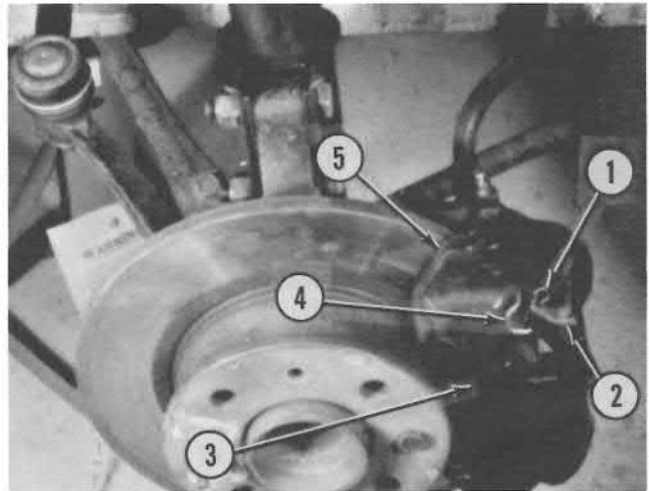
## Front and Rear Wheel Brakes

### REPLACING WHEEL BRAKE CALIPERS

Remove cotter pins (1) from locking blocks (2).

Remove locking blocks (2).

1. Cotter pin.    2. Locking blocks.    3. Caliper.  
4. Spring.    5. Support bracket.

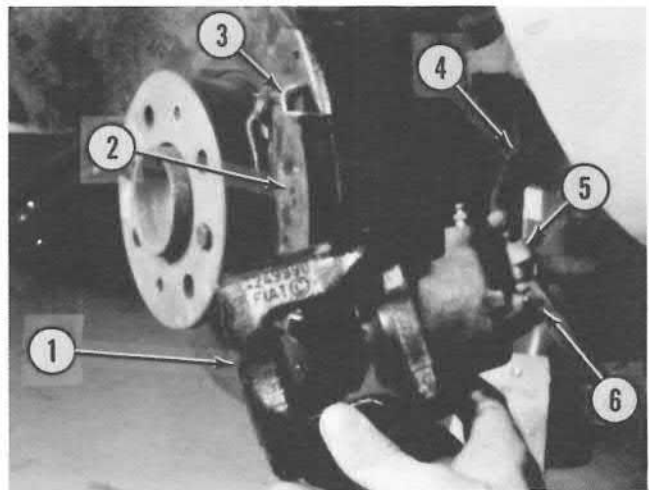


Pull calipers (1), brake linings (2), and springs (3) out. Plug outlet port of reservoir.

On front brakes, remove bolt (6) holding bracket (5) to caliper.

Remove union thru hose (4). Remove gaskets.

1. Caliper.    2. Brake lining.    3. Spring.  
4. Hose.    5. Bracket.    6. Bolt.



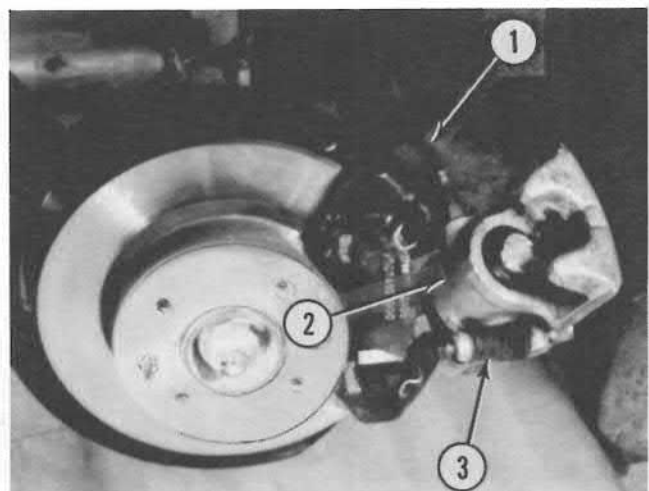
On rear brakes, disconnect hose (1) from caliper (2). Remove gaskets.

Disconnect hand brake cable (3) from rear caliper (2).

1. Hose.    2. Caliper.    3. Hand brake cable.

The minimum allowable thickness of brake linings is about 0.079 in. (2mm).

Make sure new brake linings are the same type on each pair of wheels. Linings are marked for identification.



### BRAKE DISC INSPECTION

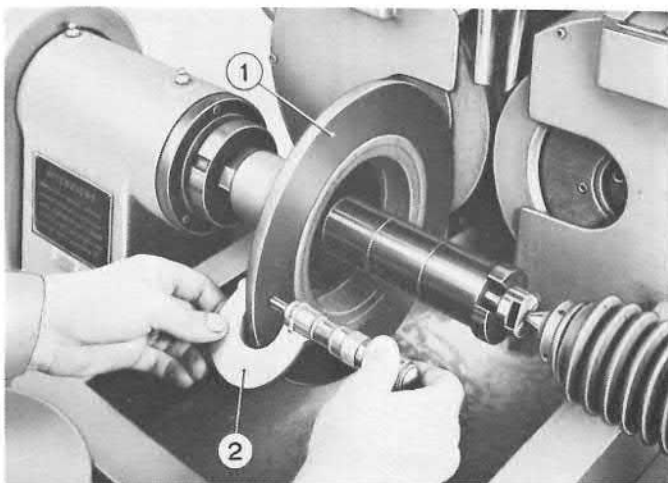
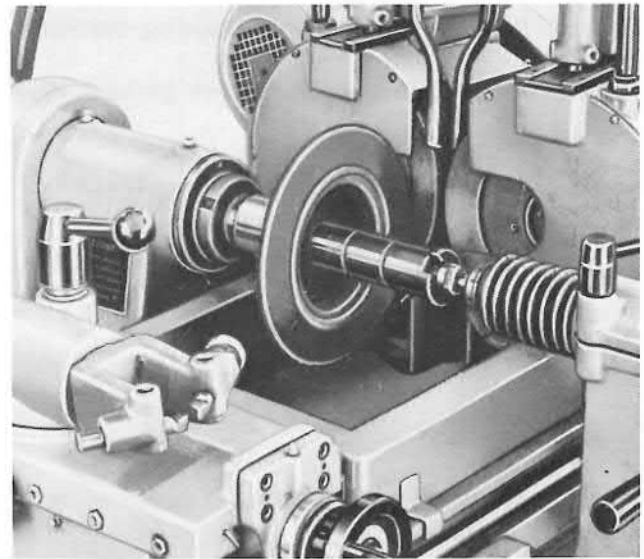
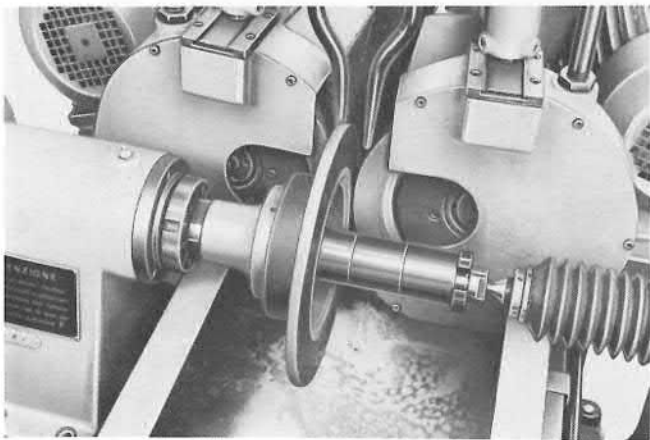
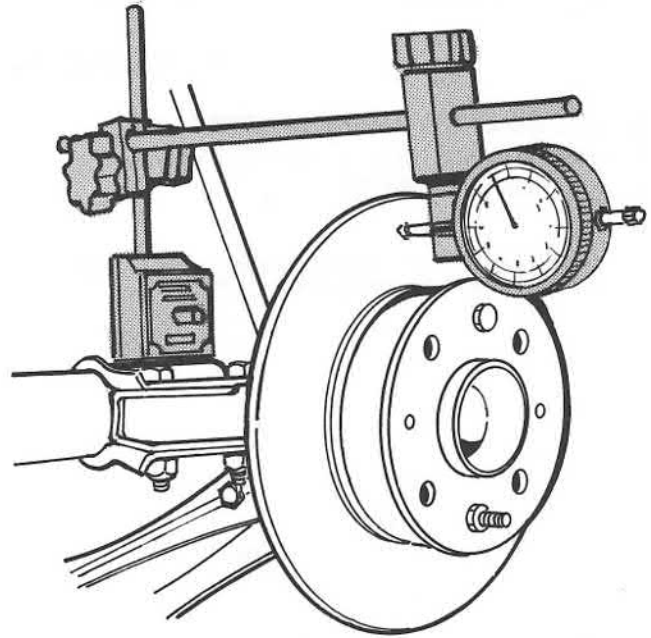
Without removing disc, set up dial indicator as shown. Rotate disc.

—maximum acceptable runout (dial indicator reading) is 0.0059 in. (0.15mm).

If runout exceeds limit or if disc is scored or damaged, reface disc. Minimum thickness after refacing is 0.368 in. (9.35mm). Minimum thickness from wear is 0.354 in. (9mm).

### REFACING BRAKE DISC

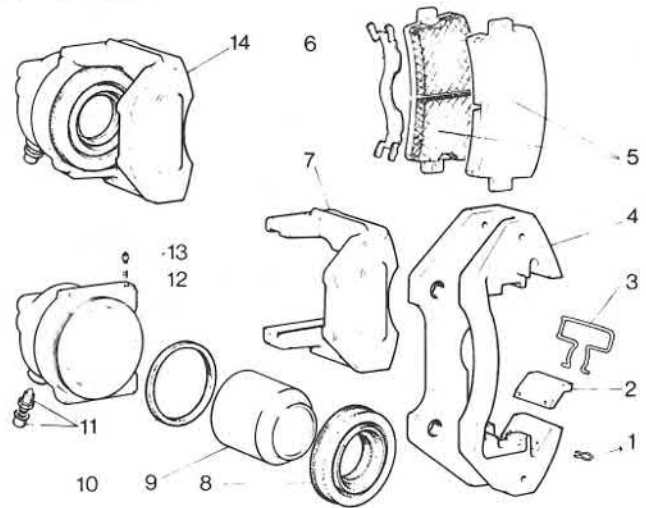
If disc is worn or has deep scores, they can be refaced. After refacing minimum thickness is 0.368 in. (9.35mm).



## Front Brake Caliper

### FRONT BRAKE CALIPER AND BRACKET COMPONENTS

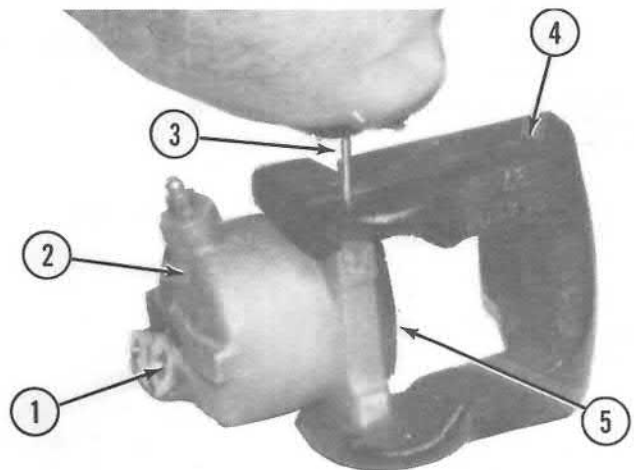
1. Cotter pin
2. Caliper locking block
3. Spring
4. Caliper support bracket
5. Lining pad
6. Lining retainer spring
7. Cylinder housing
8. Dust boot
9. Piston
10. Seal
11. Bleeder screw and dust cap
12. Cylinder
13. Spring and dowel
14. Complete caliper



### OVERHAUL FRONT CALIPER

Remove cover (5). Depress dowel using thin rod (3). Separate cylinder (2) from support (4). Apply compressed air to brake hose port (1). Blow piston out. Remove seal.

- |                     |              |              |
|---------------------|--------------|--------------|
| 1. Brake hose port. | 2. Cylinder. | 3. Thin rod. |
| 4. Support.         | 5. Cover.    |              |



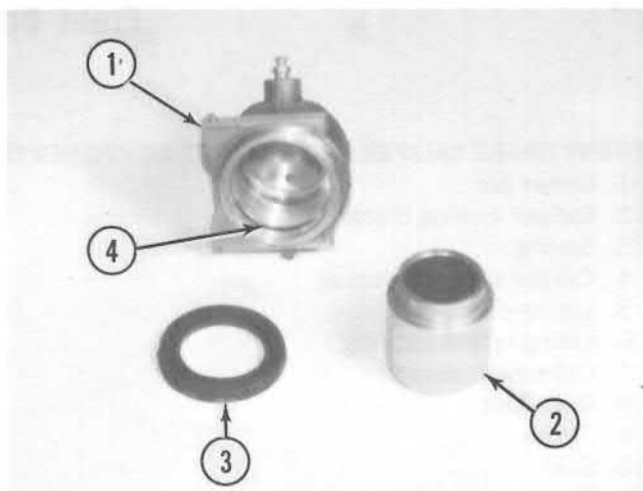
Check piston (2) and caliper cylinder (1) for scoring or binding.

Install seal (4) in caliper. Place piston in caliper. Push piston in until it bottoms.

Install dust cover (3). Make sure dust cover is seated in groove in caliper body.

Place spring and dowel in cylinder. Slide support on cylinder. Press dowel down and slide support over dowel. Make sure dowel is seated in support.

1. Cylinder. 2. Piston. 3. Cover. 4. Seal.

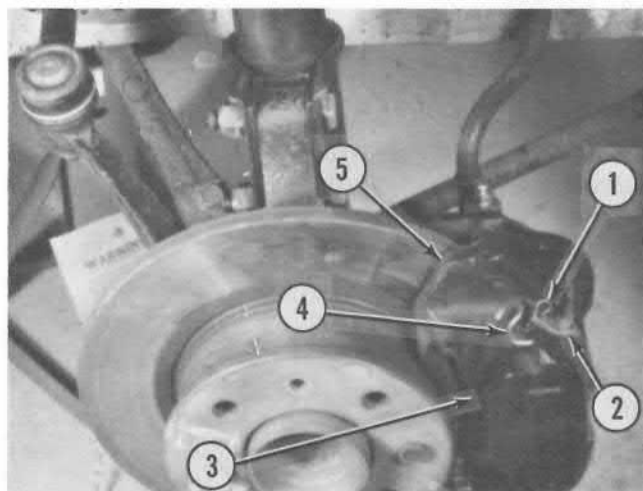


Place springs (4) and linings on support bracket (5). Place caliper (3) on bracket. Install locking blocks (2) and cotter pins (1).

Connect hoses to caliper and reservoir.

Bleed brakes.

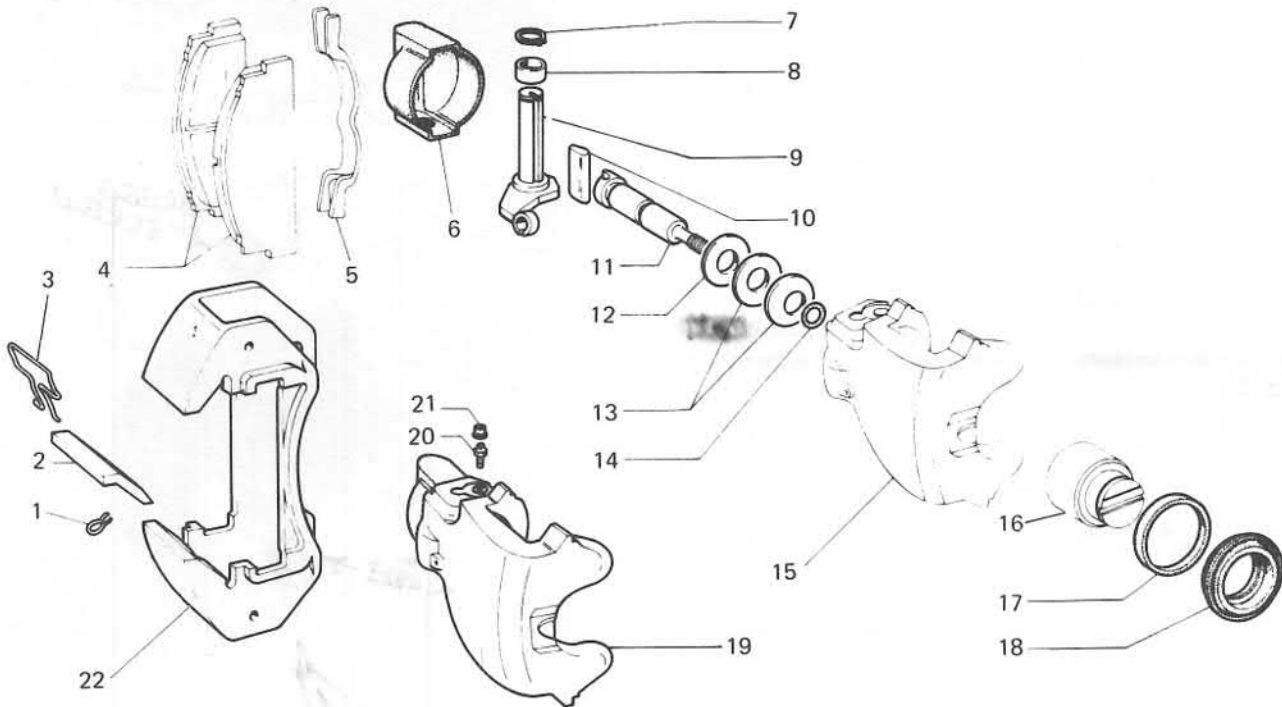
1. Cotter pins. 2. Locking blocks. 3. Caliper.  
4. Spring. 5. Support bracket.



## Rear Brake Caliper

### REAR BRAKE CALIPER AND BRACKET COMPONENTS

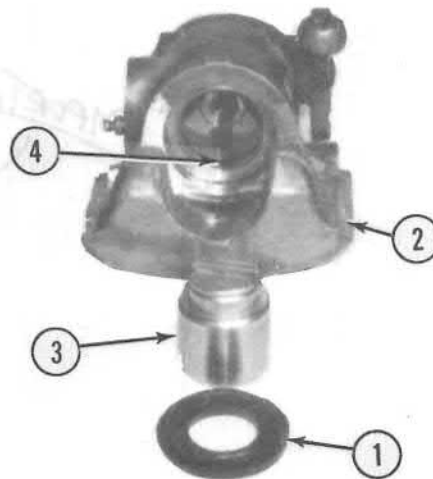
- |                           |                      |                      |
|---------------------------|----------------------|----------------------|
| 1. Cotter pin             | 9. Hand brake shaft  | 16. Piston           |
| 2. Caliper locking block  | 10. Pawl             | 17. Seal             |
| 3. Spring                 | 11. Plunger          | 18. Dust boot        |
| 4. Lining pads            | 12. Spring washers   | 19. Complete caliper |
| 5. Lining retainer spring | 13. Spring washers   | 20. Bleeder screw    |
| 6. Rubber boot            | 14. Seal             | 21. Bleeder boot     |
| 7. Locking ring           | 15. Caliper cylinder | 22. Support bracket  |
| 8. Spacer                 |                      |                      |



### OVERHAUL REAR CALIPER

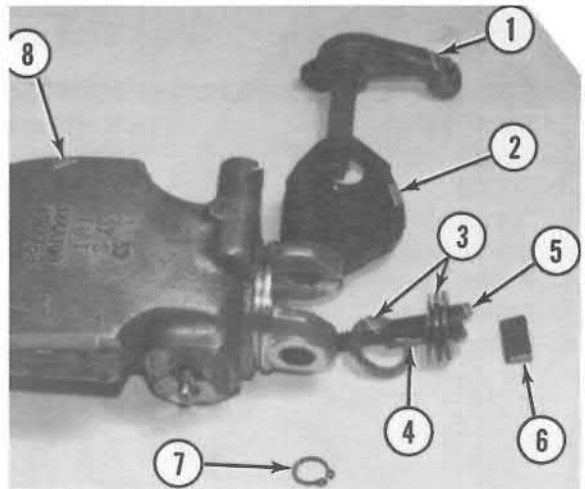
Remove dust boot (1).  
 Unscrew piston (3) from plunger.  
 Use screwdriver in slot in plunger. Remove seal.

1. Dust boot. 2. Caliper. 3. Piston. 4. Seal.



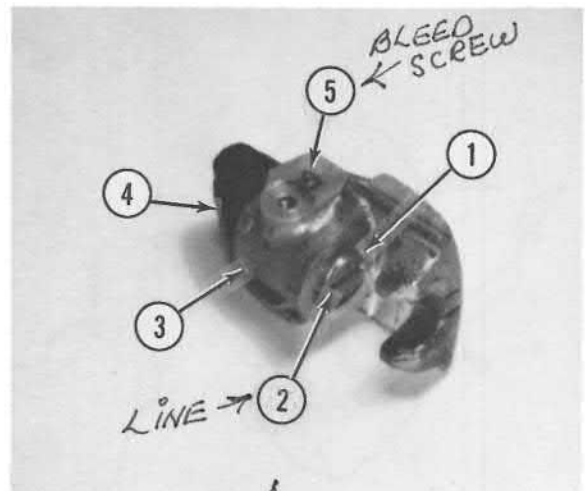
Remove locking ring (7) from shaft (1). Remove shaft. Remove plunger (5), seal (4) and spring washers (3). Place plunger (5) with seal (4) and spring washers (3) in caliper (9). Place hand brake shaft (1) in boot (2). Place shaft and pawl (6) in caliper (8). Install locking ring (7). Coat lever and plunger with grease.

- 1. Shaft.
- 2. Rubber boot.
- 3. Spring washers.
- 4. Seal.
- 5. Plunger.
- 6. Pawl.
- 7. Locking ring.
- 8. Caliper.



~~REMOVE~~ Install seal in caliper cylinder. ~~REMOVE~~ Screw piston (1) on plunger until it is seated. ~~REMOVE~~ MAKE sure mark (2) on piston is on side of caliper with bleed fitting (5). Install rubber boot (4). Make sure boot is seated in groove in caliper.

- 1. Piston.
- 2. Mark.
- 3. Caliper.
- 4. Rubber boot.
- 5. Bleed fitting.



IMPORTANT

(MARK)  
 # 2 SHOWS LINE THAT SHOULD BE UP ON SIDE WITH BLEED SCREW, WHEN REBUILDING CALIPER

## Hand Brake

### ADJUSTING HAND BRAKE

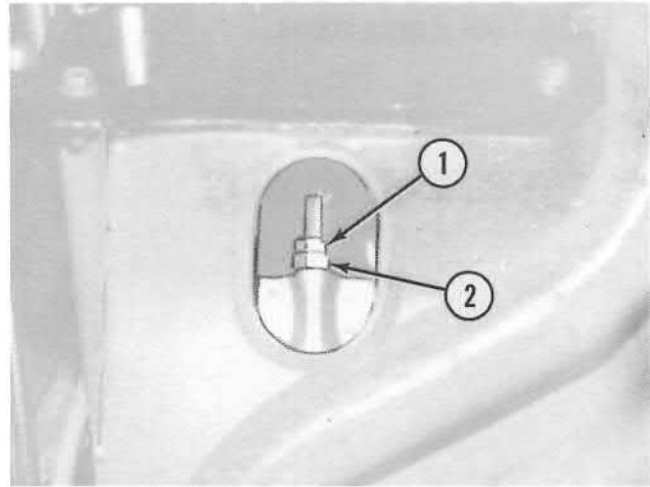
Press brake pedal a few times.

Starting from released position, pull hand brake lever up three or four clicks.

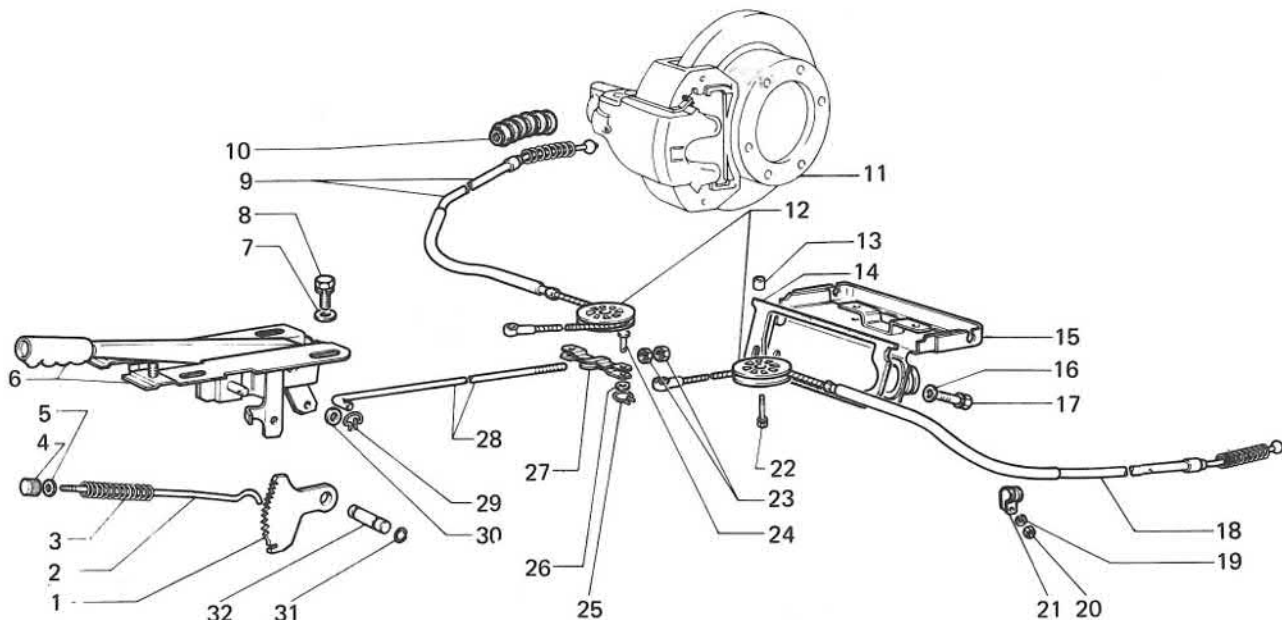
Remove cover. Loosen locknut (1).

Tighten the adjusting nut (2) until wheels are locked (try to turn wheels manually.) Tighten locknut.

Release hand brake. Check that wheels are free to turn.



1. Lock nut. 2. Adjusting nut.



### HAND BRAKE LINKAGE

- |                |             |                |                  |
|----------------|-------------|----------------|------------------|
| 1. Ratchet     | 9. Cable    | 17. Bolt       | 25. Clip         |
| 2. Rod         | 10. Boot    | 18. Cable      | 26. Washer       |
| 3. Spring      | 11. Caliper | 19. Lockwasher | 27. Swinging arm |
| 4. Button      | 12. Pulley  | 20. Nut        | 28. Tierod       |
| 5. Rubber ring | 13. Spacer  | 21. Clamp      | 29. Clip         |
| 6. Lever       | 14. Gasket  | 22. Bolt       | 30. Washer       |
| 7. Washer      | 15. Support | 23. Nuts       | 31. Lockring     |
| 8. Bolt        | 16. Washer  | 24. Pin        | 32. Pin          |



### 33A Tool Equipment

A.56126 Wrench, brake line connectors



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# STEERING SYSTEM — 41

PARTS CATALOG CODE	SERVICE MANUAL & SERVICE TIME SCHEDULE CODE		Page
—	41	Specifications-Tightening Reference .....	127
		<b>Gr. 412—STEERING SYSTEM</b>	
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D2.02	412.02	Steering Box .....	131
D2.10	412.10	Steering Linkage .....	138
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## Steering System SPECIFICATIONS

Type .....	rack and pinion
Ratio:	
— Steering wheel turns, lock to lock .....	3
— Corresponding rack travel .....	4.606 in. (117mm)
Pinion bearing .....	ball
Bearing adjustment .....	by shims set between pinion cover and upper ball bearing
Rack to pinion lash adjustment .....	by shims set between cover for rack center pawl and gear housing
Turning circle diam. ....	32.80 ft. (10m) about
Track rods .....	adjustable with fixed end ball joints
Lock angle:	
— outer wheel .....	28°
— inner wheel .....	32° 40'
Front wheel toe-in, car laden (*) .....	0.0787 to 0.1575 in. (2 to 4mm)
Steering column .....	three sections with two universal joints

(\*) Car laden: two persons plus 44 lbs. (20kg) luggage, with tire inflated to specified pressures.

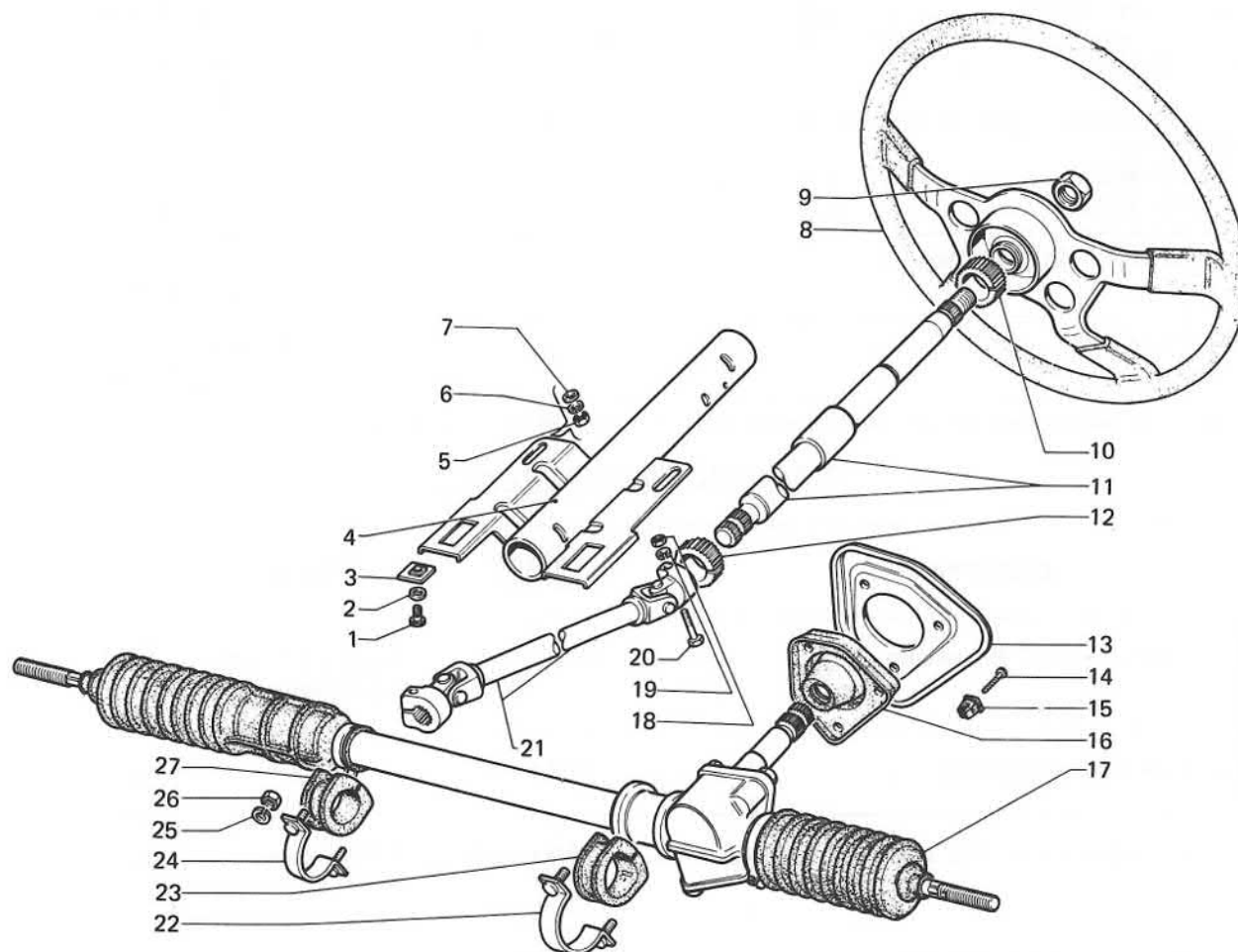
## TIGHTENING REFERENCE

DESCRIPTION	(THREAD) (METRIC)	MATERIAL	TORQUE	
			FT. LBS	kgm
Nut, steering wheel to column .....	M 16 x 1.5	R 50 Znt (shaft C 30 Norm)	36.2	5
Nut, track rod ball bearing .....	M 14 x 1	R 50 Znt	36	5
Nut, self-locking, steering arm ball bearing .....	M 10 x 1.25	R 50 Znt (Stud 12 NC 3 Carbon)	25.3	3.5
Nut, steering box to body bolt .....	M 8	R 50 Znt (Bolt R 80 Znt)	18	2.5

Nut, universal joint .....	M 8	R 80 Znt (Bolt R 100 Cdt)	18	2.5
Nut, upper steering column support .....	M 8	R 50 Znt (Bolt R 50 Sd Stab)	10.8	1.5

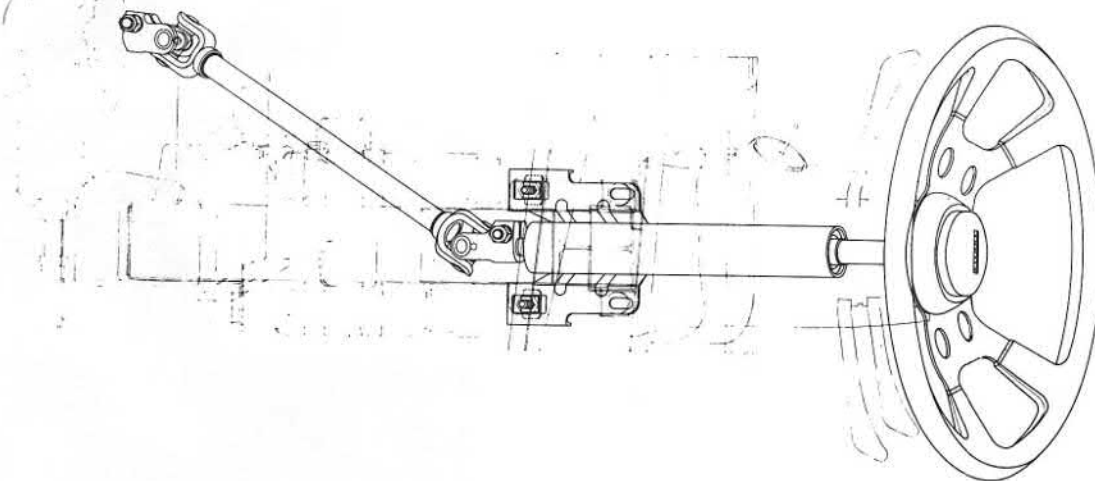
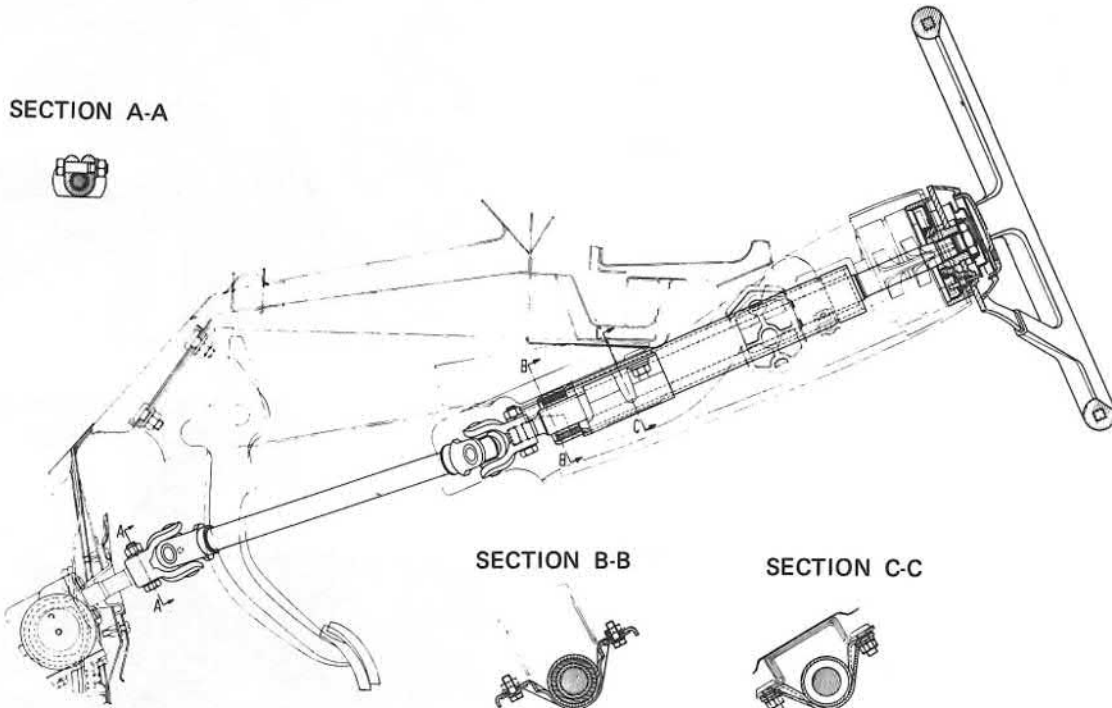
**STEERING COLUMN AND GEAR DISASSEMBLED.**

- |               |                     |                  |                |
|---------------|---------------------|------------------|----------------|
| 1. Bolt       | 8. Steering wheel   | 15. Pad          | 22. Clamp      |
| 2. Washer     | 9. Nut              | 16. Gasket       | 23. Pad        |
| 3. Retainer   | 10. Bushing         | 17. Steering box | 24. Clamp      |
| 4. Support    | 11. Steering column | 18. Nut          | 25. Lockwasher |
| 5. Nut        | 12. Bushing         | 19. Lockwasher   | 26. Nut        |
| 6. Lockwasher | 13. Cover           | 20. Bolt         | 27. Pad        |
| 7. Washer     | 14. Screw           | 21. Shaft        |                |



# Steering Gear

SECTION A-A



CROSS SECTION OF STEERING COLUMN

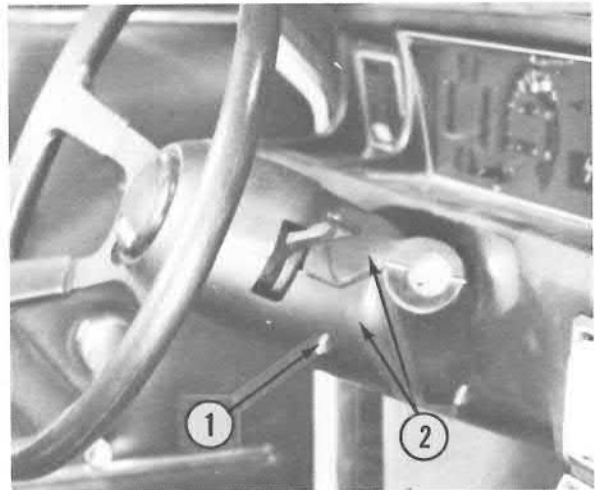
**STEERING SHAFT**

Disconnect battery.

Remove five screws (1) holding steering column cover halves (2).

Disconnect three electrical connectors and one wire.

1. Screw. 2. Cover halves.



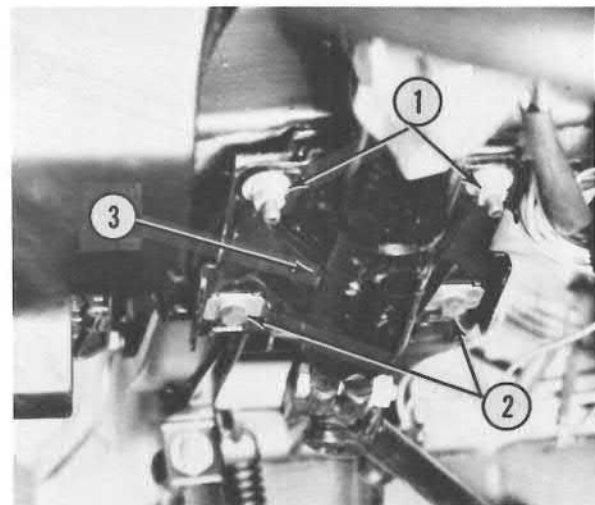
Remove two nuts (1) and washers holding column to dash board at top.

Remove two bolts (2) and washers holding column at bottom of dash.

Slide shaft off steering box shaft.

Remove complete column from car.

1. Nut. 2. Bolt. 3. Steering shaft.

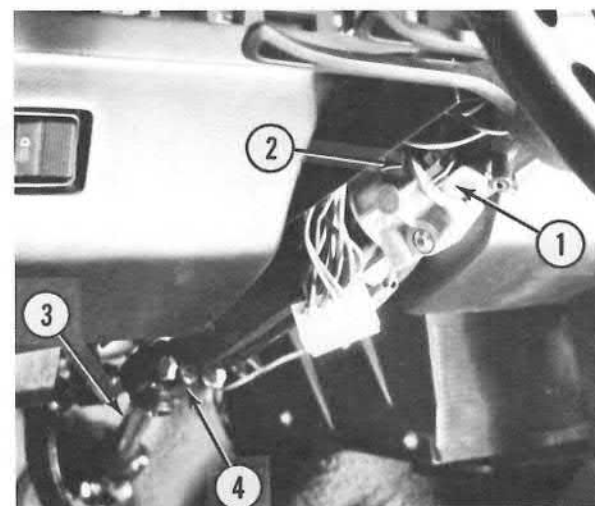


Remove horn button. Remove steering wheel nut and washer. Remove steering wheel.

Remove bolt (1) and nut thru turn signal selector unit (2). Slide unit off shaft.

If necessary to separate lower shaft (3) from upper shaft, remove bolt and nut holding universal joint (4) to lower shaft.

1. Bolt. 2. Turn signal selector. 3. Lower shaft.  
4. Universal joint.



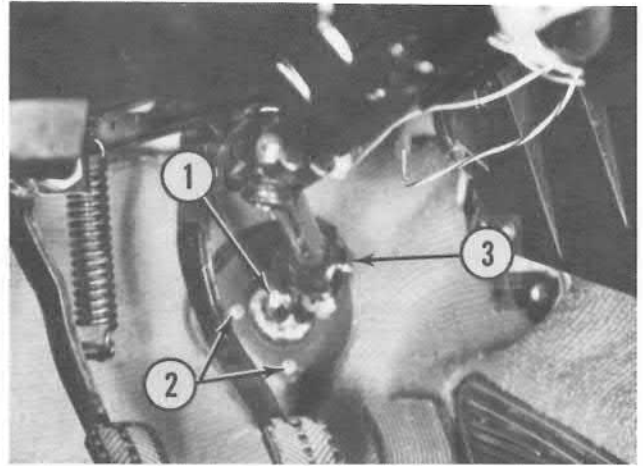
## Steering Box

### REMOVAL AND INSTALLATION

Remove bolt (1) and nut holding universal to pinion shaft on steering box.

Remove three screws (2) holding gasket cover to steering box.

1. Bolt.    2. Screw.    3. Universal joint.

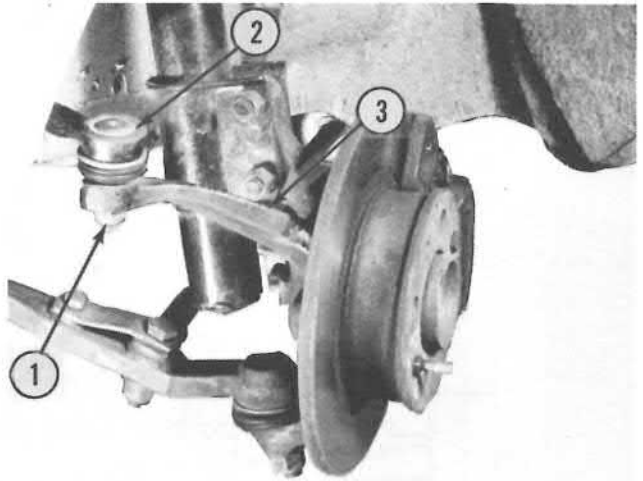


Jack up car. Remove wheels.

Remove nuts (1) holding ball joints in pillars.

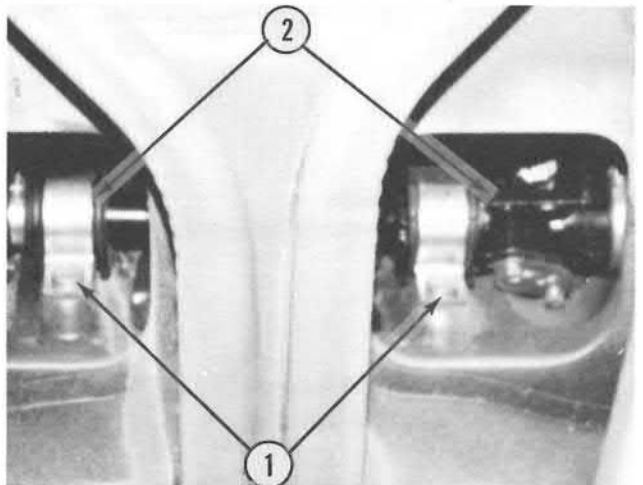
Remove tie rods (2) from pillars (3).

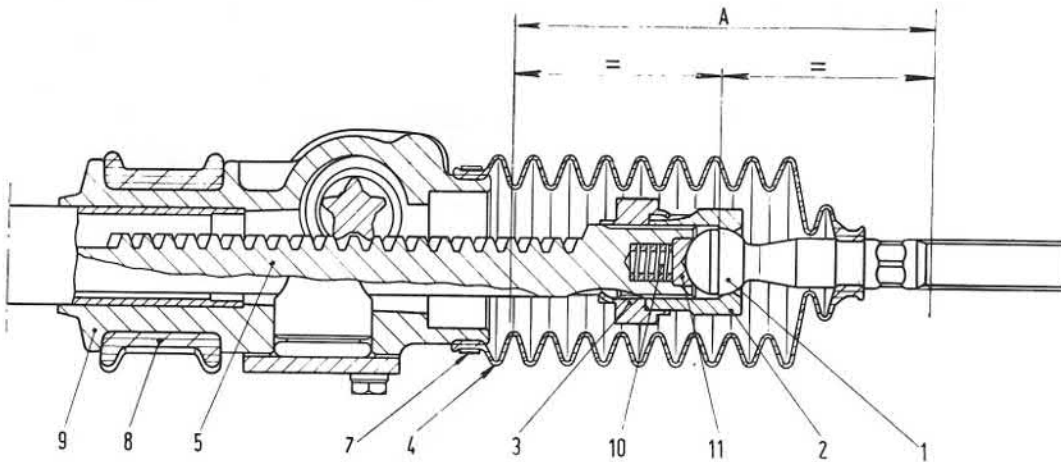
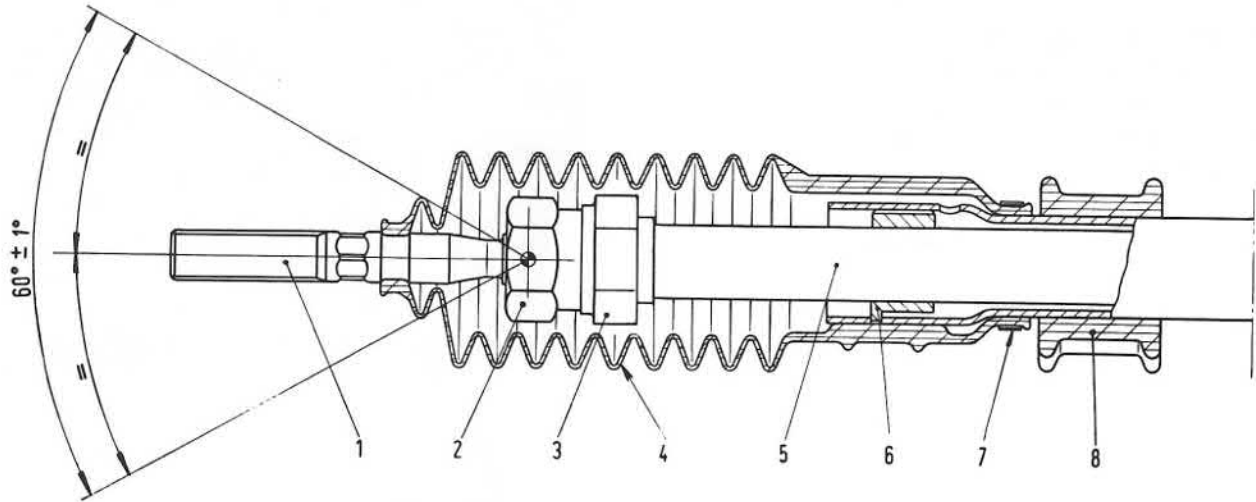
1. Nut.    2. Tie rod.    3. Pillar.



Remove four bolts (1) holding steering box (2) to body.

1. Bolt.    2. Steering box.





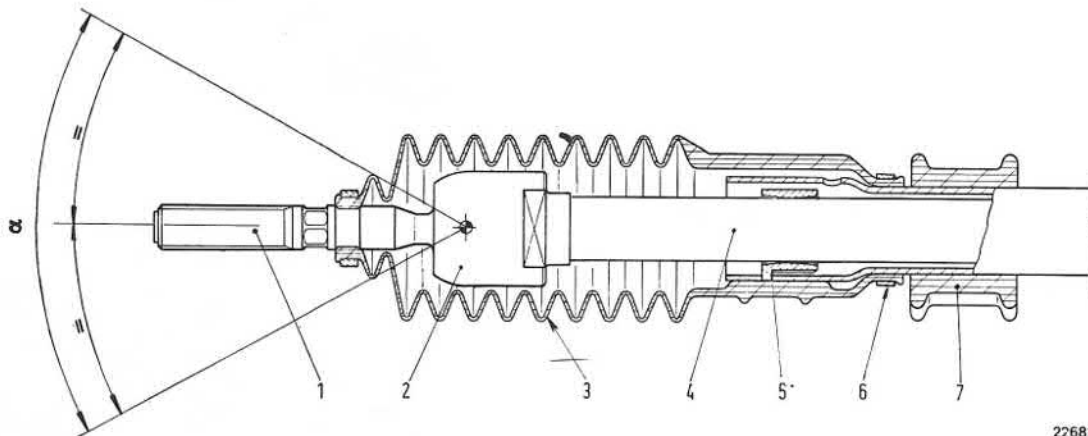
- |   |                     |
|---|---------------------|
| 1. Ball joints                          | 7. Clamps           |
| 2. Adjustable ball joints               | 8. Rubber pads      |
| 3. Lock nuts for adjustable ball joints | 9. Steering housing |
| 4. Rubber bellows                       | 10. Spring          |
| 5. Rod and rack                         | 11. Ball pin cup    |
| 6. Bushing                              |                     |

A=Travel  $4.606 \pm 0.059$  inches ( $117 \pm 1.5$ mm)  
 $60^\circ \pm 1^\circ$  ball joint stroking angle

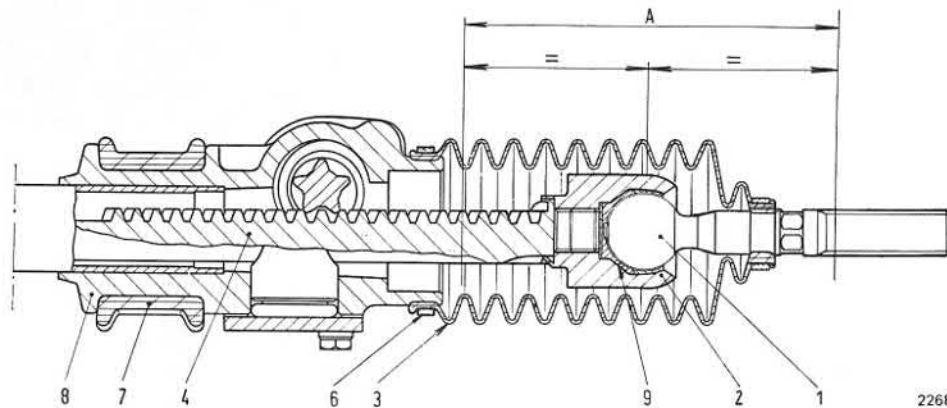
**UNMODIFIED RACK AND STEERING GEAR CROSS SECTION**



## Steering Box



22682



22682

1. Ball joints
2. Ball joint heads
3. Rubber bellows
4. Rod and rack
5. Bushing

6. Clamps
7. Resilient pads
8. Steering gear housing
9. Ball joint socket

A=Travel  $4.606 \pm 0.059$  inches ( $117 \pm 1.5$ mm)

$\alpha$ =Ball joint stroking angle  $62^\circ \pm 4^\circ$ .

### MODIFIED RACK AND STEERING GEAR CROSS SECTION

**DISASSEMBLY**

Disconnect tie rods from ball joints.  
Loosen clamps (2). Drain steering box.  
Remove bolts (1) and pads for attaching box to body.  
Remove bolts thru cover plate (4). Remove plate, gasket, spring, shims, and yoke.  
Remove bolts thru cover plate (3). Remove plate, gasket, shims, and drive pinion with bearing.

1. Boots. 2. Clamps. 3. Cover plate. 4. Cover plate.  
5. Ground wire.

NOTE: On steering box with modification, ball joints have a threaded collar. If the joint is removed, it must be replaced. Therefore, remove only one joint when removing rack.

Place steering box in vice.  
On modified box, straighten stake on collar and ball joint. Unthread ball joint.  
On unmodified box, straighten stakes on ring nuts (2). Unscrew nuts.  
Slide off ball joints with sockets and springs.  
Slide rack out of steering box.  
Remove lower bearing for drive pinion.

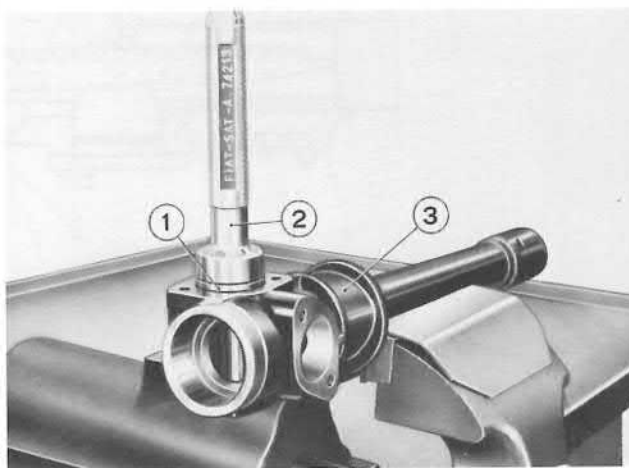
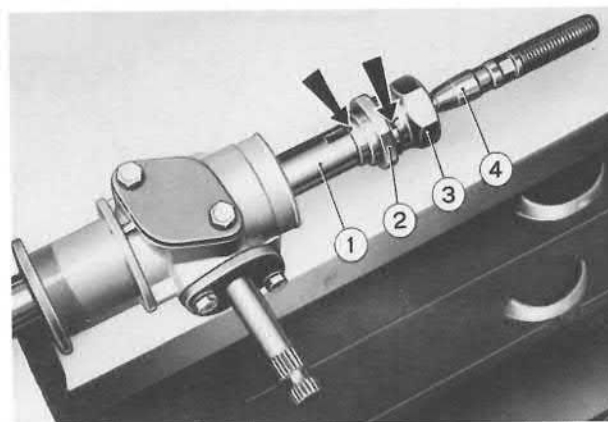
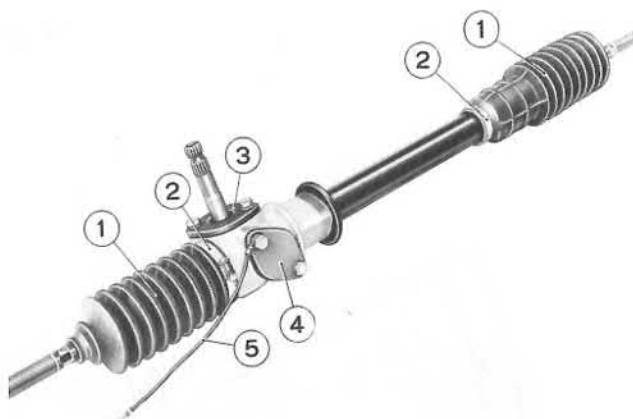
1. Rack. 2. Ring nut. 3. Adjustable head for ball-joint.  
4. Ball pin.

NOTE: Arrows show where ring nuts must be staked.

**REASSEMBLY AND ADJUSTMENT**

Place steering box in horizontal position with pinion cover facing up. Make sure all oil is drained from box.  
Install lower bearing for drive pinion. Use tool A.74219 to install bearing.

1. Bearing. 2. Installer tool. 3. Housing.



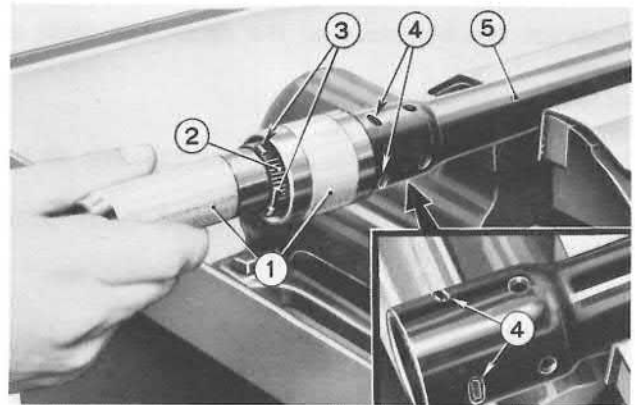
## Steering Box

Replace bushing in steering box. Use tool A.74347. Slide rack in with smooth side towards pinion seating. When rack is fully home turn rack until teeth face pinion seating.

Install pinion so that it mates with rack.

Install top bearing. Press pinion to settle bearings in place.

1. Tool A.74347.
2. Bushing.
3. Bushing tabs.
4. Slots in housing for bushing tabs.
5. Housing.

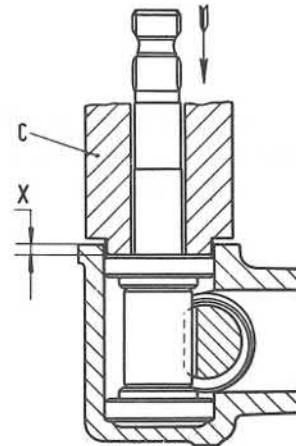


Apply enough force to the outer ring of top bearing to take up all end play. Measure distance X. Determine shim thickness as follows:

$$\text{Shim} = X + 0.0020 \text{ to } 0.0051 \text{ in.}$$

$$(X + 0.05 \text{ to } 0.13 \text{ mm}).$$

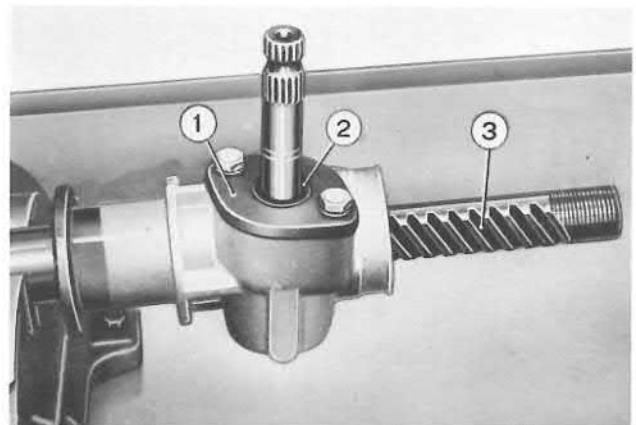
NOTE: Shims are available in the following thickness: 0.0047, 0.0079, 0.0098, 0.0984 in. (0.12, 0.2, 0.25, 2.5mm)



Install shims. Coat gasket and bolts for cover plate with adhesive liquid. Install gasket, plate (1), washers, and bolts. Install seal (2).

Check that pinion turns freely without sticking even without centering yoke installed. The pinion rolling force should not be more than 0.3 ft. lb. (0.04kgm).

1. Cover plate.
2. Seal.
3. Rack.



## Steering Box — Model X 1/9

Determine the thickness of the rack yoke shim as follows:

Set rack in half-way position.

Install rack yoke in its seat.

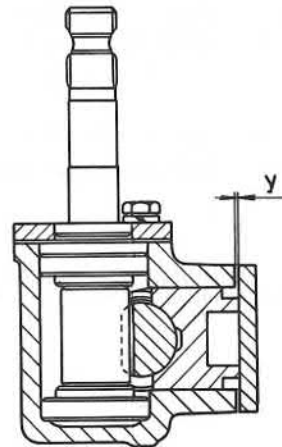
Turn pinion 180° in both directions to settle fit between it and rack.

Measure distance Y between box and cover plate.

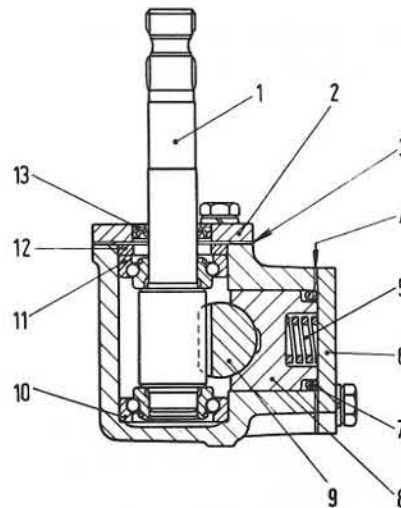
Shim =  $Y + 0.0020$  to  $0.0051$  in.

( $Y + 0.05$  to  $0.13$ mm).

NOTE: rack yoke shims are available in 0.0039 and 0.0059 in. (0.10 and 0.15mm) thickness.



Assemble spring (5) and seal ring (7) on yoke (8).  
Coat surfaces of shims (4) with adhesive liquid.  
Install shims, cover plate (6), and bolts on box.



### STEERING BOX SECTION ACROSS DRIVE PINION.

- |                       |                     |                                |
|-----------------------|---------------------|--------------------------------|
| 1. Drive pinion shaft | 6. Yoke cover plate | 10. Drive pinion lower bearing |
| 2. Cover plate        | 7. Seal ring        | 11. Drive pinion upper bearing |
| 3. Gasket             | 8. Rack yoke        | 12. Drive pinion shims         |
| 4. Rack yoke shims    | 9. Rack             | 13. Seal                       |
| 5. Spring             |                     |                                |

## Steering Box

On modified steering box, lubricate ball joint with oil. Screw collar of joint onto rack to end of threaded section. Tighten collar to 54¼ ft. lbs. (7.5Kgm). Stake inside collar over edge of rack rod.

On unmodified steering box, screw nuts (2) on rack to end of threaded section. Assemble spring and socket. Lubricate ball joint with oil. Install pin and adjustable joint.

Tighten joint until a force of 1½ to 3¼ ft. lbs. (0.2 to 0.5 kgm) is needed to turn the pins. Check that pins can describe a rotation cone with an apex angle of  $60^\circ \pm 1$ .

Lock the heads in position with nuts (3).

Stake heads as shown.

1. Rack. 2. Ring nut. 3. Adjustable head for ball joint. 4. Ball pin. 5. Ground wire.

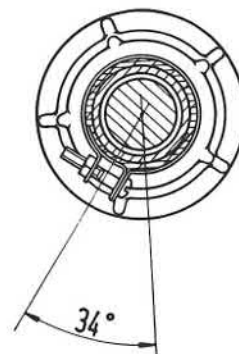
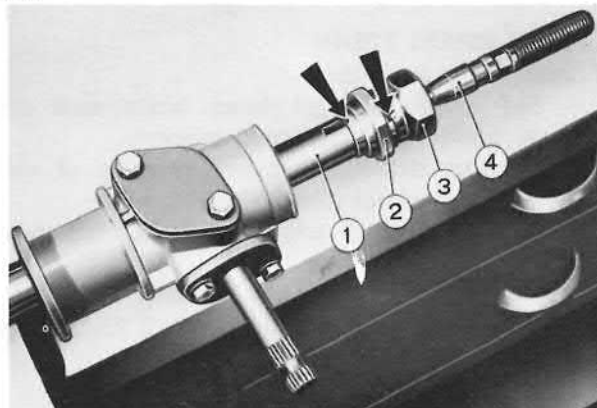
Slip boots over ball joints. Slip ends of boots over steering box.

Position clamping screws as shown.

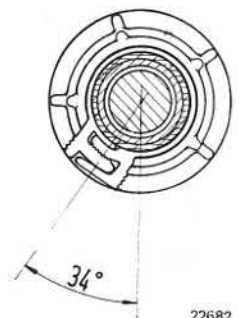
Fill steering box with oil as follows:

- Turn steering fully to the right.
- Jack car up on left side.
- Release boot on left side (driver's side).
- Insert specified quantity of oil. Use a syringe.
- Replace boot and clamp in position.
- Lower car.

NOTE: When steering box is fully assembled, drive pinion should start turning with a torque of 1½ to 2 ft. lbs. (0.195 to 0.288 kgm).



UNMODIFIED STEERING BOX



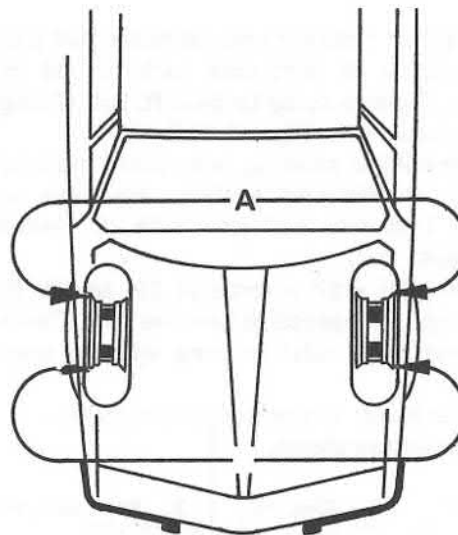
MODIFIED STEERING BOX

## Steering Linkage

### FRONT WHEEL TOE-IN

Check toe-in as follows:

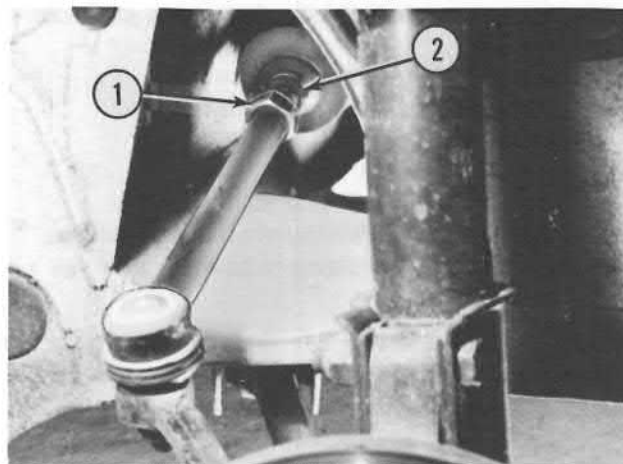
- Set wheels straight-ahead. Make sure steering wheel spokes are positioned properly.
- Measure distance between rearside of rim's as shown. Mark wheel (dimension A).
- Turn wheel 180° until mark is in front (push car forward).
- Measure distance again (dimension B).
- Dimension A must be 0.0787 to 0.1575 in. greater than dimension B with a loaded car.



Adjust toe-in as follows:

- Loosen nut (1).
- Turn ball joint (2) in or out using wrench flats until proper toe-in is obtained.
- Do not change position of steering wheel spokes.
- Tighten nut (1).

1. Nut. 2. Ball joint.



## 41A. Tool Equipment



A.74219 Installer, steering gear pinion shaft lower bearing.



A.74247 Inserter, steering rack rod guide bushing.

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# SUSPENSION AND WHEELS — 44

PARTS CATALOG CODE	SERVICE MANUAL & SERVICE TIME SCHEDULE CODE		
	44	Specifications-Tightening Reference .....	139
		<b>Gr. 443-SUSPENSION AND WHEELS</b>	
D3.01	443.01	Front Suspension .....	143
D3.02	443.02	Front Shock Absorbers and Bars .....	149
D3.05	443.05	Rear Suspension .....	153
D3.06	443.06	Rear Shock Absorbers and Bars .....	157
D3.10	443.10	Shock Absorbers .....	159
D3.16	443.16	Wheels .....	163
	44A	Tool Equipment .....	166

## Suspension and Wheels SPECIFICATIONS

### FRONT SUSPENSION

#### Type:

Independent wheels. Lower control arms with reaction strut; telescopic knuckle pillars incorporated with hydraulic shock absorbers; coil springs and co-axial buffers.

Steering Knuckles	
Caster, unladen car .....	+6°30' to +7°30'
—Adjustment: by shims set between reaction struts and supports	
<b>Wheels</b>	
<b>Camber</b>	
angle, unladen car .....	0° to -1°
measured at rim edge laden (*) .....	-0.157 to -0.315 in. (-4 to -8mm)
Toe-in, unladen car .....	+0.080 to +0.240 in. (2 to 6mm)
—Adjustment by threaded sleeves on track rods.	
Tightening of suspension: with car laden (*).	
<b>Coil Springs</b>	
Length under a load of 474 ±22 lbs. (215 ±10kg) .....	6.693 in. (170mm)
Minimum permissible load referred to above length .....	441 lbs. (200kg)
Coil springs are divided into two classes, color coded as follows;	
—yellow, springs which under a load of 474 lbs. (215kg) have a length above .....	6.693 in. (170mm)
—green, springs which under a load of 474 lbs. (215kg) have a length of .....	6.693 in. (170mm) or less
<b>Shock Absorbers</b>	
Type: hydraulic, telescopic, double acting.	
Pressure cylinder bore .....	1.063 in. (27mm)
Length (measured between upper face of dust shield and center of upper bolt hole for attachment to knuckle pillar):	
—Extended (buffering begins) .....	13.720 in. ±0.079 in. (348.5 ±2mm)
—Retracted .....	8.327 ±0.079 in. (211.5 ±2mm)
Stroke (buffering begins) .....	5.393 in. (137mm)

(\*) Car laden: two persons plus 44 lbs. (20kg) luggage, with tires inflated to specified pressures.



## SPECIFICATIONS

### REAR SUSPENSION

#### Type:

Independent wheel. Lower control arms; telescopic knuckle pillars incorporated in hydraulic shock absorbers; coil springs and co-axial buffers. Adjustable cross tie rods.

#### Wheels

##### Camber

angle, unladen car .....	-1° 10' to -2° 10'
measured at rim edge, laden (*) .....	-0.433 in. to -0.590 in. (-11 to -15mm)

Toe-in, unladen car .....	+0.360 to +0.510 in. (+9 to +13mm)
—Adjustment: by threaded sleeves on reaction rods.	
Tightening of suspension: with car laden (*).	

#### Coil Springs

Length under a load of 562 ±22 lbs. (255 ±10kg) .....	7.874 in. (200mm)
---	-------------------

Minimum permissible load referred to the above length .....	518 lbs. (135kg)
---	------------------

Coil springs are divided into two classes, color coded as follows;

—yellow, springs which under a load of 562 lbs. (255kg) have a length above .....	562 lbs. (255kg) 7.874 in. (200mm)
--	---------------------------------------

—green, springs which under a load of 562 lbs. (255kg) have a length of .....	7.874 in. (200mm) or less
--	------------------------------

Springs having same color code should be used.

#### Shock absorbers

Type; hydraulic, telescopic, double acting.

Pressure cylinder bore .....	1.063 in. (27mm)
------------------------------	------------------

Length (measured between upper face of dust shield and center of upper bolt hole for attachment to knuckle pillar):

—extended (buffering begins) .....	16.771 ±0.079 in. (426 ±2mm)
------------------------------------	---------------------------------

—Retracted .....	11.378 ±0.079 in. (289 ±2mm)
------------------	---------------------------------

Stroke (buffering begins) .....	5.394 in. (137mm)
---------------------------------	-------------------

### WHEELS AND TIRES

Wheels .....	disc type
rim size .....	4½Jx13 in.

Tires .....	radial ply
size .....	145HR-13"

Tire inflation pressure .....	Front 26 psi - Rear 29 psi
-------------------------------	----------------------------

(\*) Car laden: two persons plus 44 lbs. (20kg) luggage, with tires inflated to specified pressures.

## Suspension and Wheels

### TIGHTENING REFERENCE

DESCRIPTION	THREAD (METRIC)	MATERIAL	TORQUE	
			FT. LBS.	kgm
<b>FRONT SUSPENSION</b>				
Nut, wheel hub (stake) .....	M 20 x 1.5	C40 Norm-Cdt (Hub 38 CD 4 Bon)	112	15.5
Nut, self-locking, steering knuckle ball joint .....	M 12 x 1.25	R50 Znt (Pin 40 NiCrMi 2 R Bon R 90 to 105)	58	8
Nut, self-locking, strut to bracket .....	M 12 x 1.25	R 50 Znt (Strut C 30 Bon R > 70)	50.6	7
Nut, strut to control arm .....	M 12 x 1.25	R 50 Znt (Bolt R 80 Znt)	50.6	7
Nut, shock absorber — to body upper mounting pad .....	M 6	R 80 Znt (Bolt R 100 Cdt)	7.2	1
Bolt, brake caliper to steering knuckle .....	M 10 x 1.25	R 80 Posf. black	36.2	5
Stud bolt, wheel .....	M 12 x 1.25	C 35 R Bon Znt black	50.6	7
Nut, self-locking, front control arm to body .....	M 10 x 1.25	R 80 Znt (Bolt R 100 Cdt)	29	4
Nut, self-locking, shock absorber-to-body steering knuckle bolt .....	M 10 x 1.25	R 80 Znt (Bolt R 100 Cdt)	43.4	6
Nut, shock absorber top mounting .....	M 12 x 1.25	R 50 Znt	43.4	6
Ring nut, front wheel bearing .....	M 62 x 1.5	R 50 Znt (knuckle 38 CD 3 Stp Bon)	43.4	6
Bolt, strut support .....	M 10 x 1.25	R 80 Znt	29	4
Bolt, input conenctor on front wheel brake cylinder .....	M 10 x 1.25	C 4 MF Trf Bon Cdt Bright	21.7	3

## TIGHTENING REFERENCE

<b>REAR SUSPENSION</b>				
Nut with stacking collar, wheel hub .....	M 20 x 1.5	C 40 Norm. Cdt (Hub 38 CD4 Stp Bon Nitr Morb)	112	15.5
Stud bolt, wheel .....	M 12 x 1.25	C 35 R Bon Znt black	50.6	7
Nut, self-locking, cross reaction rod to control arm bolt .....	M 14 x 1.5	R 80 Znt (Bolt R 80 Znt)	50.6	7
Nut, self-locking, ball joint to knuckle pillar .....	M 14 x 1.5	R 80 Znt (Pin 40 NiCrMo 2 Bon R 90 to 105)	72.3	10
Nut for bolt, clamp on cross reaction rod sleeve .....	M 8	R 50 Znt (Bolt R 80 Znt)	14.4	2
Nut, self-locking, control arm pivot pin .....	M 14 x 1.5	R 80 Znt (Pin R 80 Znt)	72.3	10
Nut, self-locking, shock absorber top mounting .....	M 12 x 1.25	R 80 Znt	43.4	6
Nut, self-locking shock absorber to knuckle pillar bolt .....	M 10 x 1.25	R 80 Znt (Bolt R 100 Znt)	43.4	6
Bolt, brake caliper to knuckle pillar .....	M 10 x 1.25	R 80 Posf. black	36.2	5
Connector, rear wheel brake hose .....	3/8-24 UNF-3A	AB 40 PR Cdt or OOCR Cdt	14.4	2
Ring nut, wheel bearing .....	M 62 x 1.5	R 50 Znt (Knuckle 38 CD 4 Stp Bon)	43.4	6

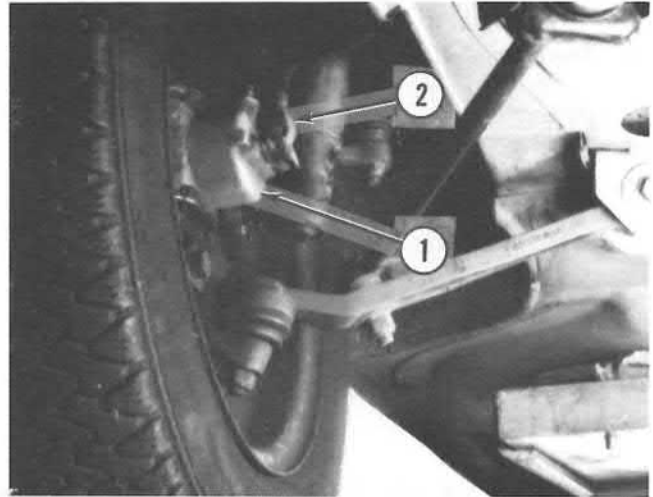
## FRONT SUSPENSION

### REMOVAL AND INSTALLATION

If brake caliper (1) needs inspection, leave caliper attached to suspension.

To do this, plug outlet from brake fluid reservoir and disconnect brake fluid hose (2) from caliper.

1. Caliper. 2. Brake hose.

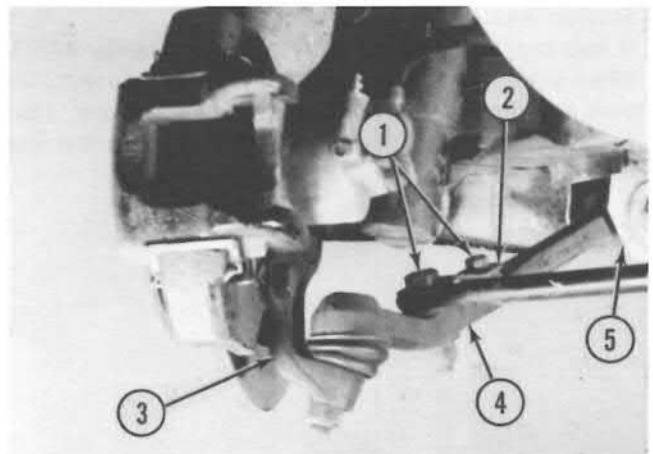


Remove wheel.

Remove bolts (1) and plate (2) holding strut to pillar (3).

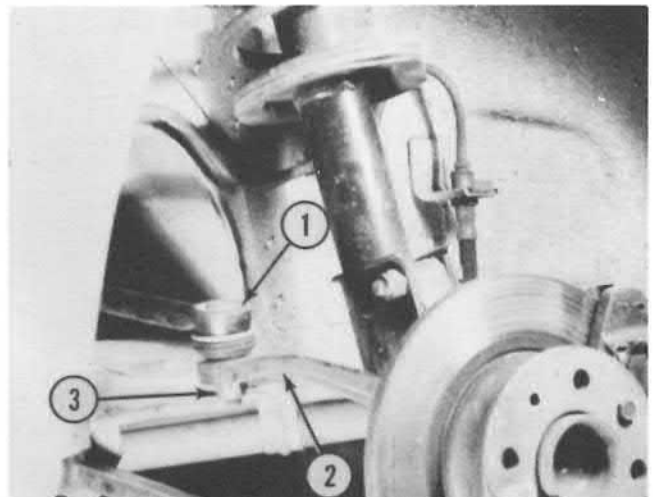
Remove bolt holding control arm (4) to bracket (5).

1. Bolts. 2. Plate. 3. Pillar. 4. Control arm.  
5. Bracket.



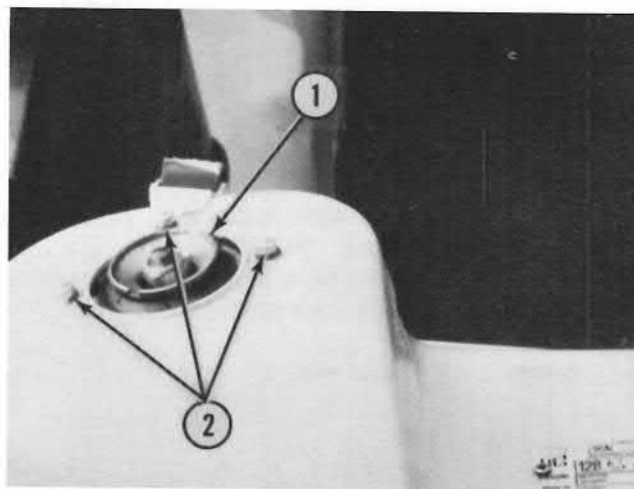
Remove nut (3) holding tie rod ball joint (1) to steering arm (2). Remove ball joint.

1. Ball joint. 2. Steering arm. 3. Nut.



Disconnect shock absorber (1) by removing three nuts (2) and washers. Lower suspension assembly out of car.

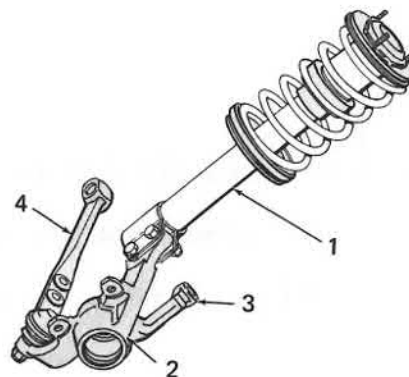
1. Shock absorber.    2. Nuts.



Coil springs are marked with a yellow strip or red strip. Make sure new ones are color matched. See Section 44.

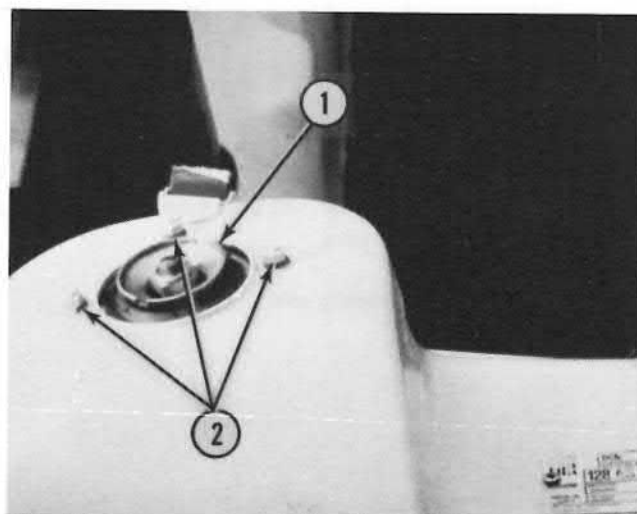
If hub bearing must be replaced, see Wheels, 443.16. When installing suspension do not fully tighten control arm attachments and sway bar attachments. These bolts and nuts must be tightened with car under load.

1. Shock absorber.    2. Pillar.    3. Control arm.  
4. Steering arm.



Place assembly in car. Install washers and nut (2) on three bolts on top of shock absorber (1). Torque nuts to 8 ft. lbs. (1 kgm).

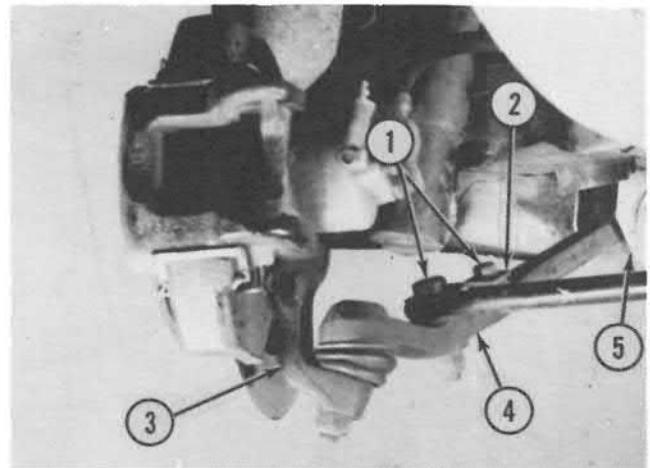
1. Shock absorber.    2. Nuts.



## Front Suspension

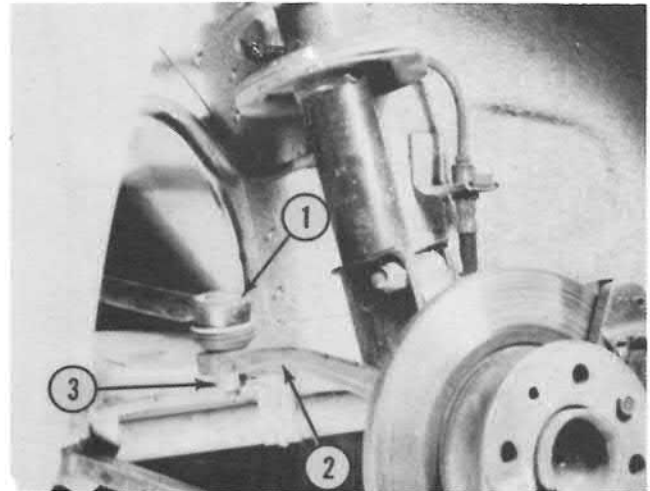
Place control arm (4) in bracket (5).  
Install bolt, washer, and nut.  
Place strut on control arm. Place plate (2) on strut.  
Install bolts (1) thru strut and control arm and install nuts.

1. Bolts. 2. Plate. 3. Pillar. 4. Control arm.  
5. Bracket.



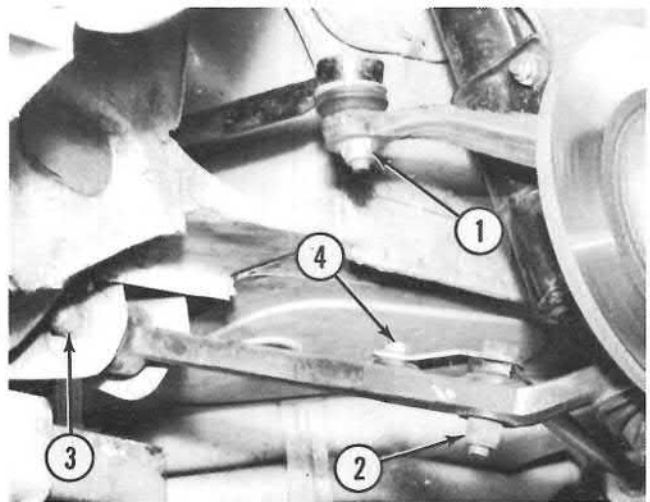
Place ball joint (1) of tie rod in pillar.  
Install nut (3).  
Install wheel. Install brake caliper.  
Lower car. Fill brake fluid reservoir.  
Bleed brakes.

1. Ball joint. 2. Steering arm. 3. Nut.

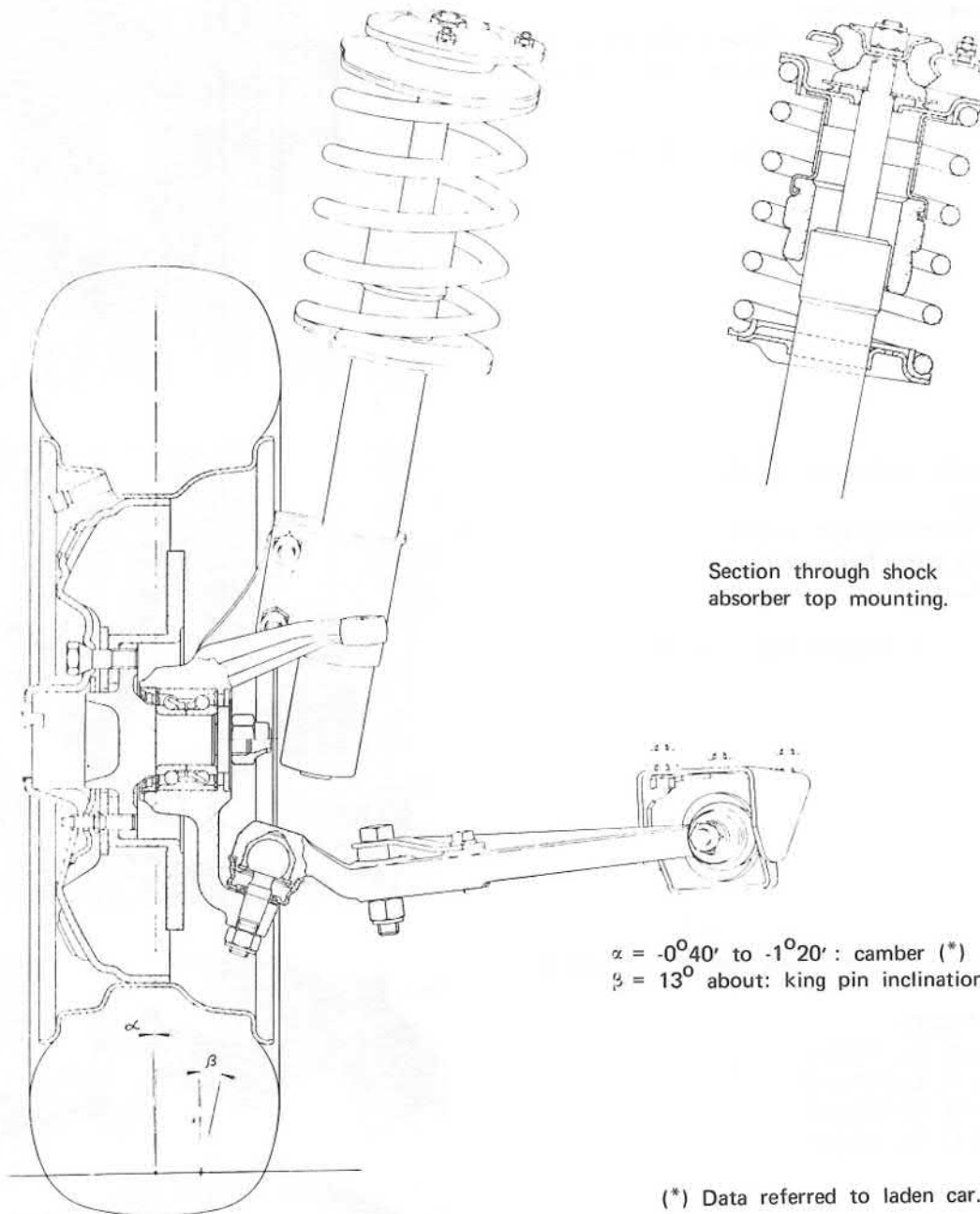


Tighten nuts (1, 2, and 3) and bolt (4) with car laden as follows:

NUT	TORQUE
(1)	58 ft. lbs. (8kgm)
(2)	51 ft. lbs. (7kgm)
(3)	29 ft. lbs. (4kgm)
(4) bolt	29 ft. lbs. (4kgm)



Model X 1/9



Section through shock absorber top mounting.

$\alpha = -0^{\circ}40'$  to  $-1^{\circ}20'$  : camber (\*)  
 $\beta = 13^{\circ}$  about: king pin inclination (\*)

(\*) Data referred to laden car.

Front Suspension

## Front Suspension

### FRONT WHEEL ALIGNMENT

Install and adjust alignment equipment. Follow instructions provided with equipment. Set up equipment to check caster.

Caster, unladen car  $+6^{\circ}30'$  to  $+7^{\circ}30'$

Adjust caster by adding or removing shims between reaction struts (2) and supports (1)

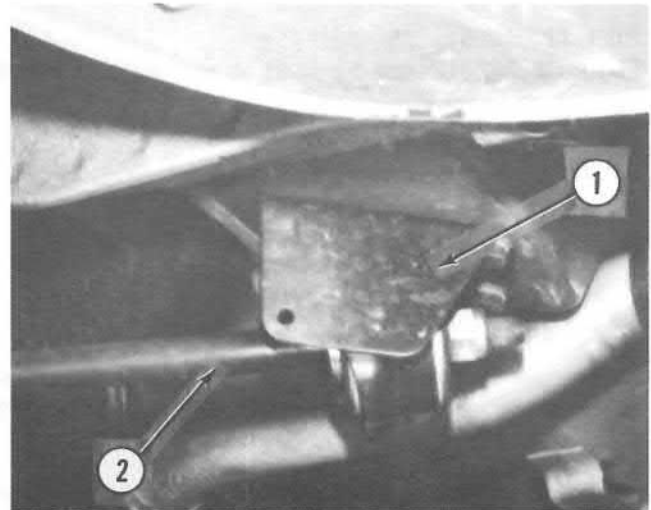
Remove shims to increase caster.

If car has been in an accident, set up equipment to check camber.

NOTE: Camber cannot be adjusted and does not cause tire wear.

Camber, unladen car,  $0^{\circ}$  to  $-1$

For toe-in of front wheels see Steering Linkage, 412.10

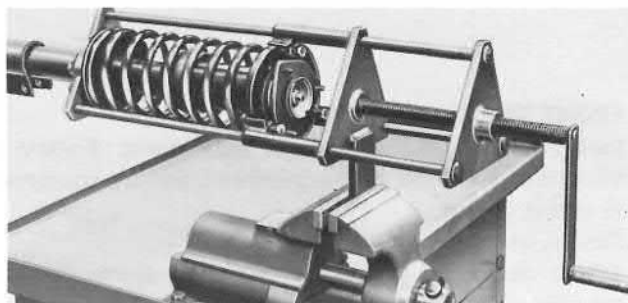


1. Support.
2. Reaction strut.



**COIL SPRINGS**

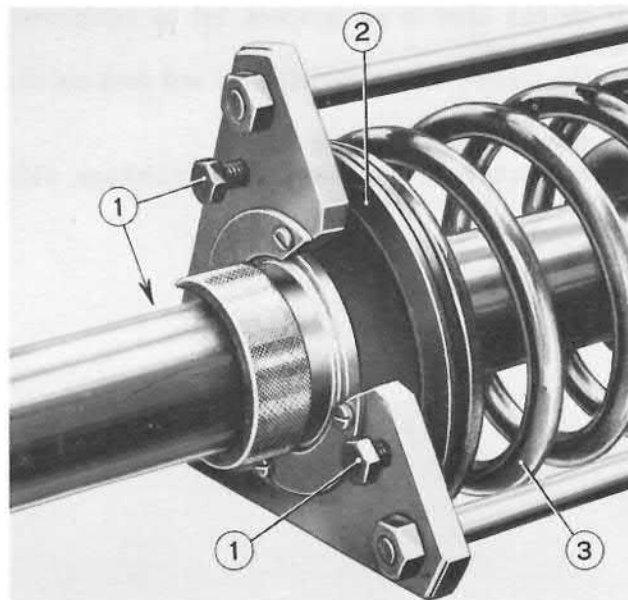
Fixture A.74241 must be used to remove and install springs on shock absorbers.



Make sure screws (1) are touching retainer (2). One screw at each end must be in the recess in retainer (2).

Lower view of tool A.74241

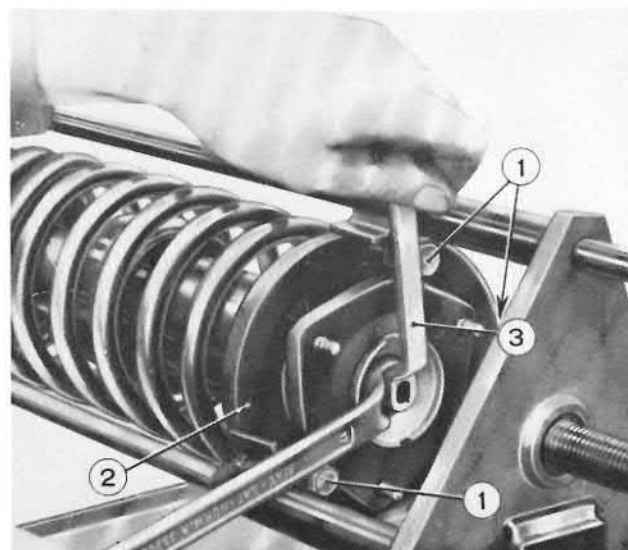
1. Spring retainer clearance screws.    2. Spring retainer.  
3. Coil spring.



Compress the spring.

Hold shock absorber stud with wrench A.57020 (3).  
Remove nut attaching retainer (2) to shock absorber.

1. Clearance screws.    2. Upper retainer.    3. Wrench.

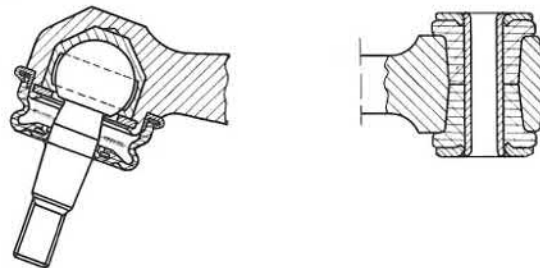


## Front Shock Absorbers and Bars

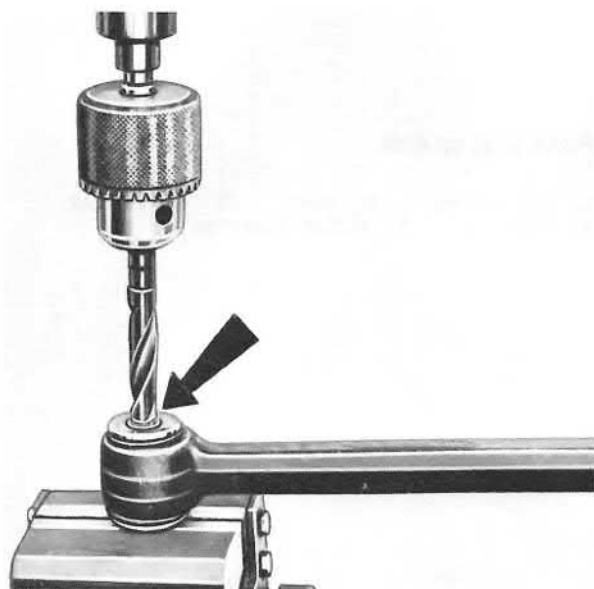
### CONTROL ARM

Check rubber bushings. If worn remove them by drilling out spacer.

Replacing control arm rubber bushings. Arrow shows stacking to be removed for removal of bushings.



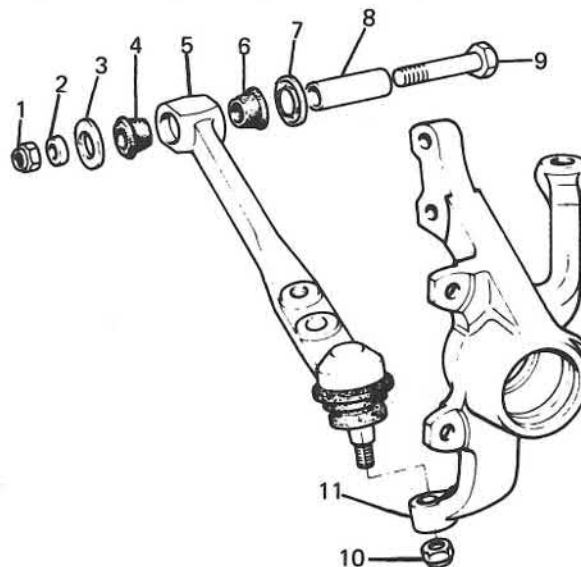
Check ball joints for excessive play and damage to swivel and rubber boot. If worn or damaged, replace complete control arm.



Sections thru ball joints and rubber bushings.

### EXPLODED VIEW OF CONTROL ARM COMPONENTS.

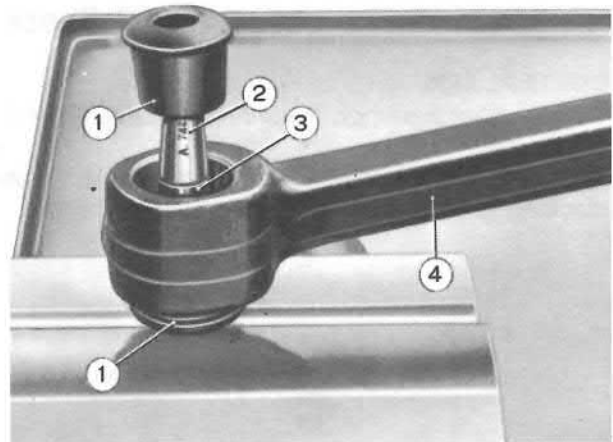
1. Nut
2. Washer
3. Washer
4. Rubber bushing
5. Control arm
6. Rubber bushing
7. Washer
8. Spacer
9. Bolt
10. Nut
11. Pillar



Install rubber bushings in control arm as follows:  
Place washer, bushing (1), and spacer (3) on pilot of tool.

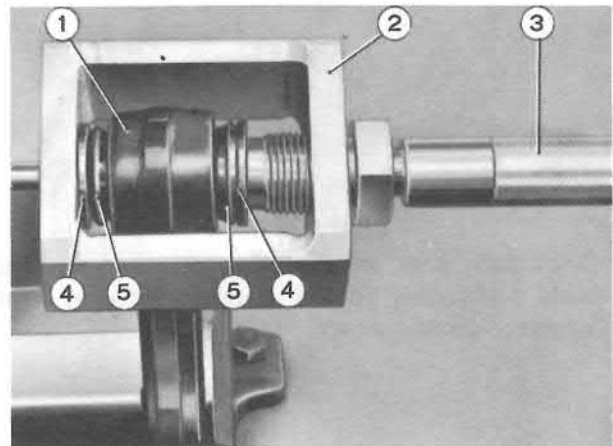
Place tool (2) thru control arm (4). Place bushing (1) and washer on tool.

- 1. Bushing.
- 2. Tool.
- 3. Spacer.
- 4. Control arm.



Place pilot on tool.

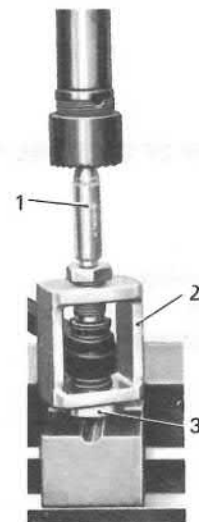
- 1. Control arm.
- 2. Tool.
- 3. Pilot of tool.
- 4. Washers.
- 5. Rubber bushings.



Press bushing into control arm and stake spacer. Use a press under a load of 2200 to 2600 lbs. (1000 to 1200kg).

Stake one side and then the other.

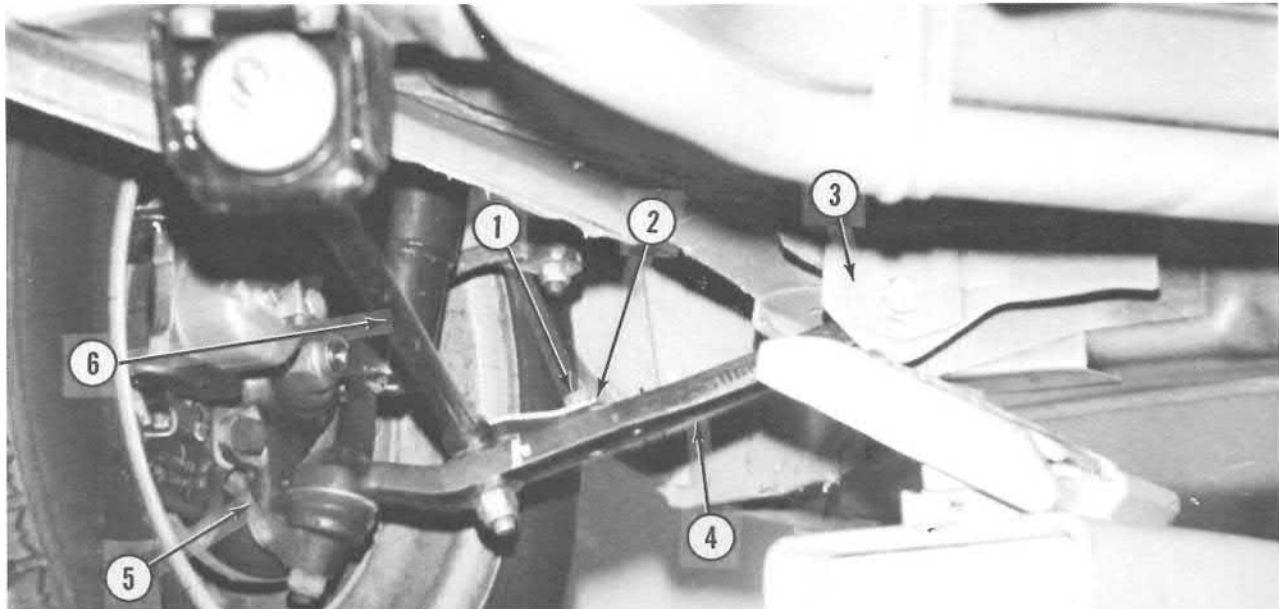
- 1. Centering pin.
- 2. Fixture
- 3. Spacer centering tool.



## Front Shock Absorbers and Bars

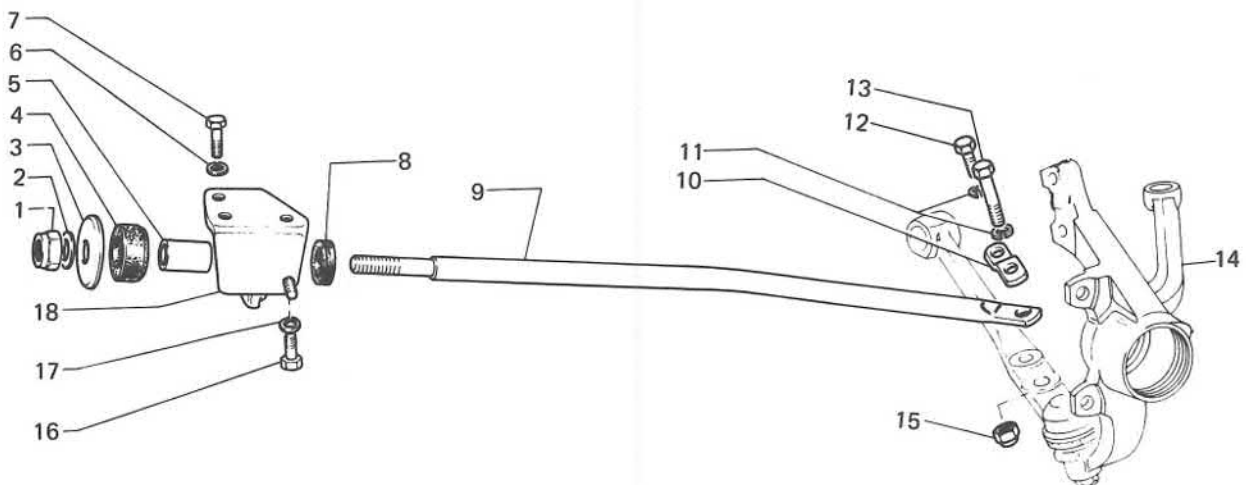
### STRUT BAR

#### STRUT BAR ATTACHMENT POINTS.



1. Bolt. 2. Plate. 3. Support. 4. Control arm. 5. Pillar. 6. Strut bar.

Inspect bar for distortions. If distortions are minor, straighten bar. If necessary, replace bar. Inspect rubber pad and ring for wear.



#### EXPLODED VIEW OF STRUT BAR ATTACHMENTS TO BODY AND CONTROL ARM.

- |               |                |                |             |
|---------------|----------------|----------------|-------------|
| 1. Nut        | 6. Lockwasher  | 11. Lockwasher | 15. Nut     |
| 2. Washer     | 7. Bolt        | 12. Bolt       | 16. Bolt    |
| 3. Cup        | 8. Rubber ring | 13. Bolt       | 17. Washer  |
| 4. Rubber pad | 9. Strut bar   | 14. Pillar     | 18. Support |
| 5. Spacer     | 10. Lockplate  |                |             |



## REAR SUSPENSION

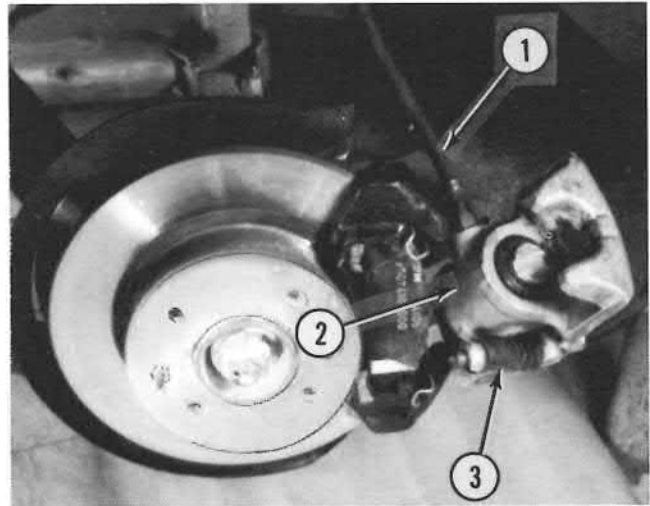
### REMOVAL AND INSTALLATION

If brake caliper (1) needs inspection, leave caliper attached to suspension. To do this, plug outlet from brake fluid reservoir and disconnect hose (2) from caliper.

Remove wheel.

Disconnect parking brake cable (3) from caliper.

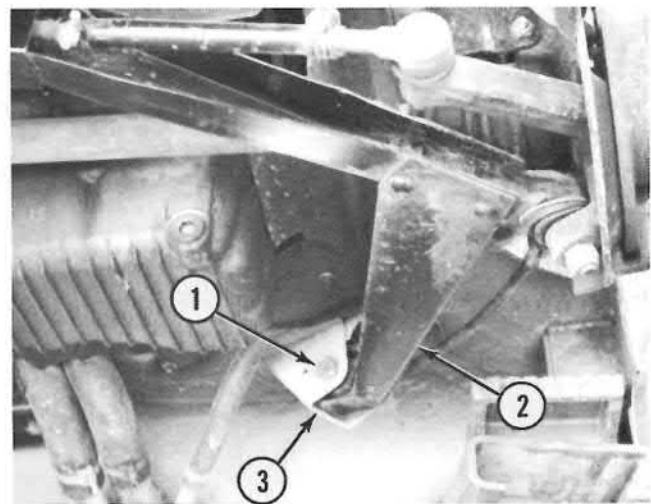
1. Caliper. 2. Hose. 3. Parking brake cable.



Remove exhaust pipe. Refer to 102.56.

Note number of shims and position on control arm. Remove nut, washer, and bolt (1) holding arm (3) to bracket (2) at front of suspension. Retain shims between arm and bracket.

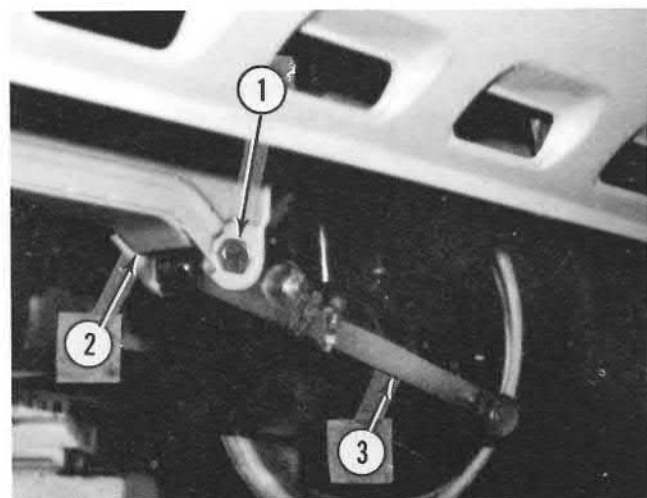
1. Bolt. 2. Bracket. 3. Control arm.



Remove nut, washer, and bolt (1) holding arm (3) to bracket (2) at rear of suspension. Note number of shims and position. Retain shims between arm and bracket.

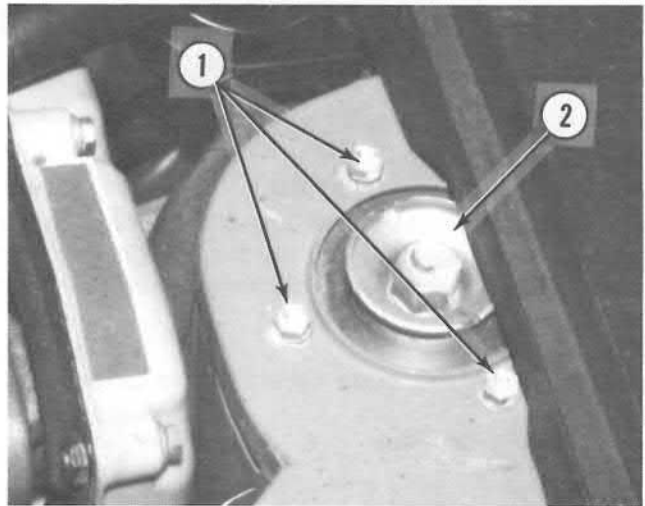
Remove hub nut (4) and washer.

1. Bolt. 2. Bracket. 3. Control arm. 4. Hub nut.



Remove 3 nuts (1) and washers holding shock absorber at top.

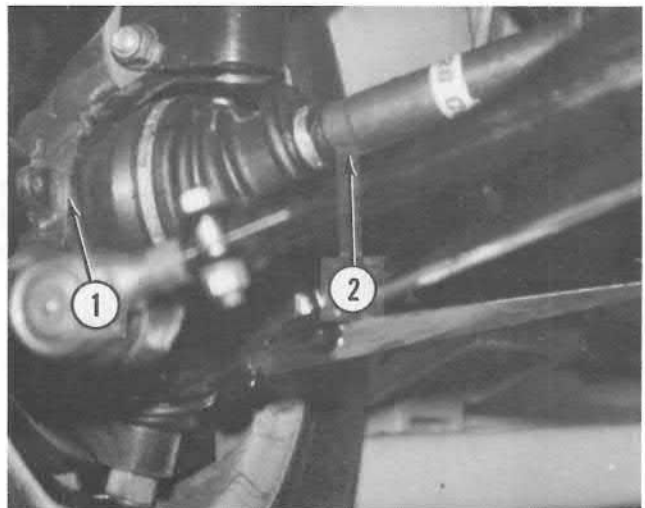
1. Nuts. 2. Shock absorber.



Slide suspension assembly off constant speed joint shaft. Position axle shaft so that it cannot come out of differential.

For disassembly of hub from pillar, refer to 274.01

1. Pillar. 2. Axle shaft.



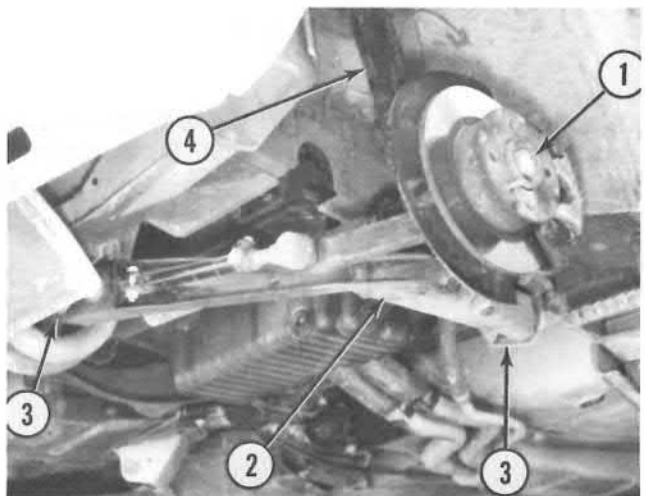
NOTE: Always use a new hub nut.  
Install shims as noted during removal.  
Loosely attach arm (2) to brackets (3).  
Raise assembly and mount hub on constant speed joint.

Insert upper attachment of shock absorber (4) in holes in body. Install 3 nuts and spring washers.

Place washer on axle shaft. Thread nut (1) on shaft. Torque nut to 101 ft. lbs. (14kgm).

Stake nut. Use tools A.74140/1 and A.74140/3.  
Install exhaust pipe. Refer to 102.56.

1. Nut. 2. Control arm. 3. Brackets. 4. Shock absorber.



## Rear Suspension

Install wheel.

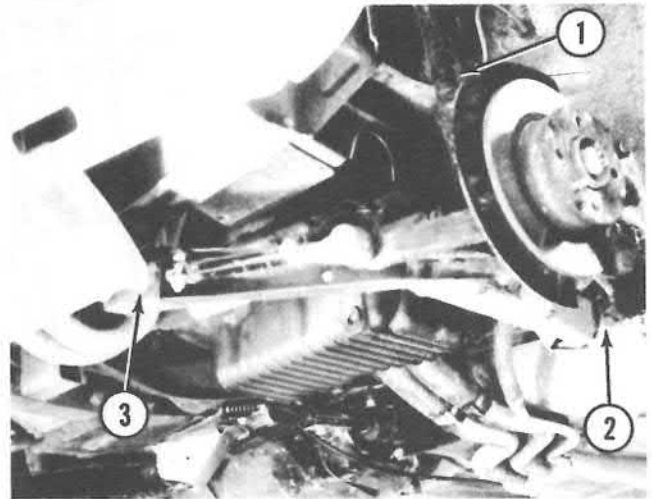
Lower car to ground.

With car laden, torque nuts (1, 2, and 3).

Nut (1) Shock absorber, 43 ft. lbs. (6kgm)

Nuts (2 and 3) Control arm, 72 ft. lbs. (10kgm)

1. Shock absorber mounting nuts.      2. Control arm front bolt.  
3. Control arm rear bolt.



### REAR WHEEL ALIGNMENT

Install and adjust alignment equipment. Follow instructions provided with equipment. Set up equipment to check camber.

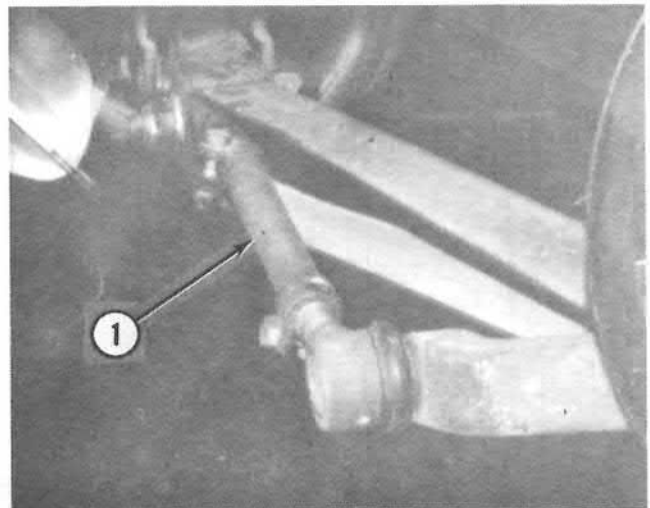
Camber, unladen car,  $-1^{\circ}10'$  to  $-2^{\circ}10'$

Check toe-in

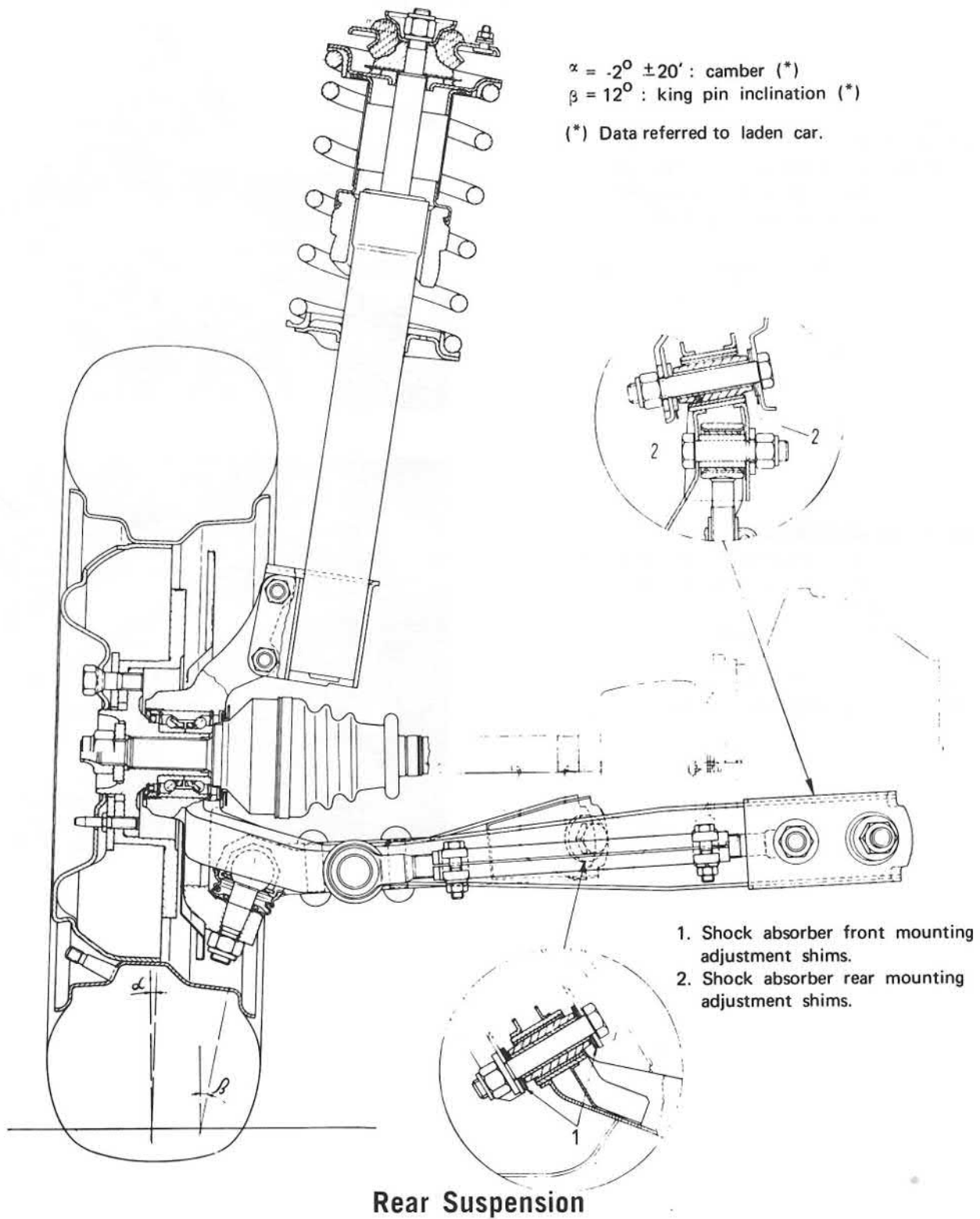
Toe-in, unladen car +0.360 to +0.510 (+9 to +13mm)

Adjust toe-in by lengthing or shorting reaction rod.

1. Reaction rod.







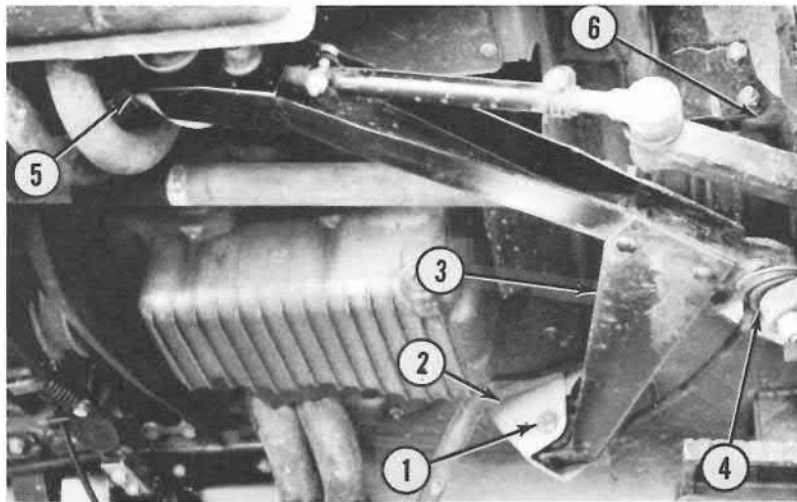
## Rear Shock Absorbers and Bars

### COIL SPRINGS

See Front Suspension Components, 443.01 for information on coil springs.

### CONTROL ARM

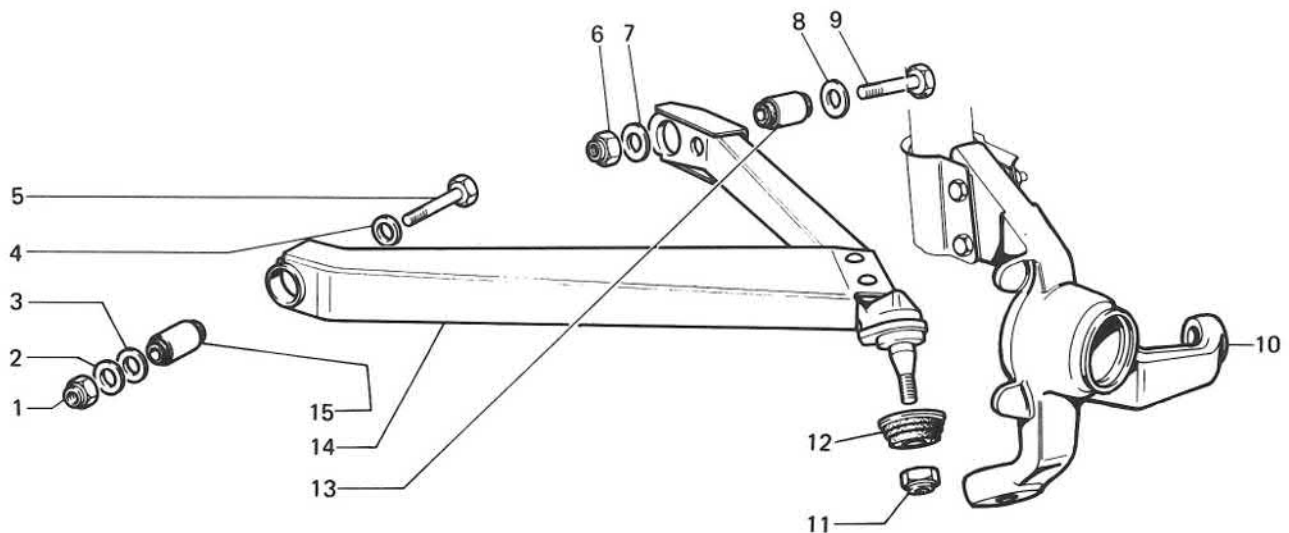
#### VIEW OF CONTROL ARM ATTACHMENT POINTS.



1. Bolt. 2. Support. 3. Control arm. 4. Ball Joint. 5. Support. 6. Pillar.

#### EXPLODED VIEW OF CONTROL ARM.

- |           |           |            |                 |
|-----------|-----------|------------|-----------------|
| 1. Nut    | 5. Bolt   | 9. Bolt    | 13. Bushing     |
| 2. Washer | 6. Nut    | 10. Pillar | 14. Control arm |
| 3. Washer | 7. Washer | 11. Nut    | 15. Bushing     |
| 4. Washer | 8. Washer | 12. Boot   |                 |





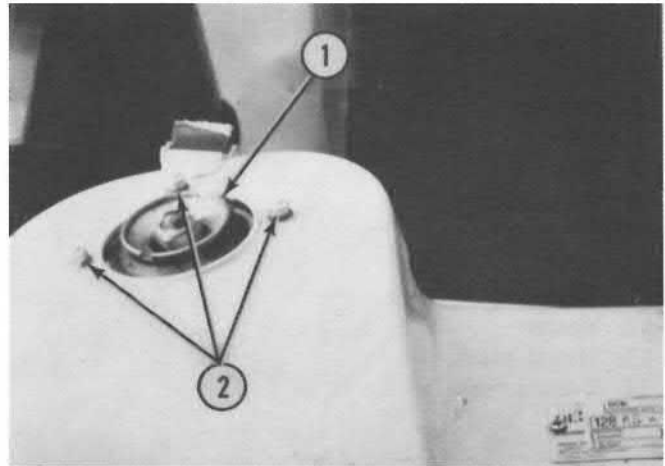
## Shock Absorbers

### REMOVAL AND INSTALLATION

#### FRONT AND REAR

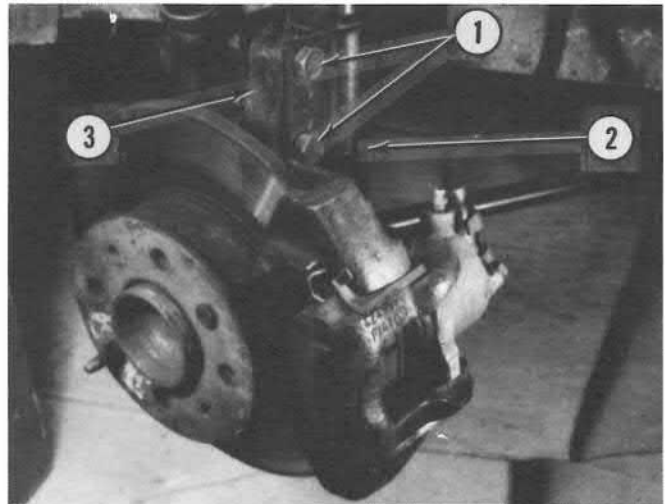
Remove three nuts (2), lockwashers, and washers holding absorbers (1) at top.

Remove two bolts and nuts (1) holding absorber (2) to pillar (3).



1. Shock absorbers. 2. Nuts.

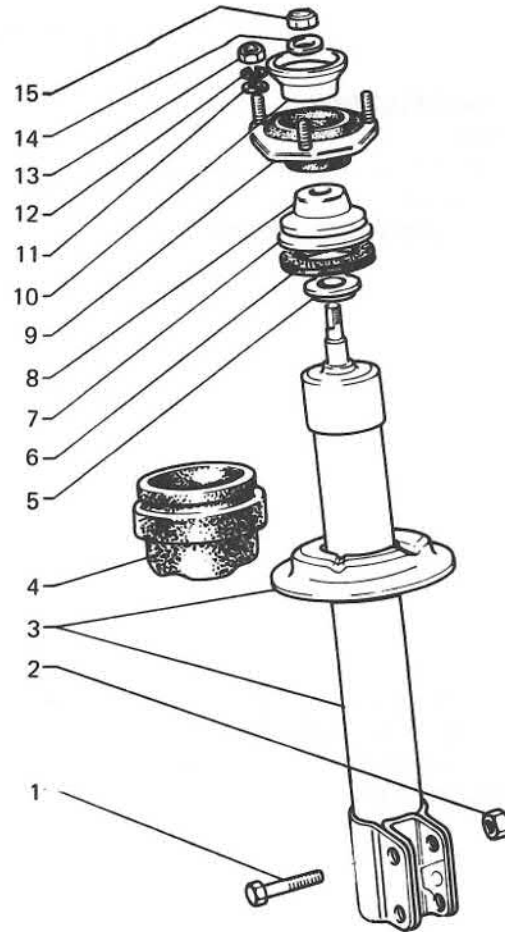
Use Tool A.74241 to remove coil spring from absorber. Refer to Front Suspension Components, 443.01. Check absorbers for operation. If absorbers fail to meet specifications replace them.



1. Bolts. 2. Shock absorbers. 3. Pillar.

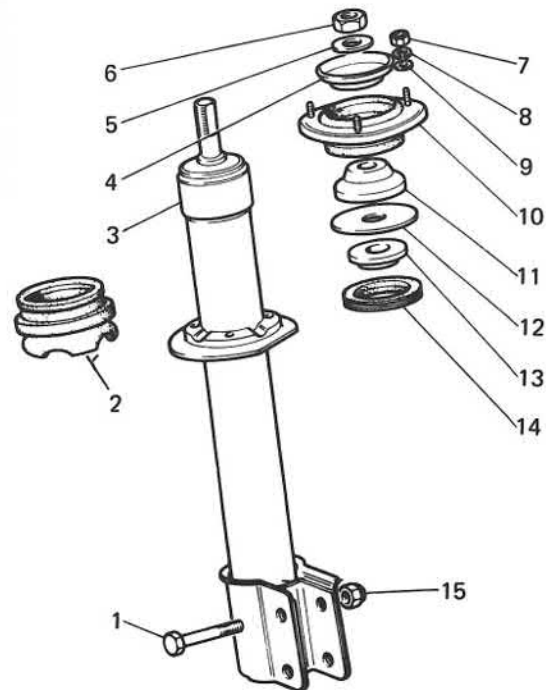
**FRONT SHOCK ABSORBER ATTACHMENTS**

1. Bolt
2. Rubber pad
3. Shock absorber
4. Cup
5. Washer
6. Nut
7. Nut
8. Lockwasher
9. Washer
10. Pad
11. Spacer
12. Washer
13. Thrust plate
14. Rubber ring
15. Nut



**REAR SHOCK ABSORBER ATTACHMENTS**

1. Bolt
2. Nut
3. Shock absorber
4. Rubber pad
5. Thrust plate
6. Rubber ring
7. Washer
8. Spacer
9. Pad
10. Cup
11. Washer
12. Lockwasher
13. Nut
14. Washer
15. Nut



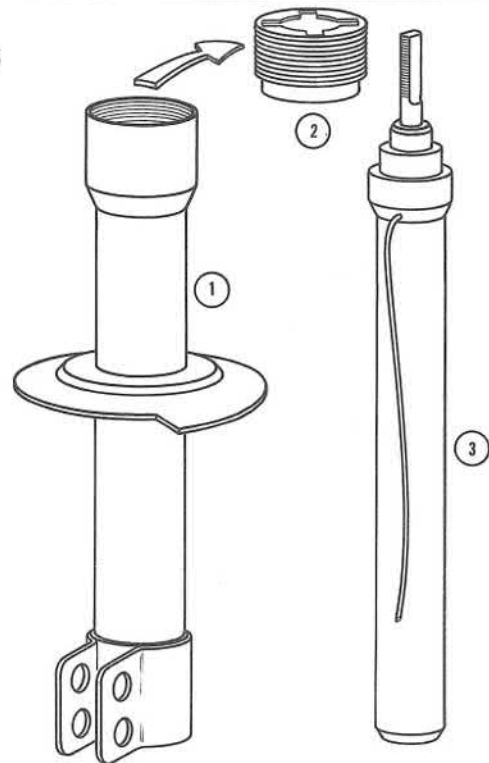
## Shock Absorbers

### DISASSEMBLY AND ASSEMBLY

Place shock absorber up right in vice. Remove threaded plug (2). Remove inner cylinder (3) from outer cylinder (1).

NOTE: New inner cylinders are supplied dry. You will have to fill them. Use either of the following methods.

1. Outer cylinder.    2. Threaded plug.    3. Inner cylinder.

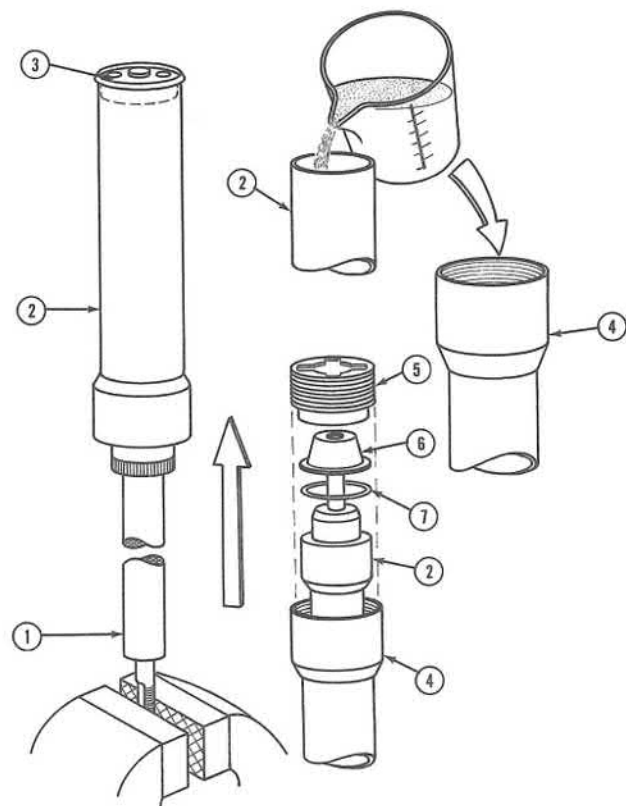


### Method A

Place stem (1) of inner cylinder (2) in vice. Extend cylinder. Carefully and gently tap around and under valve (3) to remove it.

Pour fluid into cylinder (2) until full. Add remaining fluid to outer cylinder (4). Install valve (3) by carefully tapping it around edge. Insert cylinder (2) into cylinder (4). Assemble absorber using new ring seal (7) and Cap (6). Screw threaded plug (5) on absorber.

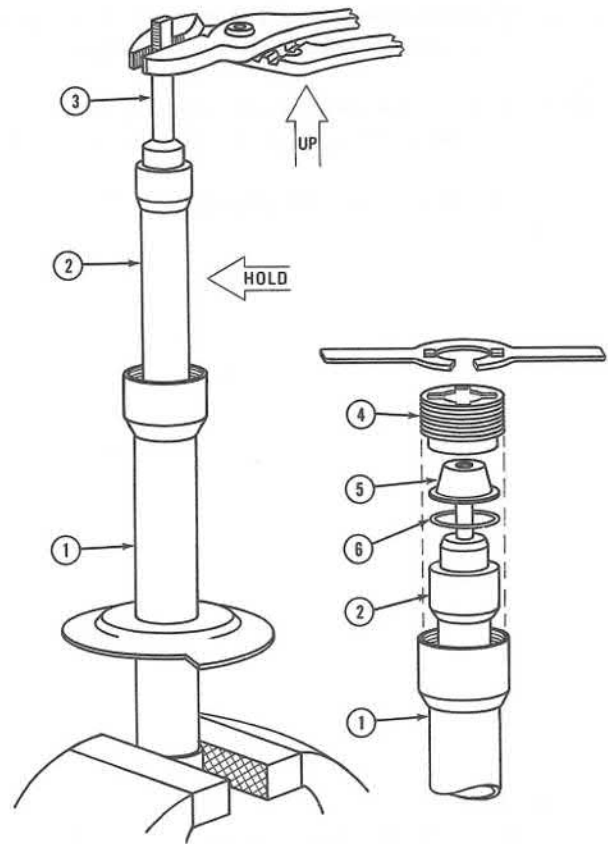
1. Stem.    2. Inner cylinder.    3. Valve.    4. Outer cylinder.  
5. Threaded plug.    6. Cap.    7. Ring seal.



**Method B**

Place outer cylinder (1) in vice. Fill cylinder with oil. Insert inner cylinder (2) until partly submerged in oil. Firmly hold stem (3) of cylinder (2) and using vice-grips, slowly pull stem (3) out to its full extension. The piston will draw the oil into the cylinder. Assemble absorber using new ring seal (6) and cap (5). Screw threaded plug (4) on absorber. After assembling, operate unit manually. Extending and compressing it two or three times to bleed it.

- |                    |                    |               |
|--------------------|--------------------|---------------|
| 1. Outer cylinder. | 2. Inner cylinder. | 3. Stem.      |
| 4. Threaded plug.  | 5. Cap.            | 6. Ring seal. |

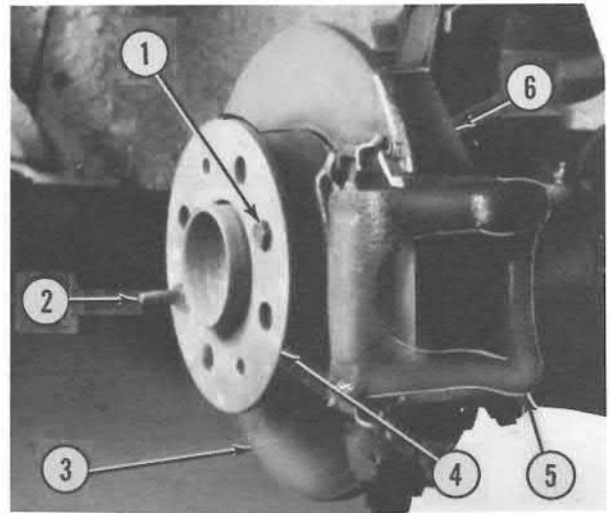


## Wheels

### FRONT WHEEL HUB REMOVAL AND INSTALLATION

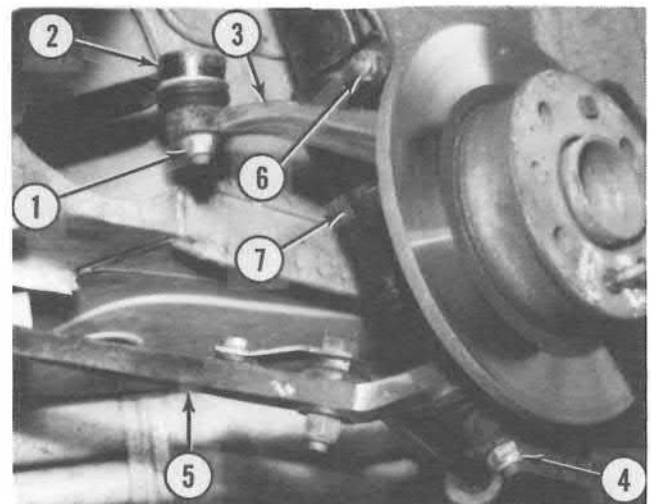
Jack up car. Remove wheel.  
Disconenct brake calipers (5) and support bracket (6).  
Remove bolt (1) and centering stud (2) holding disc (3) and plate (4).

- 1 Bolt. 2. Centering stud. 3. Disc. 4. Plate.  
5. Calipers. 6. Support bracket.



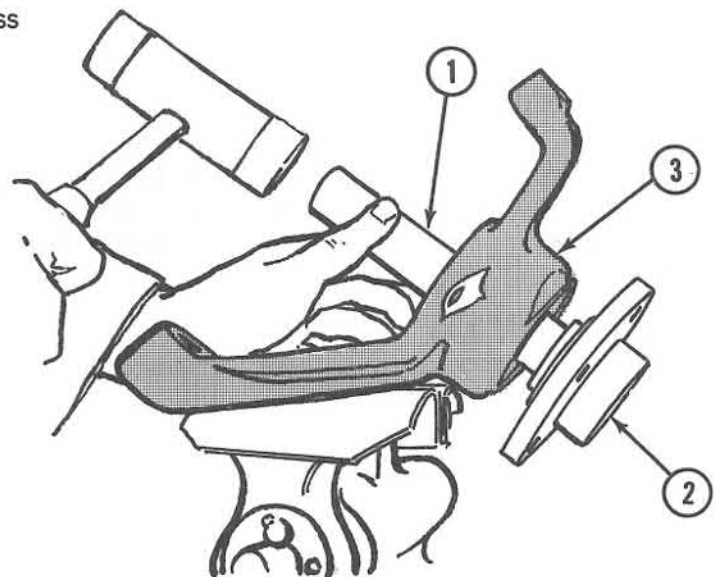
Remove nut (1) holding tie rod (2) to pillar (3). Remove ball joint from pillar. Use tool.  
Remove nut (4) holding control arm (5) to pillar (3). Remove ball joint from pillar.  
Remove two nuts (6) and bolts holding shock absorbers (7) to pillar. Remove pillar.

1. Nut. 2. Tie rod. 3. Pillar. 4. Nut.  
5. Control arm. 6. Nut. 7. Shock absorber.



Remove nut and washers holding hub to pillar. Press hub out of pillar. Use tool 8015.

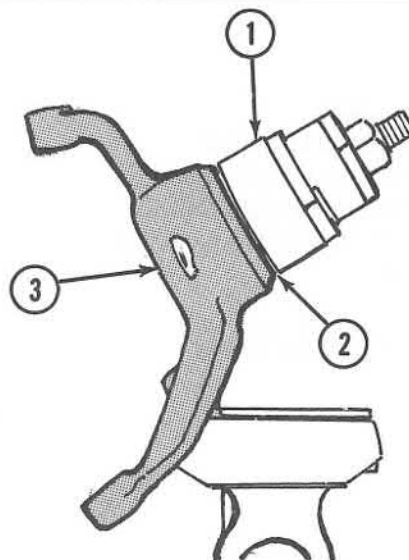
1. Tool. 2. Hub. 3. Pillar.





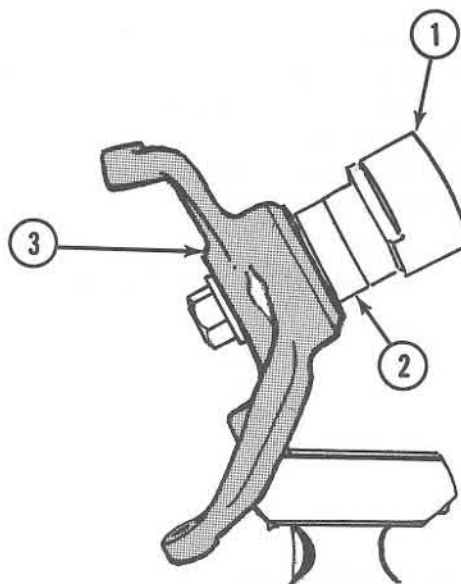
Remove ring nut holding bearing in pillar. Use tool A.57123. Pull bearing out of pillar. Use tool 8015.

1. Tool. 2. Pillar. 3. Bearing.



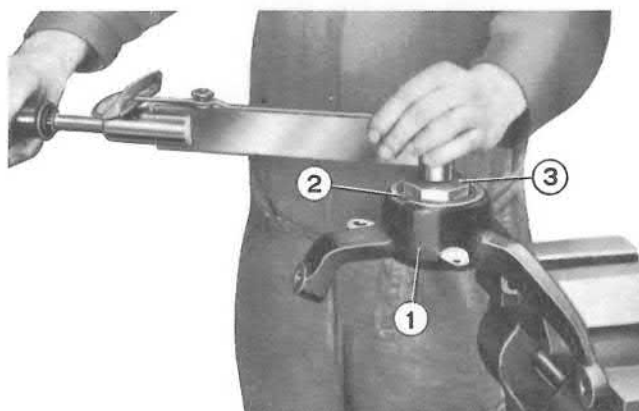
Install bearing in pillar. Use tool 8015.

1. Tool. 2. Bearing. 3. Pillar.



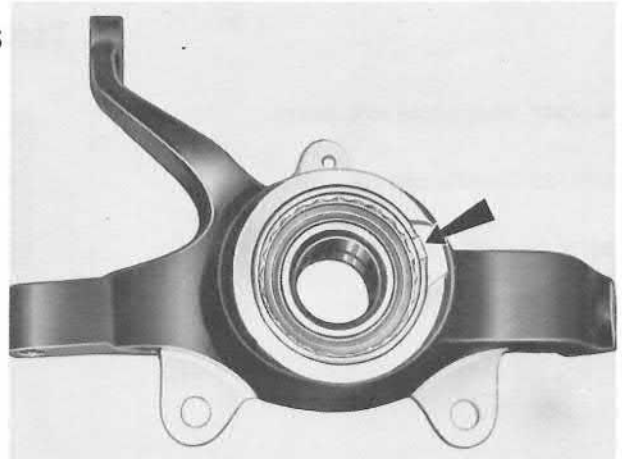
Screw a new ring nut (2) in pillar. Torque nut to 43.4 ft. lbs. (6kgm). Use tool A.57123 and torque wrench. NOTE: Always use a new ring nut after disassembling pillar.

1. Pillar 2. Ring nut. 3. Tool.



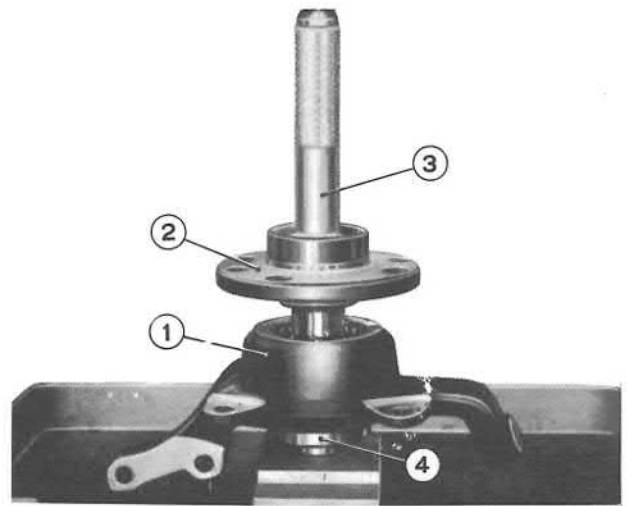
## Wheels

Stake ring nut as shown.



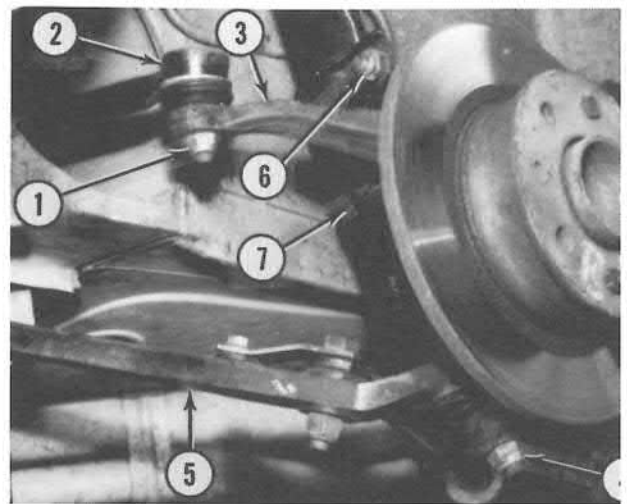
Install hub in pillar. Press hub in. Use a press.  
Install two washers and a nut. Torque nut to 101 ft. lbs.  
(14kgm). Stake nut.

1. Pillar. 2. Hub. 3. Driver. 4. Tool.



Attach pillar to shock absorber with two bolts and nuts.  
Attach control arm (5) to pillar (3).  
Install brake caliper and disc on hub.  
Install wheel. Lower car.  
Attach tie-rod (2) to pillar.  
Torque nuts shown with car loaded. Refer to Specifications, 44.

1. Nut. 2. Tie rod. 3. Pillar. 4. Nut.  
5. Control arm. 6. Nut. 7. Shock absorber.

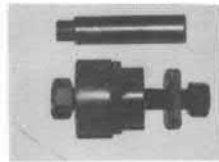


## Tool Equipment

A.74241. Compressor, coil springs.

A.75123. Wrench, ring nut.

8015. Remover, hub bearing.



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# ELECTRICAL — 55

PARTS CATALOG CODE	SERVICE MANUAL & SERVICE TIME SCHEDULE CODE		Page
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		Wiring Diagram .....	174
F1.01	551.01	Gr. 551-IGNITION Engine Ignition .....	175
F2.01	552.01	Gr. 552-STARTING Engine Starting .....	179
F3.01	553.01	Gr. 553-ALTERNATOR Alternator .....	183
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## Electrical: Specifications

### IGNITION

Firing order .....	1-3-4-2
Ignition distributor .....	DUCELIER
Type .....	4481A
Static advance .....	0
Centrifugal advance .....	28° ± 1° 30'
Vacuum advance correction .....	10° ± 1° 30'
Breaker contact pressure .....	15.9 ± 1.8 oz. (450 ± 50 gr.)
Contacts gap .....	0.0145 to 0.0169 ("0.37 to 0.43mm)
Terminal to ground insulation at 500Vdc .....	about 50 M ohms
Condenser capacity at 50 to 1000Hz .....	0.22 to 0.23 MF
Opening angle .....	35° ± 3°
Closing angle .....	55° ± 3°

#### IGNITION COIL

Type .....	MARELLI BE 200 B	MARTINETTI G 52 S
Primary winding ohmic resistance (at 68 F, 20 C) .....	3.1 to 3.4 ohms	3 to 3.3 ohms
Secondary winding ohmic resistance (at 68 F, 20 C) .....	5670 to 6930 ohms	6500 to 8000 ohms

#### SPARK PLUGS

Type .....	AC-DELCO 42-XLS	MARELLI CW 78 LP	CHAMPION N 9 Y
Thread (metric) .....	M14 x 1.25	M14 x 1.25	M14 x 1.25
Gap .....	0.020 to 0.024" (0.5 to 0.5mm)	0.020 to 0.024" (0.5 to 0.6mm)	0.020 to 0. (0.5 to 0.6mm)

## Starting Motor

Type .....	E84-0.8/12 Var. 1
Voltage .....	12
Nominal output .....	0.8KW
Direction of rotation, pinion side .....	clockwise
No. of poles .....	4
Field winding .....	series
Engagement .....	Free wheel
Drive .....	Electromagnetic
Diameter inside pole shoes .....	2.175 to 2.182 inches (55.25 to 55.42mm)
Diameter of armature .....	2.140 to 2.142 inches (54.35 to 54.40mm)
Control .....	electromagnetic
<b>Bench Testing Data</b>	
—Running test (at 77° F - 25° C)	
Amperage .....	170
Torque developed .....	2.89 ± 0.14 ft. lbs. (0.40 ± 0.02Kgm)
Speed .....	1900 rpm
Voltage .....	9.5
—Stall test (at 77° F - 25° C)	
Amperage .....	315
Torque developed .....	6.37 ± 0.22 ft. lbs. (0.88 ± 0.03kgm)
Voltage .....	7 ± 3
—No-load test (at 77° F - 25° C)	
Amperage, not above .....	30
Speed .....	7000 ± 1000 rpm
Voltage .....	11.9
—Inner resistance on starting (at 77° - 25° C) .....	0.022 ± 0.001 ohms
<b>Check of Mechanical Characteristics</b>	
—Brush pressure (unworn) .....	2.5 to 2.9 lbs. (1.15 to 1.3kg)
—End clearance, armature shaft .....	0.0039 to 0.0197 in. (0.1 to 0.5mm)
—Mica undercut depth .....	0.039 in (1mm) minimum
—Free wheel efficiency: static torque to rotate pinion slowly .....	1.5 to 1.9 in. lbs. (1.7 to 2.2kg/cm)

## Electrical: Specifications

Solenoid	
—Coil resistance at 77° F (25° C) .....	0.39 ± 0.02 ohms
—Contact stroke .....	0.1129 to 0.1586 in. (2.87 to 4.03mm)
—Core stroke .....	0.480 to 0.602 in.) (12.2 to 15.3mm)

Lubrication	
—Drive unit splines .....	VS 10 W oil (SAE 10W)
—Contact face of middle disk and driving sleeve .....	FIAT MR 3 grease

## ALTERNATOR

Type .....	FIMM A124-14V-44A Var 3
------------	-------------------------

Nominal voltage .....	12
-----------------------	----

Cut-in speed at 12V at 77° F (25° C) .....	1,000 ± 50 rpm
--	----------------

Current output at 14V to battery at 7000 rpm and thermal rate, not below .....	44A
--	-----

Max. current output .....	53A approx.
---------------------------	-------------

Max. speed, steady .....	13,000 rpm
--------------------------	------------

Rotation, drive end .....	clockwise
---------------------------	-----------

Ratio	
engine .....	1:2
alternator .....	

Rectifier Diode Characteristics		
type .....	6, Power	3, excitation
Permanent normal current .....	25A	1A
Reverse voltage .....	150V	150V
Reverse current with 150V dc at 266° F (130° C) .....	2mA	2mA

Voltage Regulator Test and Setting	
Type .....	BOSCH AD1/14V
Alternator speed for test and setting .....	4,000 to 5,000 rpm
Battery capacity .....	60Ah
2nd stage testing current .....	0.8 to 1.0A
2nd stage regulating voltage .....	14.2 ± 0.4V
1st stage testing current .....	2 to 2.2A
1st stage regulating voltage, lower than the voltage read for the 2nd stage by .....	0.2 to 0.7V
Resistance between positive terminal and ground at 77° F ± 18° F (25° C ± 10° C) .....	85 ± 4.5 ohms

## BATTERY

Nominal voltage	12
Nominal capacity (at 20 hour discharge rate)	60 AH

## RELAYS

WIRING DIAGRAM REFER. NO.	RELAYS, SYSTEM/CONTROL	LOCATION
15	Horn	right headlight motor compartment
39	Radiator cooling fan motor	left headlight motor compartment
128 (2 relays)	Headlight motors	headlight motor compartments
128/2	Seat belt and remove key warning buzzer	left side behind fuses
128/3	Starter	right side panel above drop tray
128/4	Carburetor fan motor	fan motor support, engine compartment
30	Turn signal flasher	left side behind fuses
32	Vehicular warning flasher	left side behind fuses

## LIGHTING

	SAE STANDARD
Headlights, high and low beams .....	"Sealed beam" headlight unit 7031
Front parking and rear tail lights .....	No. 67 (4cp)
Side marker lights, front and rear .....	No. 158 (2cp)
Front and rear turn signal, stop, back-up, and license plate lights .....	No. 1073 (32cp)
Instrument cluster lighting	
Fuel reserve indicator	red
Battery charge indicator	red
Low oil pressure indicator	red
High beams indicator	blue
Parking and tail lights indicator	green
Turn signal indicator	green
Brake system effectiveness and hand brake "ON" indicator	No. 158 (2cp) red
Vehicular hazard warning signal indicator	red
Fasten belts indicator	
Ideogram illumination optical fiber light source	
Cigar lighter light	
Vehicular hazard warning light switch light .....	12V 1.2 W
Courtesy lights .....	12V 5W



**Electrical: Specifications****CONTROLS**

High beam switch .....	by lever below steering wheel
Outer lighting control switch .....	on instrument panel
Instrument cluster light switch .....	on center console
Vehicular hazard warning signal switch .....	on center console
Courtesy light	
—toggle type switch .....	on center console
—door jam switch .....	on door pillars
Turn signal .....	by lever below steering wheel
—nominal number of cycles per minute .....	60 to 120
Ideogram illumination intensity rheostat .....	on center console
Heater fan switch (2 speed, 3 position) .....	on center console
Windshield wiper switch .....	by lever below steering wheel
—type .....	crank gear
—sweeps per minute	
low speed .....	48
high speed .....	75
—brush pressure on glass .....	19 to 23 oz (550 to 650 gr)

**Fuses****FUSES**

- 2 three-Amp fuses
- 8 eight-Amp. fuses
- 2 sixteen-Amp. Fuses
- 1 eight-Amp. fuse  
in separate holder

**PROTECTED CIRCUITS**

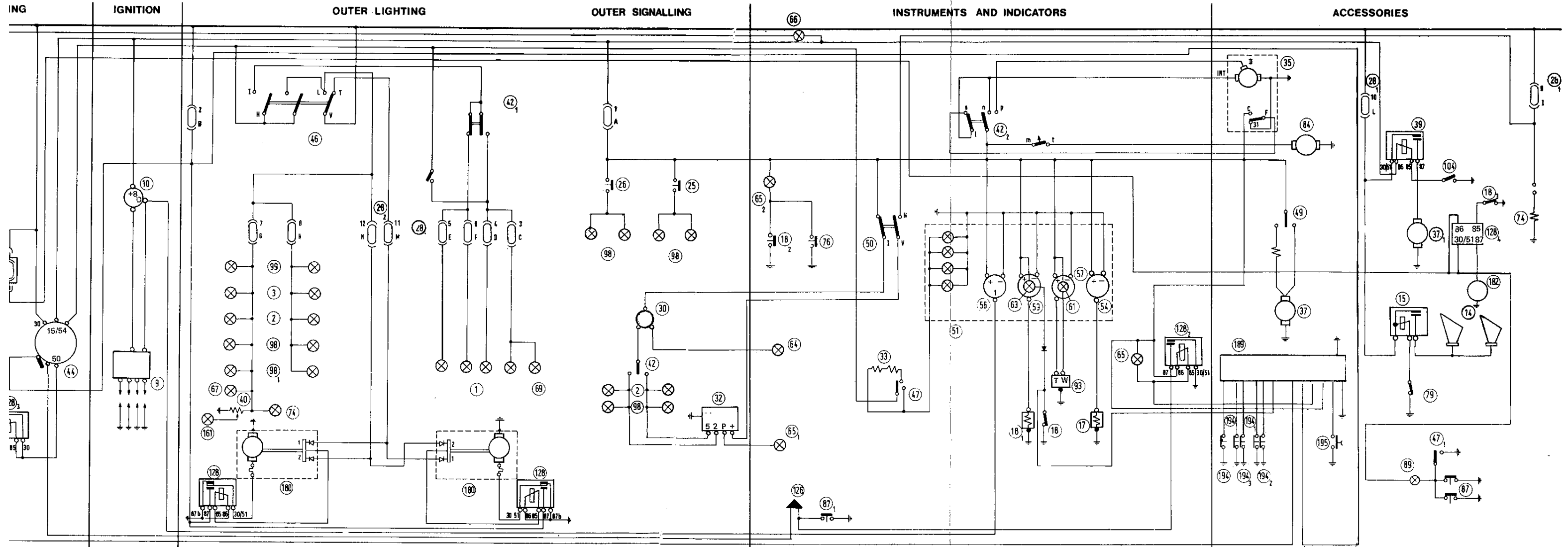
A(*) (8 Amp)	Stop lights. Back-up lights. Brake system effectiveness and hand brake "ON" indicator. Ignition-Belt interlock system. Turn signal and indicator. Tachometer. Oil pressure gage and indicator.	Electric pump, windshield washer. Fuel gage and fuel reserve indicator. Engine water temperature gage. Heater fan motor. Windshield wiper. Fasten belts indicator. Fasten belts buzzer relay.
B (8 Amp)	Actuators, retractable headlights. Interlock system electronic control unit. Fasten belts and remove key buzzer.	
C(*) (8 Amp)	Left headlight high beam.	

D(*) (8 Amp)	Right headlight high beam.	
E(*) (8 Amp)	Left headlight low beam.	
F(*) (8 Amp)	Right headlight low beam.	
G(*) (8 Amp)	Front left parking light. Parking and tail lights indicator. Rear right side marker light. Rear right tail light. Front left side marker light. License plate light (one bulb only).	Light source, ideograms optical fiber illumination. Cigar lighter spot light. Light source, heater fan ideogram illumination.
H(*) (8 Amp)	Front right parking light. Front right side marker light. Rear left tail light.	Rear left side marker light. License plate light (one bulb only).
I (16 Amp)	Cigar lighter. Vehicular hazard warning signal and indicator.	
L (16 Amp)	Engine fan motor. Horns and relay.	
M (3 Amp)	Retractable headlights control relay (on closing).	
N (3 Amp)	Retractable headlights control relay (on opening).	
28/3 (8 Amp)	Carburetor fan motor and relay. Courtesy light.	

#### UNPROTECTED CIRCUITS

Alternator circuit. Engine fan motor relay field winding. Ignition. Instrument cluster lights. Starting. Starting motor relay field winding. Battery charge indicator.

### Electrical: Wiring Diagram



DS

unit  
ig unit  
cator switch  
tor fan relay

- |   |  |  |
|---|--|--|
| <ul style="list-style-type: none"> <li>28/1 16-Amp fuse</li> <li>28/2 3-Amp fuses</li> <li>28/3 8-Amp fuses</li> <li>30. Turn signal flasher</li> <li>32. Vehicular hazard warning signal flasher</li> <li>33. Instrument cluster light resistor</li> <li>35. Windshield wiper motor</li> <li>37. Two-speed heater fan motor</li> <li>37/1 Engine fan motor</li> <li>39. Relay for engine fan motor</li> <li>40. Ideogram lighting potentiometer</li> <li>42. Turn signal indicator switch</li> <li>42/1 High/low beams change-over switch</li> <li>42/2 Wiper/washer three-position switch</li> <li>44. Steering lock ignition switch</li> <li>46. Lighting switch (controls concealed headlight motors)</li> <li>47. Instrument cluster lights switch</li> <li>47/1 Courtesy light switch</li> <li>49. Heater fan motor three-position switch</li> <li>50. Vehicular hazard warning signal switch with light</li> </ul> | <ul style="list-style-type: none"> <li>51. Twelve-indication instrument cluster</li> <li>53. Oil pressure gage</li> <li>54. Engine water temperature gage</li> <li>56. Tachometer</li> <li>57. Fuel gage</li> <li>61. Fuel reserve indicator</li> <li>63. Low oil pressure indicator</li> <li>64. Turn signal indicator</li> <li>65. Fasten belts indicator</li> <li>65/1 Vehicular hazard warning indicator</li> <li>65/2 Brake system effectiveness and hand brake "ON" indicator</li> <li>66. Battery charge indicator</li> <li>67. Parking and tail lights indicator</li> <li>69. High beams indicator</li> <li>74. Cigar lighter with housing indicator</li> <li>76. Hand brake ON switch</li> <li>79. Horn button</li> <li>84. Washer pump motor</li> <li>87. Courtesy light jam switch</li> <li>87/1 Remove key indicator jam switch (driver's door)</li> </ul> | <ul style="list-style-type: none"> <li>89. Courtesy light</li> <li>93. Fuel gage sending unit</li> <li>98. Tail, turn signal, stop and back-up lights unit</li> <li>98/1 Rear side markers lamps</li> <li>99. License plate lamp</li> <li>104. Thermostatic switch for engine fan motor</li> <li>126. Fasten belts and remove key buzzer</li> <li>128. High beam motor relays</li> <li>128/2 Relay for buzzer</li> <li>128/3 Starter relay</li> <li>128/4 Relay for carburetor fan motor</li> <li>161. Light source, optical fiber illumination</li> <li>180. Concealed headlight motors</li> <li>182. Carburetor fan motor</li> <li>189. Interlock system electronic control unit</li> <li>194. Button switch on seat belts</li> <li>194/1 Strip switch in passenger's seat cushion</li> <li>194/2 Gear-engaged signal button switch</li> <li>194/4 Strip switch in driver's seat cushion</li> <li>195. Interlock by-pass switch</li> </ul> |
|---|--|--|

## Ignition

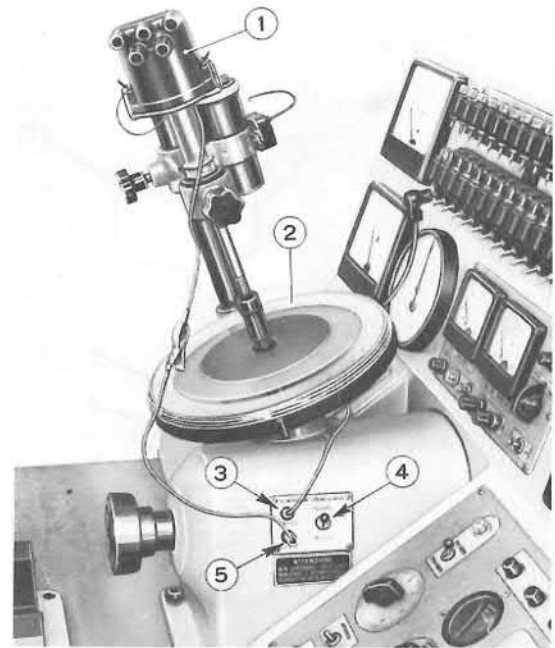
### IGNITION DISTRIBUTOR

Check automatic centrifugal advance.

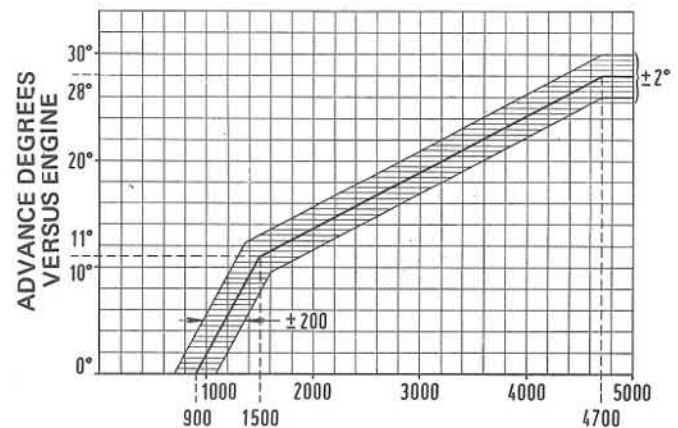
Mount distributor on test bench.

Rotate distributor at 300 to 400 rpm. Read on graduated disc angle at which one of the sparks occurs. Gradually increase speed and take readings of the number of degrees of spark advance. Compare findings with diagram.

1. Distributor. 2. Graduated disc. 3. Plug for disc.  
4. Stroboscopic switch. 5. Plug for distributor breaker.



The distributor is driven at one-half engine speed. To plot advance curve double both rpm and advance degrees. Match curve against diagram shown in figure. Check distributor contacts openings and closing angle:  
—open-contact angle —  $35^\circ \pm 3^\circ$   
—dwell (closed-contact) angle —  $55^\circ \pm 3^\circ$

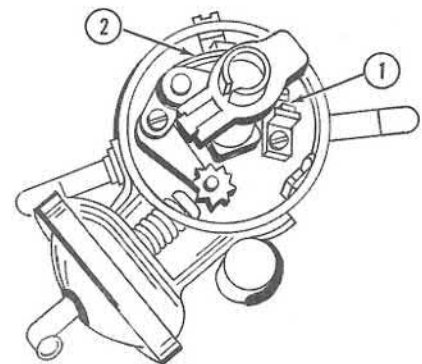


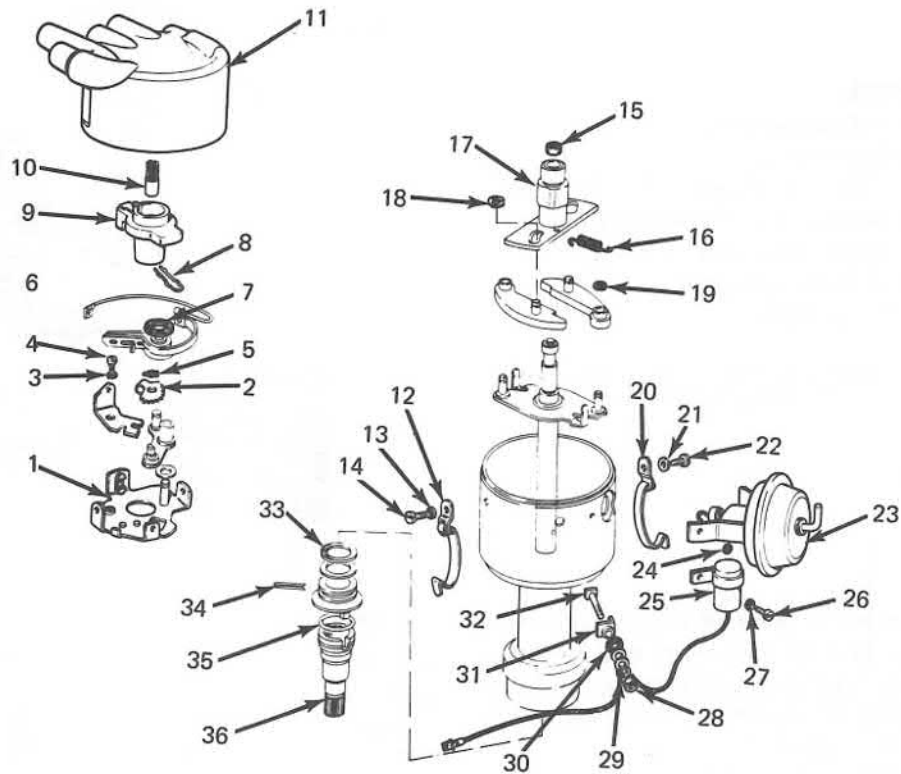
Check that contact gap is 0.0145 to 0.0169 in. (0.37 to 0.43mm).

Check that contact pressure is  $15.9 \pm 1.8$  oz. (450  $\pm$  50 gr.).

Refer to General Information for Ignition Timing.

1. Point gap. 2. Contact.





### EXPLODED VIEW OF IGNITION DISTRIBUTOR

- |                           |                  |                  |
|---------------------------|------------------|------------------|
| 1. Contact breaker plate  | 13. Washer       | 25. Condenser    |
| 2. Star gear              | 14. Screw        | 26. Screw        |
| 3. Washer                 | 15. Rubber ring  | 27. Washer       |
| 4. Screw                  | 16. Spring       | 28. Nut          |
| 5. Clip                   | 17. Cam          | 29. Lockwasher   |
| 6. Contact breaker points | 18. Clip         | 30. Fiber washer |
| 7. Washer                 | 19. Washer       | 31. Terminal     |
| 8. Clip                   | 20. Clip         | 32. Bolt         |
| 9. Rotor                  | 21. Washer       | 33. Washer       |
| 10. Spring contact        | 22. Screw        | 34. Pin          |
| 11. Cap                   | 23. Vacuum valve | 35. Seal         |
| 12. Clip                  | 24. Washer       | 36. Gear         |

## Ignition

### IGNITION COIL

Check resistance of primary winding.

Resistance at 68° F (20° C) must be as follows:

Marelli	Martinetti
3.1 to 3.4 ohms	3 to 3.3 ohms



Check resistance of secondary winding.

Resistance at 68° F (20° C) must be as follows:

Marelli	Martinetti
5670 to 6930 ohms	6500 to 8000 ohms





## Starting

### STARTER

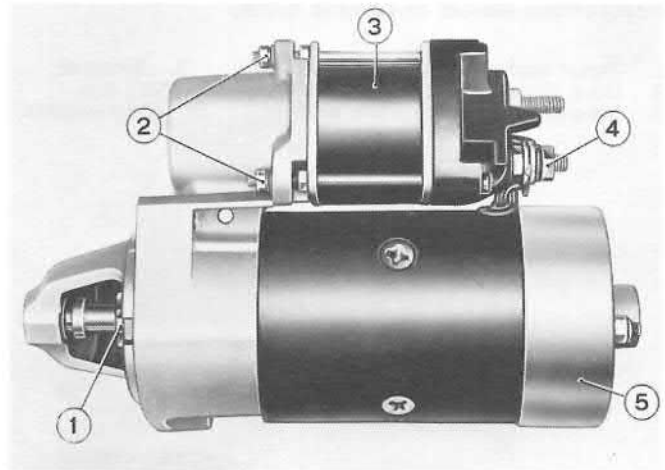
#### DISASSEMBLY AND ASSEMBLY

Disconnect wiring from solenoid terminal by removing nut (4).

Remove nuts (2) and washers holding solenoid (3).  
Remove solenoid.

Remove dust cover (5) on commutator end.

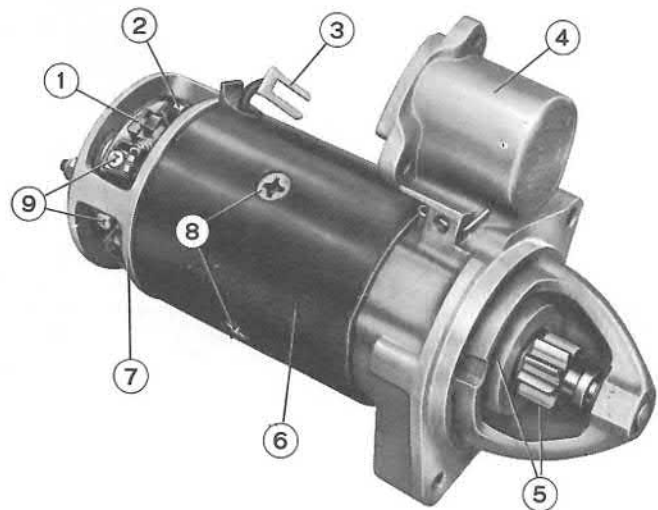
1. Pinion. 2. Nuts for solenoid. 3. Solenoid.  
4. Terminal nut. 5. Dust cover.



Remove screws (9) holding terminals on brushes (1) in brush holder. Lift brushes (1) lightly. Rest brush spring ends against side face of brushes.

Remove nuts and washers holding brush holder support to frame. Remove support. Retain thrust washers on end of pin.

1. Brush. 2. Brush spring. 3. Terminal.  
4. Pinion end head. 5. Drive pinion. 6. Frame.  
7. Commutator end head. 8. Pole shoe mounting screws.  
9. Brush terminal clamping screw.



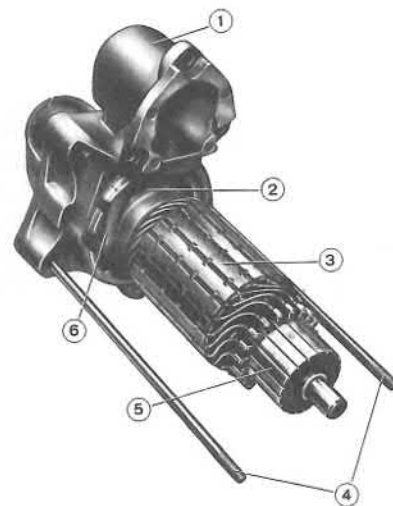
Slide frame off pinion end.

Remove cotter pin holding pin for shifting fork (6) in head (1).

Remove pin and fork (6).

Remove armature (3) from head (1).

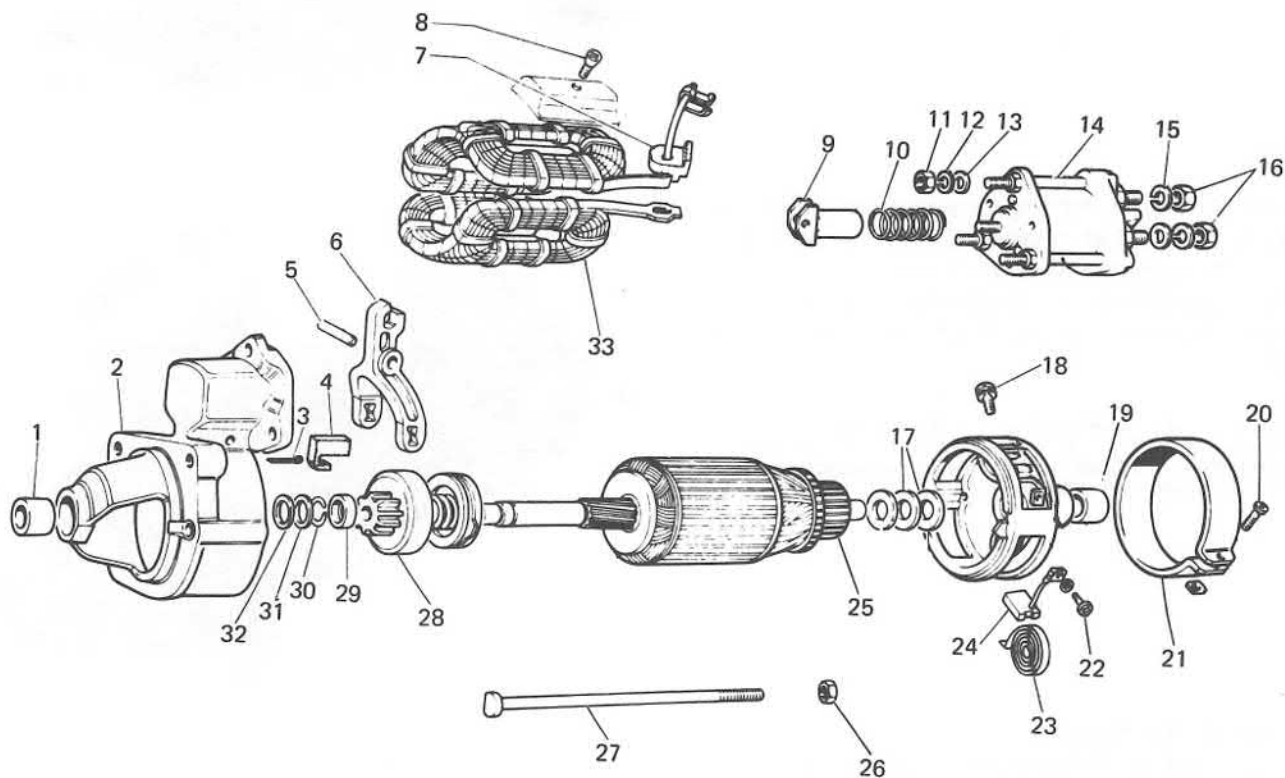
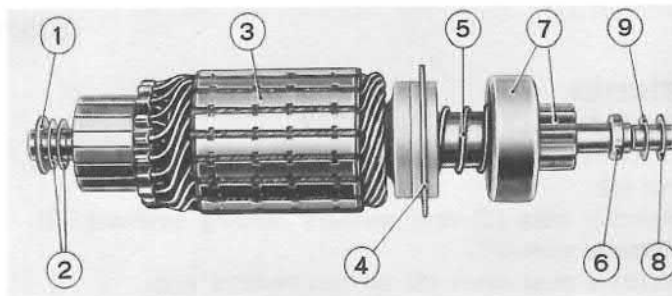
1. Pinion end head. 2. Drive pinion. 3. Armature.  
4. Thru-bolts. 5. Commutator. 6. Shifting fork.





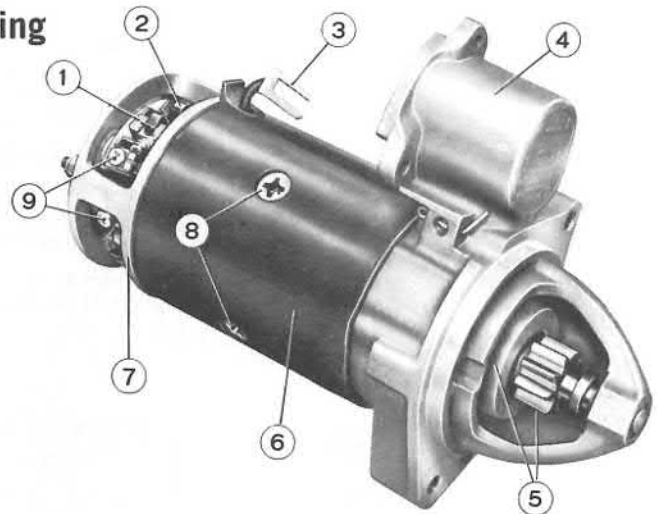
To disassemble drive, remove snap ring holding stop ring (6). Remove parts in proper order. Reassemble starter in reverse order.

- |                   |                   |                   |
|-------------------|-------------------|-------------------|
| 1. Thrust washer. | 2. Plain washers. | 3. Armature.      |
| 4. Drive sleeve.  | 5. Sleeve spring. | 6. Stop ring.     |
| 7. Drive pinion.  | 8. Plain washers. | 9. Plain washers. |



**Starter assembly**

- |                 |                |                   |
|-----------------|----------------|-------------------|
| 1. Bushing      | 12. Lockwasher | 23. Bush spring   |
| 2. Support      | 13. Washer     | 24. Brush         |
| 3. Cotter pin   | 14. Solenoid   | 25. Armature      |
| 4. Rubber pin   | 15. Lockwasher | 26. Nut           |
| 5. Fork pin     | 16. Nut        | 27. Bolt          |
| 6. Shifter fork | 17. Washer     | 28. Drive unit    |
| 7. Insulator    | 18. Screw      | 29. Ring          |
| 8. Screw        | 19. Bushing    | 30. Lockring      |
| 9. Plunger      | 20. Screw      | 31. Washer        |
| 10. Spring      | 21. Collar     | 32. Washer        |
| 11. Nut         | 22. Screw      | 33. Field winding |

**Starting****CHANGING BRUSHES**

Loosen nut on bolt thru brush cover. Remove cover. Remove screw and washer holding brush wire in terminal.

Lift brush spring and remove brush.

Install new brushes. Insert ends of springs in recesses in brushes.

Install screw and washer thru brush terminal.

Install brush cover.

1. Brush.
2. Brush spring.
3. Terminal.
4. Pinion end drive.
5. Drive pinion.
6. Frame.
7. Commutator end head.
8. Pole shoe mounting screws.
9. Brush terminal clamping screws.

**REPLACING FIELD COILS**

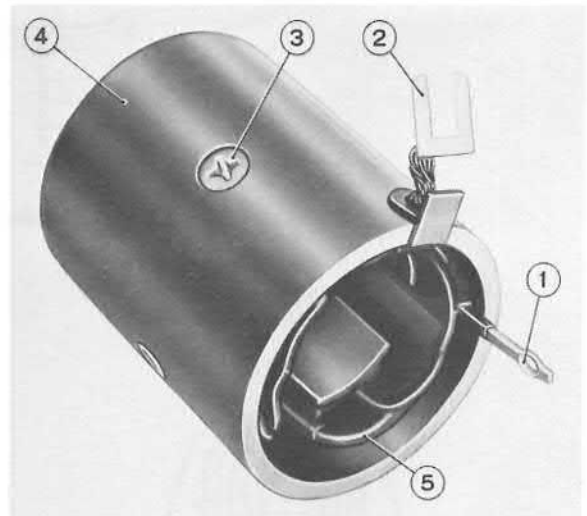
Disassemble starter to remove frame (4). Remove screws (3) and remove field coils (5) and pole shoes.

Heat replacement coils to 122° F (50° C). Install coils and shoes. Tighten screws (3) hard up to restore air space.

Check pole shoe inside diameter. It must be between 2.175 and 2.182 in. (55.25 to 55.42mm).

Reassemble starter.

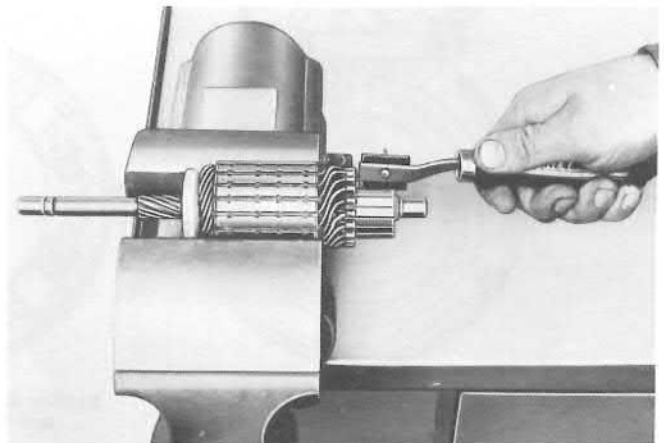
1. Coil terminal to brushes.
2. Coil terminal to solenoid.
3. Pole shoe mounting screw.
4. Frame.
5. Field coil.

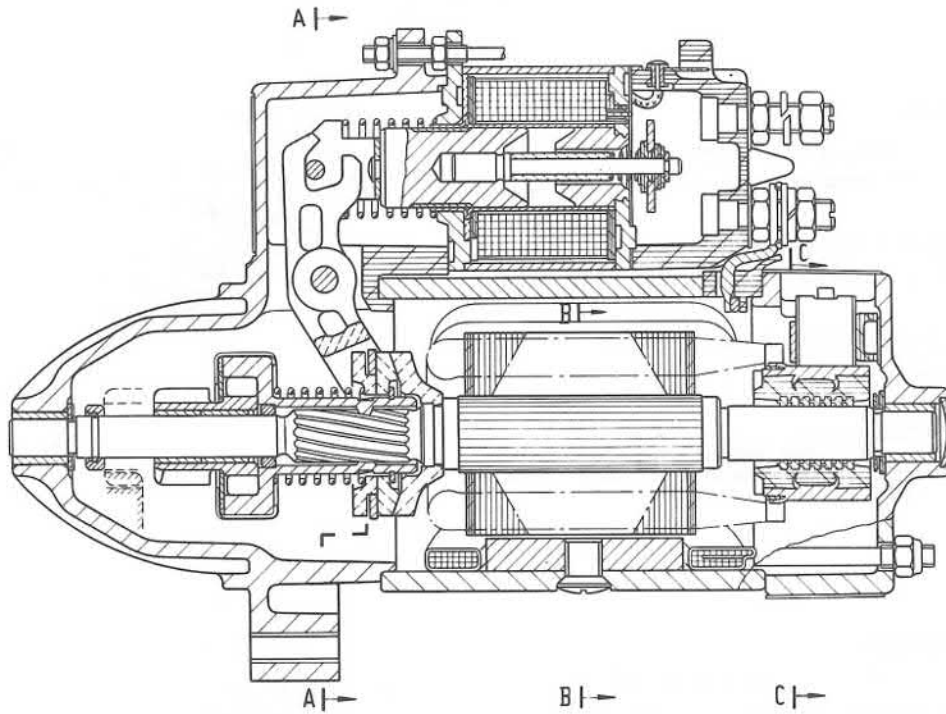
**REFACING COMMUTATOR**

Reface commutator on a lathe.

Make sure run-out does not exceed 0.0004 in. (0.01mm).

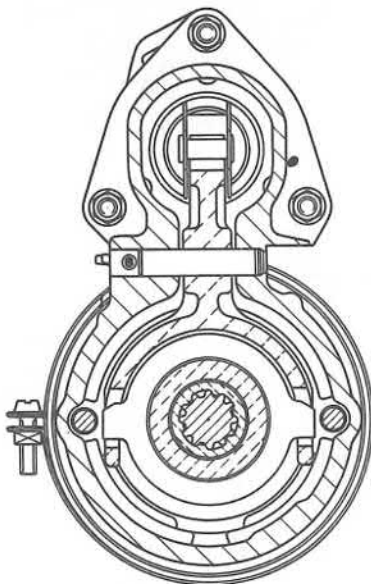
After refacing, undercut mica to a minimum depth of 0.04 in. (1mm).





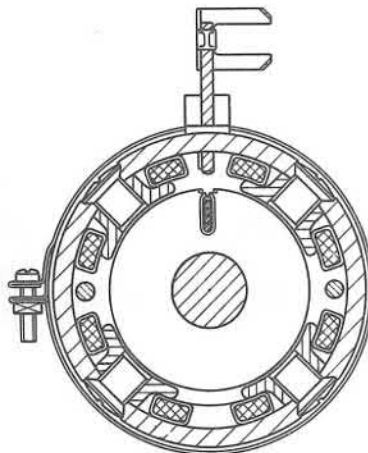
Longitudinal section of starter assembly.

SECTION A-A



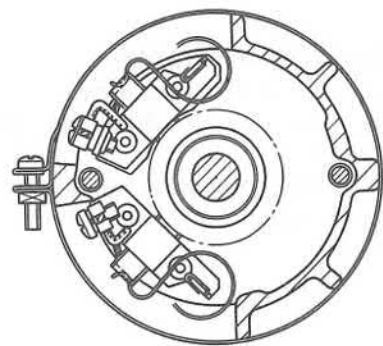
Cross section through pinion drive.

SECTION B-B



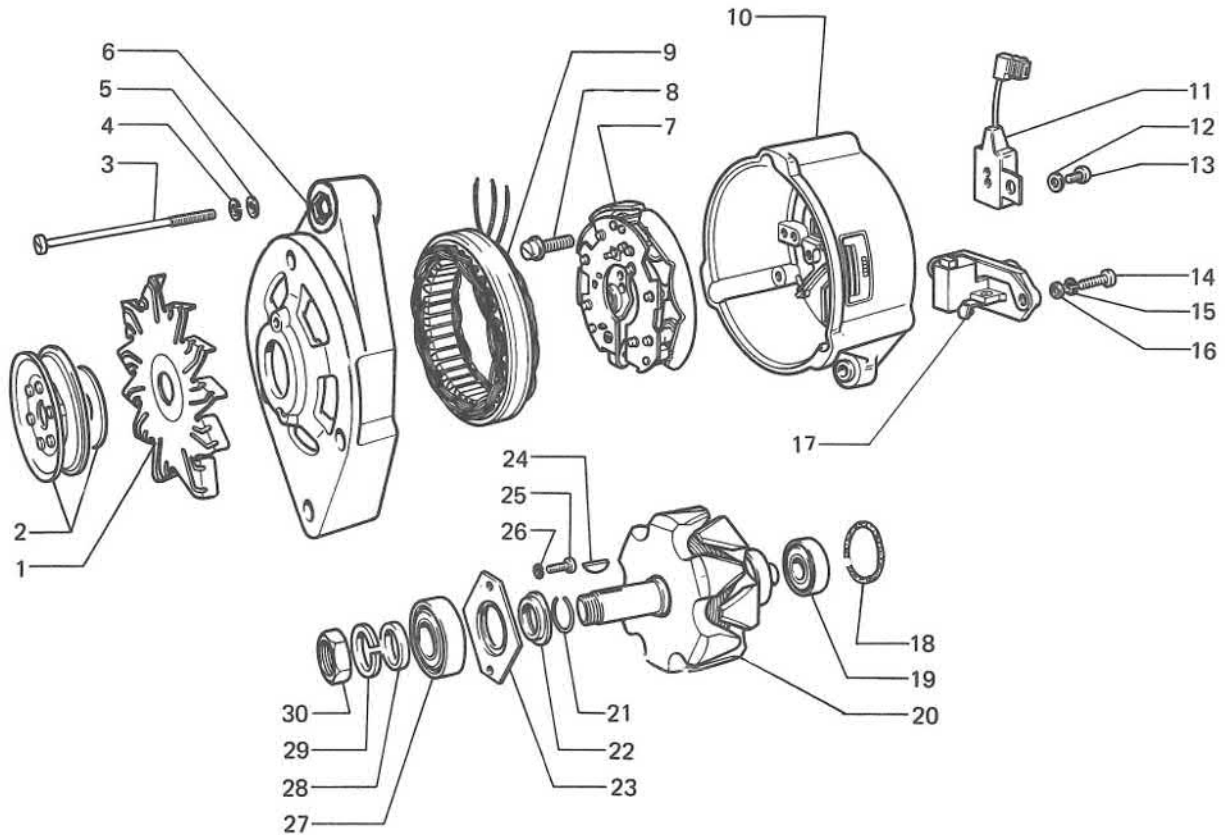
Section through pole shoes and field winding.

SECTION C-C



Section through commutator end frame and view of brushes.

### Alternator



**EXPLODED VIEW OF ALTERNATOR**

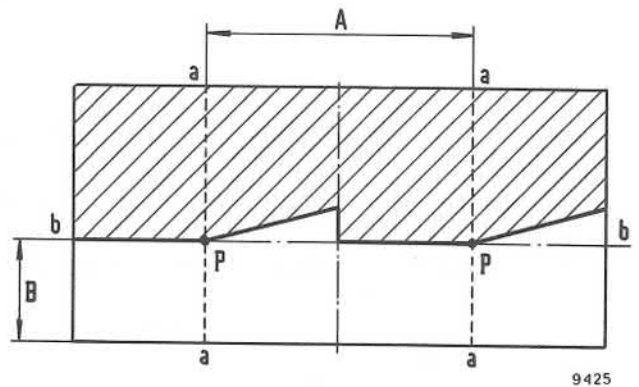
- |               |                  |                 |
|---------------|------------------|-----------------|
| 1. Blower     | 11. Condenser    | 21. Clip        |
| 2. Pulley     | 12. Washer       | 22. Seal        |
| 3. Bolt       | 13. Screw        | 23. Plate       |
| 4. Lockwasher | 14. Screw        | 24. Key         |
| 5. Washer     | 15. Lockwasher   | 25. Screw       |
| 6. Support    | 16. Washer       | 26. Washer      |
| 7. Plate      | 17. Brush holder | 27. Bearing     |
| 8. Screw      | 18. Seal         | 28. Seal        |
| 9. Stator     | 19. Bearing      | 29. Lock washer |
| 10. Support   | 20. Rotor        | 30. Nut         |



## Lighting

### HEADLIGHTS ADJUSTMENT

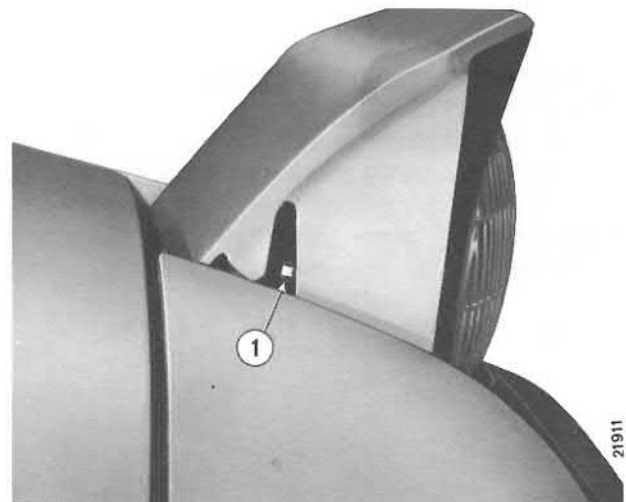
CAUTION: Motor will retract headlight if cap is turned. All headlight adjustments should be made with the car unloaded at 16 ft. (5m) from the screen. When using headlight alignment equipment, refer to instructions provided.



9425

Turn headlights on low beams.  
Adjust horizontal alignment by turning screw.

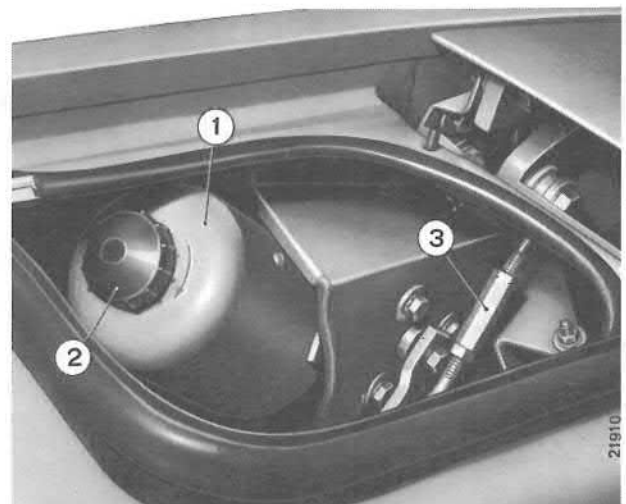
1. Adjustment screw.



21911

Adjust vertical alignment by adjusting rod.

1. Motor.
2. Cap.
3. Adjusting rod.



21910

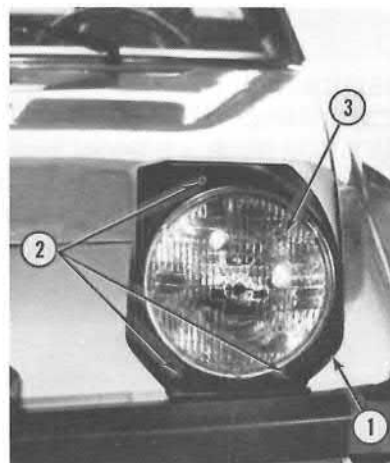
**REPLACEMENT**

Remove three screws holding frame to body. Remove frame.

Loosen three screws thru ring. Turn ring to left and remove ring.

Remove plug from headlight. Remove headlight.

1. Frame.    2. Screws.    3. Headlight.

**RETRACTABLE HEADLIGHT MOTOR REPLACEMENT**

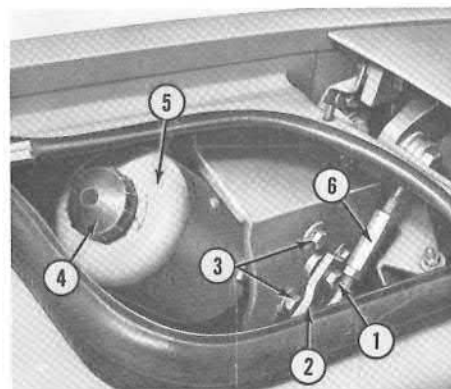
Remove bolt (1) holding arm (2) to motor shaft.

Remove three bolts (3) and washers holding motor (5).

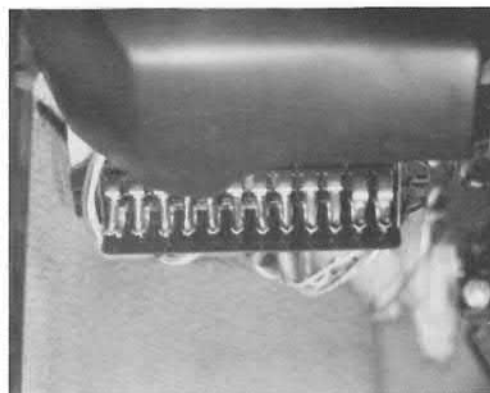
Disconnect electrical connector. Remove motor (5).

When installing, place ground wire for motor under mounting bolt (3).

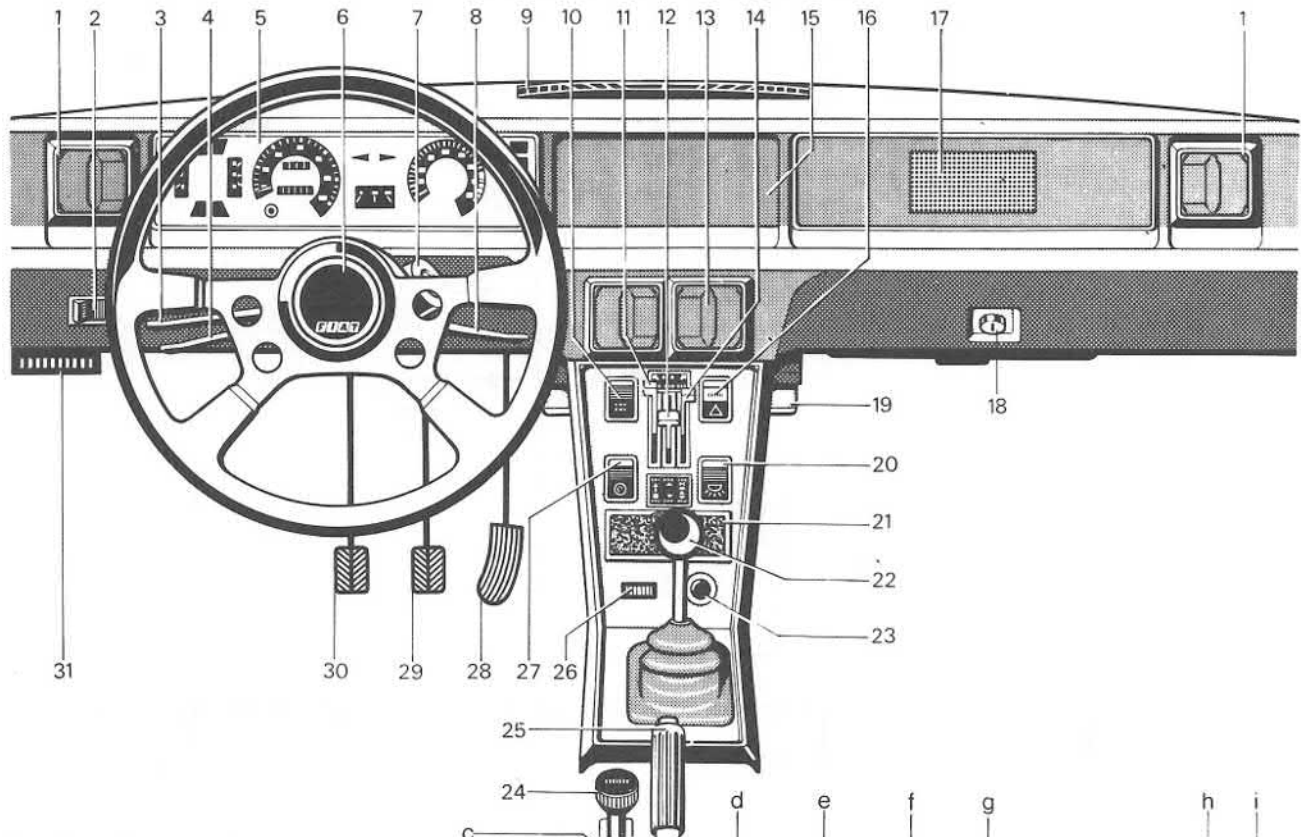
1. Bolt.    2. Arm.    3. Bolts.    4. Cap.  
5. Motor.    6. Adjusting rod.

**FUSES**

Fuses A thru H, 8-Amp Fuses I and L, 16-Amp Fuses M and N, 3-Amp Fuse in separate holder, 8-Amp.

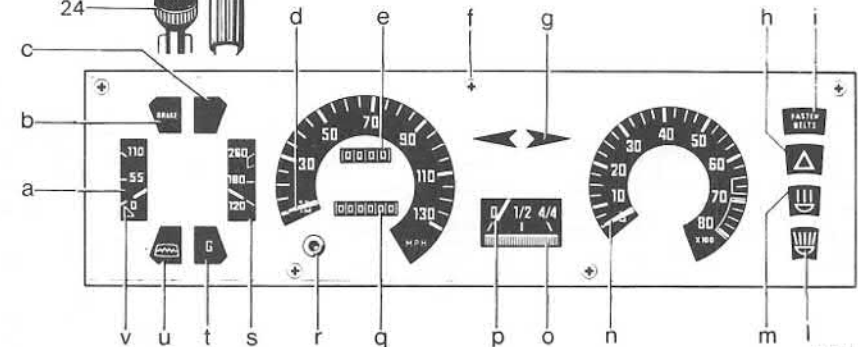


## Instruments and Controls



## Location of instruments and controls

1. Panel side air outlets, adjustable.
2. Lighting switch, three-position.
3. High/Low beams change-over switch lever.
4. Turn signal switch lever.
5. Instrument cluster.
6. Horn button.
7. Steering lock ignition switch.
8. Windshield wiper/washer switch lever, three-position.
9. Air diffuser, windshield.
10. Two-speed heater fan switch, three-position.
11. Air volume control lever.
12. Heater outlet flap lever.
13. Panel center air outlets, adjustable.
14. Air temperature control lever.
15. Radio housing blanking lid.
16. Vehicular hazard warning signal switch.
17. Loudspeaker grill, optional radio.
18. Drop tray button (with lock). Front trunk latch release handle is housed in tray recess.
19. Heater outlet flap.
20. Courtesy light switch.
21. Front ash tray.
22. Gearshift lever.
23. Cigar lighter.



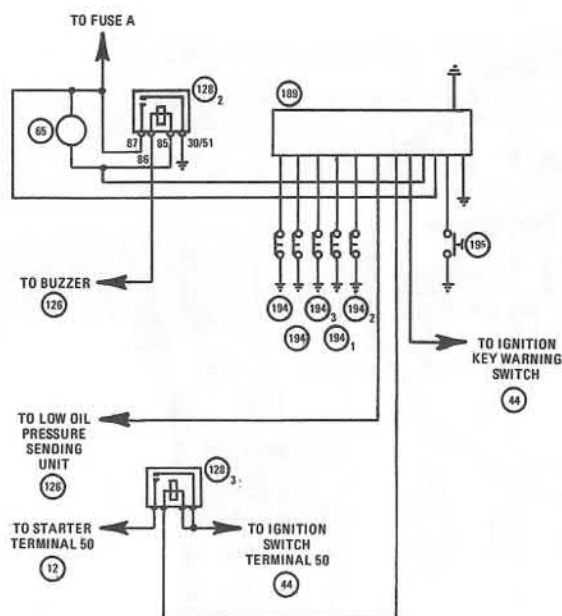
24. Hand brake lever. To release, thumb in the button on top of hand grip.
  25. Choke knob.
  26. Ideogram illumination intensity rheostat.
  27. Instrument cluster light switch.
  28. Accelerator pedal.
  29. Service brake pedal.
  30. Clutch pedal.
  31. Fusebox.
- a. Oil pressure gage.
  - b. Brake system effectiveness indicator (red).
  - c. Spare indicator.
  - d. Speedometer.
  - e. Trip recorder.
  - f. Cluster panel mounting screws.
  - g. Turn signal arrow indicator.
  - h. Vehicular hazard warning indicator.
  - i. Fasten belts indicator (red) and buzzer.
  - l. High beams indicator (blue).
  - m. Parking and tail lights indicator (green).
  - n. Tachometer.
  - o. Fuel reserve indicator (red).
  - p. Fuel gage.
  - q. Odometer.
  - r. Trip recorder zeroing knob.
  - s. Engine water temperature gage.
  - t. Battery charge indicator (red).
  - u. Back window demister indicator (amber).
  - v. Low oil pressure indicator (red).

22663



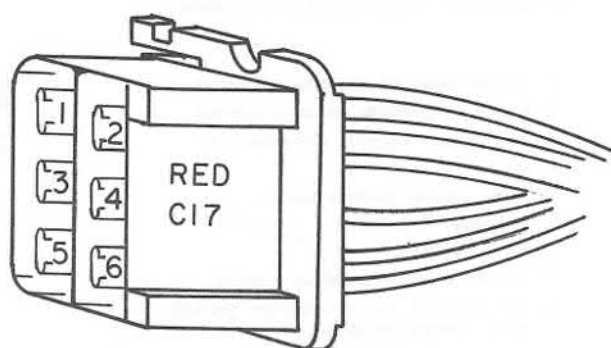
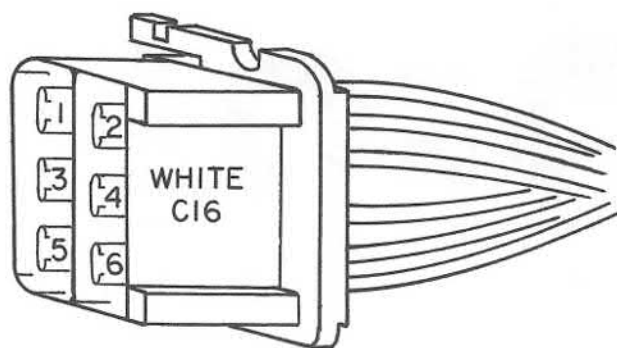
## Instruments and Controls

### SEATBELT INTERLOCK SYSTEM



### CHECKOUT

NOTE: This checkout is to be used with the troubleshooting procedure and diagram in the Supplement. Use this procedure if test box is not available.



The connectors for the control box have been given number for reference (C16-white connector, C17-red connector). The wires are also numbered W1 thru W6 and R1 thru R6. The procedures refer to wire numbers instead of color since some variation in wire color coding does occur. The table below lists the wire colors and numbers being used at the time this manual was written.

#### RED CONNECTOR — C17

- R1 — pink/yellow
- R2 — red/white
- R3 — white/black
- R4 — yellow/black
- R5 — gray/yellow
- R6 — green/white

#### WHITE CONNECTOR — C16

- W1 — blue/red
- W2 — light blue/red
- W3 — red
- W4 — brown/white
- W5 — violet/black
- W6 — light blue/white

## 1974 FIAT MODELS

### SEAT BELT INTERLOCK CHECKOUT

#### 1—OPERATION

- a. Sit in driver's seat. Buckle seat belt. Start car. If car will not start and seat belt warning light does not come on, go to step 2 and 8 of check-out. If car will not start and light comes on, go to step 2 and 3.
- b. Place transmission in each gear in turn. If seat belt warning light comes on, go to step 2 and 6.
- c. Shut off engine. Have someone sit in passenger's seat with belt buckled. Try to start car. If car will not start, go to step 2 and 5.
- d. Shut off engine. Unbuckle seat belts. Depress by-pass switch. Try to start car. If car will not start, go to step 2 and 11.

#### 2—PREPARATION

- a. Obtain volt/ohm meter and jumper wire 6 inches long.
- b. Locate control box. The box is located above glove tray.
- c. Disconnect two connectors C16 (white) and C17 (red) from control box.

#### 3—DRIVER'S SEAT SWITCH

- a. Connect black lead of ohmmeter to ground. Connect red meter lead to 4R in connector C16. Set meter to X1.
- b. With seat empty meter should read infinity ( $\infty$ ).
- c. Have someone sit in seat. Meter should read 0 ohms.
- d. If readings are faulty, go to DRIVER'S SEAT CIRCUIT.

#### 4—DRIVER'S SEAT BELT SWITCH

- a. Leave black lead connected to ground. Connect red lead to 2R in connector C17.
- b. With belt retracted, meter should read 0 ohms.
- c. Pull belt out and buckle it. Meter should read infinity ( $\infty$ ).
- d. If any reading is faulty, go to DRIVER'S SEAT BELT SWITCH CIRCUIT.

#### 5—PASSENGER'S SEAT SWITCH

- a. Leave black lead connected to ground. Connect red lead to 3R in connector C17.
- b. With seat empty, meter should read infinity ( $\infty$ ).
- c. Have someone sit in passenger's seat. Meter should read 0 ohms.

- d. If any reading is faulty, go to PASSENGER'S SEAT SWITCH CIRCUIT.

#### 6—PASSENGER'S SEAT BELT SWITCH

- a. Leave black lead connected to ground. Connect red lead to 1R in connector C17.
- b. With belt retracted, meter should read 0 ohms.
- c. Pull belt out and buckle it. Meter should read infinity ( $\infty$ ).
- d. If any reading is faulty, go to PASSENGER'S SEAT BELT SWITCH CIRCUIT.

#### 7—TRANSMISSION SWITCH

- a. Leave black lead connected to ground. Connect red lead to 6R in connector C17.
- b. Place gearshift lever in neutral. Meter should read infinity ( $\infty$ ).
- c. Place gearshift lever in other gears in turn. Meter should read 0 ohms in any gear.
- d. If any reading is faulty, go to TRANSMISSION SWITCH CIRCUIT.

#### 8—INDICATOR AND BUZZER RELAY CIRCUIT

- a. Get jumper wire. Connect one end of jumper to ground. Connect other end to 1W in connector C16.
- b. Insert ignition key. Turn key to ON position.
- c. Check that indicator and buzzer come on.
- d. If indicator and buzzer do not come on, go to SEAT BELT INDICATOR AND BUZZER CIRCUIT.

#### 9—STARTER RELAY CIRCUIT

- a. Leave one end of jumper connected to ground. Connect other end to 6W in connector C16.
- b. Try to start car. Car should start.
- c. If car will not start, go to STARTER RELAY CIRCUIT.

#### 10—OIL PRESSURE SENDER CIRCUIT

- a. Get ohmmeter. Connect black lead to ground. Connect red lead to 5B in connector C17.
- b. Meter should read 0 ohms. If meter reads more than 0 ohms, check that oil pressure light is on with ignition key on and engine off.
- c. If light is off, troubleshoot oil pressure indicator.
- d. If light is on, repair gray/yellow wire from connector C7 at instrument panel to connector C17.
- e. Leave ignition switch in ON position.

**11—BY-PASS SWITCH CIRCUIT**

- a. Leave black lead connected to ground. Connect red lead to 2W in connector C16.
- b. Meter should read infinity ( $\infty$ ).
- c. Have someone hold switch down. Meter should read 0 ohms.
- d. If any reading is faulty, go to BY-PASS SWITCH CIRCUIT.

**12—CONTROL BOX GROUND CIRCUITS**

- a. Leave black lead connected to ground. Connect red lead to 5W in Connector C16.
- b. Meter should read 0 ohms. If meter reads more than 0 ohms, check 5W from connector to ground connection in front of control box. Check ground connection.

**13—CONTROL BOX POWER CIRCUITS**

- a. Get voltmeter. Connect black lead to ground.

Connect red lead to 4W in connector C16.

- b. Meter should read voltage.
- c. If meter does not read voltage, check wire from connector C16 to instrument panel connector. Repair wire.
- d. Connect red lead to 3W. Meter should read voltage.
- e. If meter does not read voltage, check that ignition key warning system works. If system works, repair wire from connector C16 to fuse B.

**14—CONTROL BOX**

- a. If only one or two checks were performed and the fault was not found, perform all the checks.
- b. If all checks are good, check wiring from connectors to control box. Check connectors.
- c. If wiring and connectors are good replace control box.

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# B O D Y — 7 0 - 7 1

<b>PARTS CATALOG CODE</b>	<b>SERVICE MANUAL &amp; SERVICE TIME SCHEDULE CODE</b>		
—	70-71	<b>General Information .....</b>	<b>191</b>
		<b>Gr. 701 BODY SHELL</b>	
L1.02	701.02	<b>Instrument Panel .....</b>	<b>193</b>
L1.05	701.05	<b>Body Shell .....</b>	<b>197</b>
L1.08	701.08	<b>Hard Top .....</b>	<b>203</b>
L1.09	701.09	<b>Doors .....</b>	<b>205</b>
L1.18	701.18	<b>Windshield .....</b>	<b>209</b>
L1.20	701.20	<b>Back Window .....</b>	<b>211</b>
L1.23	701.23	<b>Luggage Compartment .....</b>	<b>213</b>
L1.27	701.27	<b>Air Intakes and Lids .....</b>	<b>217</b>
		<b>Gr. 711 INTERIOR TRIM AND SEATS</b>	
M1.01	711.01	<b>Front Seats .....</b>	<b>219</b>

## GENERAL INFORMATION

### Body

#### GENERAL INFORMATION

Two-door unitized body.

Front doors hinged at front. Side window with two safety glass panes, i.e. fixed quarter window and drop window controlled by regulator.

Doors have outside key handles and inside locking devices. Outer door handles have spring-loaded release grips.

Rear window is fixed safety glass.

Luggage compartments in front and rear. Front compartment unlatched by latch in glove compartment. Rear compartment key lock located in left door column. Tool kit and jack located in rear compartment.

Front seats are adjustable bucket-type with tiltable back for access to rear of seats.

Spare wheel housed behind passenger's seat.

Instrument panel has plastic padding. Instruments and switches on driver's side. Heat and

air controls are in center panel. Four adjustable outlets, one at each end and two in center panel.

Interior trim and seats are imitation leather. Arm rests in padded plastic on doors.

Rear view mirrors inside and outside.

Sun visors are padded and adjustable.

Carpeting in passenger compartment. Rubber mats in luggage compartment.

Engine compartment lid has key lock located in driver's door column.

Air louvers in both sides for letting air into engine compartment.

Ignition key lock with anti-theft device.

Seat belts with ignition interlock and warning system.

Removable hard top.

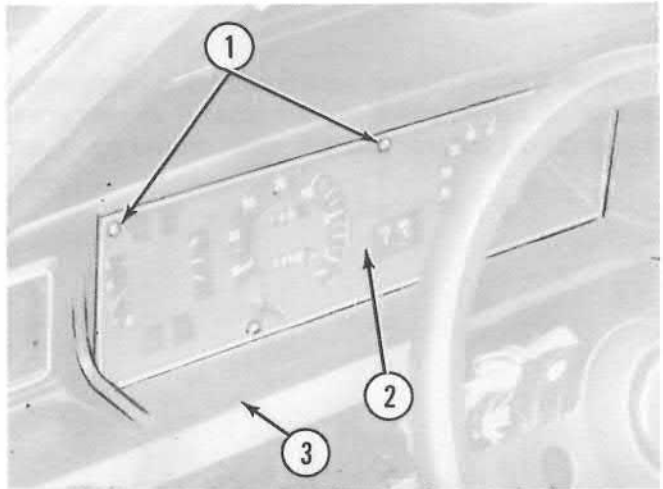


## Instrument Panel

### REMOVAL AND INSTALLATION

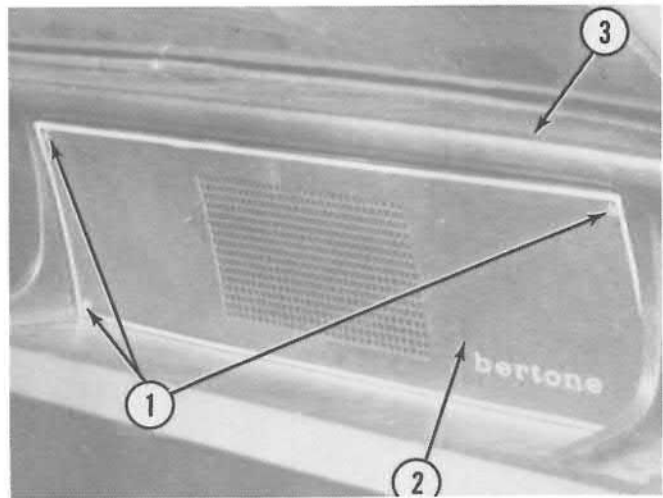
Remove 5 screws (1) holding cluster (2) to panel (3). Slide cluster out part way. Disconnect 3 electrical connectors and speedometer cable. Remove instrument cluster.

1. Screw.
2. Instrument cluster.
3. Instrument panel.



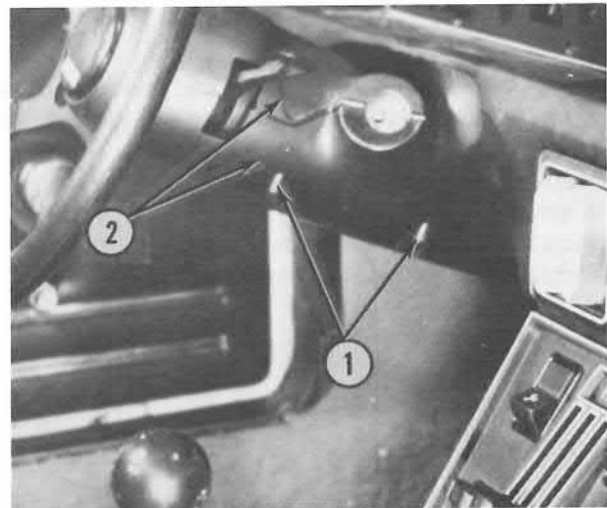
Remove 4 screws (1) holding panel (2) on right side of instrument panel (3). Remove panel (2). Remove light switch from left side of instrument panel.

1. Screw.
2. Panel.
3. Instrument Panel



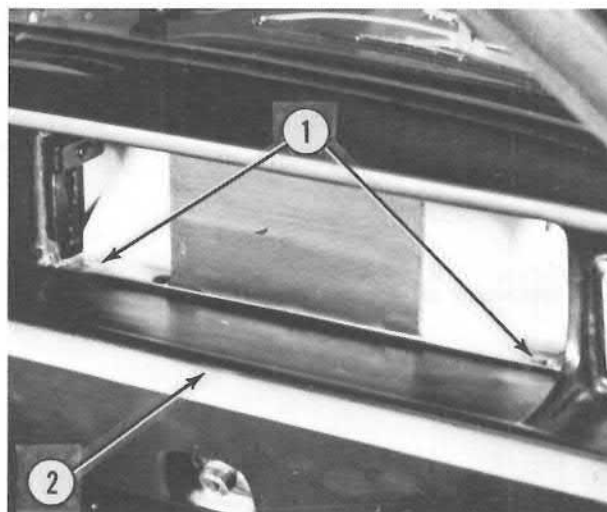
Remove 5 screws (1) thru bottom of steering column cover (2). Remove cover.

1. Screws.
2. Steering column cover.



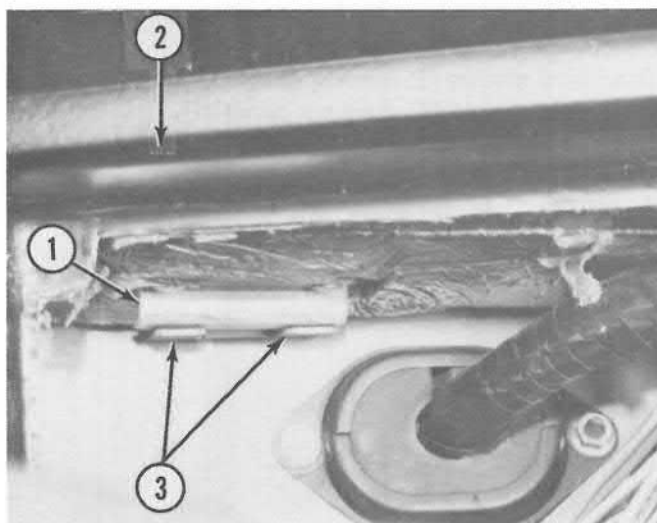
Remove 4 bolts (1) and washers (2) behind instrument cluster, 2 behind panel on right side). Pull instrument panel (2) out towards you. Lift panel up and out of car.

1. Bolt.    2. Instrument panel.



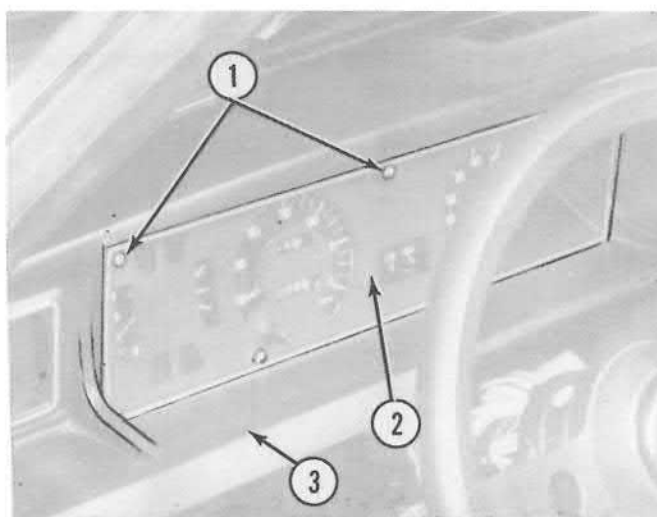
Place panel in car. Align defroster outlet with duct. Slide clips (1) in top of panel (2) into clamps (3) on body. Install 4 bolts, lockwashers, and washers (2) behind instrument cluster, 2 behind panel on right side) thru panel into body.

1. Clips.    2. Panel.    3. Clamps.



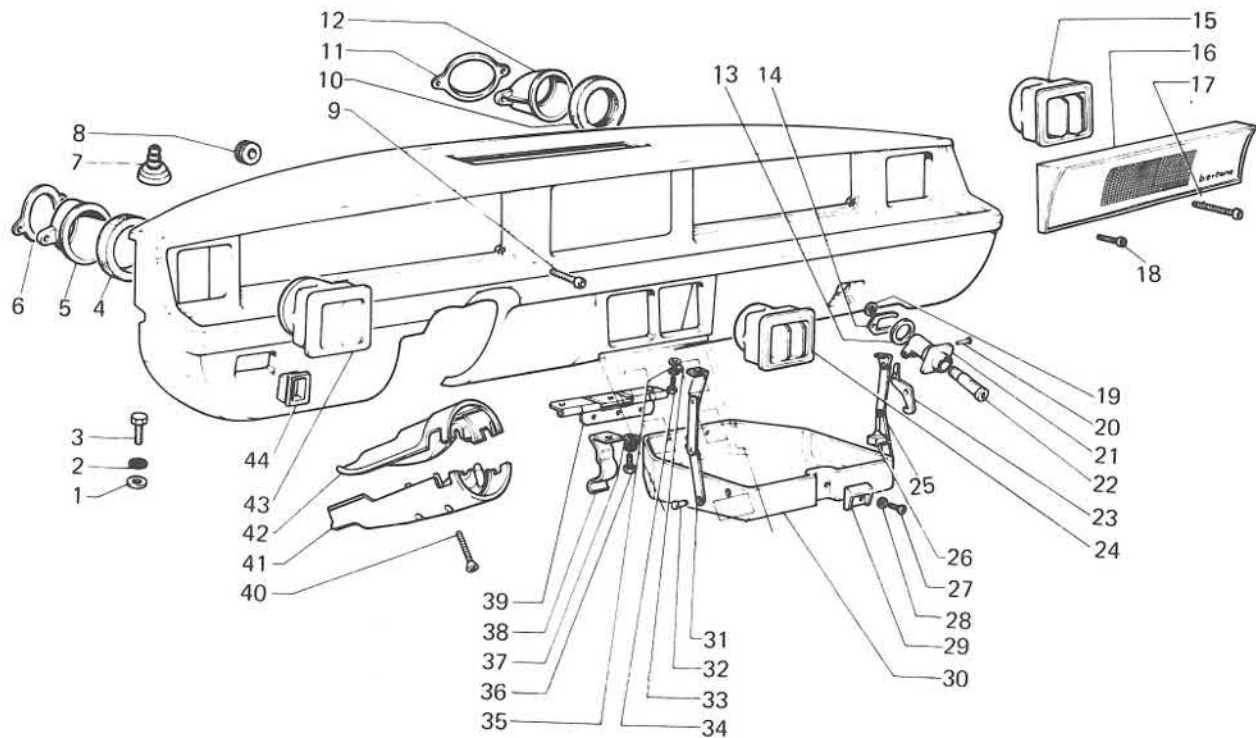
Place instrument cluster (1) into position in panel. Connect electrical connectors and speedometer cable to cluster. Secure cluster with 5 screws (2). Install panel on right side of instrument panel with 4 screws. Install steering column cover with 5 screws. Install lighting switch in instrument panel.

1. Instrument cluster.    2. Screws.





## Instrument Panel



## VIEW OF INSTRUMENT PANEL COMPONENTS

- |                   |                    |                    |
|-------------------|--------------------|--------------------|
| 1. Washer         | 16. Plate          | 31. Hinge          |
| 2. Lockwasher     | 17. Screw          | 32. Pin            |
| 3. Bolt           | 18. Screw          | 33. Washer         |
| 4. Gasket         | 19. Lockwasher     | 34. Screw          |
| 5. Duct           | 20. Pin            | 35. Lockwasher     |
| 6. Gasket         | 21. Lock           | 36. Bolt           |
| 7. Rubber bushing | 22. Lock cylinder  | 37. Washer         |
| 8. Rubber bushing | 23. Latch          | 38. Spring clip    |
| 9. Screw          | 24. Duct           | 39. Hinge          |
| 10. Gasket        | 25. Hinge          | 40. Screw          |
| 11. Duct          | 26. Rubber bushing | 41. Cover          |
| 12. Gasket        | 27. Screw          | 42. Cover          |
| 13. Spacer        | 28. Washer         | 43. Duct           |
| 14. Clip          | 29. Catch          | 44. Switch housing |
| 15. Duct          | 30. Tray           |                    |



## Body Shell-Sheet Metal

Damages due to accidents are very different in nature and extent. It is impossible to provide detailed information on what should be done to repair bodies because each accident may result in repair procedures for that particular case.

In order to repair a damaged body, it is essential that you become thoroughly familiar with the body construction and know how the various assemblies or sections are welded together. In most cases you will have to remove some parts to gain access to parts requiring repairs. If the body is severely damaged, you should remove all interior trim which are easily removed. This will provide better access during repair and alignment operations. It will also save you time in measuring checking, and placing jacks for straightening and aligning the body.

### Alignment

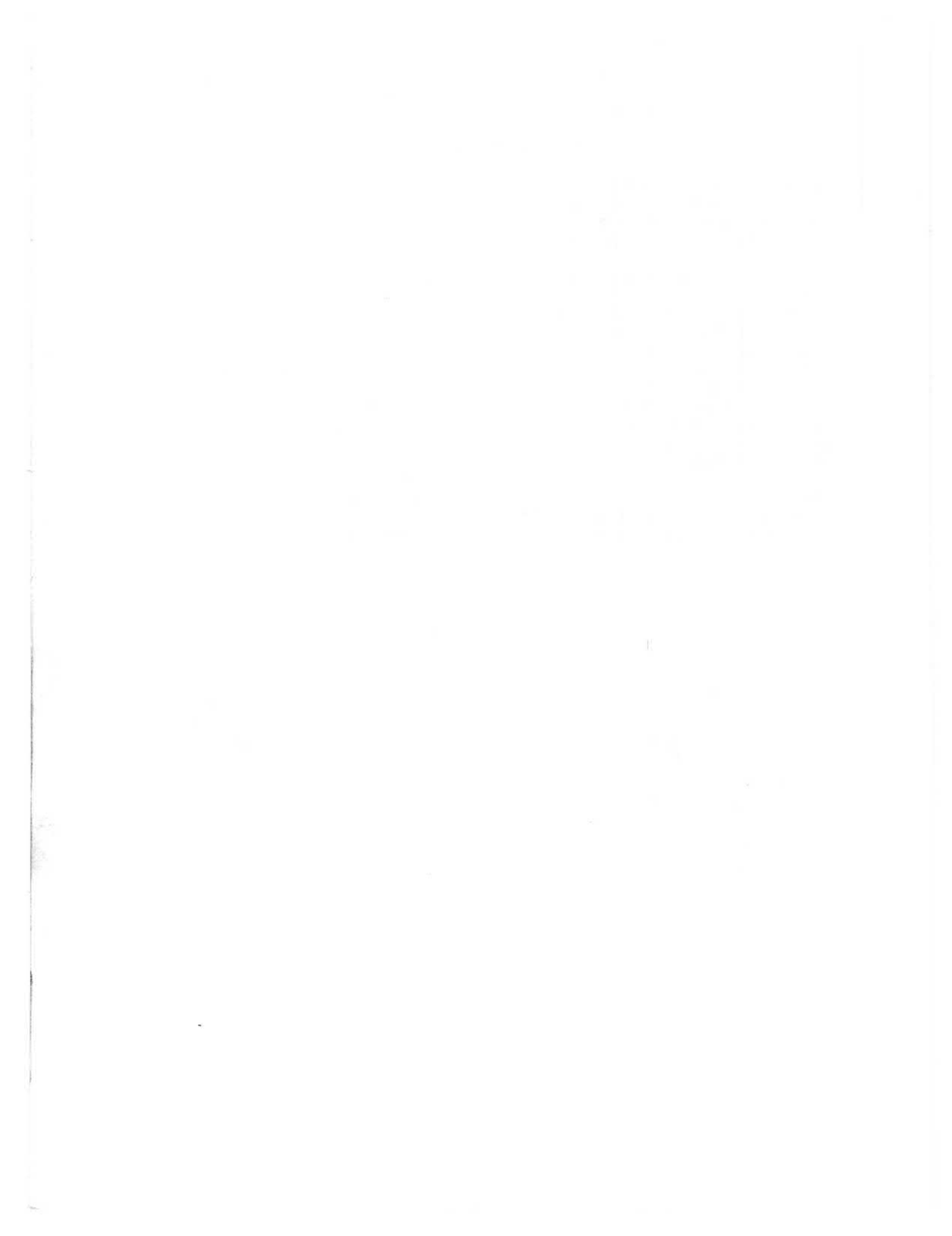
The body is of unitized construction and therefore the body and underbody are one unit. The alignment of

front and rear wheels is the first thing to check. Misalignment is apparent when there is no parallel relationship between the axes of front and rear wheels or when rear wheels do not follow in the tracks of the front wheels. You should first check to make sure the misalignment is not caused by damage to front and rear suspension, steering linkage, etc.

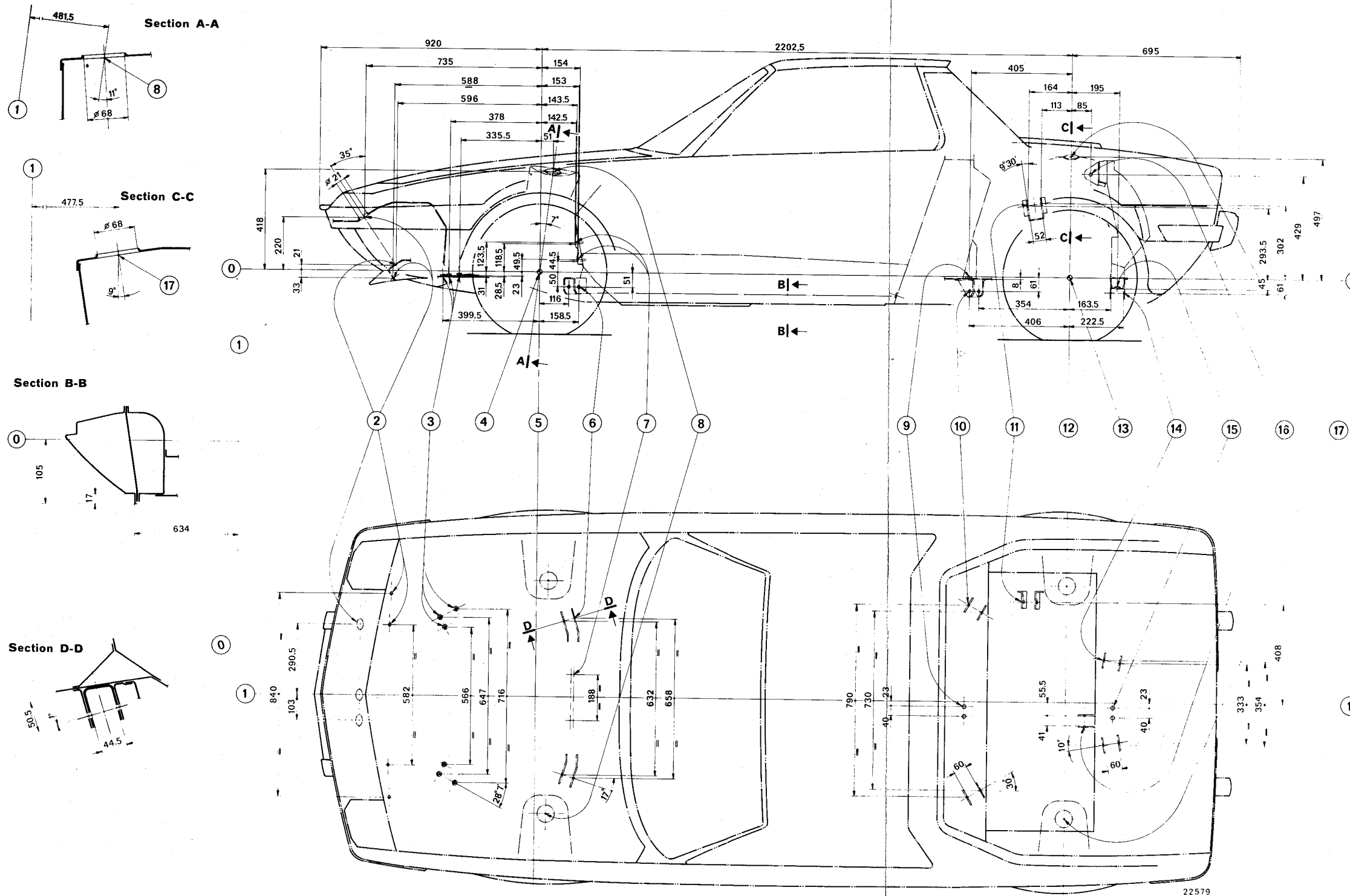
If the body proves to be bent, you may restore it to its proper dimensions by checking the mounting points of mechanical units to the underbody. They must be the same as given in the illustration on the next page. Extreme care is required in checking dimensions. Any distortions must be corrected until the proper dimensions are obtained.

### Dust And Water Leaks

After repairing the body and before installing interior trim you should inspect all points where dust and water are likely to get into the interior of the car. Seal points of possible leakage with sealing cement.



### Body Shell-Sheet Metal



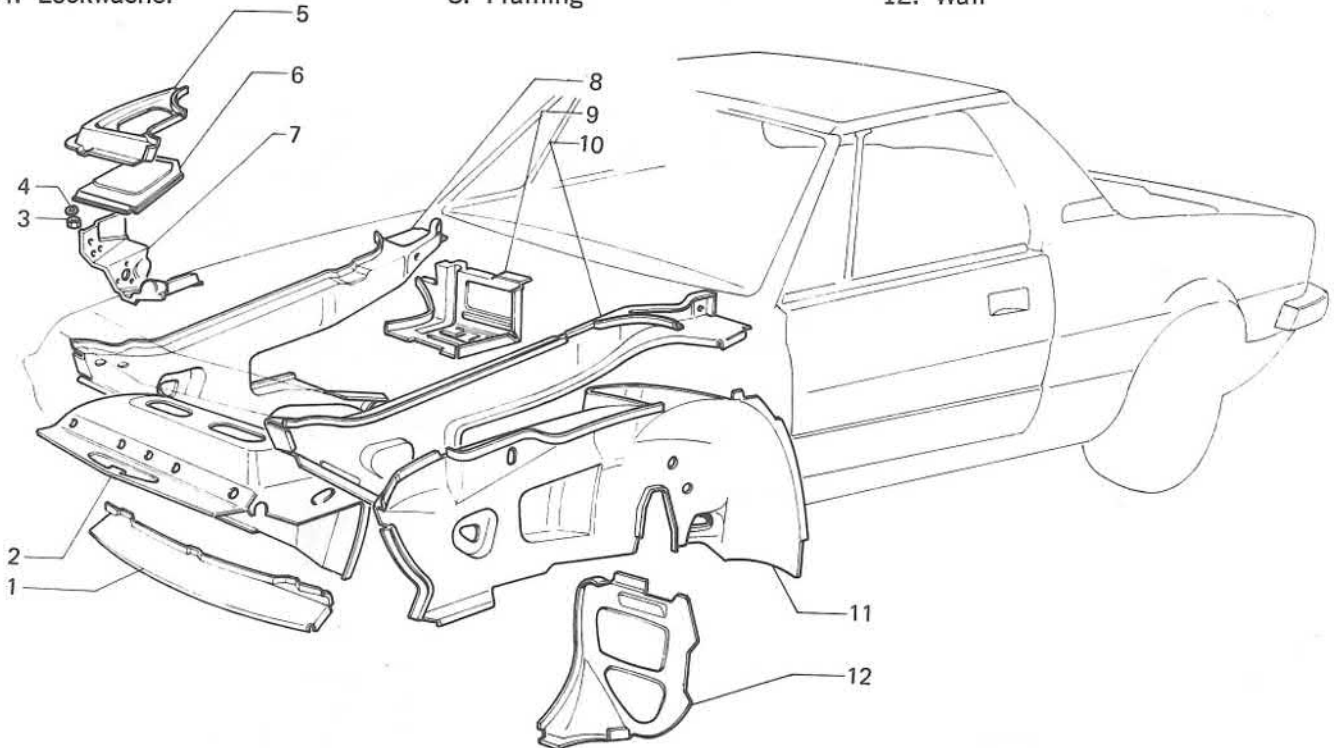
2202.5 mm = 86.7124 in	188 mm = 7.4015 in
920 mm = 36.2205 in	164 mm = 6.4566 in
840 mm = 33.0708 in	163.5 mm = 6.4173 in
790 mm = 31.1024 in	158.5 mm = 6.2204 in
735 mm = 28.9370 in	154 mm = 6.0629 in
730 mm = 28.7402 in	143.5 mm = 5.6496 in
716 mm = 28.1890 in	142.5 mm = 5.6105 in
695 mm = 27.3622 in	123.5 mm = 4.8622 in
658 mm = 25.9055 in	118.5 mm = 4.6653 in
647 mm = 25.4724 in	116 mm = 4.5669 in
634 mm = 24.9606 in	113 mm = 4.4488 in
632 mm = 24.8819 in	105 mm = 4.1338 in
596 mm = 23.4646 in	103 mm = 4.0551 in
588 mm = 23.1496 in	85 mm = 3.3464 in
582 mm = 22.9134 in	68 mm = 2.6771 in
566 mm = 22.2835 in	61 mm = 2.4016 in
497 mm = 19.5669 in	60 mm = 2.3622 in
481.5 mm = 18.9567 in	55.5 mm = 2.1850 in
477.5 mm = 18.7992 in	52 mm = 2.0472 in
429 mm = 16.8898 in	51 mm = 2.0078 in
418 mm = 16.4567 in	50.5 mm = 1.9882 in
408 mm = 16.0630 in	50 mm = 1.9685 in
406 mm = 15.9843 in	49.5 mm = 1.9488 in
405 mm = 15.9449 in	45 mm = 1.7717 in
399.5 mm = 15.7283 in	44.5 mm = 1.7520 in
378 mm = 14.8819 in	41 mm = 1.6339 in
354 mm = 13.9370 in	40 mm = 1.5748 in
335.5 mm = 13.2087 in	33 mm = 1.2992 in
333 mm = 13.1102 in	31 mm = 1.2205 in
302 mm = 11.8898 in	28.5 mm = 1.1220 in
293.5 mm = 11.5551 in	23 mm = 9055 in
290.5 mm = 11.4370 in	21 mm = 8268 in
222.5 mm = 8.7598 in	17 mm = 6693 in
220 mm = 8.6614 in	8 mm = 3150 in
195 mm = 7.6771 in	

- 0. Reference line.
- 1. Car centreline.
- 2. Radiator suspension mounting.
- 3. Front suspension front mounting.
- 4. Front wheel static centre.
- 5. Front wheel axis.
- 6. Front control arm rear mounting.
- 7. Steering box mounting.
- 8. Front shock absorber upper mounting.
- 9. Crossmember front mounting, power plant suspension.
- 10. Rear control arm front mounting.
- 11. Power plant side mounting.
- 12. Rear wheel axis.
- 13. Rear wheel static centre.
- 14. Rear control arm rear mounting.
- 15. Crossmember rear mounting, power plant suspension.
- 16. Power plant suspension rear mounting.
- 17. Rear shock absorber upper mounting.

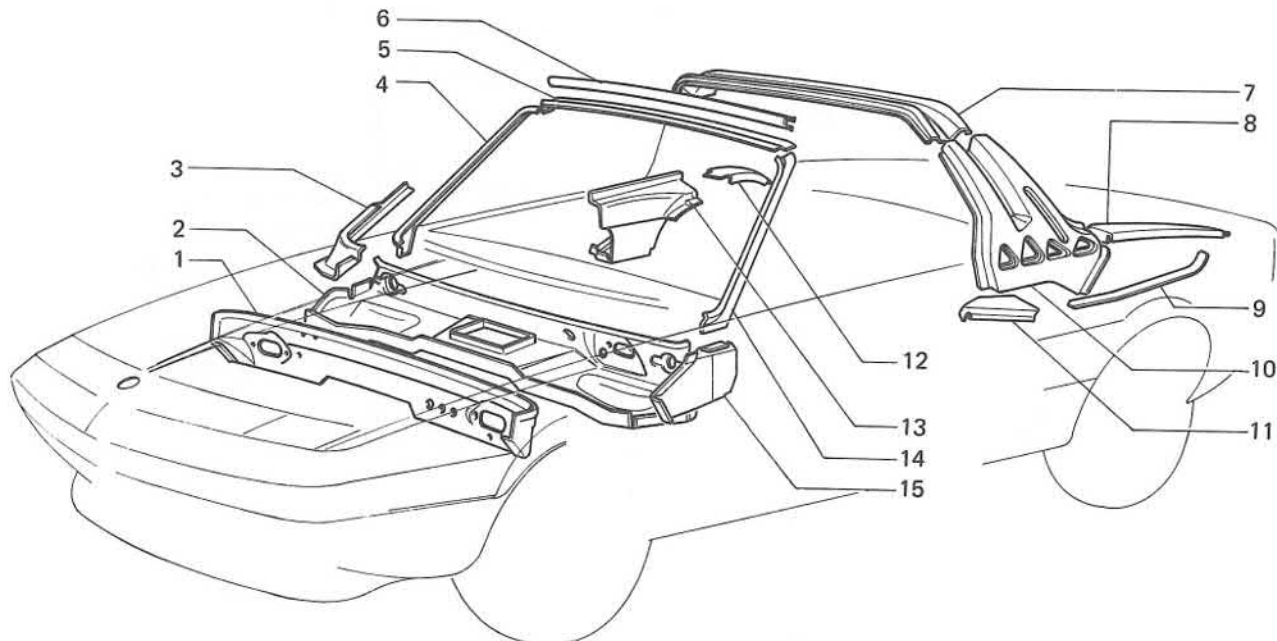
## Body Shell-Sheet Metal

### BODY SHELL INNER COMPONENTS

- |               |                    |                 |
|---------------|--------------------|-----------------|
| 1. Crossrail  | 5. Joining element | 9. Battery seat |
| 2. Wall       | 6. Cover           | 10. Framing     |
| 3. Nut        | 7. Bracket         | 11. Side panel  |
| 4. Lockwasher | 8. Framing         | 12. Wall        |

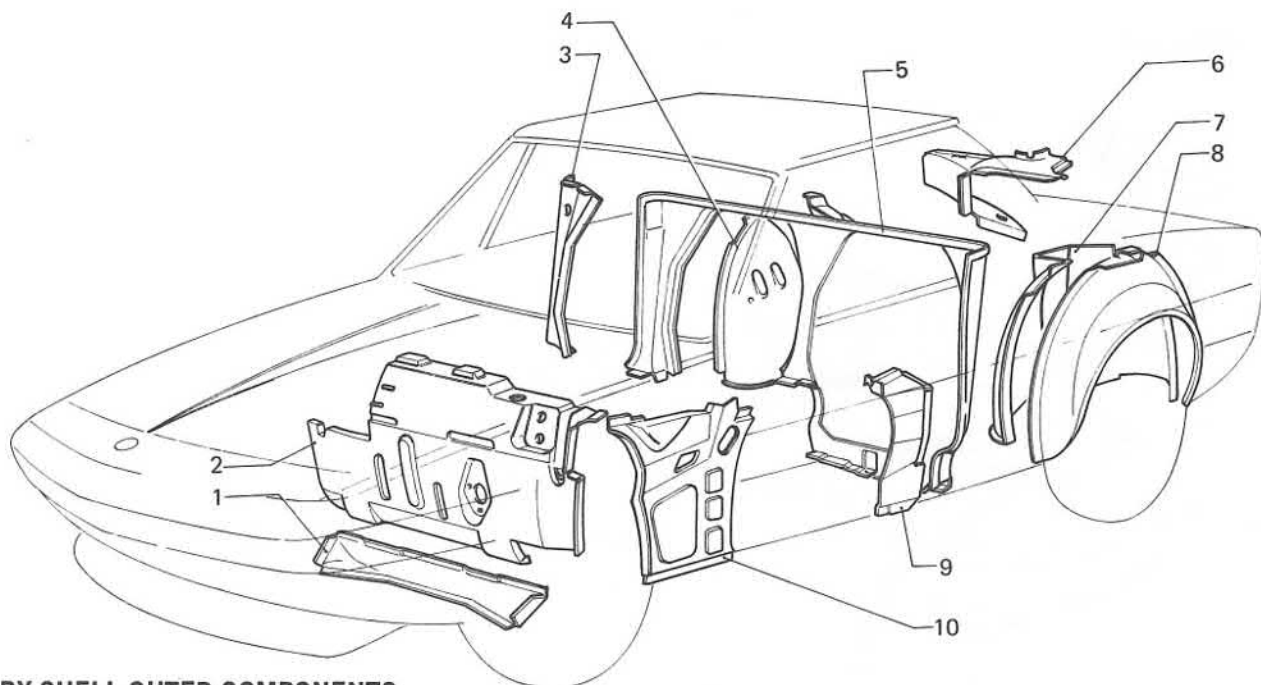


- |                       |                    |                     |
|-----------------------|--------------------|---------------------|
| 1. Air intake wall    | 6. Joining element | 11. Reinforcement   |
| 2. Air intake case    | 7. Framing         | 12. Reinforcement   |
| 3. Reinforcement      | 8. Joining element | 13. Reinforcement   |
| 4. Framing            | 9. Reinforcement   | 14. Framing         |
| 5. Windshield framing | 10. Framing        | 15. Joining element |



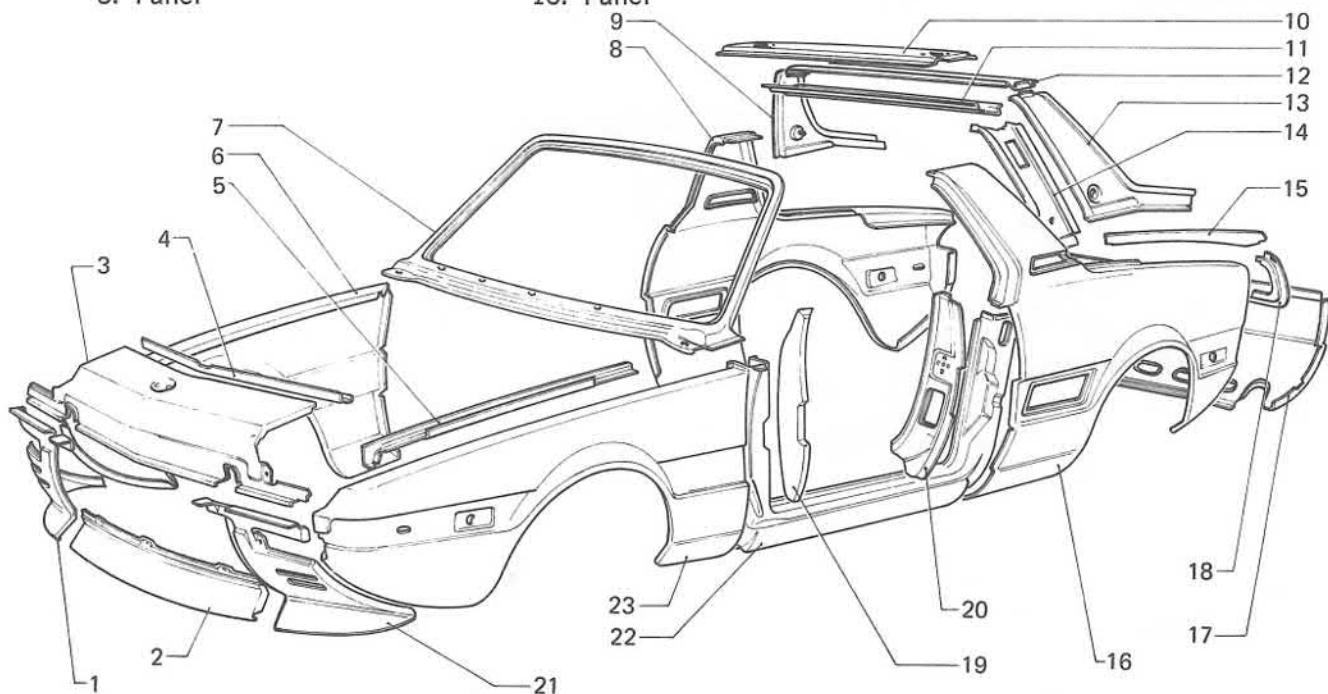
**BODY SHELL INNER COMPONENTS**

- |                    |                    |                  |
|--------------------|--------------------|------------------|
| 1. Boxed panel     | 4. Side panel      | 8. Wheel box     |
| 2. Wall            | 5. Wall            | 9. Reinforcement |
| 3. Joining element | 6. Joining element | 10. Side panel   |
|                    | 7. Side panel      |                  |



**BODY SHELL OUTER COMPONENTS**

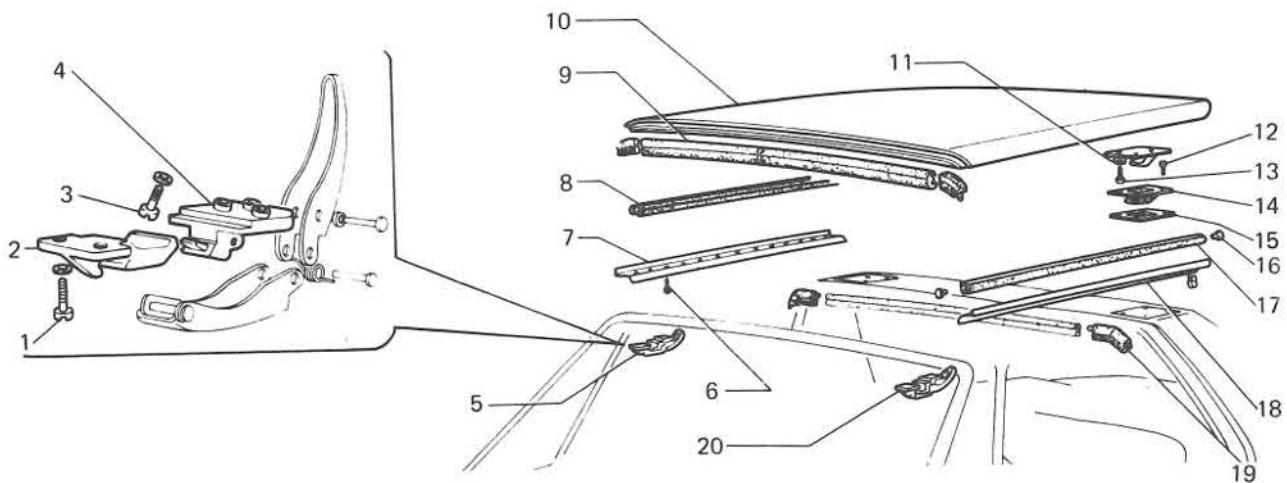
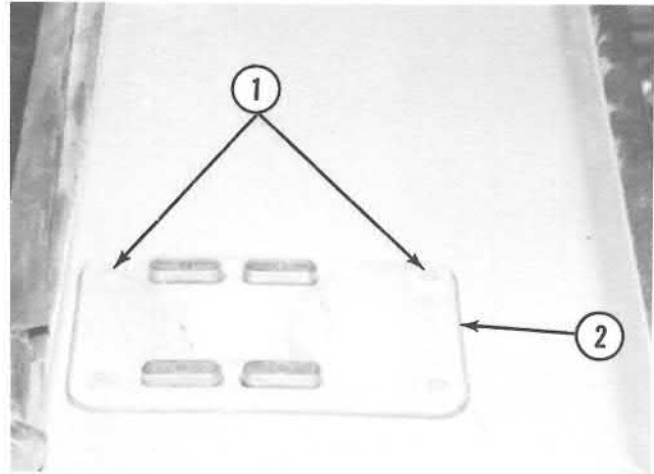
- |                     |                  |                        |
|---------------------|------------------|------------------------|
| 1. Panel            | 9. Panel         | 17. Panel              |
| 2. Panel            | 10. Panel        | 18. Seat               |
| 3. Panel            | 11. Panel        | 19. Joining element    |
| 4. Channel          | 12. Panel        | 20. Joining element    |
| 5. Hood channel     | 13. Panel        | 21. Panel              |
| 6. Panel            | 14. Panel        | 22. Door opening panel |
| 7. Windshield panel | 15. Hood channel | 23. Panel              |
| 8. Panel            | 16. Panel        |                        |



## Hard Top

Adjust hard top for proper alignment by loosening 4 screws (1) holding stricker plate (2) and shifting plate (2).

1. Screws. 2. Stricker plate.



### EXPLODED VIEW OF HARD TOP COMPONENTS

- |                   |                    |                   |
|-------------------|--------------------|-------------------|
| 1. Screw          | 8. Weather strip   | 15. Covering      |
| 2. Stricker plate | 9. Weather strip   | 16. Plug          |
| 3. Screw          | 10. Hard top       | 17. Weather strip |
| 4. Support        | 11. Lug            | 18. Moulding      |
| 5. Lock           | 12. Screw          | 19. Joint         |
| 6. Screw          | 13. Screw          | 20. Lock          |
| 7. Moulding       | 14. Stricker plate |                   |





## Doors

### REMOVING DOOR PANEL

Pry out plug (1) in top of arm rest (2). Remove 3 screws holding arm rest (2) in door.

Remove screw and door handle (4).

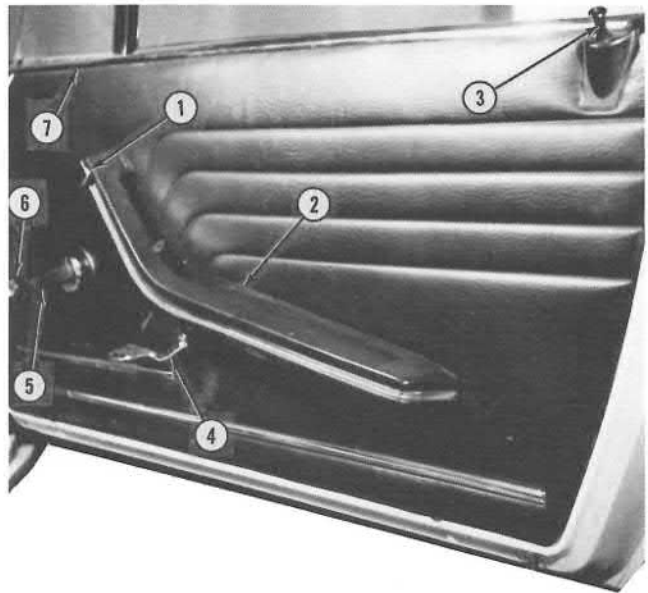
Unscrew lock button (3).

Pry back cover (5) on window crank (6). Push crank toward center of regulator and pull crank off.

Pry off top covering (7).

Pry door panel out.

- |                 |              |                  |
|-----------------|--------------|------------------|
| 1. Plug.        | 2. Arm rest. | 3. Lock button.  |
| 4. Door handle. | 5. Cover.    | 6. Window crank. |
| 7. Covering.    |              |                  |



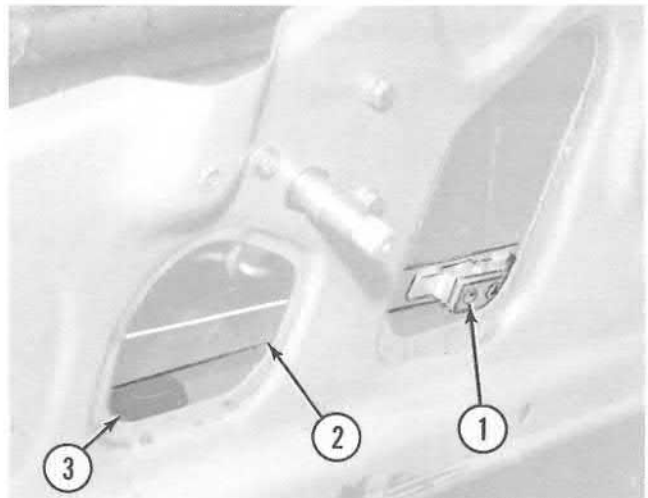
### WINDOW ADJUSTMENT

Loosen screws (1) (2 places).

Rest window (2) on rubber pad (3).

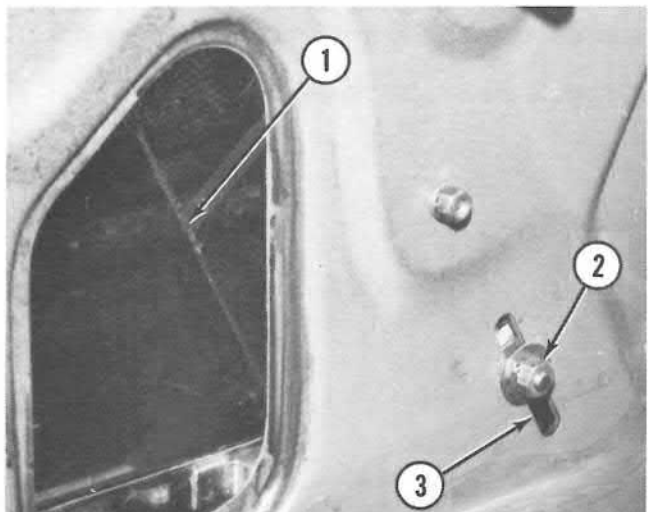
Set regulator handle in "wide open" position. Tighten screws (1) hard. After adjustment, the glass must be able to run full length of its travel. Control cable must wind and unwind properly on regulator pulley.

- |            |            |                |
|------------|------------|----------------|
| 1. Screws. | 2. Window. | 3. Rubber pad. |
|------------|------------|----------------|



To adjust tension of cable (1), loosen nut (2) on adjustable pulley. Move pulley in slot (3) to set tension. Tighten nut (2).

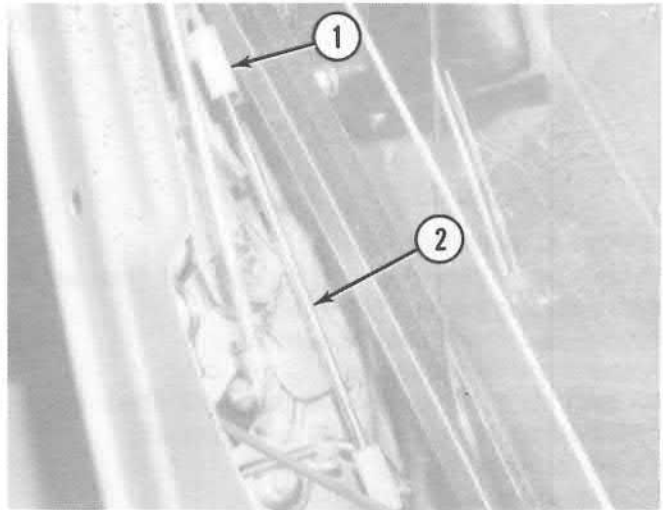
- |           |         |          |
|-----------|---------|----------|
| 1. Cable. | 2. Nut. | 3. Slot. |
|-----------|---------|----------|



### DOOR LOCK ADJUSTMENT

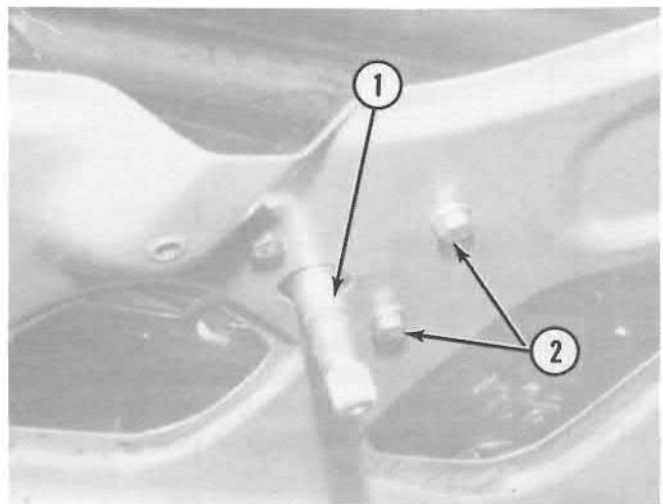
To adjust outside doorhandle, turn adjustable head (1) of tie rod (2).

- 1. Adjustable head.
- 2. Tie rod.



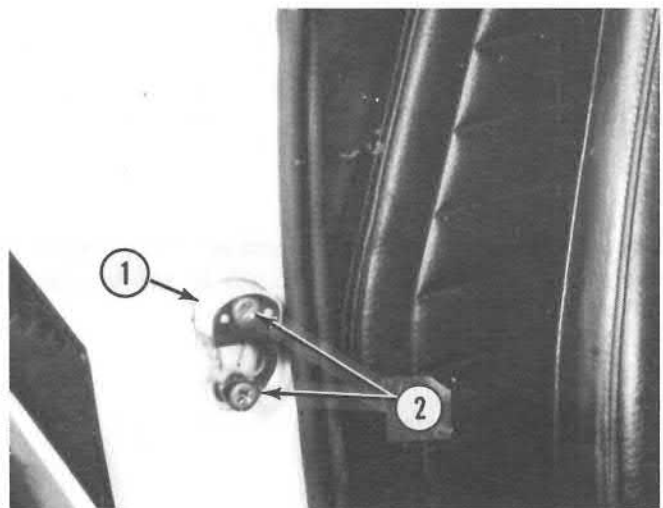
To adjust the inside door handle (1), loosen 3 screws (2) and shift the handle (1).

- 1. Door handle.
- 2. Screws.



To adjust stricker plate (1) for door lock, mark its position. Loosen 2 screws (2) and shift plate (1).

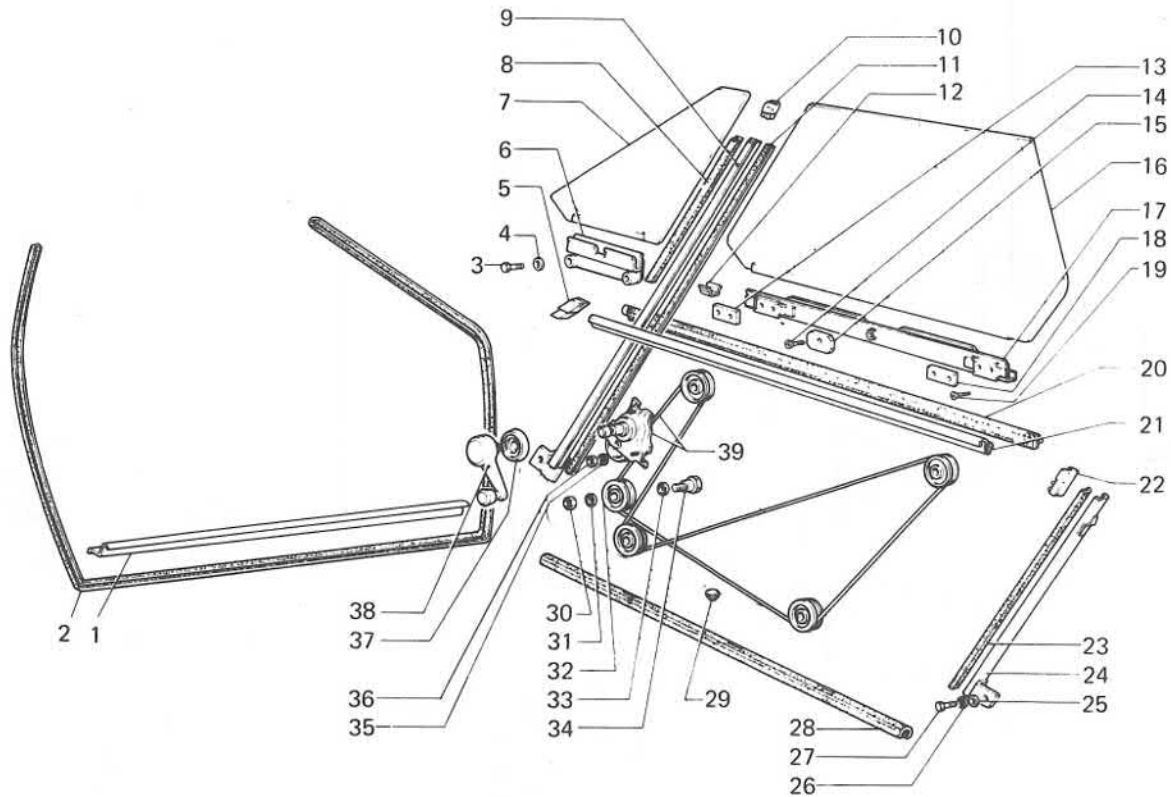
- 1. Stricker plate.
- 2. Screws.





**EXPLODED VIEW OF DOOR**

- |                      |                   |                      |
|----------------------|-------------------|----------------------|
| 1. Doorsill moulding | 14. Screw         | 27. Screw            |
| 2. Weather strip     | 15. Pad           | 28. Weather strip    |
| 3. Bolt              | 16. Glass         | 29. Pad              |
| 4. Washer            | 17. Guide         | 30. Nut              |
| 5. Boot              | 18. Plate         | 31. Washer           |
| 6. Channel           | 19. Screw         | 32. Sheave           |
| 7. Glass             | 20. Weather strip | 33. Washer           |
| 8. Weather strip     | 21. Cover         | 34. Bolt             |
| 9. Pillar            | 22. Boot          | 35. Lockwasher       |
| 10. Pad              | 23. Weather strip | 36. Nut              |
| 11. Weather strip    | 24. Channel       | 37. Ornament         |
| 12. Clip             | 25. Washer        | 38. Handle           |
| 13. Plate            | 26. Lockwasher    | 39. Window regulator |



## Windshield

### REMOVAL AND INSTALLATION

Remove wiper blades. Remove instrument panel (3). Refer to 701.02.

Remove inside weatherstrip (1).

If glass is damaged, remove outside moulding. Cut layer of sealant between glass and windshield opening fence with steel wire.

If glass can be reused, find internal resistance terminals (2) for the sealant. They are on bottom center of windshield. Connect 24V source to terminals for a few minutes to soften the sealant. Push glass very carefully from inside to remove it.

If sealant cannot be softened, remove trim from windshield. Very carefully cut sealant from windshield. Clean surfaces of windshield, weatherstrip, and opening fence.

Set glass in position in fence. Center glass so that distance between glass and fence is even all around. Place spacers (1) to hold glass in position.

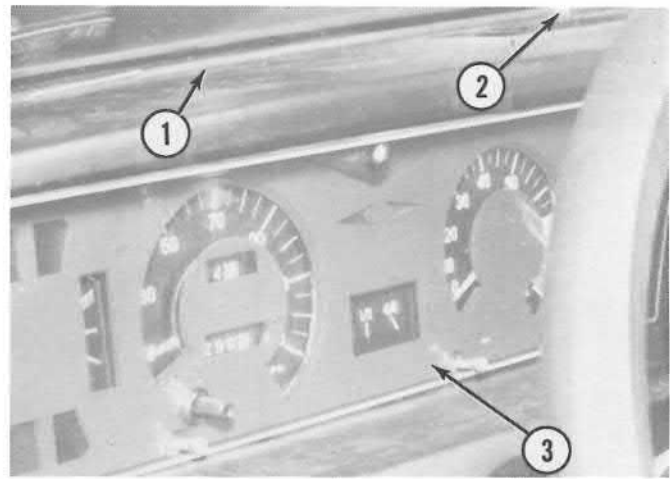
Check that glass is centered with respect to the fence. Use gauges (4). Insert 4 or more spacers (3) to hold glass. Glue spacers to opening fence. Make sure they are right size to enable a continuous bead of adhesive to be applied.

1. Spacers for centering glass on fence.    2. Moltoprene.  
3. Spacer for resting glass on fence.  
4. Reference gauges.    5. Windshield glass.

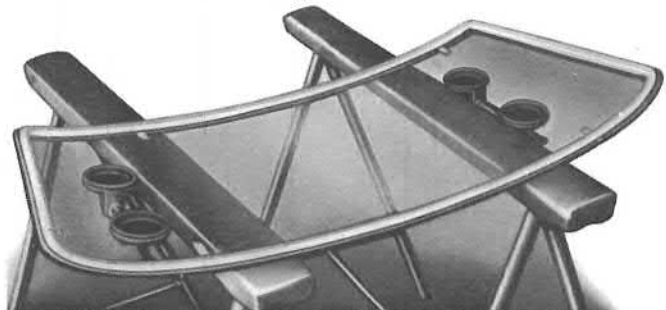
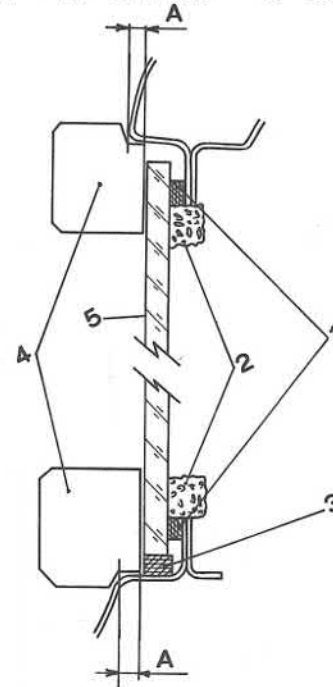
A = 0.15 in. (4mm)

Apply 4 strips of tape to glass. Cut strips at edge of glass. Remove glass and place it on a stand.

Apply self-adhesive moltoprene (0.39 x 0.39 in. (10 x 10mm) thick) along inside promoter of glass about 0.6 in. (15mm) from edge. This is to prevent adhesive from getting into car.

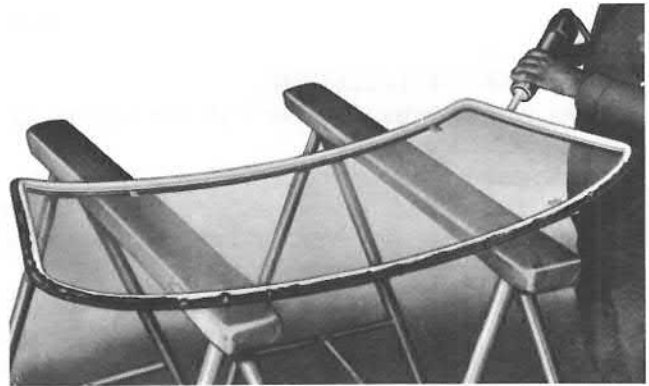


1. Weatherstrip.    2. Terminals.    3. Instrument panel.

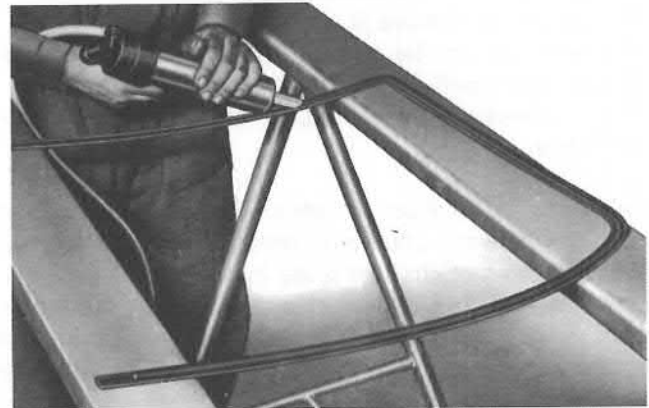


Self-adhesive moltoprene on glass

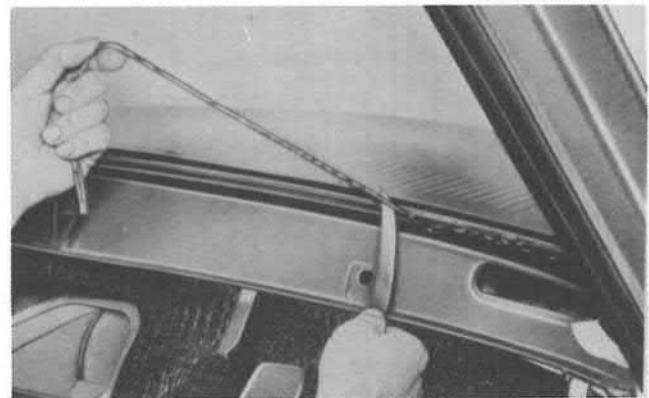
Apply a thin coat of primer to edge of glass, fence seat, and inner part of outside weatherstrip.  
Apply sealant along inside promoter of glass. Form a bead of about 0.36 in. (10mm) in diameter.  
Be careful to avoid variations in bead sections and air bubbles between bead and glass.



Apply sealant to inner part of outside weatherstrip.  
Be careful to avoid variations in bead sections and air bubbles between bead and glass.  
Place glass in fence, resting it on the spacers. Align taps on glass and car. Remove taps. Apply a thin coat (0.39 in. (10mm) wide) of primer to outer edge of glass.



Apply outside weatherstrips. Join end with butt joints.  
Press strips until they are in place. Use a spring-type fixture to apply pressure to weatherstrips. After 24 hours, remove strip of moltoprene. Remove excess sealant by scraping along fence. Remove the fixture.  
Install parts removed. Clean glass surfaces.

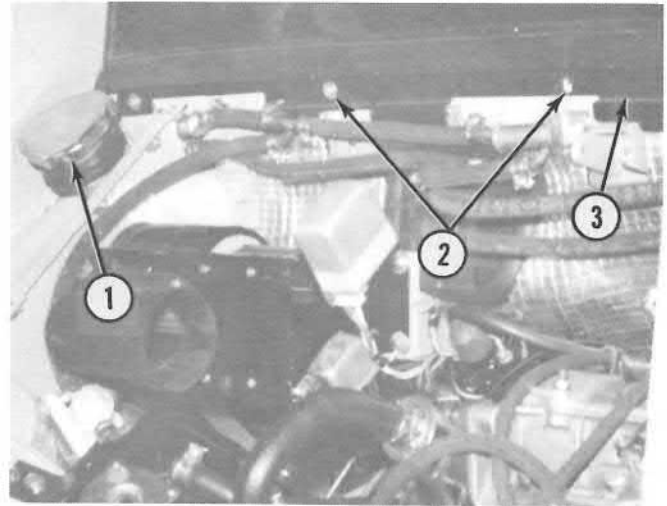


## Back Window

### REMOVAL AND INSTALLATION

Remove engine compartment lid. Refer to 701.27. Remove air scoops on either side by removing 4 screws (1 screw is under trunk lid). Remove gas cap. Remove 6 bolts (2) holding weatherstrip (3) to body. On cars with rear window defogger, disconnect 1 wire each side from window.

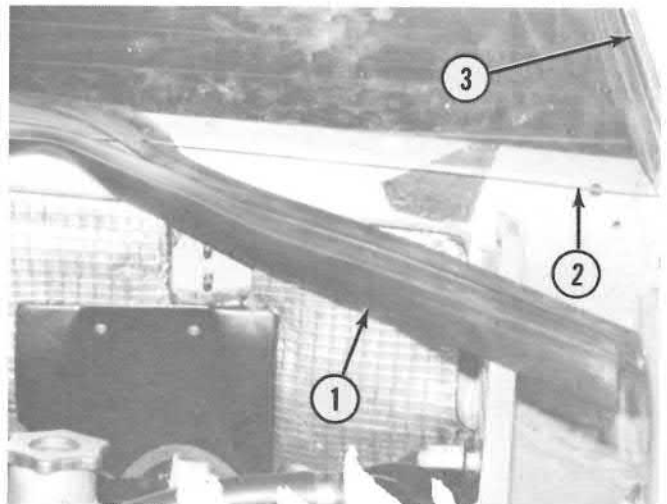
1. Gas cap. 2. Bolts. 3. Weatherstrip.



Pull rubber seal (1) around window towards center of window. Slide seal out from under window (2) at edge. Pull window down. Remove top rubber seal. Remove window.

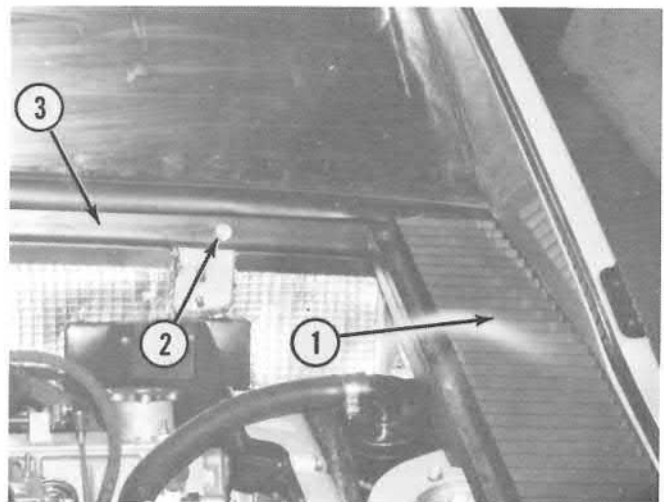
Place rubber seal on top of window. Place window in frame (3) and push it up into place. Slide rubber seal (1) under window. Make sure window is in center of seal and seal overlaps frame (3).

1. Rubber seal. 2. Window. 3. Frame.



Install weatherstrip (2) with 6 bolts (3). Install air scoops (1) on either side. On cars with rear window defogger, connect 1 wire each side to window. Install engine compartment lid.

1. Air scoops. 2. Weatherstrip. 3. Bolts.







## Luggage Compartment Lid

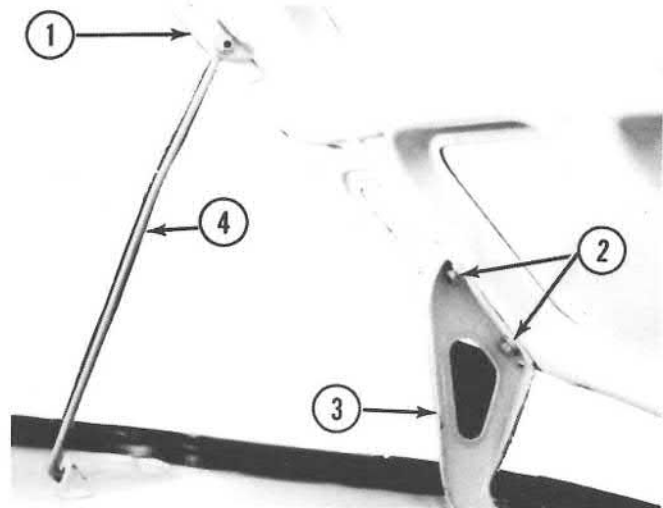
### FRONT LUGGAGE COMPARTMENT LID REPLACEMENT AND ADJUSTMENT

Remove bolts (2) and washers holding lid (1) to hinges (3). Remove nut and washers holding support rod (4) to lid (1).

When installing lid, tighten bolts thru hinges enough to permit the lid to be shifted. Close lid and check for proper alignment. Shift lid as necessary. After lid is positioned properly, tighten bolts.

Install support rod.

1. Lid. 2. Bolts. 3. Hinge. 4. Support rod.

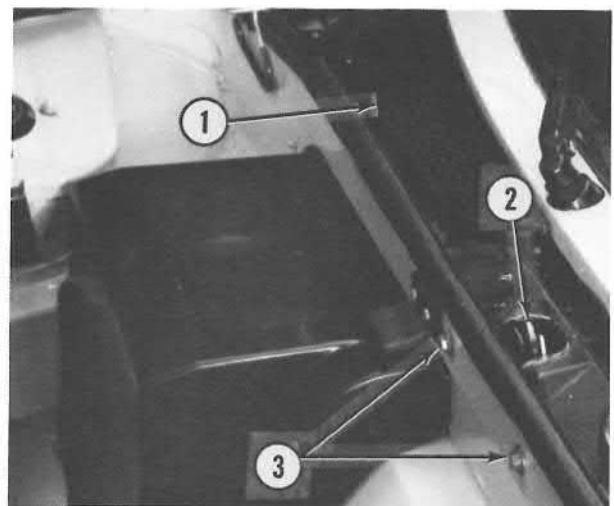


### LID LOCK REPLACEMENT AND ADJUSTMENT

Remove 4 screws and bolt holding grill (1) on right side of car.

Remove 2 bolts (3) and washers holding lock (2) in car. Work lock out thru grill opening.

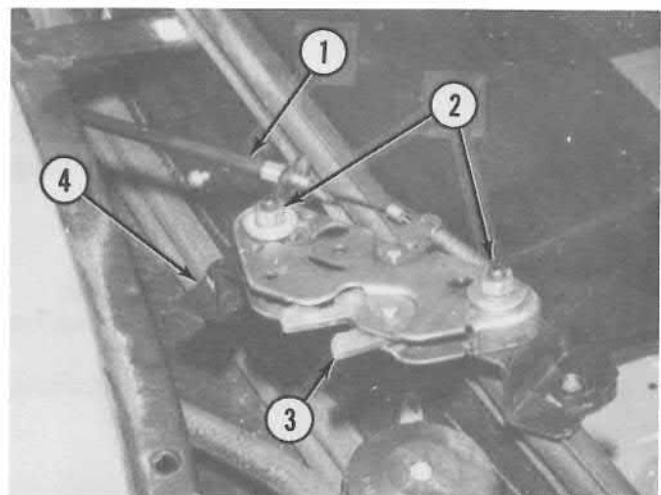
1. Grill. 2. Lock. 3. Bolts.



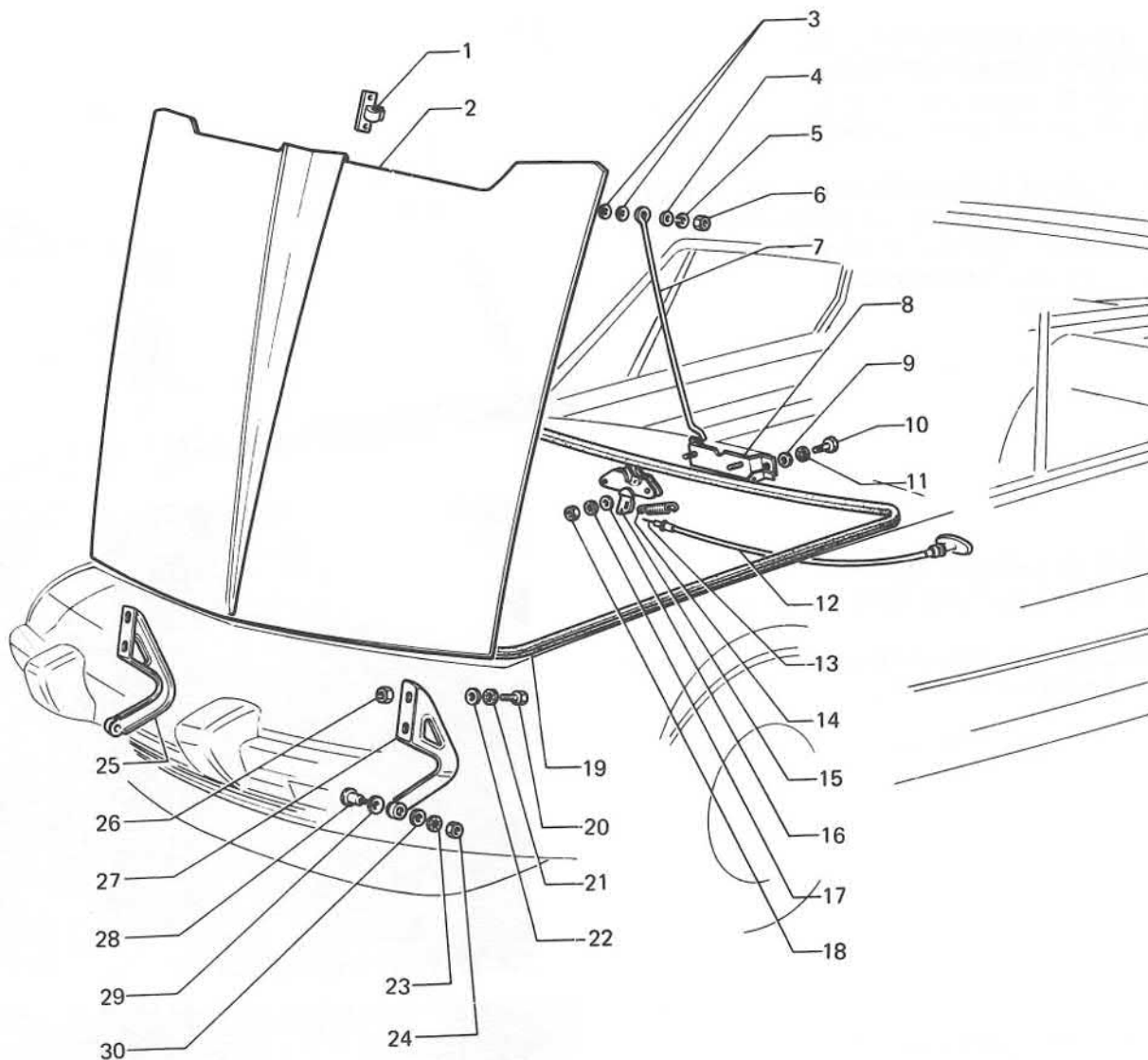
Disconnect cable (1) from lock (3).

Remove 2 nuts (2) and washers holding lock to bracket (4). When installing, tighten bolts enough to allow lock to be shifted. Check lock for operation and shift lock as needed. Tighten 2 bolts.

1. Cable. 2. Nuts. 3. Lock. 4. Bracket.



**VIEW OF FRONT LUGGAGE COMPARTMENT LID COMPARTMENTS.**



- |                   |                             |                |
|-------------------|-----------------------------|----------------|
| 1. Stricker plate | 11. Washer                  | 21. Lockwasher |
| 2. Lid            | 12. Latch cable             | 22. Washer     |
| 3. Spring washer  | 13. Cable                   | 23. Lockwasher |
| 4. Washers        | 14. Spring                  | 24. Nut        |
| 5. Lockwasher     | 15. Lock                    | 25. Hinge      |
| 6. Nut            | 16. Washer                  | 26. Nut        |
| 7. Rod            | 17. Lockwasher              | 27. Hinge      |
| 8. Lock bracket   | 18. Nut                     | 28. Bolt       |
| 9. Washers        | 19. Compartment rubber seal | 29. Washer     |
| 10. Bolt          | 20. Bolt                    | 30. Washer     |

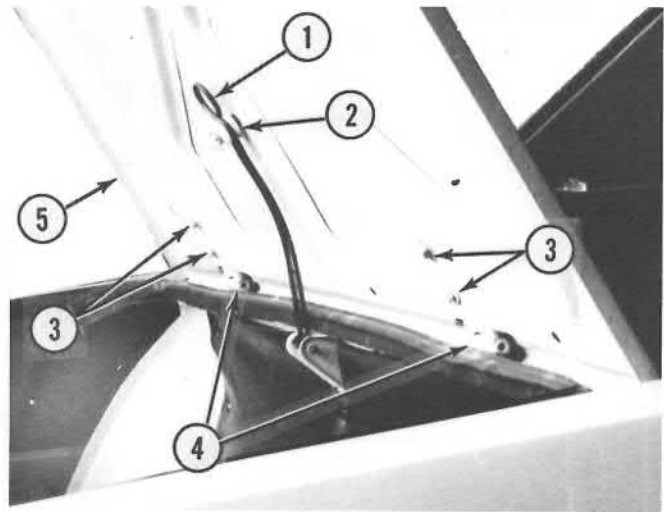
## Luggage Compartment Lid

### REAR LUGGAGE COMPARTMENT LID REPLACEMENT AND ADJUSTMENT

Remove bolts (3) holding lid (5) to hinges (4). Unhook center prop (1). Remove lid. Remove prop (1), cotter pin, washers, and bushing (2).

When installing lid, check position. Shift lid on hinges to obtain proper alignment. Tighten bolts holding lid to hinges.

1. Prop.    2. Bushing.    3. Bolts.    4. Hinge.  
5. Lid.



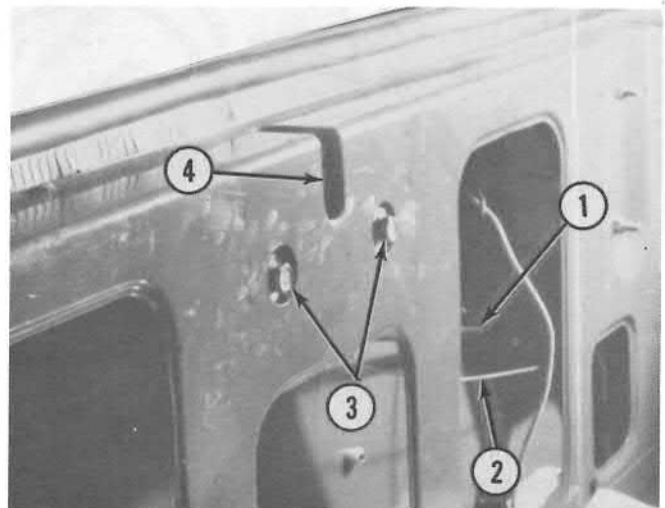
### LID LOCK REPLACEMENT AND ADJUSTMENT

Remove 2 bolts (3) and 4 washers holding lock (4) in car. Disconnect cable (1) from lock. Disconnect plastic cable (2) from lock.

When installing lock, position lock for proper operation. Tighten 2 bolts.

NOTE: The pull for the plastic cable is in engine compartment.

1. Cable.    2. Plastic cable.    3. Bolts.    4. Lock.



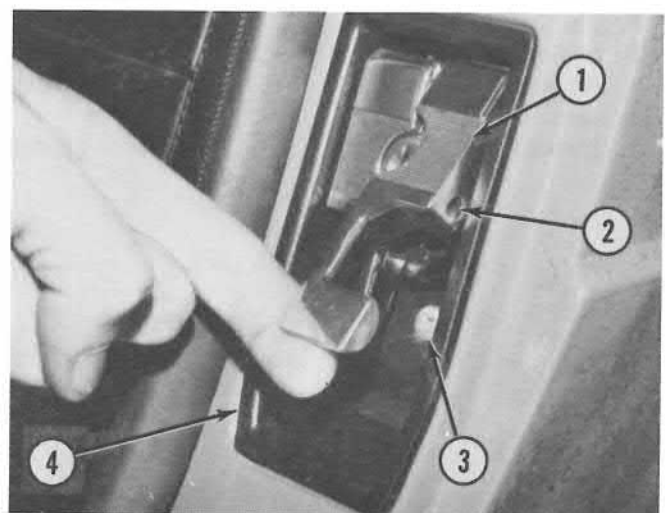
### KEY LOCK REPLACEMENT

Remove screws (2) holding cables in levers (1). Remove screw (3) holding assembly (4) in door frame. Remove assembly.

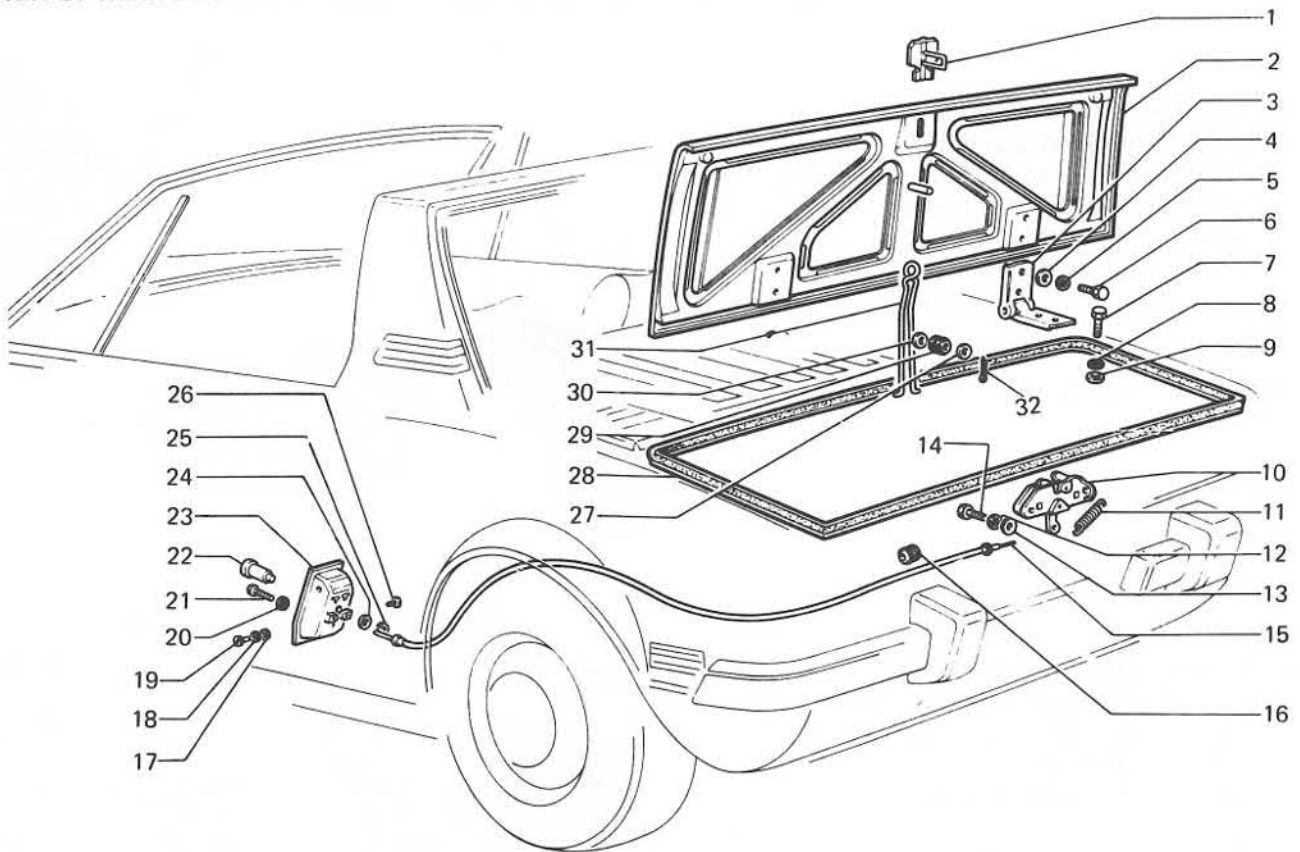
Feed cables into levers. Pull cables and levers until lids release. Hold cables and feed them into levers. Install screws (2) in levers (1).

Install screw (3) thru assembly (4).

1. Lever.    2. Screw.    3. Screw.    4. Assembly.



VIEW OF REAR LUGGAGE COMPARTMENT LID COMPONENTS.



- 1. Stricker plate
- 2. Lid
- 3. Hinge
- 4. Washer
- 5. Lockwasher
- 6. Bolt
- 7. Bolt
- 8. Lockwasher
- 9. Washer
- 10. Lock
- 11. Spring

- 12. Lockwasher
- 13. Washer
- 14. Bolt
- 15. Cable
- 16. Rubber ring
- 17. Washer
- 18. Lockwasher
- 19. Screw
- 20. Lockwasher
- 21. Screw
- 22. Lock cylinder

- 23. Handle
- 24. Washer
- 25. Fork
- 26. Screw
- 27. Washer
- 28. Weather strip
- 29. Bushing
- 30. Stay
- 31. Pin

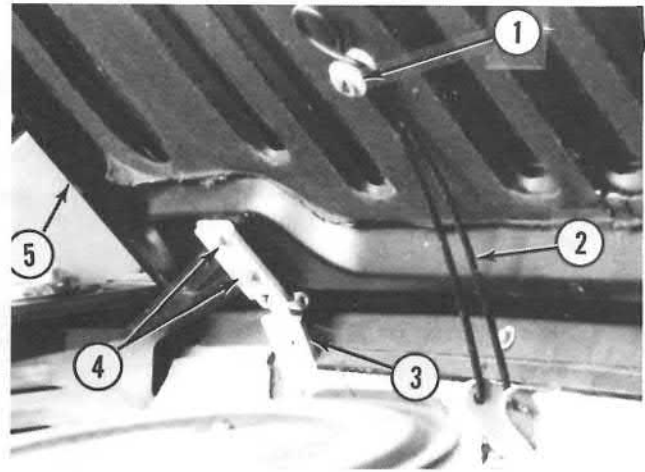
## Air Intakes and Lids

### ENGINE COMPARTMENT LID REPLACEMENT AND ADJUSTMENT

Remove bolts (4) and washers holding lid (5) to hinges (3). Unhook center prop (2). Remove prop (2), cotter pin, washers, and bushing (1).

When installing lid, check position. Shift lid on hinges to obtain proper alignment. Tighten bolts holding lid to hinges.

1. Bushing.
2. Prop.
3. Hinge.
4. Bolts.
5. Lid.



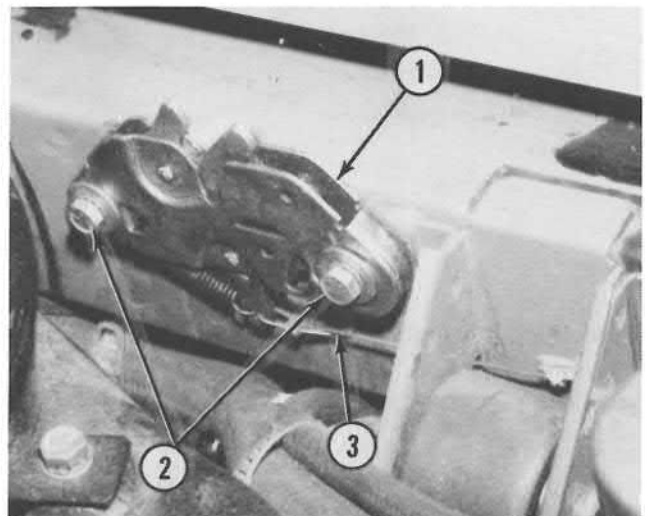
### LID LOCK REPLACEMENT AND ADJUSTMENT

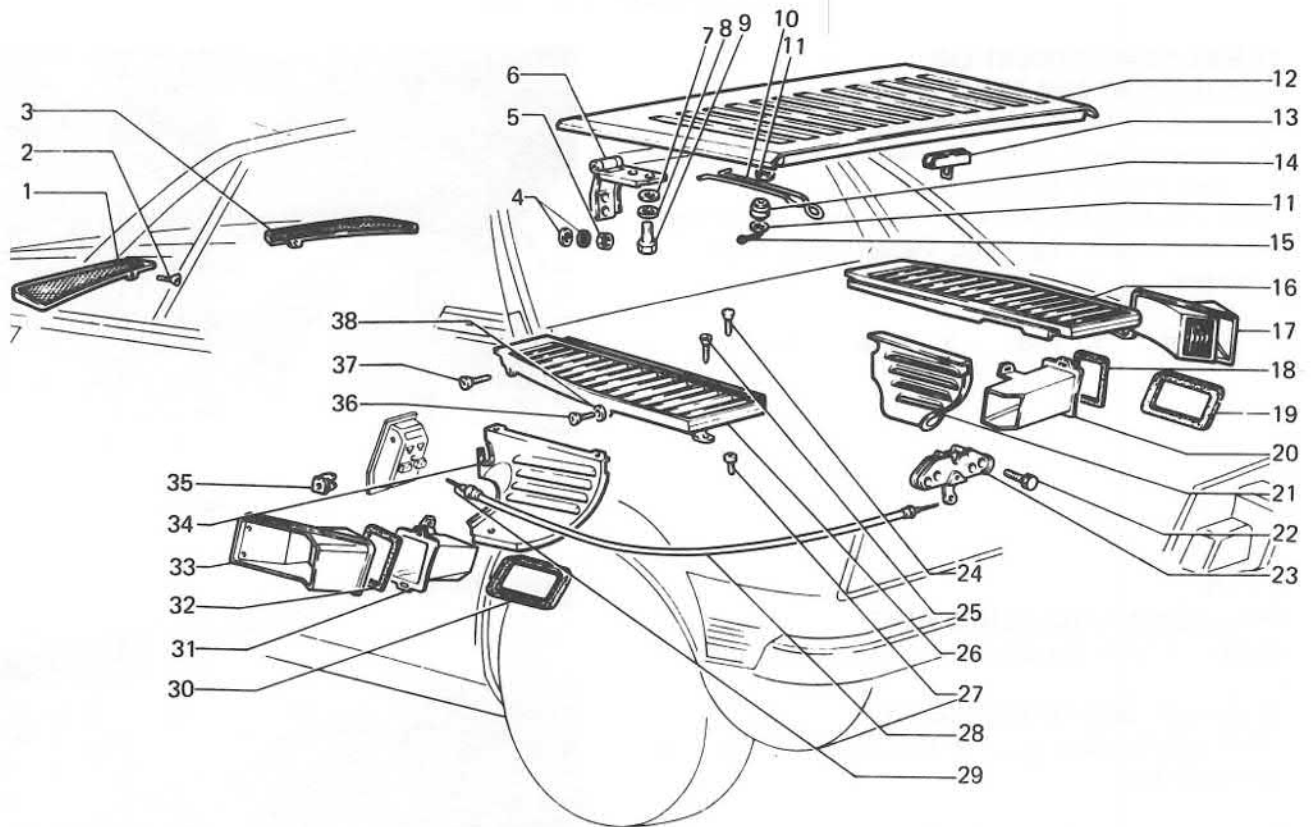
Remove 2 bolts (2) and 4 washers holding lock (1) in car.

Disconnect cable (3) from lock (1).

When installing lock, position lock for proper operation. Tighten 2 bolts.

1. Lock.
2. Bolts.
3. Cable.





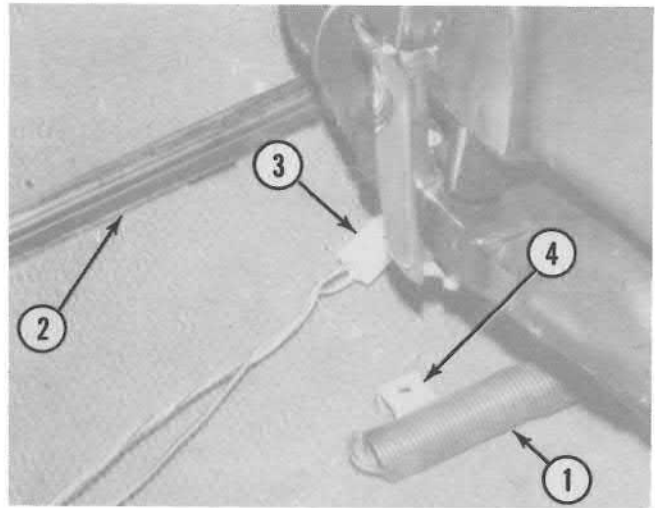
**EXPLODED VIEW OF LID COMPONENTS AND AIR INLETS**

- |                    |                |                |
|--------------------|----------------|----------------|
| 1. Grill           | 14. Bushing    | 27. Screw      |
| 2. Screw           | 15. Cotter pin | 28. Cable      |
| 3. Grill           | 16. Grill      | 29. Cable      |
| 4. Washers         | 17. Conveyor   | 30. Gasket     |
| 5. Nut             | 18. Gasket     | 31. Conveyor   |
| 6. Hinge           | 19. Gasket     | 32. Gasket     |
| 7. Washer          | 20. Wall       | 33. Air intake |
| 8. Lock washer     | 21. Conveyor   | 34. Wall       |
| 9. Bolt            | 22. Bolt       | 35. Clip       |
| 10. Center prop    | 23. Lock       | 36. Screw      |
| 11. Washer         | 24. Screw      | 37. Screw      |
| 12. Lid            | 25. Screw      | 38. Washer     |
| 13. Stricker plate | 26. Grill      |                |

## Front Seats

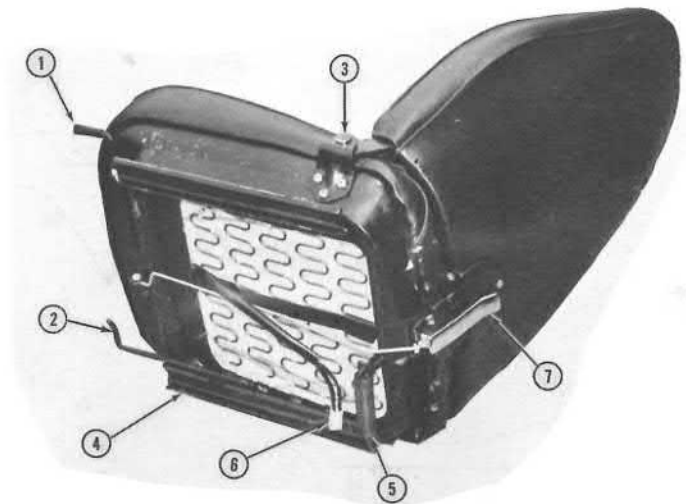
To remove seats, disconnect spring from bracket under seat. Disconnect connector for seat switch. Raise lever. Slide seat off floor tracks.

1. Spring. 2. Track. 3. Connector. 4. Bracket.



### FRONT SEAT

1. Fore and aft adjuster lever
2. Seat release lever
3. Back hinge
4. Track
5. Spring
6. Seat Belt interlock wires
7. Front seat release lever







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# ELECTRICAL SYSTEM TROUBLESHOOTING

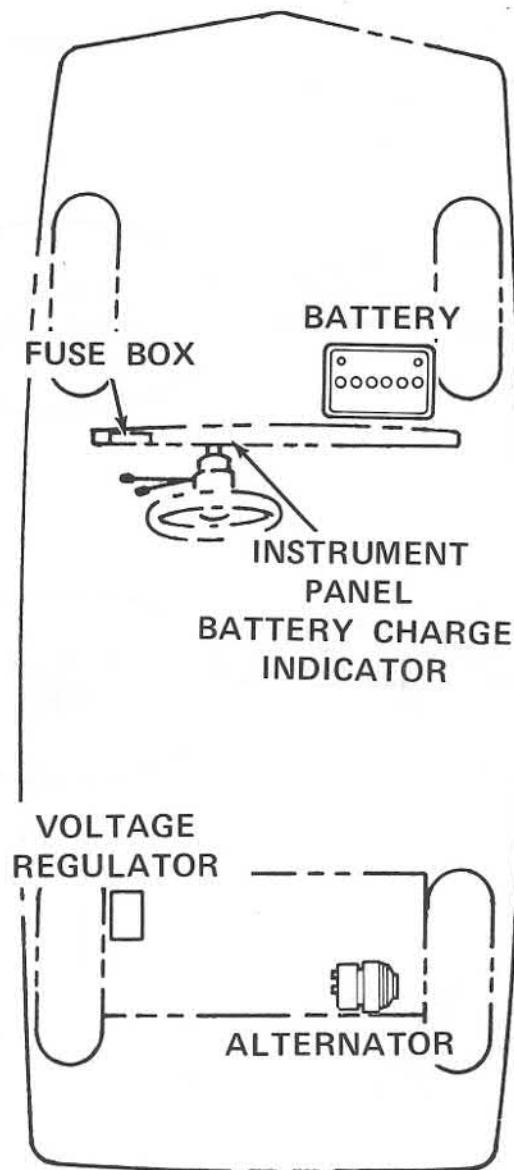
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# ELECTRICAL SYSTEM TROUBLESHOOTING

## BATTERY AND CHARGING SYSTEM

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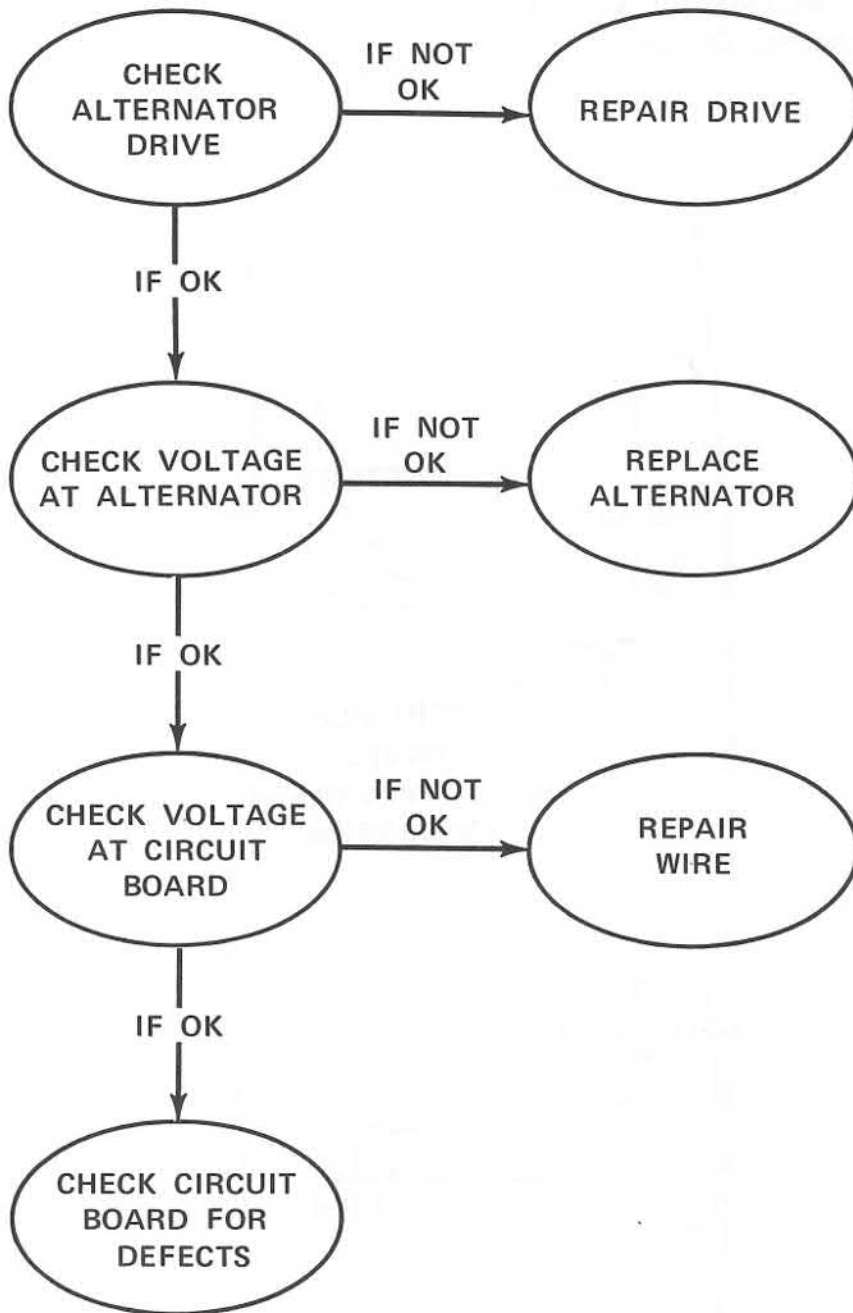
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# ELECTRICAL SYSTEM TROUBLESHOOTING

## BATTERY AND CHARGING SYSTEM

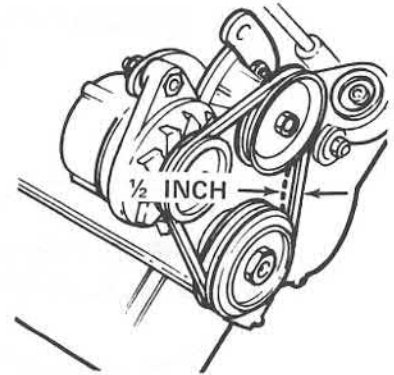
### BATTERY CHARGE INDICATOR STAYS ON AFTER ENGINE STARTS



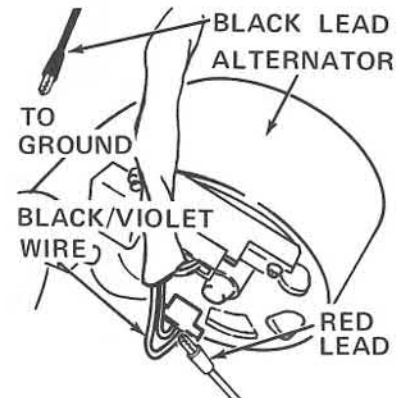
## BATTERY AND CHARGING SYSTEM

### BATTERY CHARGE LIGHT STAYS ON AFTER ENGINE STARTS

- 1.a. Go to engine compartment. Check that alternator drive belt is not broken. If broken, replace it.
- b. Check that alternator drive belt is not loose. (More than 1/2 inch play.) If loose, move alternator to tighten belt. If not loose, go to step c.
- c. Start engine. Be sure alternator shaft is turning. If not turning, replace alternator. If belt and alternator O.K. go to step 2.



- 2.a. Get voltmeter. Connect red meter lead to black/violet wire at alternator. Connect black lead to ground.
- b. If meter reads voltage, go to step c. If meter does not read voltage, replace alternator.

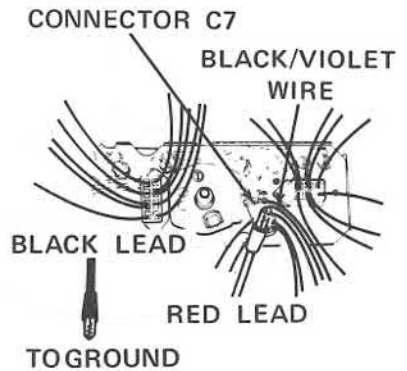


- c. Remove 5 screws thru instrument panel. Disconnect speedometer cable from panel. Do not disconnect connectors.
- d. Connect red meter lead to black/violet wire in connector C7. Connect black lead to ground.

#### NOTE

Connector C7 is in middle of instrument panel. It is a 6 pin connector.

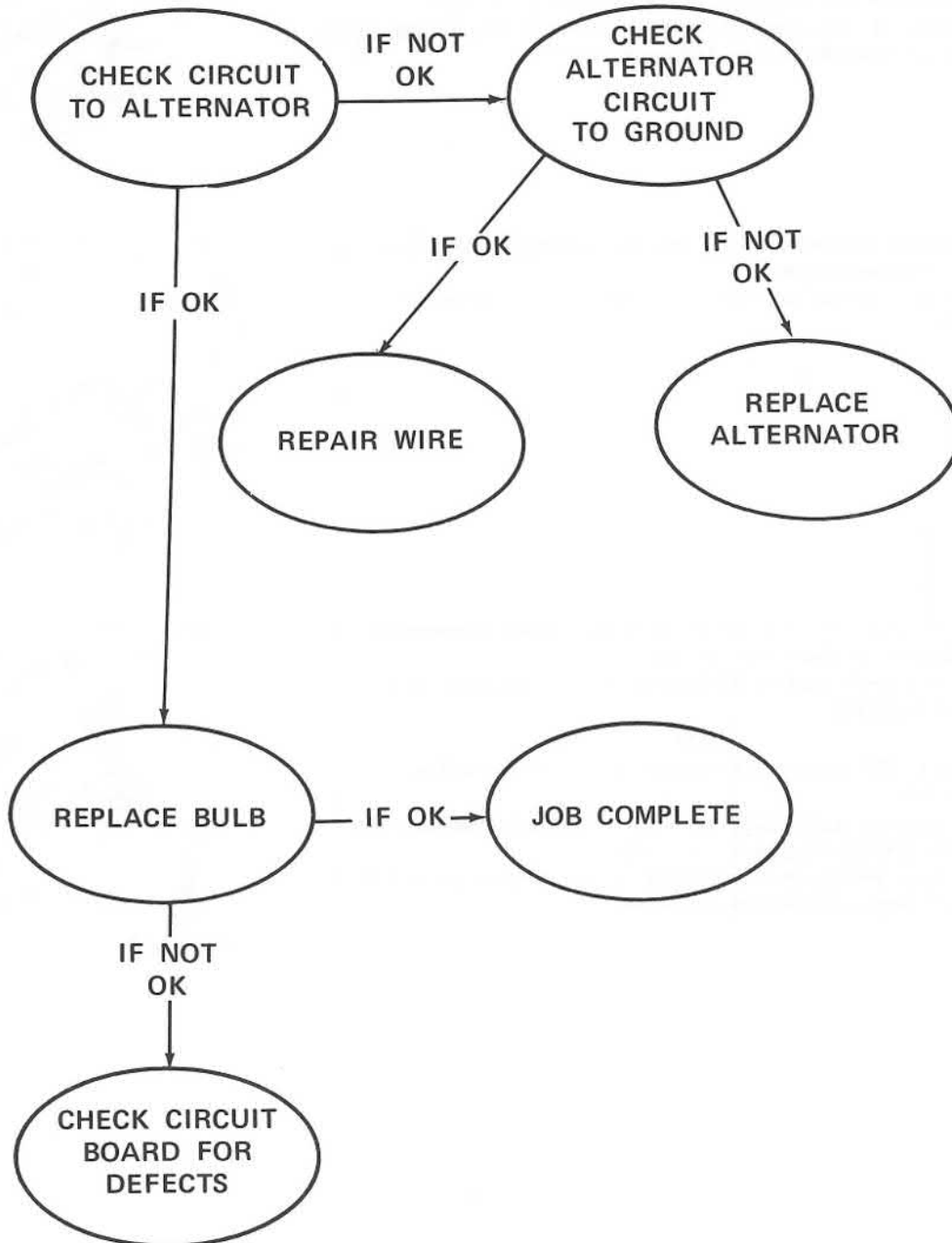
- e. If meter does not read voltage, repair black/violet wire from connector C7 to regulator and from regulator to alternator.
- f. If meter reads voltage, check connector C7, circuit board, and bulb holder for defects. Repair or replace defective part.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## BATTERY AND CHARGING SYSTEM

INDICATOR DOES NOT LIGHT WITH IGNITION SWITCH ON AND STAYS OFF WITH ENGINE RUNNING



## BATTERY AND CHARGING SYSTEM

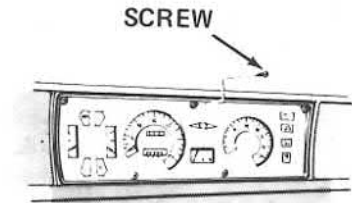
### INDICATOR DOES NOT LIGHT WITH IGNITION SWITCH ON AND STAYS OFF WITH ENGINE RUNNING

- 1.a. Check that horns work. If horns do not work, repair light blue/black wire from connector C12 to fuse A.

**NOTE**

Connector C12 is a 4 pin connector located under steering column cover.

- b. If horns work, remove 5 screws thru instrument panel. Pull panel out. Disconnect speedometer cable from panel.



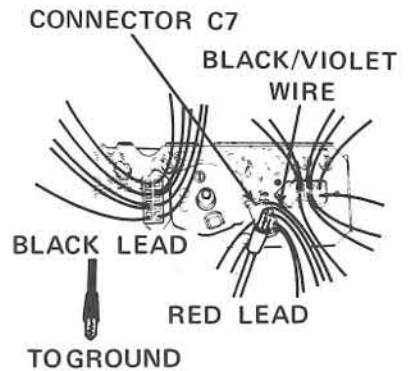
INSTRUMENT PANEL

- c. Turn ignition switch off. Connect red meter lead to black/violet wire in connector C7. Connect black lead to ground.

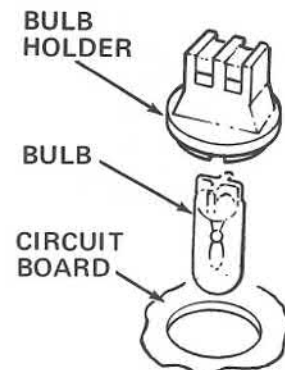
**NOTE**

Connector C7 is a 6 pin connector. It is the middle connector on the instrument panel.

- d. If meter reads 10 ohms or less, go to step 2. If meter reads more than 10 ohms, go to step 3.



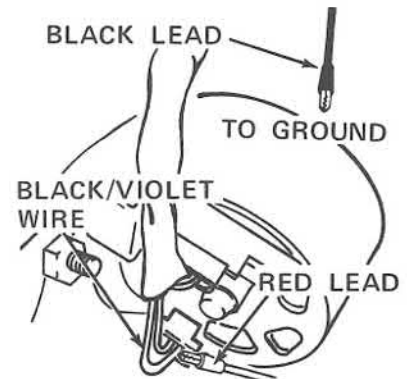
- 2.a. Locate bulb holder for battery charge indicator. Turn bulb holder to left and remove it from circuit board. Pull bulb out of holder.
- b. Install new bulb. Install holder in circuit board.
- c. Turn ignition switch on. Check indicator. If indicator is lit, install instrument panel.
- d. If indicator is not lit, check connector C7, circuit board, and bulb holder for defects. Repair or replace defective part.



- 3.a. Go to engine compartment. Connect red meter lead to black/violet wire at alternator. Connect black lead to ground.
- b. If meter reads more than 10 ohms, replace alternator.
- c. If meter reads 10 ohms or less, repair black/violet wire from alternator to connector C7.

**NOTE**

The wire runs from connector C7, connector C13, regulator terminal D+ to alternator terminal D+.

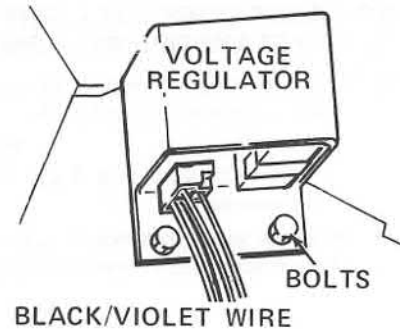


# ELECTRICAL SYSTEM TROUBLESHOOTING

## BATTERY AND CHARGING SYSTEM

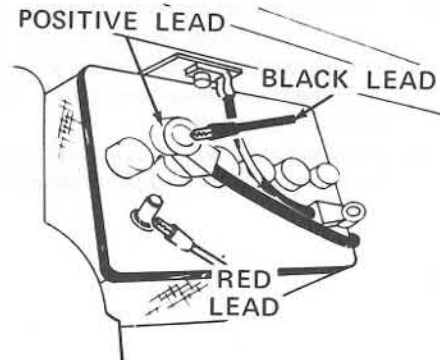
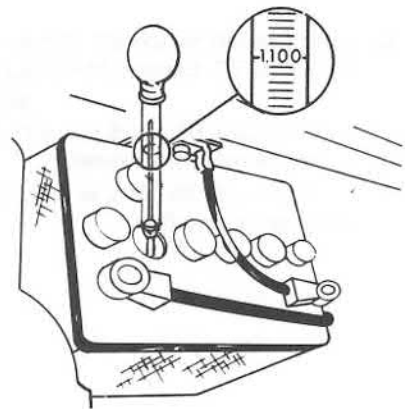
### BATTERY BOILS OVER. LIGHTS BURN OUT FREQUENTLY

- 1.a. Go to voltage regulator.
- b. Check that voltage regulator mount bolts are tight.
- c. Check that wire connections are clean and tight.
- d. If bolts are tight and connections are tight and clean, replace voltage regulator.



### BATTERY DOES NOT STAY CHARGED

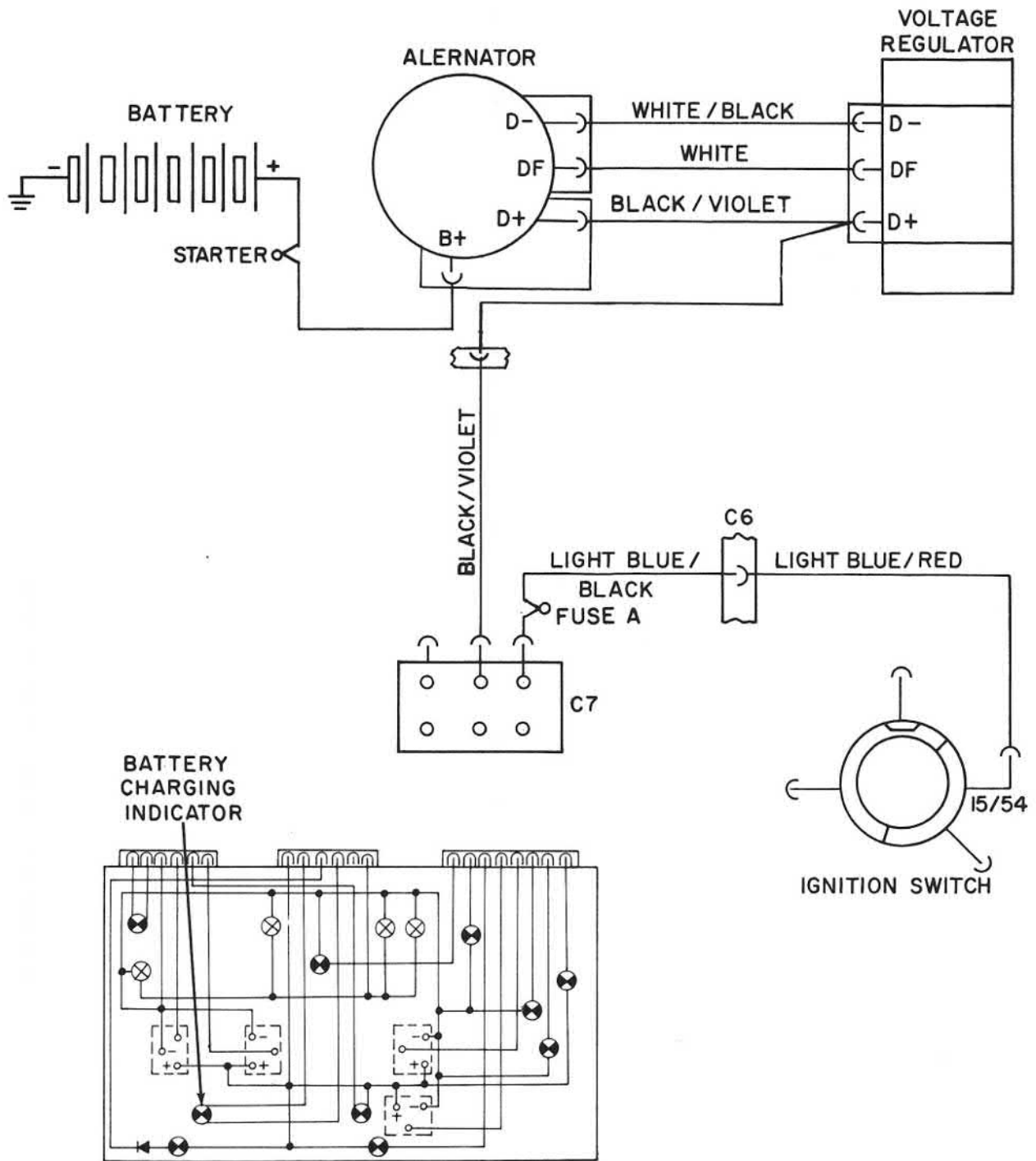
- 1.a. Check that battery cells are filled with water. If battery needs water, fill cell and charge battery. If cells are full, charge battery. Go to step b.
- b. Get hydrometer. Measure specific gravity of each cell. If specific gravity is below 1.100 on any cell or cells, check battery with a carbon pile load. If battery O.K. go to step 2. If load test indicates battery is no good, replace it.
- 2.a. Get multimeter. Set up meter to measure amps.
- b. Make sure all switches are off. Close doors.
- c. Disconnect battery positive cable. Connect black meter lead to cable. Connect red meter lead to battery positive post.
- d. If meter reads 0 amps, replace voltage regulator.
- e. If meter moves, check wiring between battery and ignition switch, and between ignition switch and fuse box. Check ignition system wiring.





# ELECTRICAL SYSTEM TROUBLESHOOTING

## BATTERY AND CHARGING SYSTEM



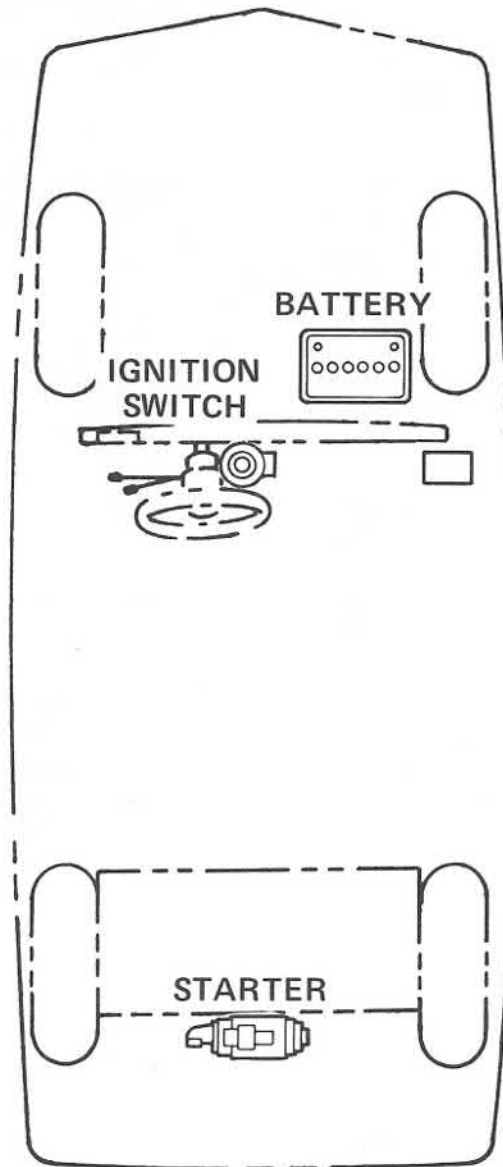


# ELECTRICAL SYSTEM TROUBLESHOOTING

## STARTING SYSTEM

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SECTION	PAGE
Starter Will Not Crank Engine	230
Starter Cranks Slowly	235



# ELECTRICAL SYSTEM TROUBLESHOOTING

## STARTING SYSTEM

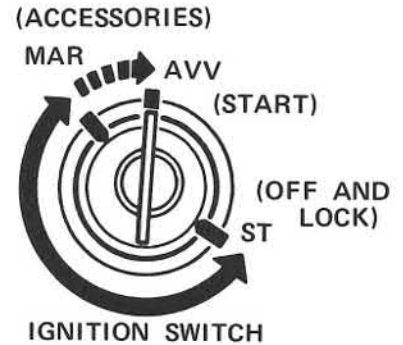
### STARTER WILL NOT START CAR



## STARTING SYSTEM

### STARTER WILL NOT CRANK ENGINE

- 1.a. If starter runs but will not crank engine, starter drive is defective. Repair starter drive.
- b. Turn outer lighting switch on. If headlights do not come on or are dim, troubleshoot headlights.
- c. Turn ignition switch to start. If lights dim slightly, go to step 3.
- d. If lights are very dim or go out, go to step 4.
- e. If lights remain bright, try to start car from outside of car. If starter starts engine, starting procedure or seat belt interlock system faulty.
- f. If starter does not run, go to step 2.

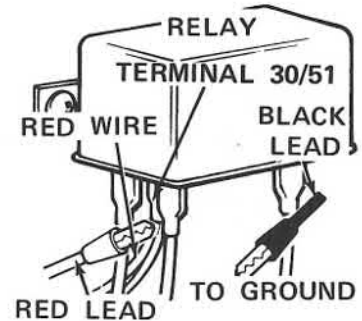


- 2.a. Get voltmeter. Go to interlock relay.

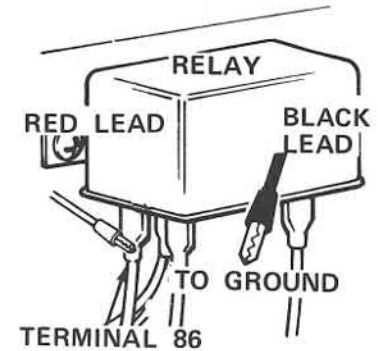
**NOTE**

Interlock relay is mounted under instrument panel above drop tray.

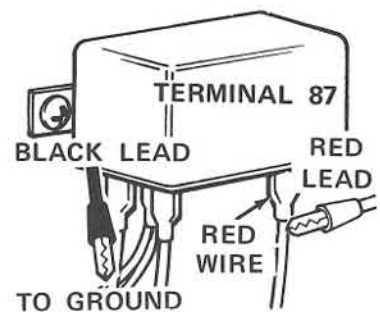
- b. Connect red lead to terminal 30/51 (red wire) of relay. Connect black lead to ground.
- c. Have someone start car. If meter reads less than 8 volts, go to step i.



- d. If meter reads 8 volts or more, get ohmmeter. Connect red lead to terminal 86 (light blue/white wire). Connect black lead to ground.
- e. If meter reads 5 ohms or less, go to step g.
- f. If meter reads more than 5 ohms, troubleshoot seat belt interlock system.



- g. Get voltmeter. Connect red lead of meter to terminal 87 (red wire) of relay. Connect black lead to ground.
- h. Have someone start engine. If meter reads 8 volts or more, go to step o. If meter reads less than 8 volts, check orange/white wire between terminals 30 and 85. If wire is good, replace relay.

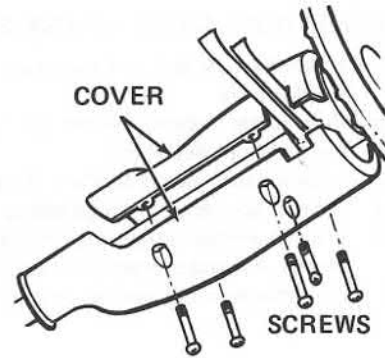


# ELECTRICAL SYSTEM TROUBLESHOOTING

Page 232

## STARTING SYSTEM

- i. Remove 5 screws thru bottom of steering column cover. Remove bottom of cover.

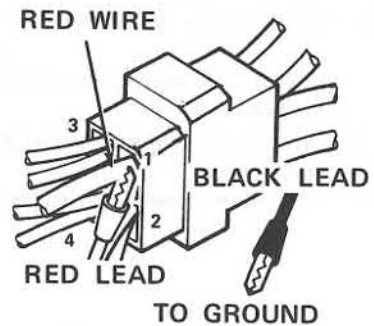


- j. Find connector C12.

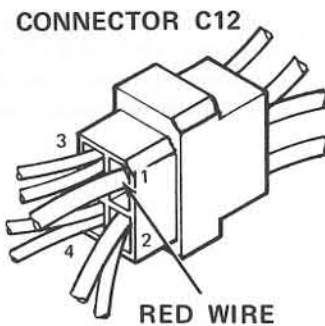
### NOTE

Connector C12 is located on the right side of the steering column. It is a 4 pin black and white connector.

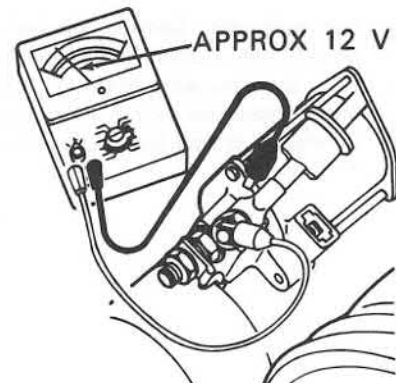
- k. Connect red meter lead to red wire (position 1) to relay in connector C12. Connect black lead to ground.
- l. Turn ignition switch to start. If meter reads 8 volts or more, repair red wire to relay.



- m. If meter reads less than 8 volts, check connector C12 for looseness, dirt, or corrosion. Check red wire (position 1) to ignition switch for breaks. Repair or replace wire or connector.
- n. If wire and connector are good, replace ignition switch.

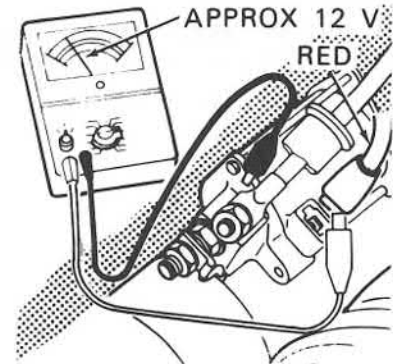


- o. Go to starter. Connect red meter lead to terminal 30 of starter. Connect black lead to ground.
- p. If meter reads less than 8 volts, repair wire to battery.

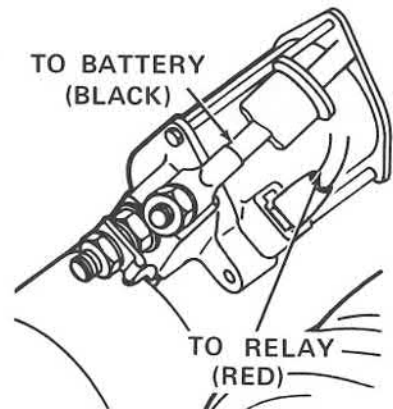


## STARTING SYSTEM

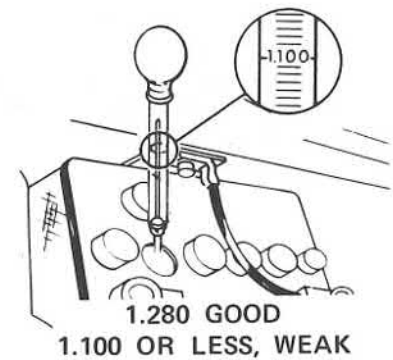
- q. Connect red meter lead to terminal 50 (red wire) of starter. Connect black lead to ground.
- r. Have someone start engine. If meter reads less than 8 volts, repair red wire to relay.



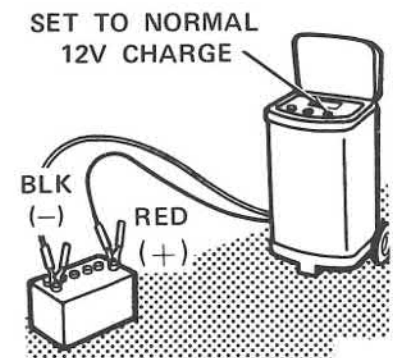
- s. If meter reads 8 volts or more, check connections at starter and solenoid terminals. Remove, clean, and tighten.
- t. Turn ignition switch to start. If starter will not run, replace starter.



- 3.a. Check connections at starter terminals.
- b. Remove, clean, and re-tighten.
- c. Check condition of battery with hydrometer. If specific gravity of any cell is below 1.100, check battery with a carbon pile load. If load test indicates battery is no good, replace it.



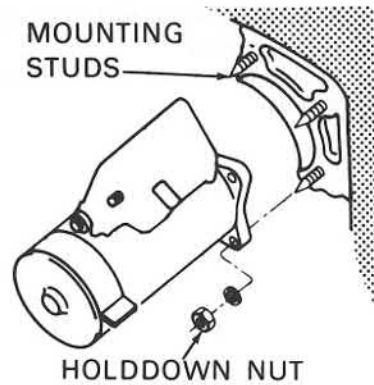
- d. If battery load test indicates a good battery, recharge battery.



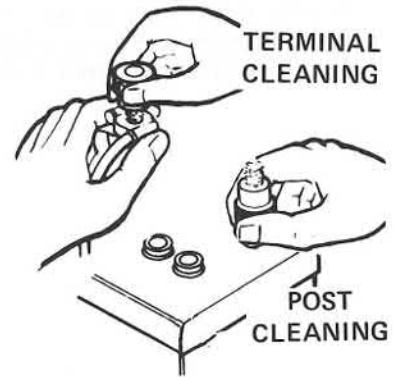
# ELECTRICAL SYSTEM TROUBLESHOOTING

## STARTING SYSTEM

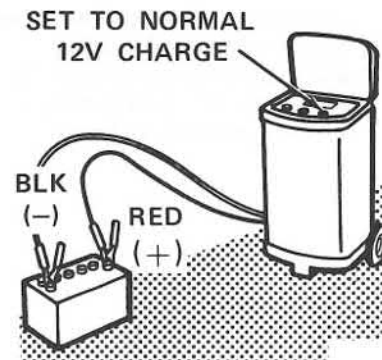
- e. If starter connections are good and battery checks satisfactory, solenoid or starter drive are defective and must be bench checked.



- 4.a. Check battery connections for corrosion or looseness.
  - b. If necessary, clean posts and terminals with a wire bristle brush. Tighten connections.



- c. Check battery condition with hydrometer.
- d. If specific gravity of any cell is below 1.100, check battery with a carbon pile load. If load test indicates battery is not good, replace battery.
- e. If load test indicates battery is good, recharge battery.
- f. If battery and cables check good, starter is possibly shorted internally and must be removed and bench checked.





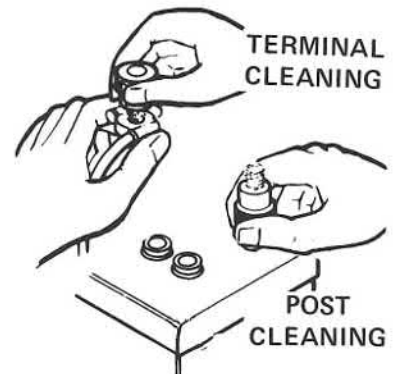
# ELECTRICAL SYSTEM TROUBLESHOOTING

Page 235/236

## STARTING SYSTEM

### STARTER CRANKS SLOWLY

- 1.a. Check battery condition with hydrometer.
- b. Check battery connections for looseness or corrosion.
- c. Recharge battery or clean and retighten connections as required.



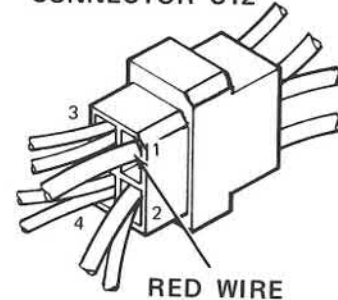
- d. Check connector C12 for dirt, looseness, or corrosion.

#### NOTE

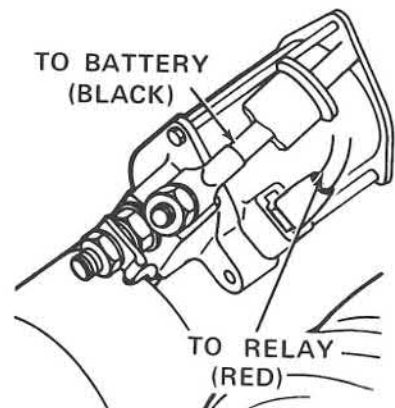
Connector C12 is located on right side of steering column under column cover. It is a 4 pin connector.

- e. Repair or replace connector as necessary.

#### CONNECTOR C12



- f. Check terminals at starter for looseness or corrosion. Clean and reinstall.
- g. If starter continues to crank slowly after each point has been checked and found good, condition may be caused by recently over hauled or tight engine or possibly too heavy an oil in crankcase at temperatures below 40°F.



1. [Illegible text]

2. [Illegible text]

3. [Illegible text]

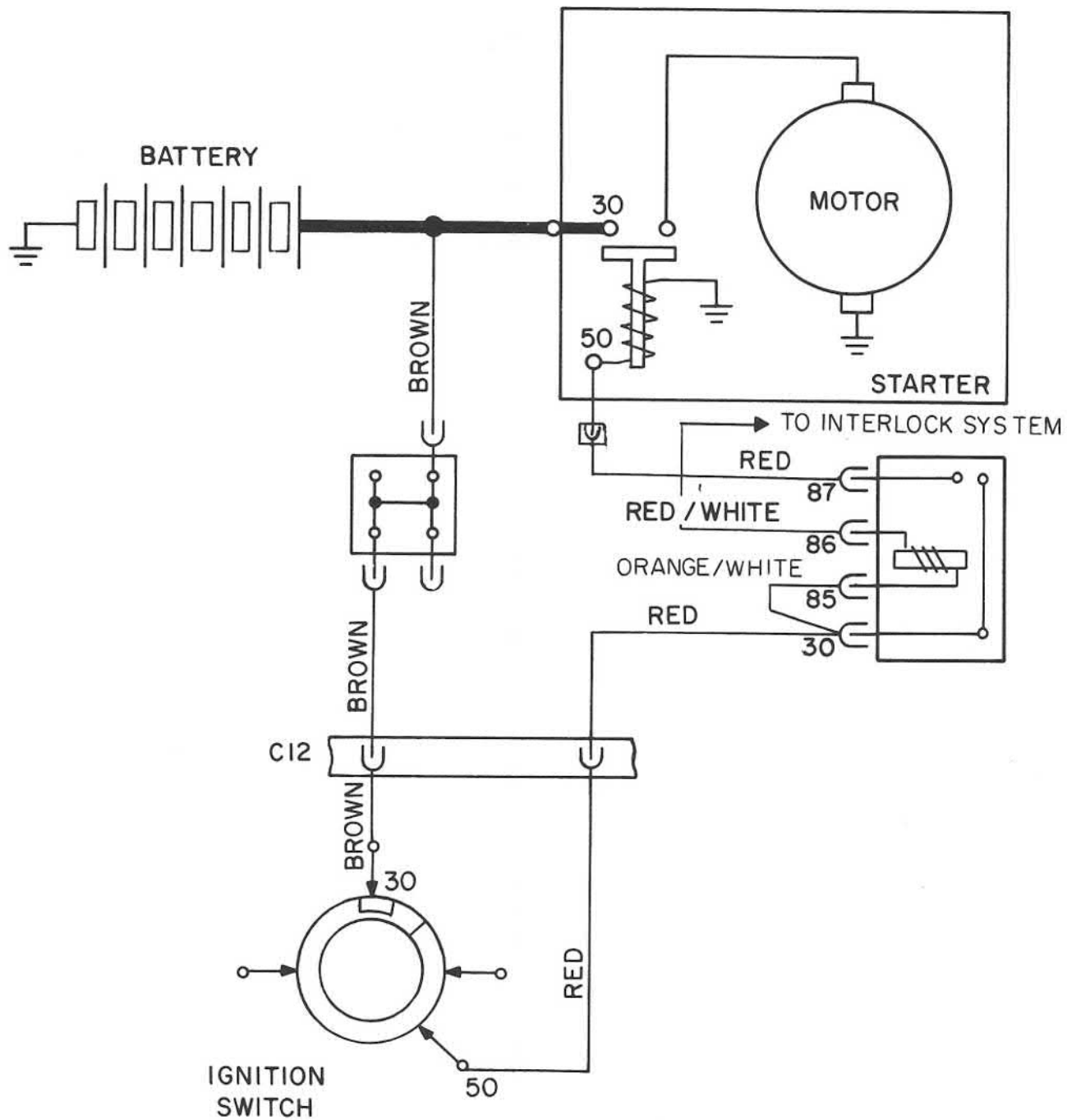
4. [Illegible text]

5. [Illegible text]

6. [Illegible text]

# ELECTRICAL SYSTEM TROUBLESHOOTING

## STARTING SYSTEM



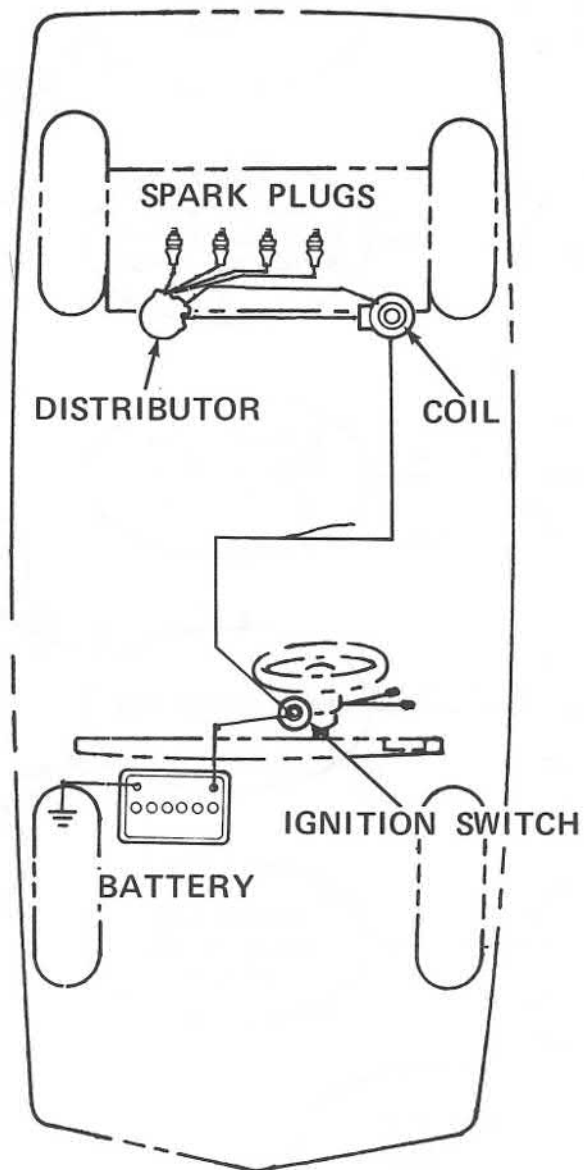


# ELECTRICAL SYSTEM TROUBLESHOOTING

## IGNITION SYSTEM

### TABLE OF CONTENTS

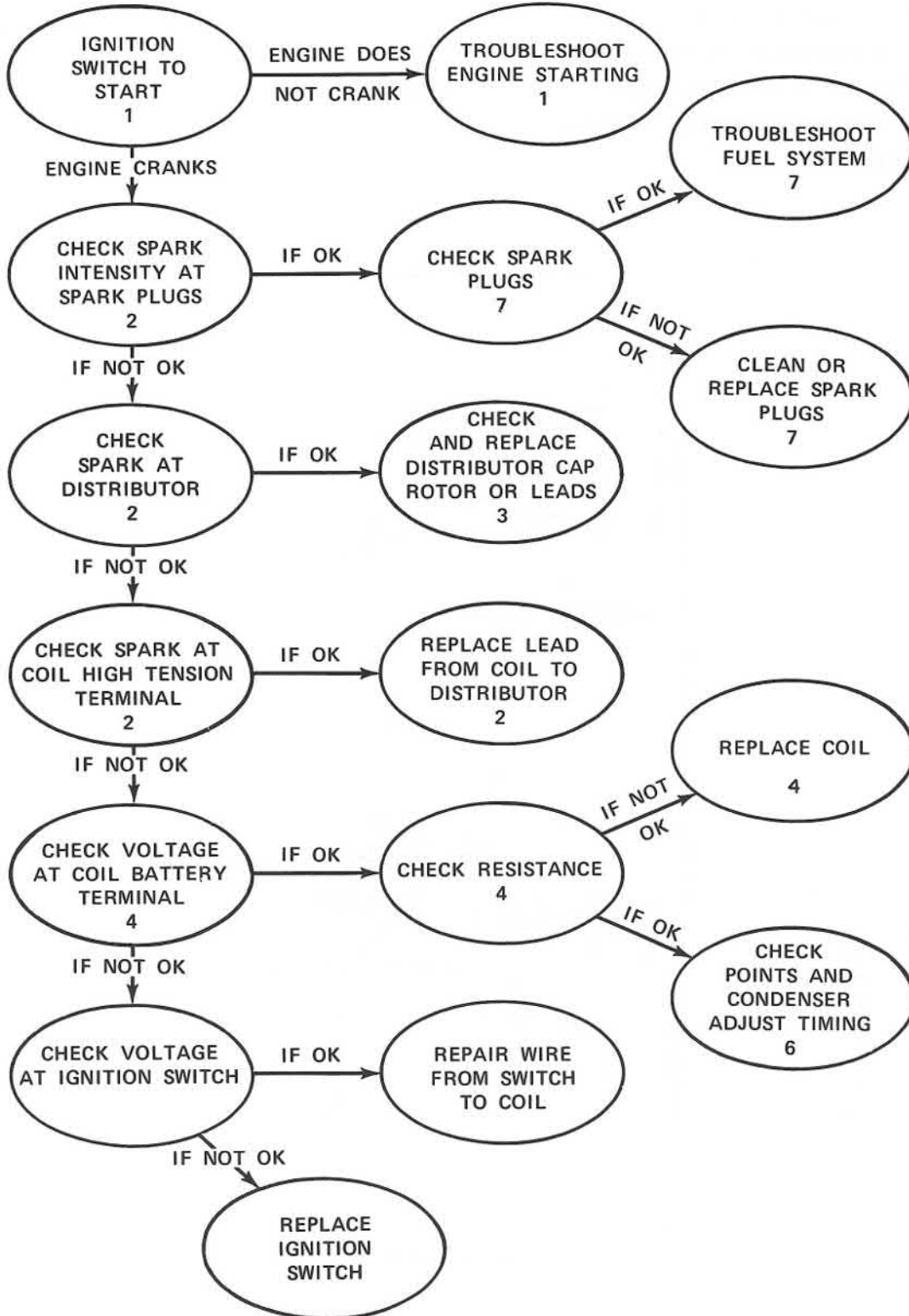
SECTION	PAGE
Engine Will Not Start	240
Engine Misses at Idle (Rough Idle)	247
Engine Runs But Lacks Power Or Misses at High Speeds	250
Timing Ignition With Timing Light	251
Engine Stalls	257



# ELECTRICAL SYSTEM TROUBLESHOOTING

## IGNITION SYSTEM

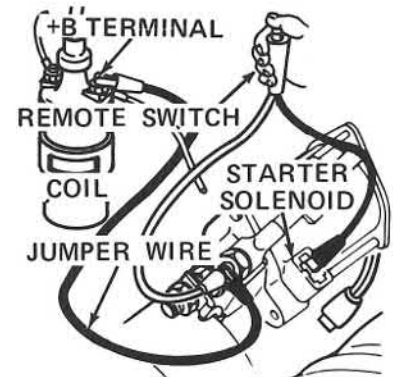
### ENGINE WILL NOT START



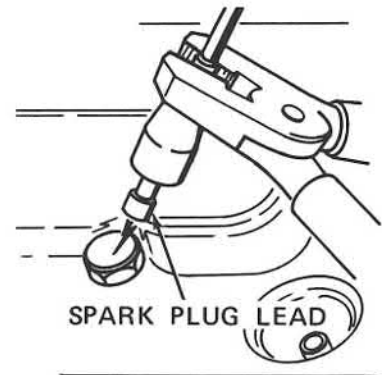
## IGNITION SYSTEM

### ENGINE WILL NOT START

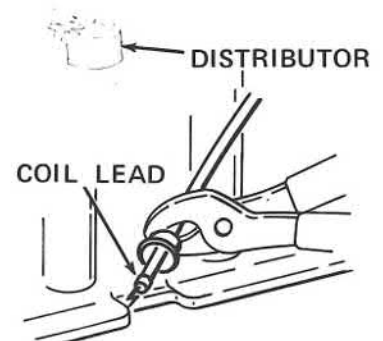
- 1.a. Turn ignition switch to start. If engine will not crank, go to Starting troubleshooting.
- b. If engine cranks, connect a remote starter switch as shown. Turn off ignition switch.



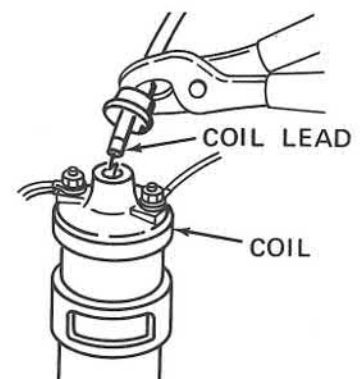
- c. Disconnect lead from a spark plug. Hold lead about 1/2 inch from engine. Use insulated pliers.
- d. Crank engine and check for spark. If spark is strong, troubleshoot fuel system. If there is no spark or it appears weak go to step 2.



- 2.a. Take coil to distributor lead out of distributor.
- b. Hold lead about 1/4 inch from engine. Use insulated pliers.
- c. Crank engine and check for spark. If spark is present, go to step 3.



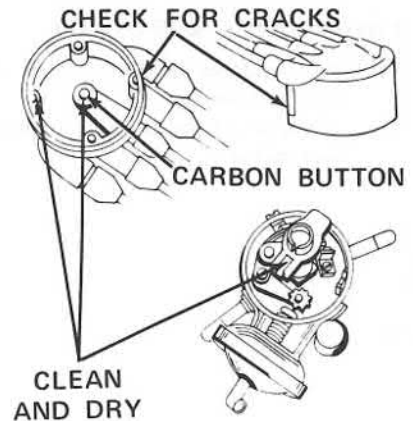
- d. If spark is not present, connect lead to distributor. Disconnect lead from top of coil.
- e. Hold lead about 1/4 inch from terminal on coil. Use insulated pliers.
- f. Crank engine and check for spark. If spark is not present, go to step 4. If spark is strong, replace lead from coil to distributor.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## IGNITION SYSTEM

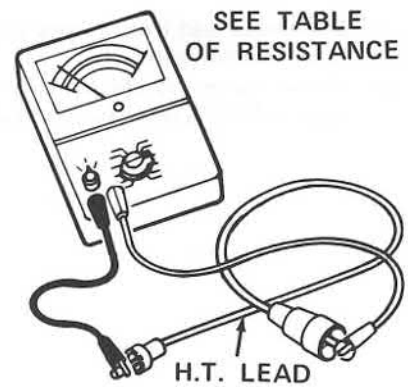
- 3.a. Remove distributor cap.
- b. Check distributor cap for cracks. Check distributor carbon button for defects or corrosion.
- c. Check rotor contacts for defects or corrosion.



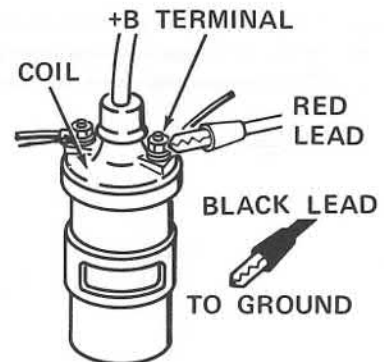
- d. Replace or clean rotor or cap if found faulty. If cap and rotor are good, check resistance of each high tension lead that showed weak or no spark. If resistance is greater than values shown, replace leads.

Lead No.	Resistance (Ohms)
1	450
2	500
3	550
4	750

- e. If leads are good, carefully examine distributor cap sockets for dirt, corrosion, or damaged terminals. Check each end of the high tension lead also.

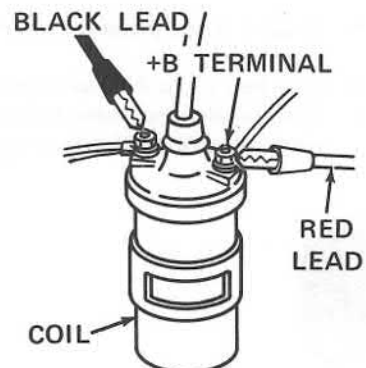


- 4.a. Connect coil lead to top of coil. Disconnect remote starter switch from coil. Turn ignition switch on.
- b. Get voltmeter. Connect red meter lead to +B terminal of coil. Connect black lead to ground.
- c. Crank engine. If meter does not read voltage, go to step 5.



- d. If meter reads voltage, get ohmmeter. Turn ignition switch off.
- e. Connect red meter lead to +B terminal of coil. Connect black lead to distributor side of coil.
- f. Meter should read as follows:

Coil	Resistance (Ohms)
Marelli	3.1 to 3.4
Martinetti	3 to 3.3





# ELECTRICAL SYSTEM TROUBLESHOOTING

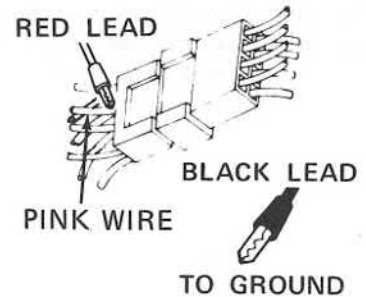
## IGNITION SYSTEM

- 5.a. Get voltmeter. Find connector C14.

### NOTE

Connector C14 is located behind center console. It is an 8 pin connector.

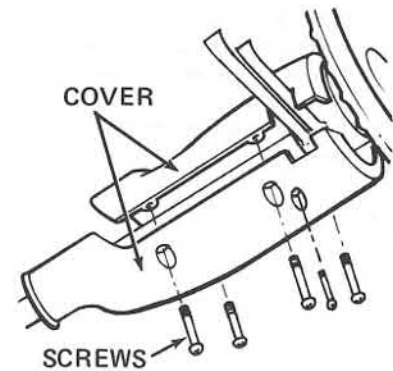
- b. Connect red lead to pink wire from coil. Connect black lead to ground.  
c. If meter reads 8 volts or more, repair pink wire to coil.



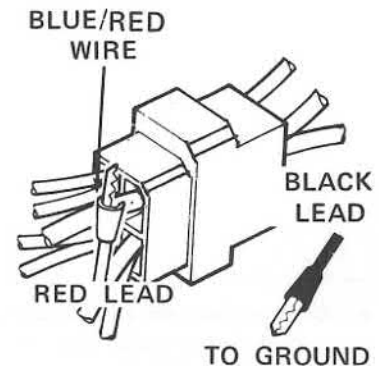
- d. If meter reads less than 8 volts, remove 5 screws thru steering column cover. Remove cover.  
e. Get voltmeter. Find connector C12.

### NOTE

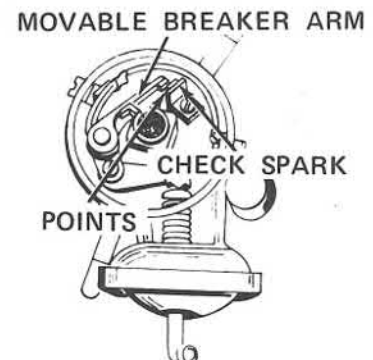
Connector C12 is located on right side of steering column. It is a 4 pin connector.



- f. Connect red meter lead to light blue wire in connector C12. Connect black lead to ground.  
g. If meter reads voltage, repair pink wire from connector C12 to connector C14.  
h. If meter does not read voltage, check light blue/red wire to ignition switch. If wire is good, replace ignition switch.



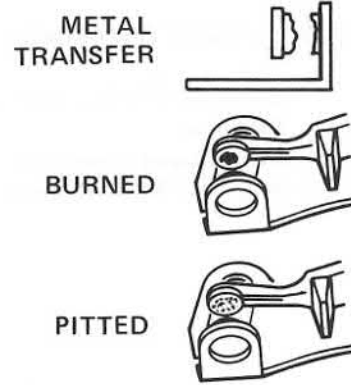
- 6.a. Remove distributor cap and rotor.  
b. With ignition switch on, crank engine with remote starter switch.  
c. Watch points to see if they open and close fully. If points do not open and close fully go to step k.  
d. Check spark at points. If spark is strong, set timing (See ENGINE RUNS BUT LACKS POWER, step 2).  
e. If spark is weak, check condition of moveable breaker arm and rubbing block. If visibly defective, remove and replace points. Be sure all connections are cleaned and tight.



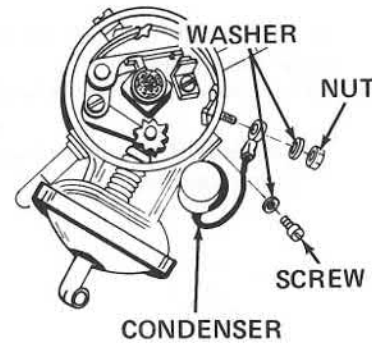
# ELECTRICAL SYSTEM TROUBLESHOOTING

## IGNITION SYSTEM

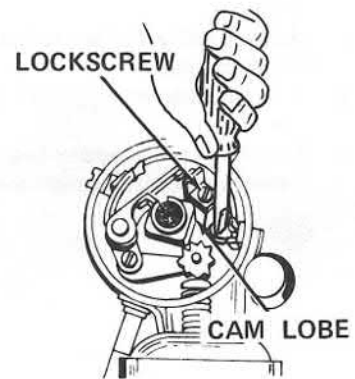
- f. Check face of points for condition. If burned and pitted, replace points.
- g. If material has transferred from one point to the other, condenser is defective and must be replaced.



- h. Make sure condenser lead is not worn or broken. Make sure connection is clean and tight at terminal.
- i. Check black wire from coil to distributor for damage. Replace wire, if necessary.
- j. If wire is good, check points as directed in steps k. thru g. Then set the timing.



- k. Crank engine until rubbing block is at peak of cam lobe.
- l. Loosen breaker plate lockscrew.
- m. Insert screwdriver in adjust slot. Adjust points so gap is 0.015 to 0.017 in. (0.37 to 0.43mm) when checked with feeler gage.
- n. Tighten breaker plate screw. Gap must not change when gage is removed.



## IGNITION SYSTEM

- o. Rotate cam, then recheck gap.
- p. Check distributor shaft for side play (up and down play is normal). If you feel excessive side play, remove distributor for overhaul.

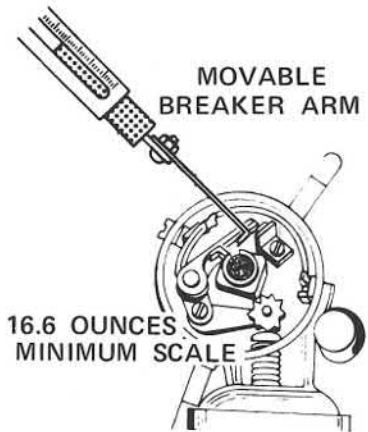
### NOTE

After the car accumulates mileage, the distributor may wear and permit slight side play.



CHECK SIDE PLAY OF DISTRIBUTOR SHAFT

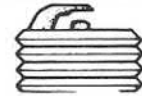
- q. Measure tension of breaker moveable arm. If less than 16.6 ounces, replace breaker points.



MOVABLE BREAKER ARM

16.6 OUNCES MINIMUM SCALE

WORN ELECTRODES  
EXCESS GAP



REPLACE

HEAVY CARBON



CLEAN AND REPLACE

ASH WHITE



TOO HOT  
IMPROPER TYPE

HEAVY CARBON



CLEAN AND REPLACE

OILY



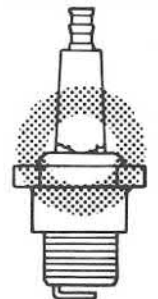
CHECK ENGINE

- 7.a. Remove spark plugs. Check condition.
- b. Clean or replace plugs, if necessary.

SHORTING AT ELECTRODE



CRACKED INSULATOR

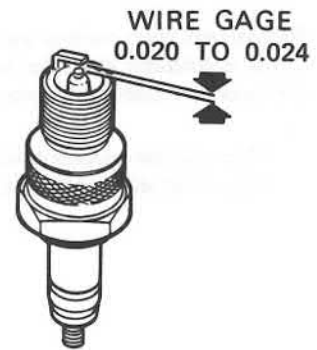


# ELECTRICAL SYSTEM TROUBLESHOOTING

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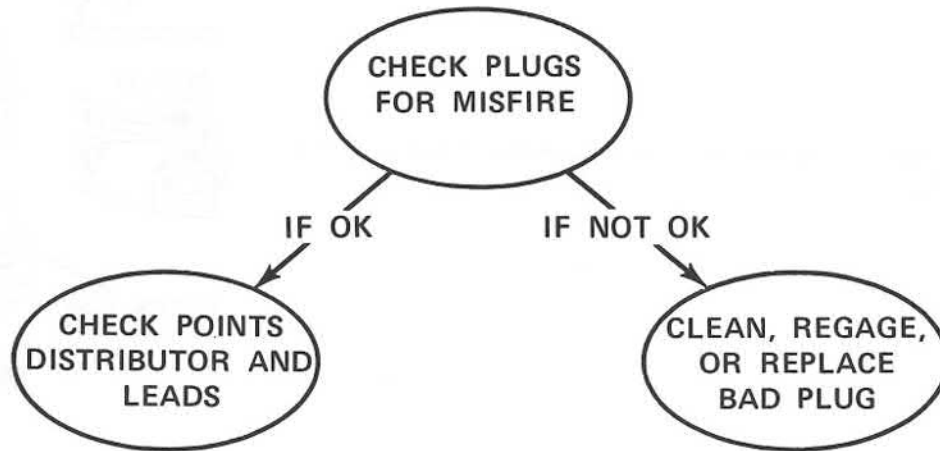
## IGNITION SYSTEM

- c. Check gap. Reset gap, if necessary.
- d. Reinstall plugs. Connect leads.
- e. If plugs were good or if engine still will not start, troubleshoot fuel system.

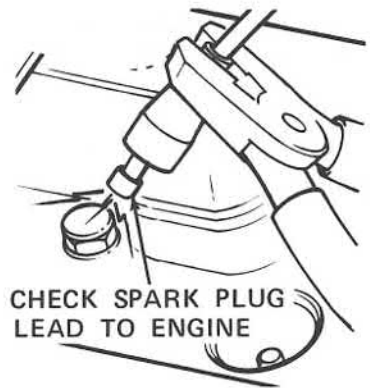


## IGNITION SYSTEM

### ENGINE MISSES AT IDLE (ROUGH IDLE)



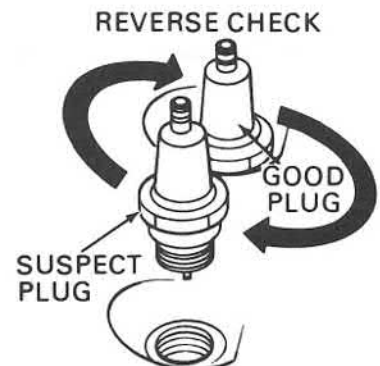
- 1.a. Short or remove one spark plug lead at a time to locate misfiring cylinder.
- b. If misfiring cylinder is located, turn ignition switch off and go to step c. If misfiring cylinder is not located, go to step 2.



#### NOTE

Misfiring is detected by no change in the idle RPM when lead is shorted or removed.

- c. Remove plug. Check plug for dirt, damage, and gap. If plug is good, go to step d. If plug is not good, clean, gap or replace plug.
- d. Remove plug from firing cylinder. Reverse plugs and reinstall.
- e. Start engine. See if misfiring is in cylinder with suspect plug by repeating shorting in step 1.a.
- f. If so, replace with new plug.

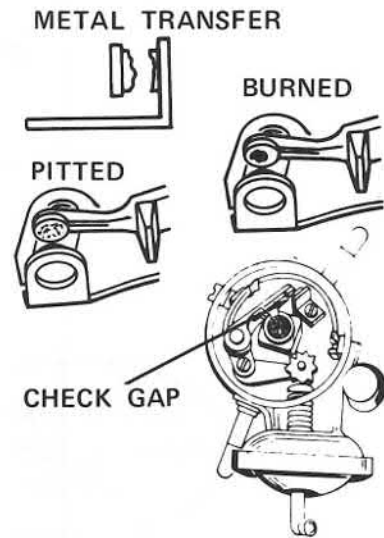


# ELECTRICAL SYSTEM TROUBLESHOOTING

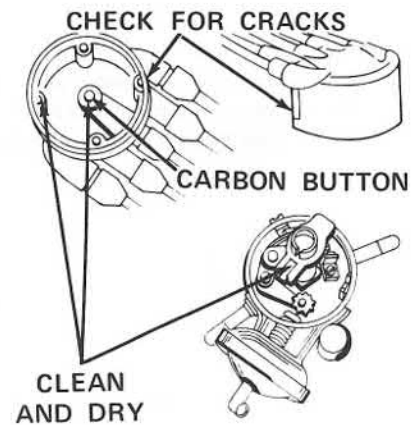
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## IGNITION SYSTEM

- 2.a. If misfiring can not be located, remove distributor cap. Check points for burning, pitting or improper gap.



- b. If point condition and gap are good, check spark plug leads, distributor cap, and rotor for defects. Replace any defective part.



- c. If leads, cap, and rotor are good, check for side play in distributor shaft. Remove distributor for overhaul or replacement if excessive play is detected.

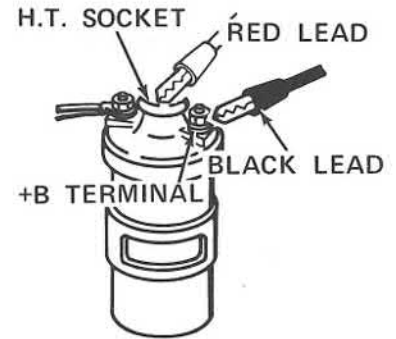


# ELECTRICAL SYSTEM TROUBLESHOOTING

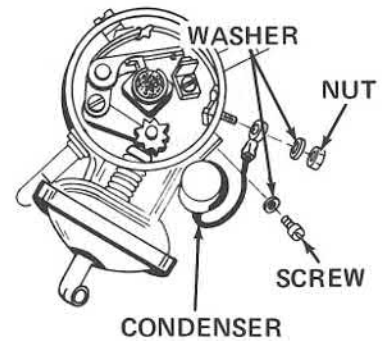
## IGNITION SYSTEM

- d. If distributor is not defective, check coil for proper secondary resistance. Make sure ignition switch is off.
- e. Disconnect high tension lead from top of coil. Disconnect light blue/red wire from +B terminal of coil.
- f. Connect red meter lead to top of coil. Connect black lead to +B terminal of coil. Resistance should be as follows:

Coil	Resistance (Ohms)
Marelli	5,670 to 6,930
Martinetti	6,500 to 8,000



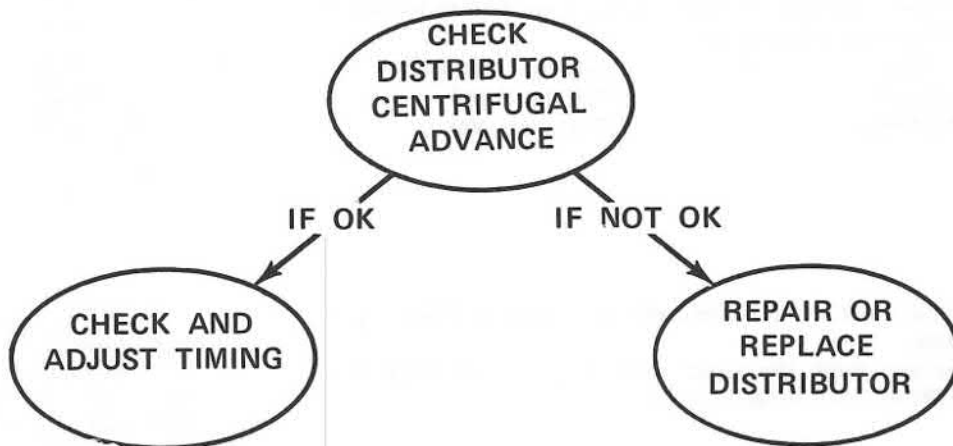
- g. If coil resistance is not within range specified, replace it. If test is good, replace condenser.
- h. Restart engine and check idle speed. If missing is still apparent, go to FUEL SYSTEM OR COMPRESSION CHECK.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## IGNITION SYSTEM

### ENGINE RUNS BUT LACKS POWER OR MISSES AT HIGH SPEED



- 1.a. Remove distributor cap. Check movement of centrifugal advance. Be sure advance mechanism is free to move without binding.
- b. Check that mechanism returns to original position when hand pressure is removed. If advance operates normal, go to step 2.
- c. If advance does not return, check springs. Connect or replace damaged or disconnected springs. Check return operation.
- d. If springs appear good, remove them. Move mechanism by hand and check for binding. If binding is felt, distributor must be replaced.

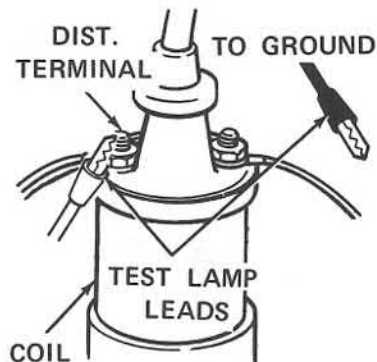
#### NOTE

When replacing distributor, be sure to note position of rotor before removal. New distributor must be installed in exact same position. Check timing after installing distributor.



CHECK SIDE PLAY OF DISTRIBUTOR SHAFT

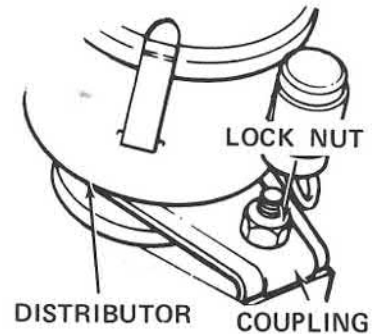
- 2.a. If advance operates normally, proceed with timing.
- b. Connect a test lamp to coil distributor terminal and ground. Remove distributor cap.
- c. Turn ignition switch on.





## IGNITION SYSTEM

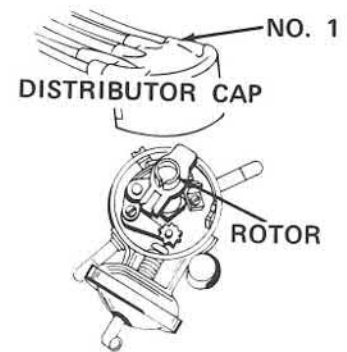
- d. Turn crankshaft by hand until timing mark on drive pulley is at position near mark on timing cover. Loosen distributor lock nut.



### NOTE

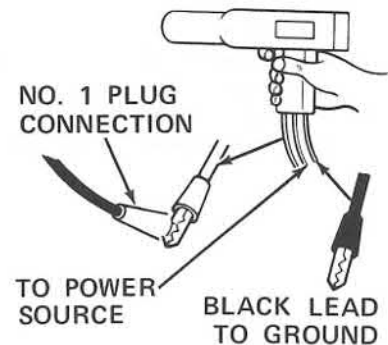
Rotor should be about in No. 1 firing position. Make sure No. 1 piston is on the firing stroke.

- e. Rotate distributor by hand until test light comes on. This corresponds to points opening. Repeat several times until the exact point at which points just start to open is sure.
- f. Tighten distributor lock nut.
- g. Be careful not to move distributor while tightening lock nut on coupling of crankcase. If point gap was set properly, ignition should be timed at this point.
- h. Reinstall plug and lead.
- i. Reinstall distributor cap.

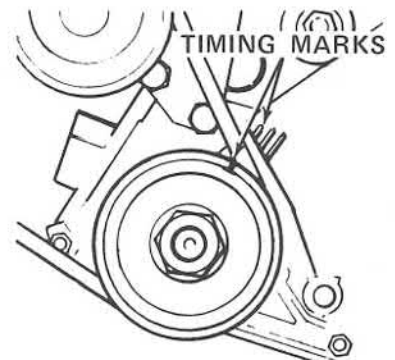


## TIMING IGNITION WITH TIMING LIGHT

- 1.a. Slide No. 1 spark plug lead cover back on lead.
- b. Connect one lead of timing light to No. 1 spark plug.
- c. Connect black lead to ground.
- d. Connect red lead to power source.



- e. Apply chalk or other whitener to marks on drive pulley and timing gear cover.

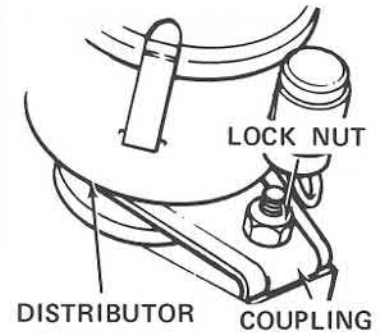


# ELECTRICAL SYSTEM TROUBLESHOOTING

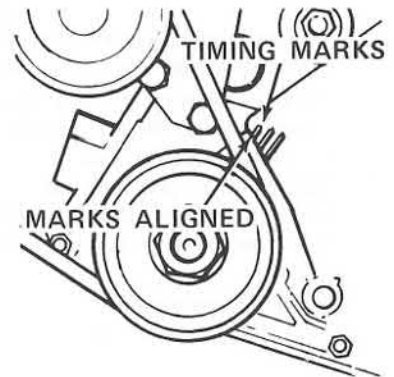
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## IGNITION SYSTEM

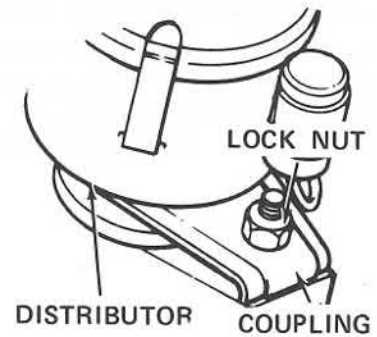
- f. Loosen nut on clamp for distributor at crankcase.



- g. Start engine. Allow engine to idle at 850 RPM. Aim timing light beam at drive pulley.  
h. If ignition is properly timed, marks on pulley and cover shall appear in line.

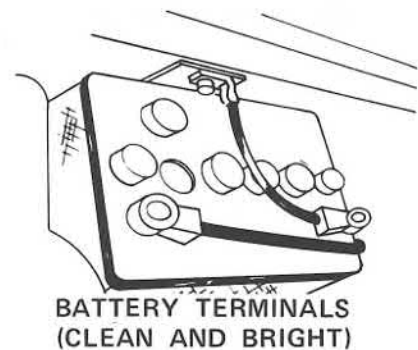


- i. If marks are not in line, turn distributor body until alignment is good.  
j. Tighten nut on clamp for distributor on crankcase. Recheck timing after tightening.  
k. If engine still lacks power or misses at high speed, check CARBURETION AND FUEL SUPPLY or go to ENGINE MISSES AT IDLE.



## ENGINE STALLS

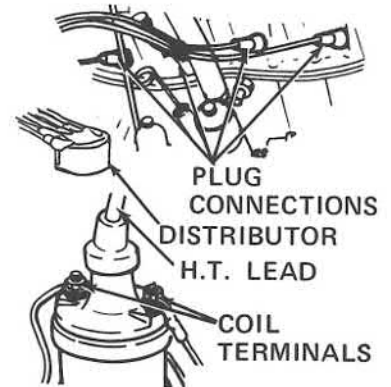
- 1.a. Check battery terminals for looseness or corrosion. Clean to bright condition and tighten.



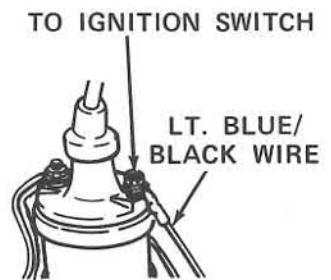
# ELECTRICAL SYSTEM TROUBLESHOOTING

## IGNITION SYSTEM

- b. Check connections of all high tension leads for good connections. Remove corrosion, dirt, or moisture. Replace if defective.



- c. Check primary wire to ignition switch. Wire to coil must not be bare at any point.
- d. If condition still occurs, check CARBURETION or COMPRESSION. If these are good, repeat procedures under ENGINE WILL NOT START.



PHILOSOPHY

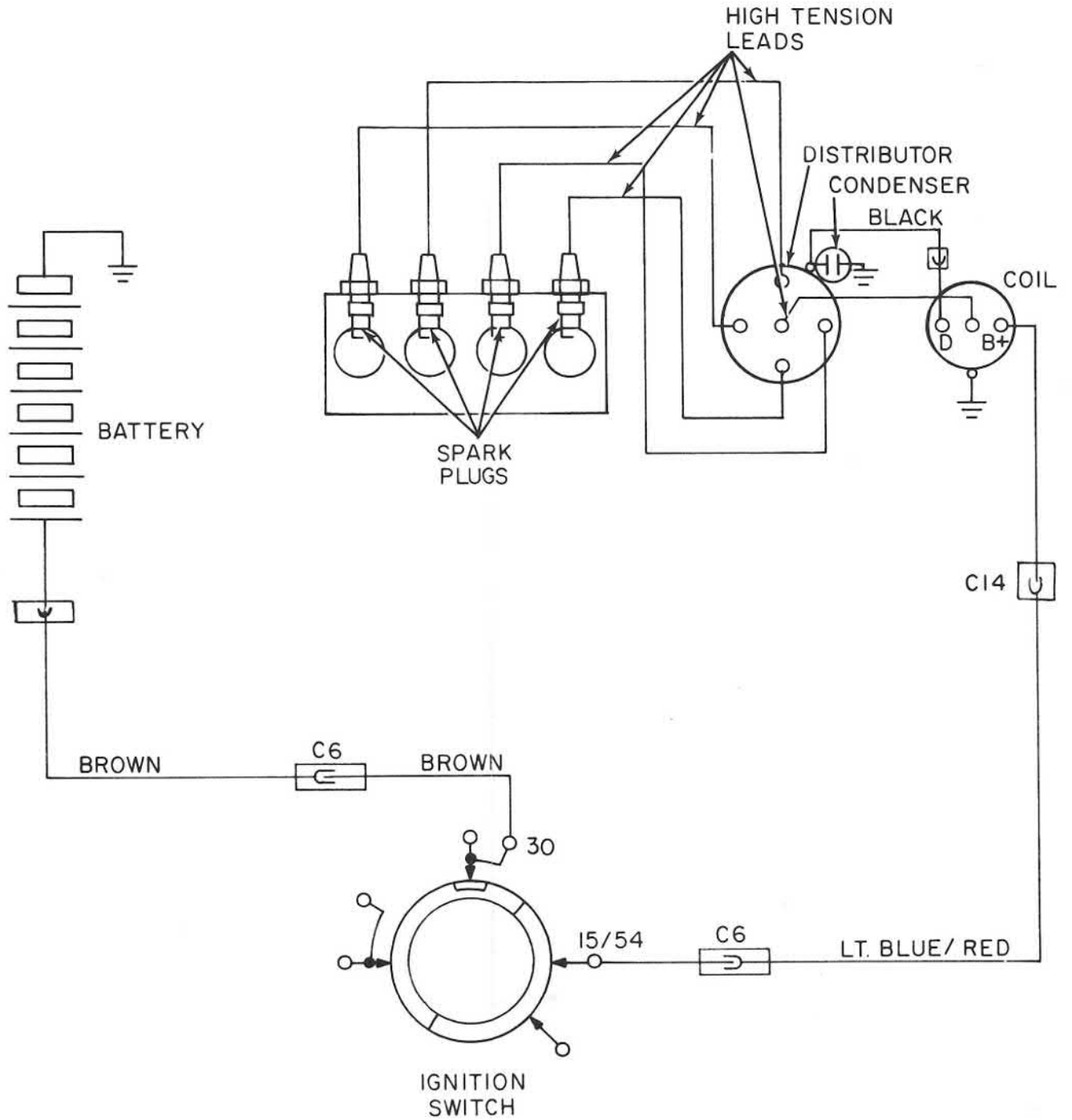
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# ELECTRICAL SYSTEM TROUBLESHOOTING

## IGNITION SYSTEM



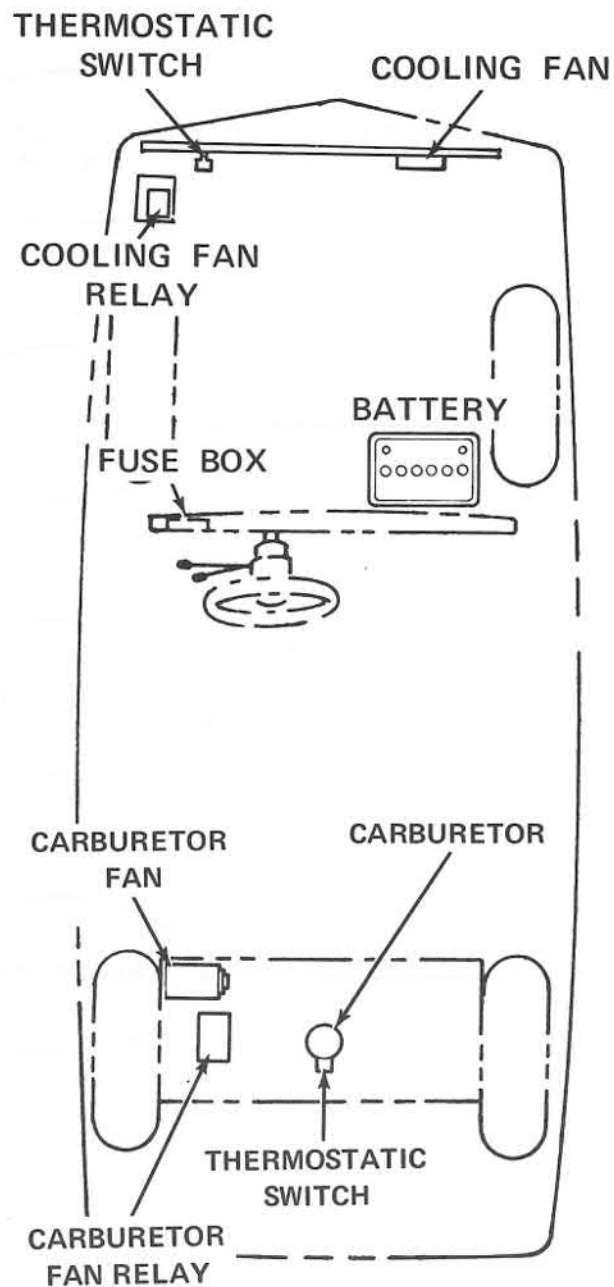


# ELECTRICAL SYSTEM TROUBLESHOOTING

## RADIATOR AND CARBURETOR COOLING SYSTEMS

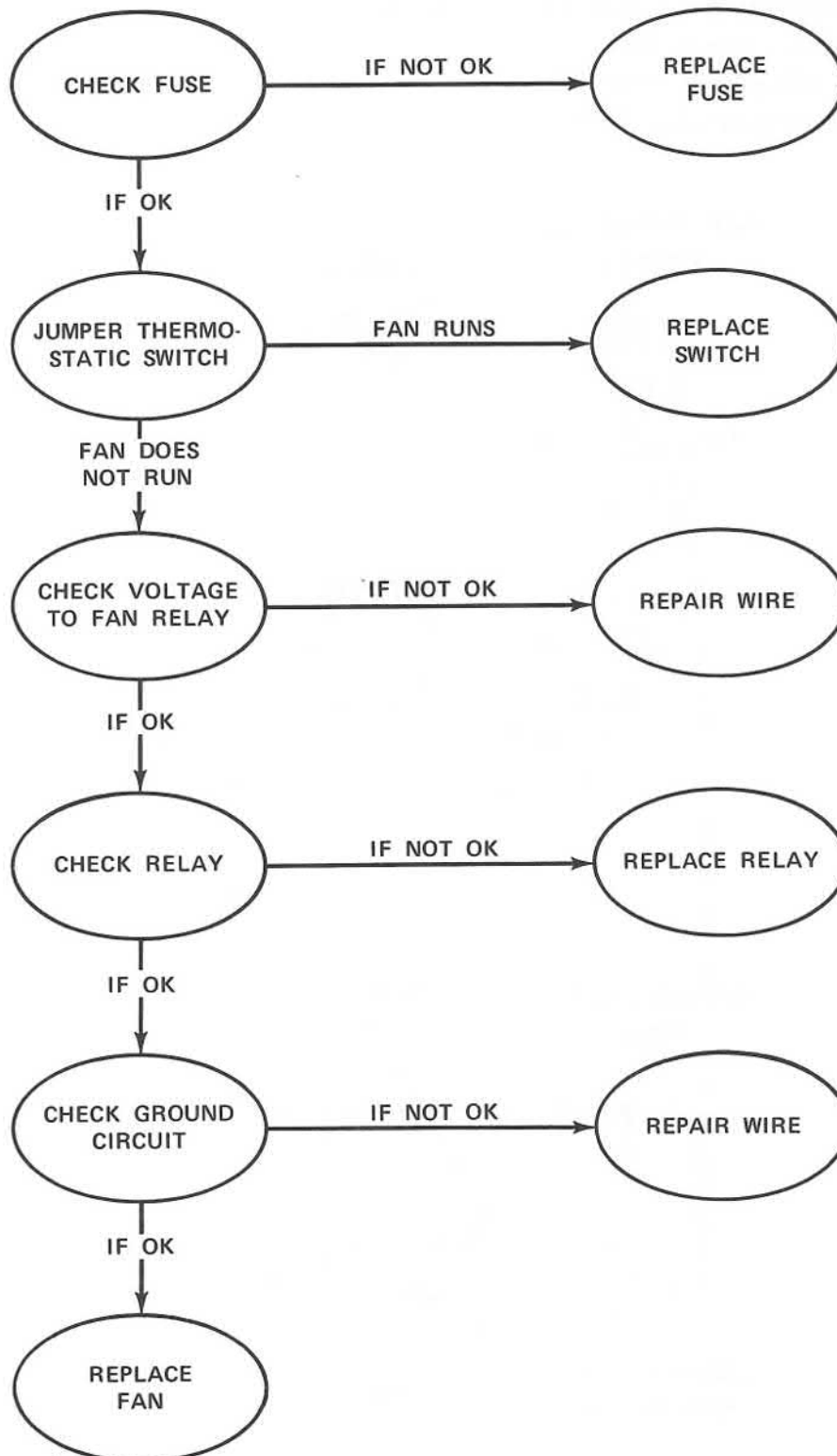
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Radiator Cooling Fan Runs All The Time	260
Carburetor Cooling Fan Will Not Run	261
Carburetor Cooling Fan Runs All The Time	262



# ELECTRICAL SYSTEM TROUBLESHOOTING

## RADIATOR AND CARBURETOR COOLING SYSTEMS





## RADIATOR AND CARBURETOR COOLING SYSTEMS

### ENGINE OVERHEATS—RADIATOR COOLING FAN WILL NOT RUN

- 1.a. Blow horn. If horn blows, go to step b. If horn will not blow, go to HORN troubleshooting and check fuse L.
- b. Turn ignition switch on. Check battery charge indicator. If indicator is on, go to step c. If indicator is out with engine not running, troubleshoot CHARGING SYSTEM.
- c. Go to thermostatic switch in radiator. Get jumper.

**CAUTION**

In next step, if switch is bad, fan will run. Keep clear of fan.

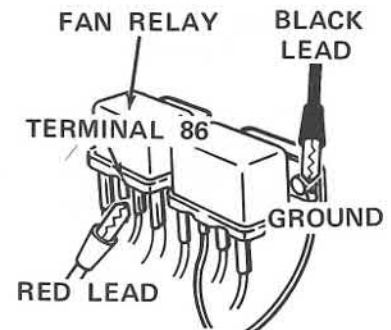
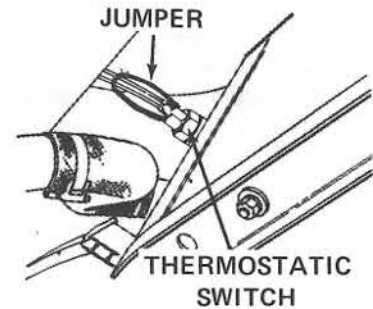
- d. Connect jumper to terminals on switch. If fan runs, replace switch. If fan does not run, go to step e. Leave jumper on switch.

- e. Get voltmeter. Connect red meter lead to terminal 86 (light blue/black wire) of cooling fan relay. Connect black lead to ground.

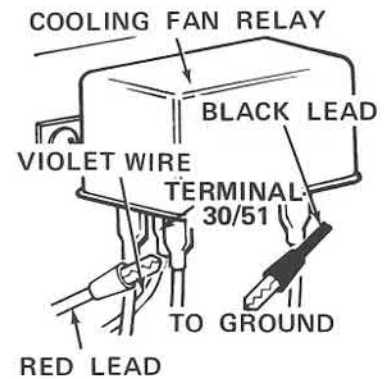
**NOTE**

Cooling fan relay is mounted in compartment for left headlight motor. It is the forward relay.

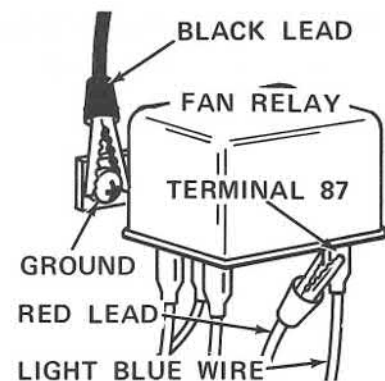
- f. If meter reads voltage, go to step 2. If meter does not read voltage, repair light blue/black wire from relay to connector C7.



- 2.a. Connect red meter lead to terminal 30/51 (violet wire) of relay. Connect black lead to ground.
- b. If meter reads voltage, go to step c. If meter does not read voltage, repair violet wire from relay to fuse box.



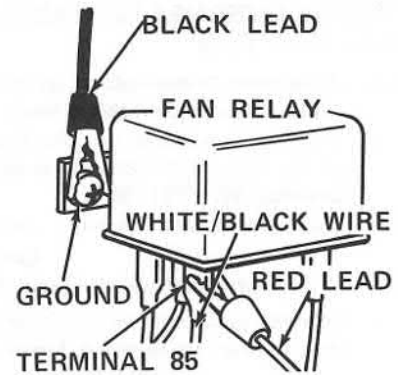
- c. Connect red meter lead to terminal 87 (light blue wire) of relay. Connect black lead to ground.
- d. If meter reads voltage, go to step h. If meter does not read voltage, get ohmmeter.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## RADIATOR AND CARBURETOR COOLING SYSTEMS

- e. Connect red meter lead to terminal 85 (white/black wire) of relay. Connect black lead to ground.
- f. If meter reads more than 5 ohms, go to step g. If meter reads 5 ohms or less replace relay.
- g. If meter reads more than 5 ohms, check white/black wire from relay to thermostatic switch. Check black wire from switch to ground. Repair wire.

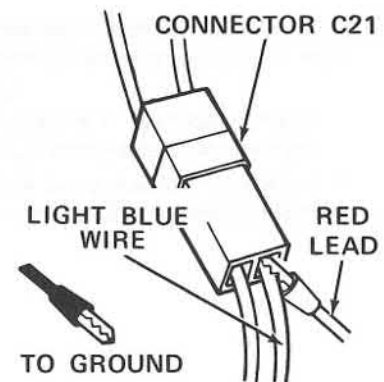


- h. Find connector C21. Connect red meter lead to light blue wire. Connect black lead to ground.

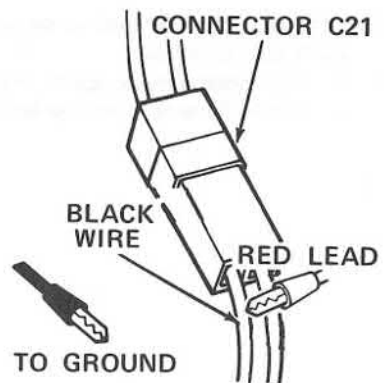
### NOTE

Connector C21 is a 2 pin connector. It is located above the cooling fan.

- i. If meter reads voltage, go to step j. If meter does not read voltage, repair light blue wire from connector C21 to relay.

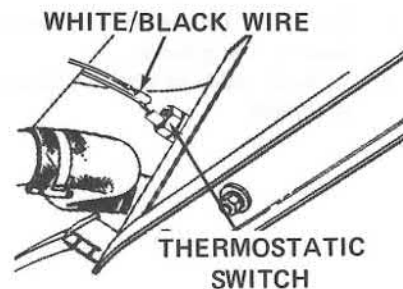


- j. Get ohmmeter. Connect red lead to black wire in connector C21. Connect black lead to ground.
- k. If meter reads more than 5 ohms, repair black lead to ground.
- l. If meter reads 5 ohms or less, check wires to fan for defects. Repair wires or replace fan.



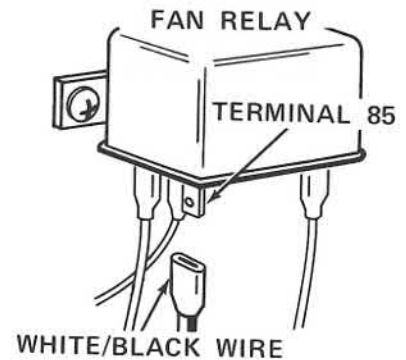
## RADIATOR COOLING FAN RUNS ALL THE TIME

- 1.a. Disconnect white/black wire from thermostatic switch. If fan stops, replace switch.
- b. If fan still runs, go to fan relay.



## RADIATOR AND CARBURETOR COOLING SYSTEMS

- c. Disconnect white/black wire from terminal 85 of cooling fan relay. If fan still runs, replace relay.
- d. If fan stops, repair white/black wire from relay to switch.



### CARBURETOR COOLING FAN WILL NOT RUN

- 1.a. Turn courtesy light on. If light works, go to step b. If light won't work, troubleshoot COURTESY LIGHT.
- b. Get jumper. Go to thermostatic switch.

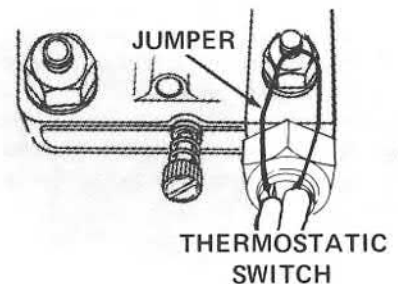
#### NOTE

Thermostatic switch is located on rear of carburetor.

#### CAUTION

In next step, if switch is bad, fan will run. Keep clear of fan.

- c. Connect jumper to terminals on switch. If fan runs, replace switch. If fan does not run, go to step d. Leave jumper on switch.

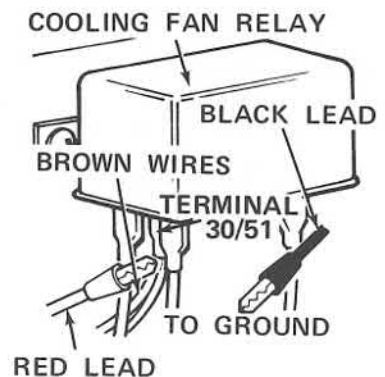


- d. Get voltmeter. Connect red meter lead to terminal 30/51 (brown wire) of carburetor cooling fan. Connect black lead to ground.

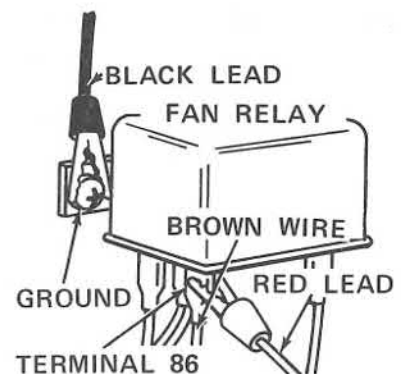
#### NOTE

The relay for the cooling fan is located on support for carburetor cooling fan.

- e. If meter reads voltage, go to step 3. If meter does not read voltage, repair brown wire to fuse box.



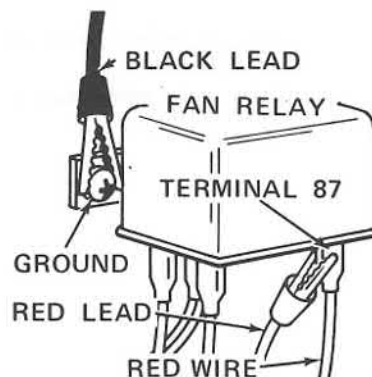
- 2.a. Connect red meter lead to terminal 86 (brown wire) of relay. Connect black lead to ground.
- b. If meter reads voltage, go to step c. If meter does not read voltage, repair brown wire between terminals 86 and 30/51.



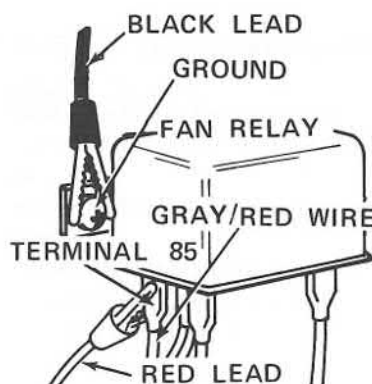
# ELECTRICAL SYSTEM TROUBLESHOOTING

## RADIATOR AND CARBURETOR COOLING SYSTEMS

- c. Connect red meter lead to terminal 87 (red wire) of relay. Connect black lead to ground.
- d. If meter reads voltage, go to step e. If meter does not read voltage, go to step 3.



- e. Get ohmmeter. Connect red lead to terminal 85 (gray/red wire) of relay. Connect black lead to ground.
- f. If meter reads more than 5 ohms, go to step g. If meter reads 5 ohms or less, replace relay.
- g. If meter reads more than 5 ohms, check gray/red wire from relay to thermostatic switch. Check white/black wire from switch to ground. Check ground terminal. Repair wire or ground connection.

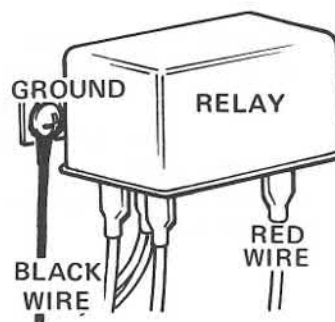


- 3.a. Go to fan motor. Check red wire from fan to relay for defects. If wire is damaged, repair wire.
- b. Check black wire from fan to ground. If wire is damaged repair wire.

### NOTE

Wire is grounded at relay mount.

- c. Check ground terminal for dirt, corrosion, or looseness. Clean and tighten ground terminal. Repair ground wire.
- d. If wires and ground terminal are good, replace fan motor.

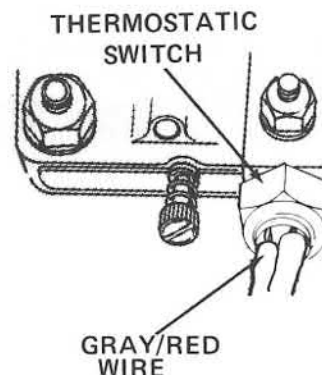


## CARBURETOR COOLING FAN RUNS ALL THE TIME

### NOTE

The carburetor cooling fan will run after the engine is shut off, even with the ignition key removed. This is normal.

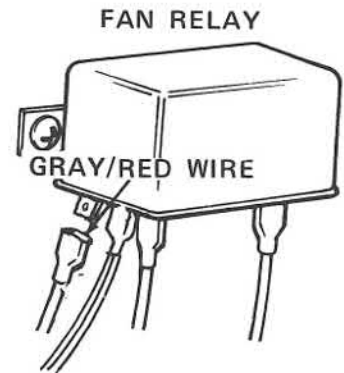
- 1.a. Disconnect gray/red wire from thermostatic switch. If fan stops replace switch.
- b. If fan still runs, go to carburetor cooling fan relay.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## RADIATOR AND CARBURETOR COOLING SYSTEMS

- c. Disconnect gray/red wire from terminal 85 of relay. If fan still runs, replace relay.
- d. If fan stops, repair gray/red wire from relay to switch.



THE UNIVERSITY OF CHICAGO

PHILOSOPHY DEPARTMENT

PHILOSOPHY 101

LECTURE 1

Introduction to Philosophy

The purpose of this course is to introduce you to the basic concepts and methods of philosophy.

We will explore the history of philosophy and the work of major philosophers.

The course will cover the following topics:

1. The nature of philosophy

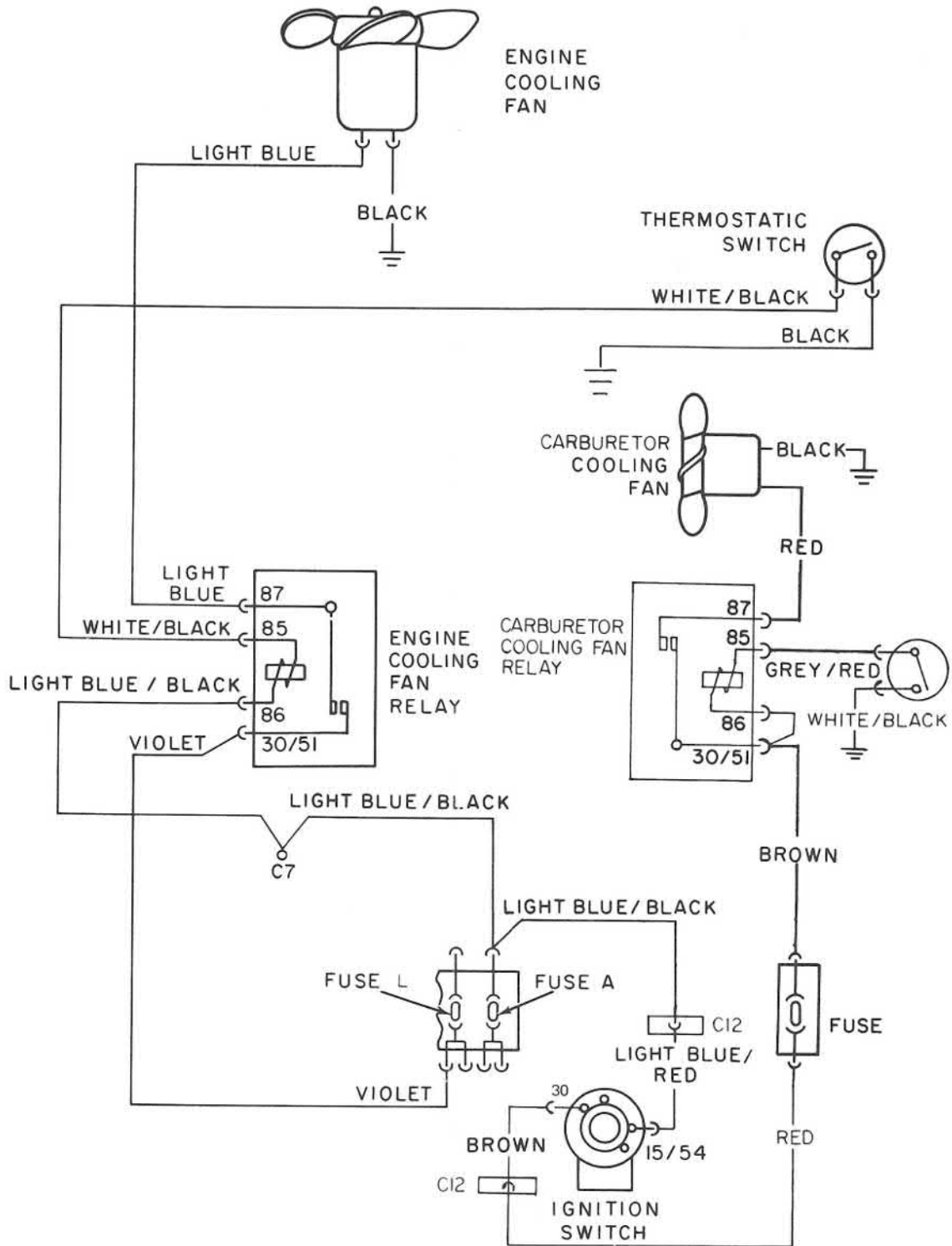
2. The history of philosophy

3. The work of major philosophers

4. The methods of philosophy

# ELECTRICAL SYSTEM TROUBLESHOOTING

## RADIATOR AND CARBURETOR COOLING SYSTEMS





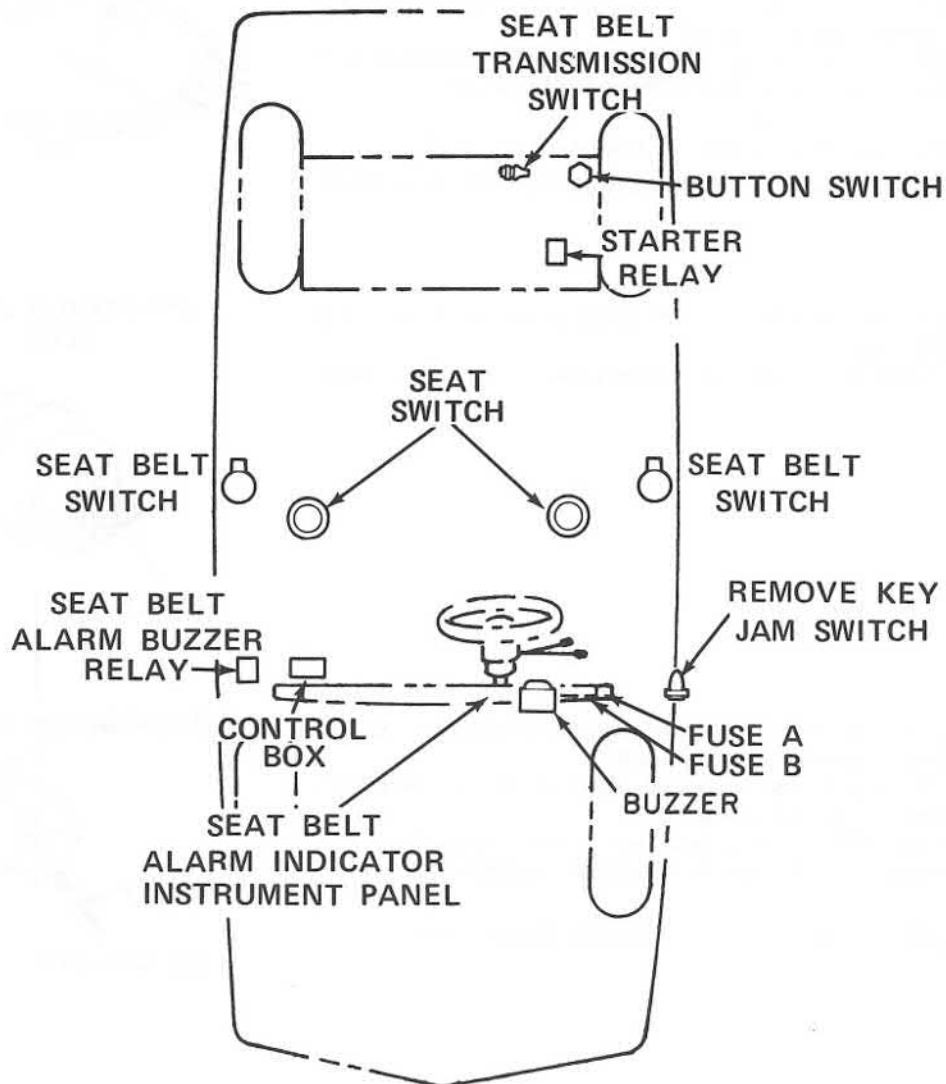


# ELECTRICAL SYSTEM TROUBLESHOOTING

## SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM

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# ELECTRICAL SYSTEM TROUBLESHOOTING

## SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM

### SEAT BELT INTERLOCK SYSTEM

#### NOTE

Before troubleshooting the interlock system, perform the checkout in the Shop Manual using either the test box or volt/ohm meter. When a fault is found leave test equipment connected.

### DRIVER'S SEAT CIRCUIT FAULTY

- 1.a. If meter did not read 0 ohms or test box light is out with someone in seat, go to step 2.
- b. If meter did not read infinity ( $\infty$ ) or test light is on with seat empty, disconnect connector under driver's seat.
- c. If meter reads 0 ohms or test light remains on, repair yellow/black wire from connector under seat to connector C9 and to connector C17.

#### NOTE

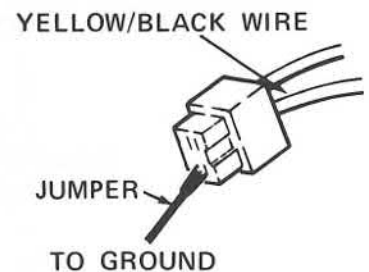
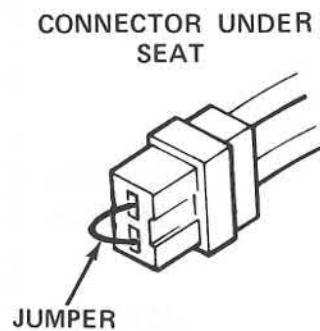
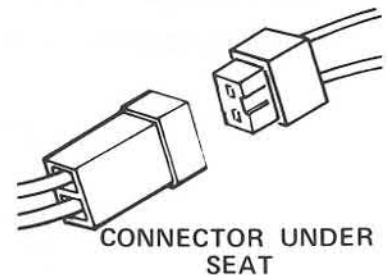
Connector C9 is a 6 pin connector. It is behind center console.

- d. If meter reads infinity or test light goes out, replace switch in driver's seat.
- 
- 2.a. Disconnect connector under driver's seat. Using jumper wire, connect 2 wires in connector together.
  - b. If meter reads 0 ohms or test light comes on, replace switch in driver's seat.

- c. If meter reads infinity ( $\infty$ ) or light is still out, connect jumper wire to yellow/black wire in connector and to ground.
- d. If meter reads 0 ohms or light comes on, repair black/violet wire from connector to ground or ground connection.
- e. If meter still reads infinity or light remains out, repair yellow/black wire from connector under seat to connector C9 and to connector C17.

#### NOTE

Connector C9 is a 6 pin connector. It is located behind center console.



## SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM

### DRIVER'S SEAT BELT CIRCUIT FAULTY

- 1.a. If meter did not read infinity or test light is on with seat belt pulled out, go to step 2.
- b. If meter did not read 0 ohms or test light is out with belt retracted, disconnect connector under rug behind driver's seat.
- c. Using jumper wire, connect wire from control box to ground. If meter reads 0 ohms or light comes on, replace switch in seat belt.
- d. If meter reads infinity or light remains out, repair pink/yellow wire from connector to connector C9 and to connector C17.

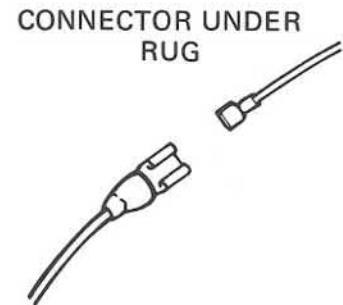
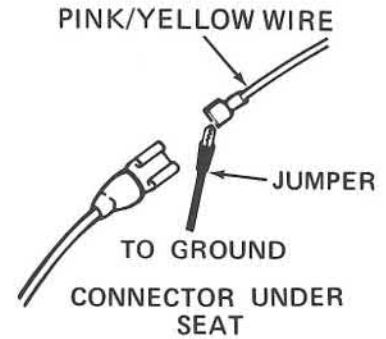
#### NOTE

Connector C9 is a 6 pin connector. It is behind the center console.

- 2.a. Disconnect connector under rug behind driver's seat. If meter reads 0 ohms or light remains on, repair pink/yellow wire to connector C9 and to connector C17.

#### NOTE

Connector C9 is a 6 pin connector. It is behind center console.



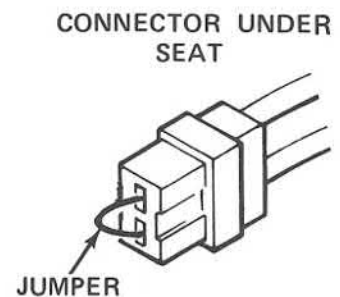
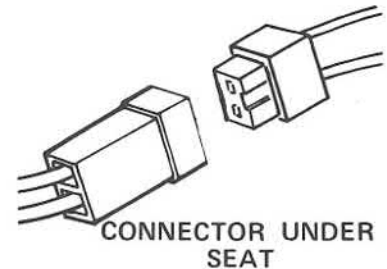
### PASSENGER'S SEAT CIRCUIT FAULTY

- 1.a. If meter did not read 0 ohms or test light is out with someone in seat, go to step 2.
- b. If meter did not read infinity ( $\infty$ ) or test light is on with seat empty, disconnect connector under passenger's seat.
- c. If meter reads 0 ohms, or test light remains on, repair white/black wire from connector under seat to connector C9 and to connector C17.

#### NOTE

Connector C9 is a 6 pin connector. It is behind the center console.

- d. If meter reads infinity or test light goes out, replace switch in passenger's seat.
- 2.a. Disconnect connector under passenger's seat. Using jumper wire, connect 2 wires from control box in connector together.
- b. If meter reads 0 ohms or test light comes on, replace switch in passenger's seat.



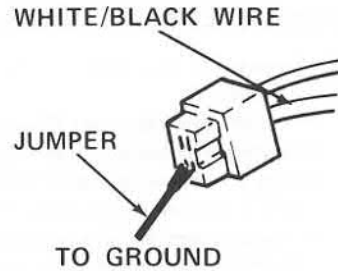
# ELECTRICAL SYSTEM TROUBLESHOOTING

## SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM

- c. If meter still does not read 0 ohms or test light is still out, connect jumper wire to white/black wire in connector and to ground.
- d. If meter reads 0 ohms or test light comes on, repair black/violet wire from connector to ground or ground connection.
- e. If meter reads infinity or light remains out, repair white/black wire from connector under seat to connector C9 and to connector C17.

### NOTE

Connector C9 is a 6 pin connector. It is behind center console.

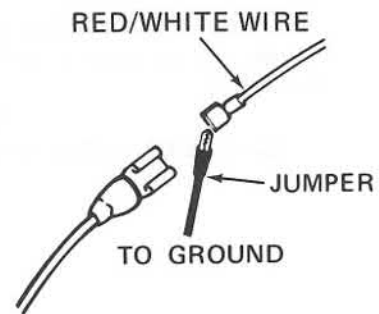


## PASSENGER'S SEAT BELT CIRCUIT FAULTY

- 1.a. If meter did not read infinity ( $\infty$ ) or test light is on with seat belt pulled out, go to step 2.
- b. If meter did not read 0 ohms or test light is out with belt retracted, disconnect connector behind spare wheel.
- c. Using jumper wire, connect white/red wire to ground. If meter reads 0 ohms or light comes on, replace switch in seat belt.
- d. If meter reads infinity or test light remains out, repair white/red wire to connector C9 and to connector C17.

### NOTE

Connector C9 is a 6 pin connector. It is behind center console.

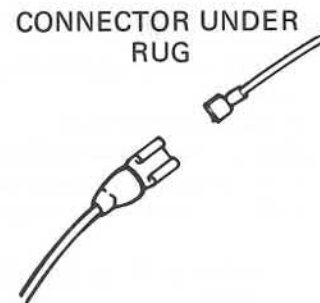


- 2.a. Disconnect connector behind spare wheel passenger's seat. If meter reads 0 ohms or light remains on with belt pulled out, repair white/red wire to connector C9 and to connector C17.

### NOTE

Connector C9 is a 6 pin connector. It is behind center console.

- b. If meter reads infinity or test light goes out, replace switch in seat belt.



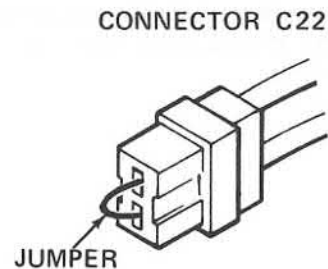
## TRANSMISSION SWITCH CIRCUIT FAULTY

- 1.a. If meter did not read infinity ( $\infty$ ) or test light is on with gearshift in neutral, go to step 2.
- b. If meter did not read 0 ohms or test light did not come on with gearshift in any gear, connect jumper wire to wires in connector C22.

### NOTE

Connector C22 is a 2 pin connector. It is located on bottom forward side of engine.

- c. If meter reads 0 ohms or test light comes on, remove jumper. Go to step e.
- d. If meter reads infinity or test light remains out, go to step h.



# ELECTRICAL SYSTEM TROUBLESHOOTING

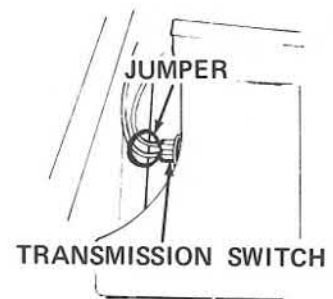
## SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM

- e. Locate switch in transmission. Connect jumper wire to wires in switch.

**NOTE**

Switch is located near crossrail.

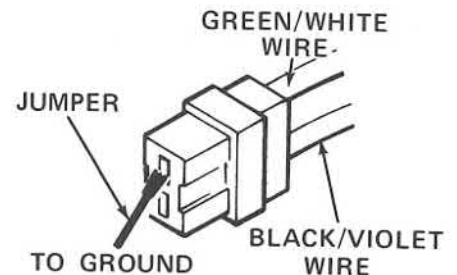
- f. If meter does not read 0 ohms or test light remains out, repair wires from switch to connector C22.  
g. If meter reads 0 ohms or test light comes on, replace switch.



- h. Connect jumper wire to green/white wire in connector and to ground.  
i. If meter reads 0 ohms or test light comes on, repair black/violet wire to ground or ground connection.  
j. If meter does not read 0 ohms or test light remains out, repair green/white wire to connector C9 and to connector C17.

**NOTE**

Connector C9 is a 6 pin connector. It is behind center console.



- 2.a. Disconnect connector C22.

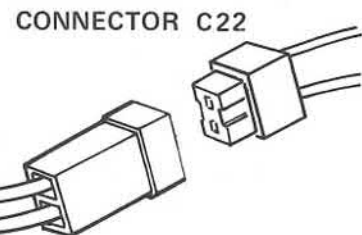
**NOTE**

Connector C22 is a 2 pin connector. It is located on bottom forward side of engine.

- b. If meter does not read infinity ( $\infty$ ) or test light remains on, repair green/white wire from connector C22 to connector C9 and to connector C17.

**NOTE**

Connector C9 is a 6 pin connector. It is behind the center console.

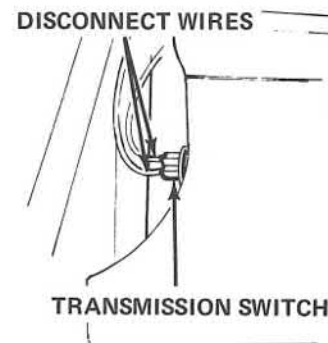


- c. If meter reads infinity or test light goes out, connect connector C22.  
d. Disconnect wires from transmission switch.

**NOTE**

Switch is located toward rear of crossrail.

- d. If meter reads infinity or test light goes out, replace switch in transmission.  
e. If meter does not read infinity or test light remains on, repair wire from switch to connector C22.

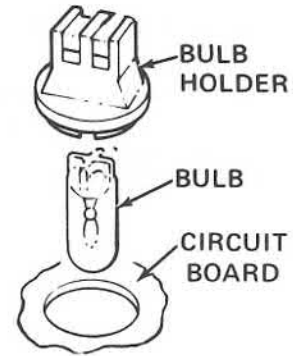


# ELECTRICAL SYSTEM TROUBLESHOOTING

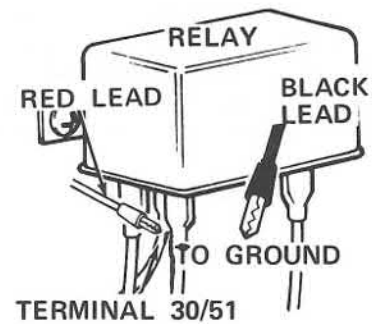
## SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM

### SEAT BELT INDICATOR AND BUZZER CIRCUIT FAULTY

- 1.a. If indicator and buzzer will not go off, go to step 3.
- b. If buzzer works but indicator does not, replace bulb in indicator. If indicator still does not work, check circuit board for defects.
- c. If both indicator and buzzer will not work, go to step 2.



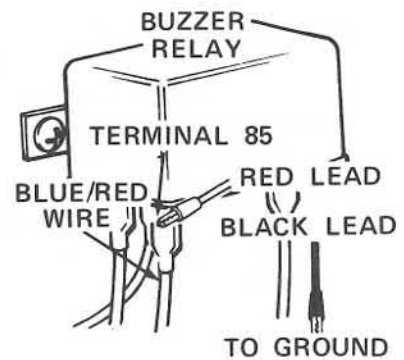
- d. If indicator works but buzzer does not, open driver's door with key installed. If buzzer will not work, go to KEY WARNING BUZZER troubleshooting.
- e. If buzzer works with door open, get ohmmeter. Connect red meter lead to terminal 30/51 (black wire) of buzzer relay. Connect black lead to ground.
- f. If meter reads 0 ohms, go to step g. If meter does not read 0 ohms, repair black wire to ground or ground connection.



- g. Disconnect blue/red wire from terminal 85 of relay. Connect red meter lead to wire. Connect black lead to ground.
- h. If meter reads 0 ohms, replace relay. If meter does not read 0 ohms, repair blue/red wire from relay to connector C6.

#### NOTE

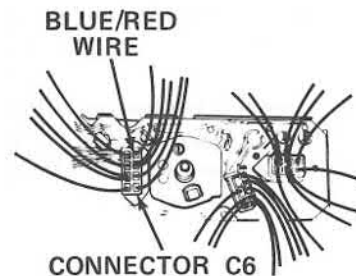
Connector C6 is middle connector at instrument panel. It is an 8 pin connector.



- 2.a. Check other indicators in instrument panel. If indicators do not work, repair orange wire from buzzer relay to fuse A.
- b. If other indicators work, repair blue/red wire from connector C16 to C6.

#### NOTE

Connector C6 is middle connector at instrument panel. It is an 8 pin connector.



# ELECTRICAL SYSTEM TROUBLESHOOTING

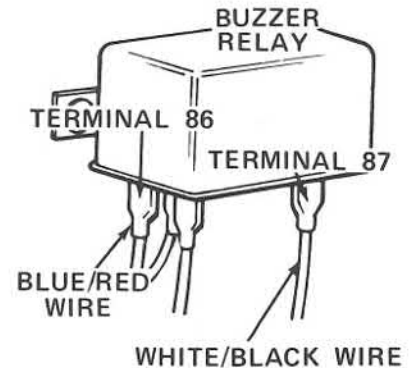
## SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM

- 3.a. If only buzzer will not go off, disconnect white/black wires from terminal 87 of buzzer relay. If buzzer will not go off, go to KEY WARNING BUZZER troubleshooting. If buzzer goes off, replace relay.

### NOTE

Buzzer relay is located forward of fuse box.

- b. If both buzzer and indicator will not stop disconnect blue/red wire from terminal 86 of relay. If indicator goes off, replace relay.

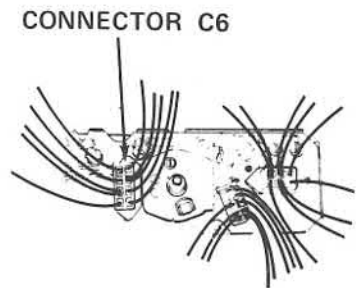


- c. If indicator did not go off, connect wire to relay. Remove instrument panel.  
d. Disconnect connector C6 from instrument panel. If indicator goes out, replace instrument panel.

### NOTE

Connector C6 is the connector in the middle. It is an 8 pin connector.

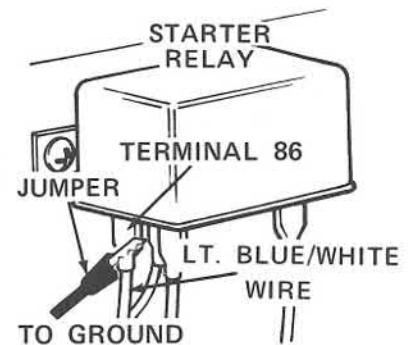
- e. If indicator does not go out, repair blue/red wire from connector C16 to connector C6 and to buzzer relay.



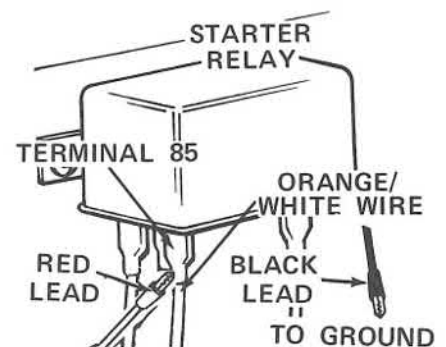
INSTRUMENT PANEL

## STARTER RELAY CIRCUIT FAULTY

- 1.a. Go to starter relay in drop tray area. Get jumper.  
b. Connect jumper to terminal 86 (light blue/white wire) of starter relay. Connect other end of jumper to ground.  
c. Try to start car. If car will start, repair light blue/white wire from relay to connector C16.



- d. Get voltmeter. Connect red meter lead to terminal 85 (orange/white wire) of starter relay. Connect black lead to ground.  
e. Try to start car. If meter does not read voltage, troubleshoot starter circuit.  
f. If meter reads voltage, replace relay.



# ELECTRICAL SYSTEM TROUBLESHOOTING

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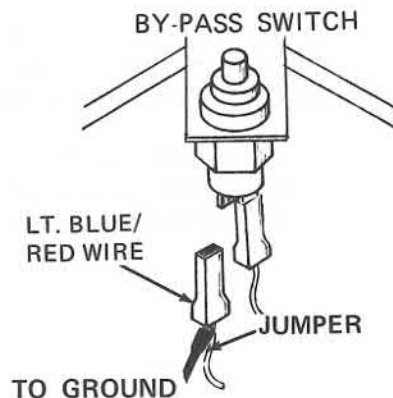
## SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM

### BY-PASS SWITCH CIRCUIT FAULTY

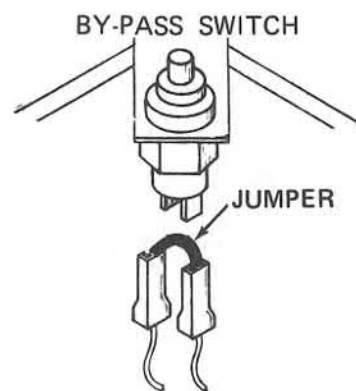
- 1.a. If meter did not read infinity ( $\infty$ ) or test light was on with switch released, go to step 2.
- b. If meter did not read 0 ohms or test light was out with switch depressed, disconnect light blue/red wire from by-pass switch.
- c. Using jumper, connect light blue/red wire to ground. If meter reads 0 ohms or test light comes on, go to step e.
- d. If meter reads infinity or test light remains out, repair light blue/red wire from by-pass switch to connector C9 and to connector C16.

#### NOTE

Connector C9 is a 6 pin connector. It is behind center console.



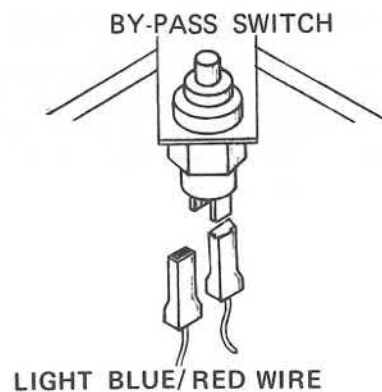
- e. Disconnect black/violet wire from by-pass switch. Using jumper, connect wires together.
- f. If meter reads 0 ohms or test light comes on, replace by-pass switch.
- g. If meter reads infinity or test light does not come on, repair black/violet wire to ground or ground connection.



- 2.a. Disconnect light blue/red wire from by-pass switch. If meter reads infinity or test light goes out, replace by-pass switch.
- b. If meter does not read infinity or test light stays on, repair light blue/red wire from switch to connector C9 and to connector C16.

#### NOTE

Connector C9 is a 6 pin connector. It is behind center console.

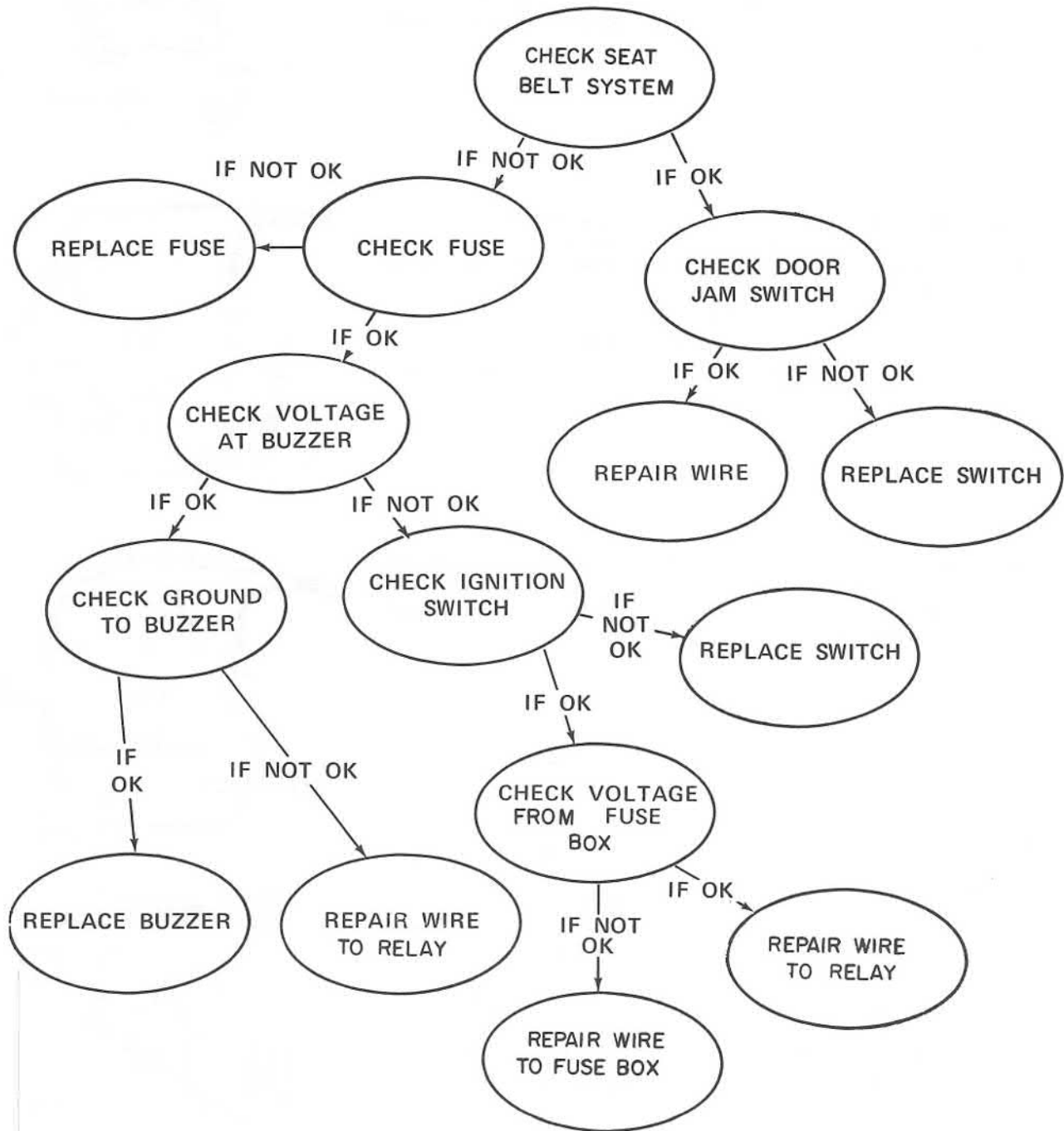




# ELECTRICAL SYSTEM TROUBLESHOOTING

## SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM

### KEY BUZZER WILL NOT WORK

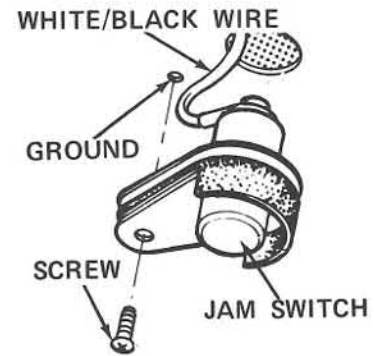


# ELECTRICAL SYSTEM TROUBLESHOOTING

## SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM

### KEY BUZZER WILL NOT WORK

- 1.a. Try to start car without seat belt buckled. If buzzer does not work, go to step 2.
- b. If buzzer works, remove screw thru door jam switch. Check screw, hole, and switch for dirt. Clean as necessary.
- c. Disconnect white/black wire from switch. Touch wire to ground.
- d. If buzzer works replace switch. If buzzer does not work, repair white/black wire from switch to relay for buzzer.

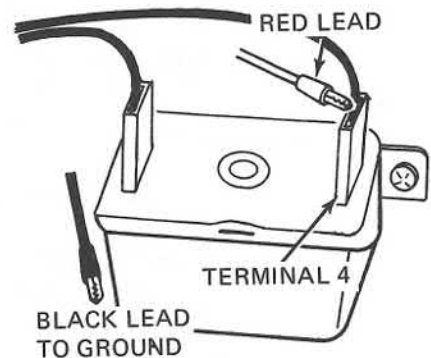


- 2.a. Operate headlights. If headlight motors won't work, replace fuse B.
- b. Put key in ignition switch. Open door. Get voltmeter.
- c. Connect red meter lead to terminal 4 (red/white wire) of buzzer. Connect black lead to ground.

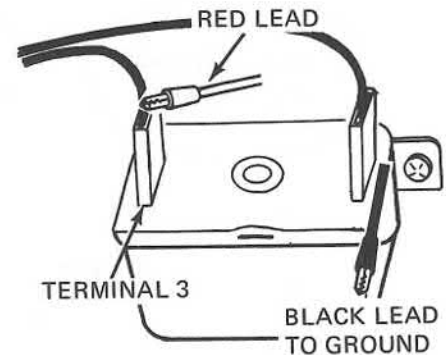
#### NOTE

Buzzer is located on left side of driver's footwell.

- d. If meter reads voltage, go to step e. If meter does not read voltage, go to step g.



- e. Get ohmmeter. Connect red meter lead to terminal 3 (white/black wire). Connect black lead to ground.
- f. If meter reads 5 ohms or less replace buzzer. If meter reads more than 5 ohms, repair white/black wire to buzzer relay.

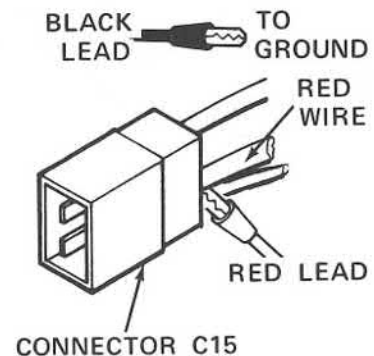


- g. Remove 5 screws in steering column cover. Remove cover. Get ohmmeter.
- h. Disconnect connector C15. Connect meter leads to wires in connector. Make sure you use connector half from ignition switch.

#### NOTE

Connector C15 is a white 2 pin connector. It is located on right side of column.

- i. If meter does not read 0 ohms, check connector C15 and wires to ignition switch for defects. If wires and connector are good, replace ignition switch.

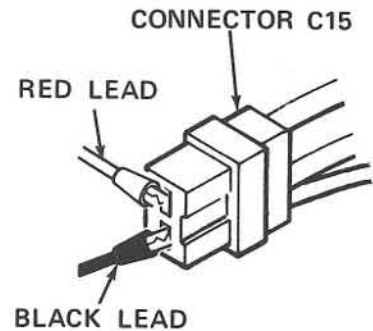


# ELECTRICAL SYSTEM TROUBLESHOOTING

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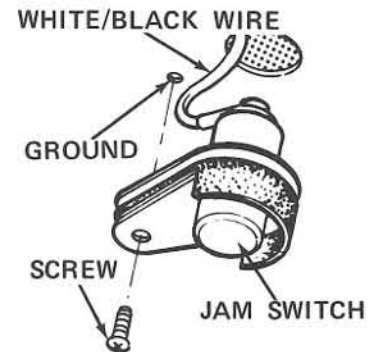
## SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM

- j. If meter reads 0 ohms, get voltmeter. Connect red lead to red wires in connector C15. Connect black lead to ground.
- k. If meter reads voltage, repair red/white wire (position 1) from connector C15 to buzzer.
- l. If meter does not read voltage, repair red wire (position 2) from connector C15 to fuse box.

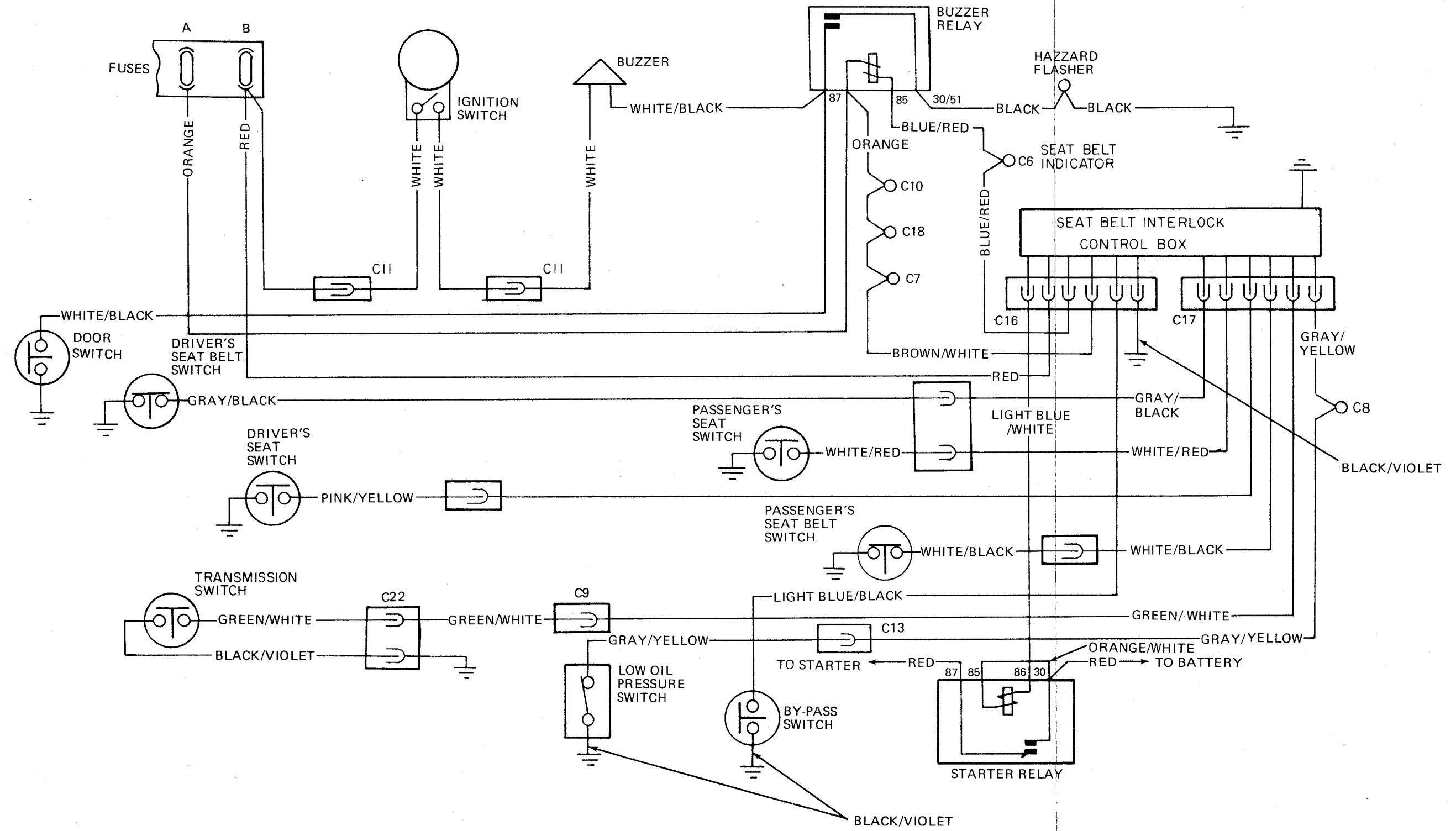


## KEY BUZZER WILL NOT STOP WITH DOOR CLOSED AND KEY IN

- 1.a. Open door. Remove jam switch. Make sure wire does not touch metal.
- b. If buzzer does not stop, repair white/black wire from switch to relay and to buzzer.
- c. If buzzer stops, check jam switch for dirt or corrosion. If switch looks good, install it.
- d. Close door and check buzzer. If buzzer is on, replace jam switch.



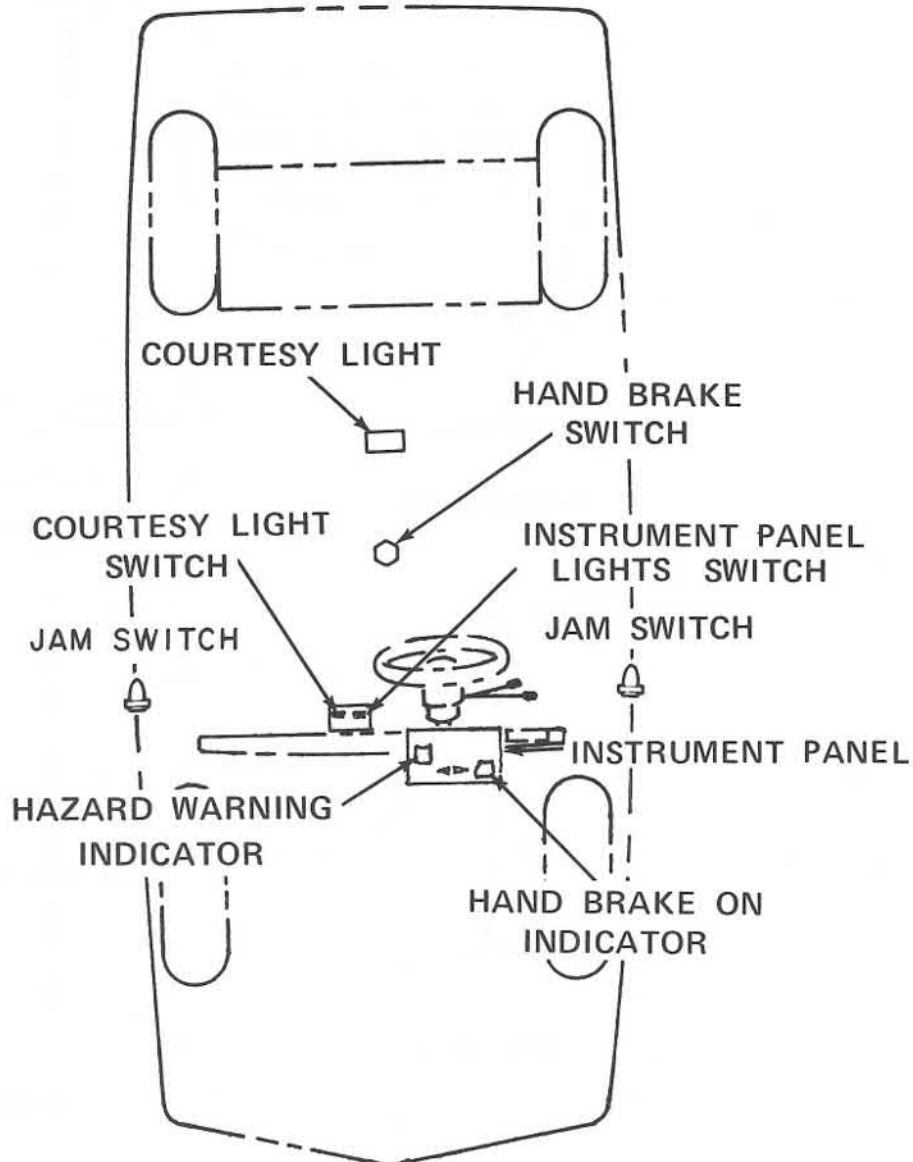
SEAT BELT INTERLOCK AND REMOVE KEY WARNING SYSTEM



# ELECTRICAL SYSTEM TROUBLESHOOTING

## INTERIOR LIGHTS TABLE OF CONTENTS

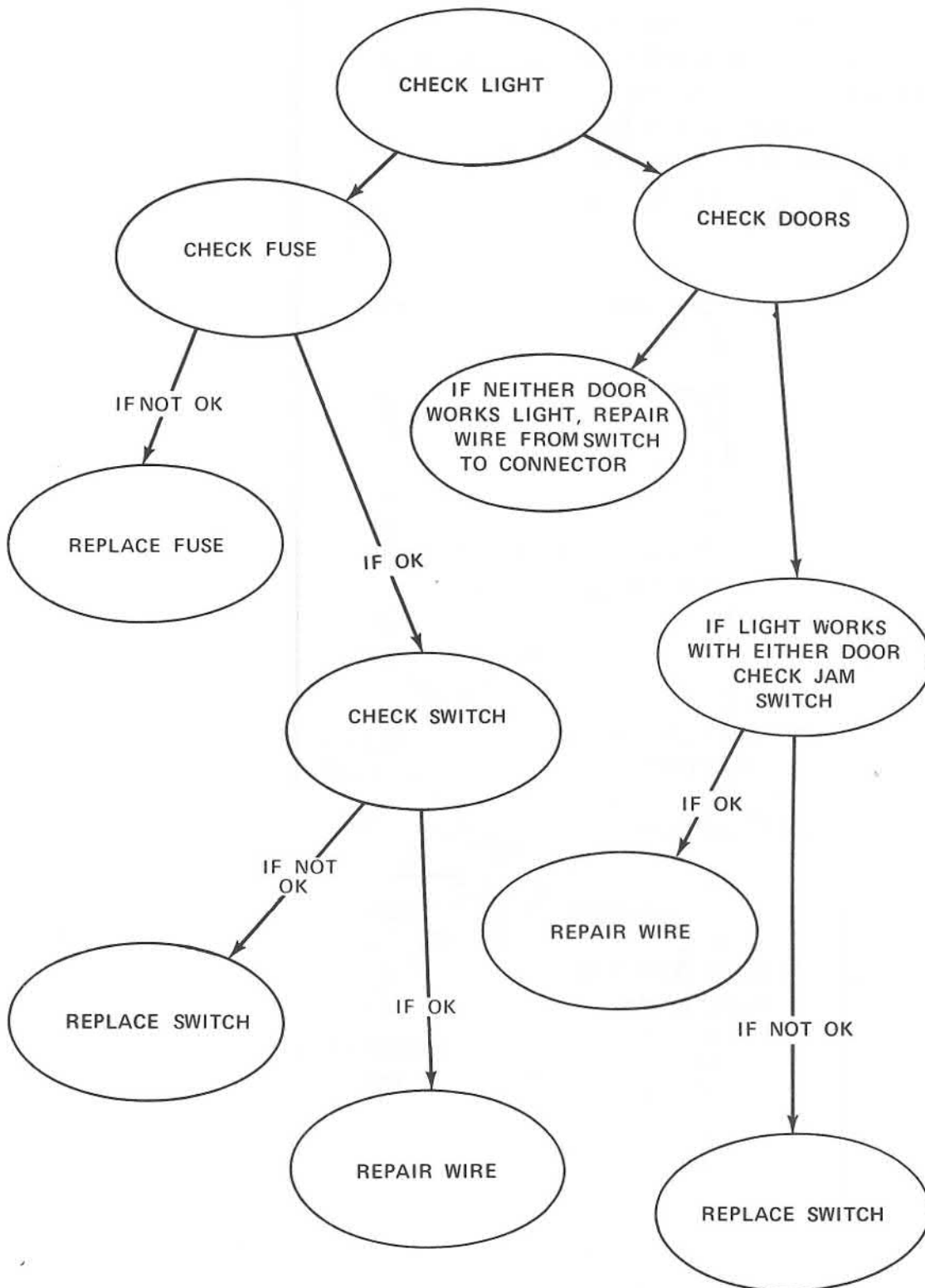
SECTION	PAGE
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Brake Indicator Light Will Not Work With Lever Pulled Up	284
Instrument Lights Will Not Light	285
Optical Fiber Illumination Will Not Work	286
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Direction Indicator Light Will Not Work	288



# ELECTRICAL SYSTEM TROUBLESHOOTING

## INTERIOR LIGHTS

### COURTESY LIGHT NOT ON WITH DOOR OPEN



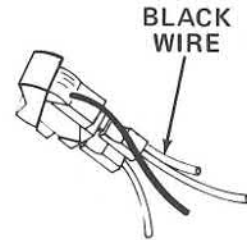
## INTERIOR LIGHTS

### COURTESY LIGHT NOT ON WITH DOOR OPEN

- 1.a. Set courtesy light switch on. If light does not work, go to step 2.
- b. If light works, check light with one door and then other.
- c. If light does not work with either door, repair black wire from connector C13 to courtesy light switch.

**NOTE**

Connector C13 is an 8 pin connector. It is located behind center console.



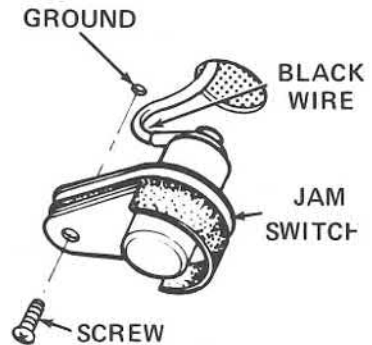
COURTESY LIGHT SWITCH

- d. If light works with one door, close door that works. Open other door.
- e. Remove screw and jam switch.
- f. Remove wire from switch. Hold wire to ground.
- g. If light does not work, repair black wire from switch to connector C13.

**NOTE**

Connector C13 is an 8 pin connector. It is located behind center console.

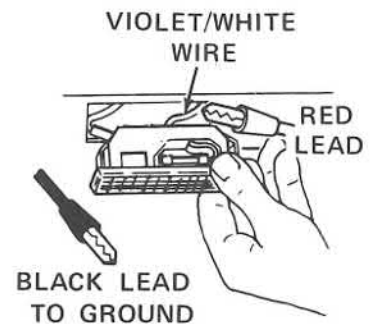
- h. If light works, check screw, switch, and door pillar for dirt and corrosion. Clean as necessary.
- i. Install switch. If light will not work, replace switch.



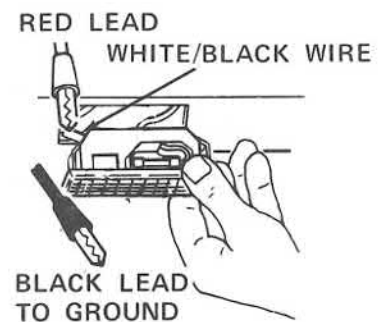
- 2.a. Check fuse in separate holder. Replace fuse if blown.
- b. If fuse is good, check bulb in light. Replace bulb if defective.
- c. If bulb is good, get voltmeter. Connect red meter lead to violet/white wire at light. Connect black lead to ground.
- d. If meter reads voltage, go to step f.
- e. If meter does not read voltage, repair violet/white wire from light to connector C13.

**NOTE**

Connector C13 is an 8 pin connector. It is located behind center console.



- f. Get ohmmeter. Connect red meter lead to white/black wire at light. Connect black lead to ground.
- g. If meter reads 5 ohms or less, replace light.
- h. If meter reads more than 5 ohms, repair white/black wire from light to interior light switch.

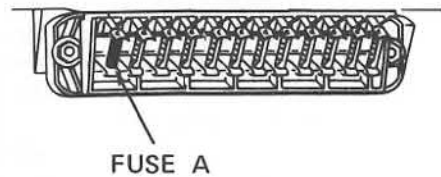


# ELECTRICAL SYSTEM TROUBLESHOOTING

## INTERIOR LIGHTS

### BRAKE INDICATOR LIGHT WILL NOT WORK WITH LEVER PULLED UP

- 1.a. Depress brake pedal. If stop lights do not work, replace fuse A.
- b. Turn on directional indicators. If lights work, go to step 2. If lights do not work, check windshield wipers.
- c. If wipers do not work, troubleshoot wipers. If wipers work, check circuit board for defects. If board is good, repair orange wire from circuit board to connector C18 for wiper motor.



- 2.a. Get ohmmeter. Find connector C14.

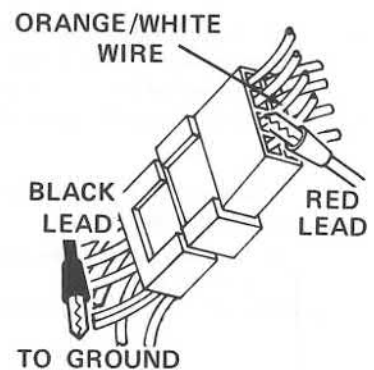
#### NOTE

Connector C14 is located behind center console. It is a red 8 pin connector.

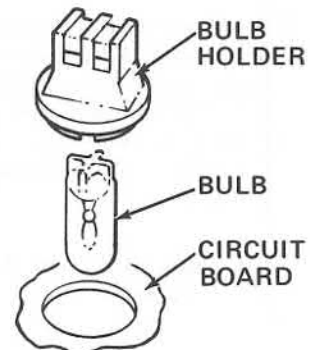
- b. Connect red meter lead to orange/white wire in connector. Connect black lead to ground.
- c. If meter reads 5 ohms or less, go to step e.
- d. If meter reads more than 5 ohms, check orange/white wire from connector C14 to switch at hand brake. Check ground at switch.

#### NOTE

The hand brake switch can be checked by removing cover over hand brake.



- e. Remove 5 screws thru instrument panel. Disconnect 3 connectors and speedometer cable. Pull panel out.
- f. Replace bulb. Connect connectors to panel.
- g. If indicator is not lit, go to step h. If indicator is lit, install instrument panel.

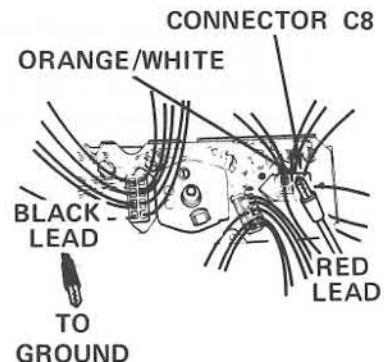


- h. Get ohmmeter. Connect red meter lead to orange/white wires in connector C8. Connect black lead to ground.

#### NOTE

Connector C8 is a 6 pin connector.

- i. If meter reads more than 5 ohms, repair orange/white wire from panel to connector C14. If meter reads 5 ohms or less, check circuit board and connector C8 for defects.

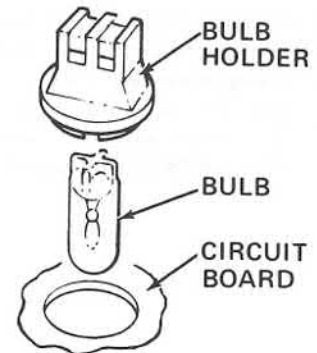




## INTERIOR LIGHTS

### INSTRUMENTS LIGHTS WILL NOT WORK

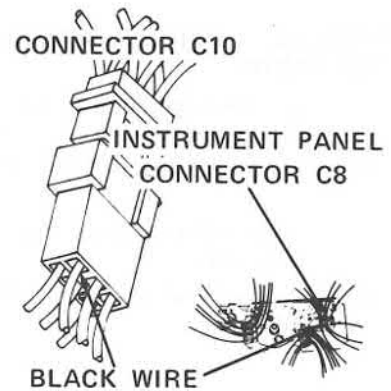
- 1.a. If only one instrument light is out, remove instrument panel. Replace bulb.
- b. Turn on outer lighting switch. If parking lights do not work, replace fuse G. If headlights do not work, troubleshoot LOW BEAMS.
- c. Check parking light indicator. If indicator is lit go to step 2.
- d. If indicator is not lit, operate windshield washer. If washer does not work, go to step f.



- e. If washer works, check circuit board for defects. Repair or replace board.
- f. If washer does not work, operate horn. If horn does not work, go to HORN WILL NOT BLOW troubleshooting.
- g. If horn works, repair black wire from connector C8 to connector C10.

#### NOTE

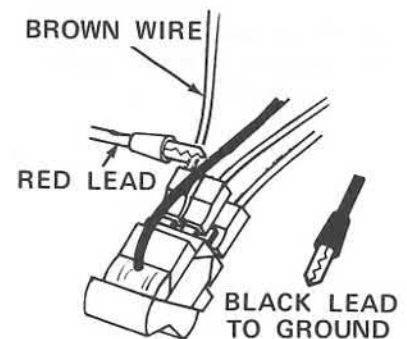
Connector C8 is a 6 pin connector for the instrument panel.  
Connector C10 is a 6 pin connector under the steering column cover.



- 2.a. If lights work on high setting but not low, go to step 3.
- b. If lights do not work at all, pull panel light switch out.
- c. Get voltmeter. Connect red meter lead to terminal I (brown wire) of switch. Connect black lead to ground.
- d. If meter does not read voltage, repair brown wire from switch to connector C5 and to connector C10.

#### NOTE

Connector C5 is an 8 pin connector. Connector C10 is a 4 pin connector. They are under the steering column cover.

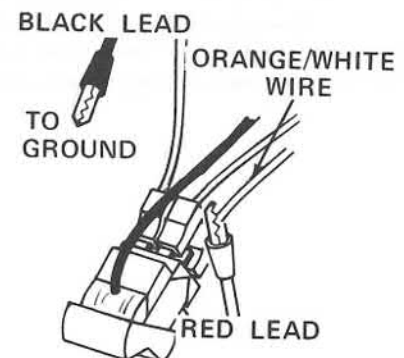


- e. If meter reads voltage, connect red meter lead to terminal U (orange/white wire). Connect black lead to ground.
- f. If meter reads voltage, repair orange/white wire to resistor holder or white/red wire from holder to connector C8.

#### NOTE

Resistor holder is accessible by removing ash tray and holder.

- g. If meter does not read voltage, replace switch.

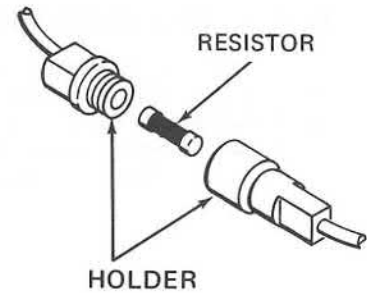


# ELECTRICAL SYSTEM TROUBLESHOOTING

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## INTERIOR LIGHTS

- 3.a. Remove ash tray and holder.
- b. Remove resistors from holders.
- c. Using ohmmeter, check for circuit thru resistors. If either resistor shows open (infinity), replace resistor.
- d. If resistors are good, check holders and wire from switch to holder and from holder to other holder.



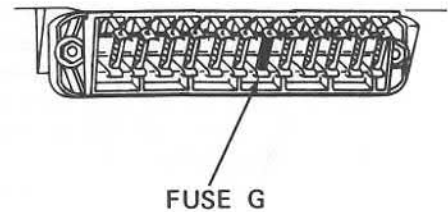
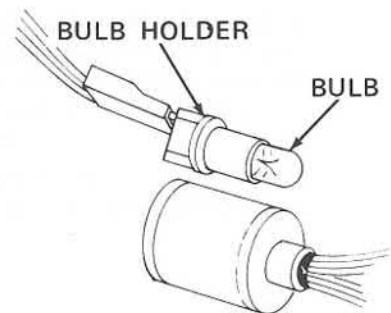
## OPTICAL FIBER ILLUMINATION WILL NOT WORK

- 1.a. If all switch lights and heater panel lights are out, rotate rheostat. If lights work at any point, replace switch.
- b. If only switch lights or heater panel light is out, replace bulb.

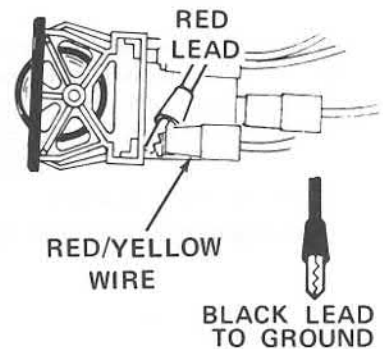
### NOTE

Optical fiber bulb is located behind center console on left side below heater.

- c. If only one or two switch lights are out, replace optical fiber for that switch.
- d. Check cigar lighter light. If light is on, go to step 2.
- e. If light is off check fuse G. If fuse is good, repair yellow/black wire from rheostat to fuse box.



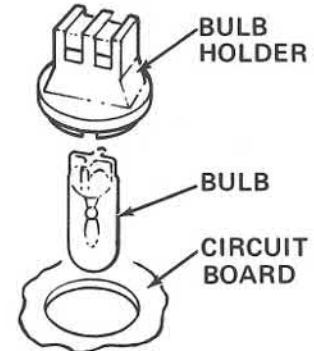
- 2.a. Get voltmeter. Pull rheostat out. connect red meter lead to terminal L (yellow/red wire). Connect black lead to ground.
- b. Rotate rheostat. If meter does not read voltage, replace rheostat.
- c. If meter reads voltage, repair yellow/red wires to bulb holders.



## INTERIOR LIGHTS

### VEHICLE WARNING INDICATOR LIGHT WILL NOT WORK

- 1.a. If warning lights are working, remove 5 screws thru instrument panel. Disconnect 3 connectors and speedometer cable.
- b. Turn light socket to left. Replace bulb. Install socket. Connect connectors.
- c. Turn warning light switch on. If light flashes, install instrument panel.

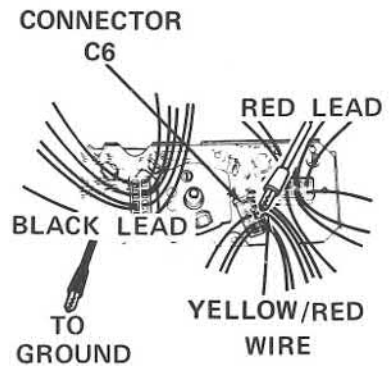


- d. If light still does not flash, get voltmeter.
- e. Connect red meter lead to yellow/red wire in connector C6. Connect black lead to ground.

#### NOTE

Connector C6 is an 8 pin connector.

- f. If meter does not read voltage, go to step 2.
- g. If meter reads voltage, check connector and circuit board for defects. Repair or replace board or connector as necessary.

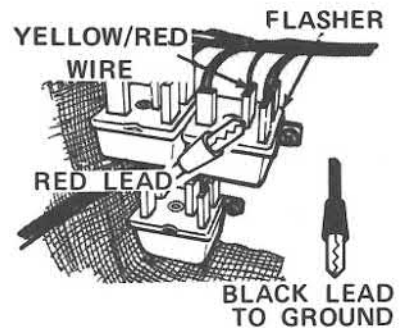


- 2.a. Find warning light flasher. Get voltmeter.

#### NOTE

Warning light flasher is mounted forward of fuse box under rug.

- b. Connect red meter lead to terminal P (yellow/red wire) of flasher. Connect black lead to ground.
- c. If meter reads voltage, repair yellow/red wire from flasher to connector C6.
- d. If meter does not read voltage, replace flasher.

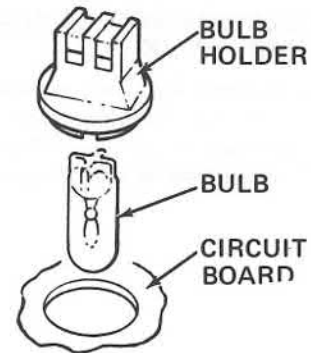


# ELECTRICAL SYSTEM TROUBLESHOOTING

## INTERIOR LIGHTS

### DIRECTIONAL INDICATOR LIGHT WILL NOT WORK

- 1.a. If directional lights are working, remove 5 screws thru instrument panel. Disconnect 3 connectors and speedometer cable.
- b. Turn bulbholder to left. Replace bulb. Install bulb.
- c. Connect connectors. Turn directional indicators on. If indicator is flashing install instrument panel.



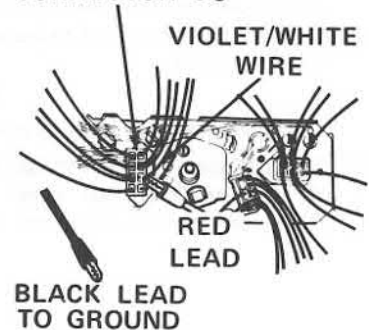
- d. If light still does not work, get voltmeter.
- e. Connect red meter lead to violet/white wire at connector C6. Connect black lead to ground.

#### NOTE

Connector C6 is an 8 pin connector.

- f. If meter does not read voltage, go to step h.
- g. If meter reads voltage, check connector, circuit board, and bulb holder for defects. Repair or replace parts as necessary.

### CONNECTOR C6

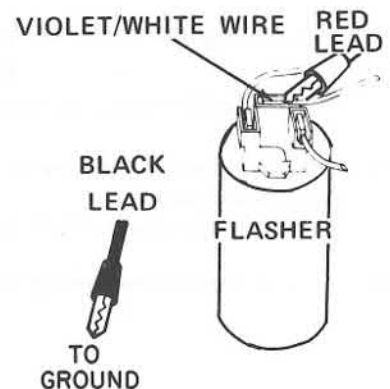


- h. Find directional flasher.

#### NOTE

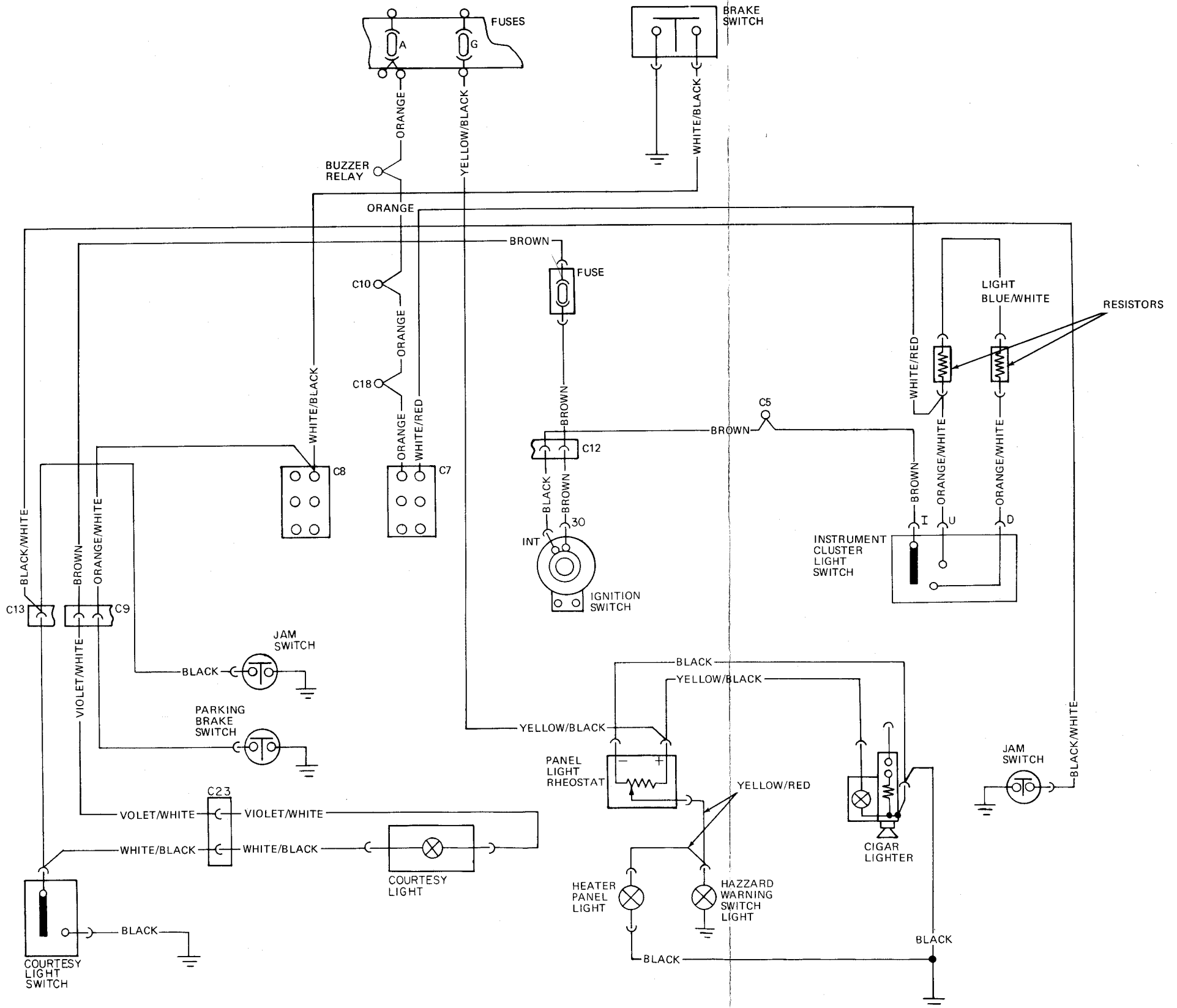
Flasher is mounted in a clip above the fuse box.

- i. Connect red meter lead to terminal P (violet/white wire) of flasher. Connect black lead to ground.
- j. If meter reads voltage, repair violet/white wire from flasher to connector C6.
- k. If meter does not read voltage, replace flasher.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## INTERIOR LIGHTS

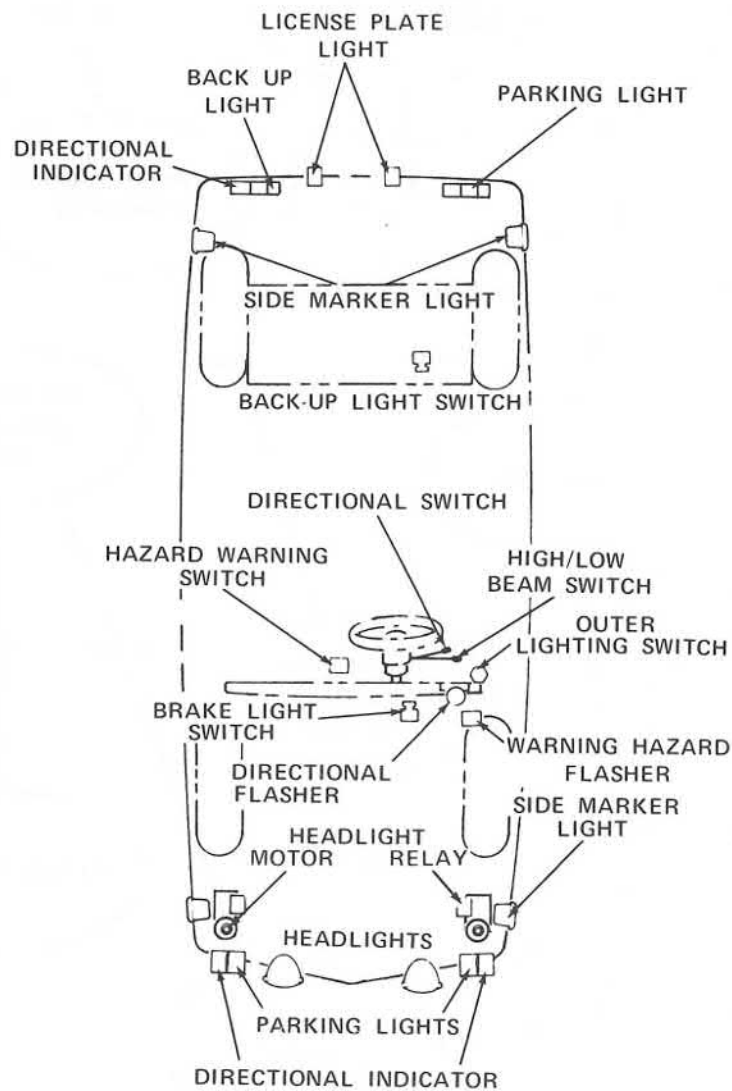


# ELECTRICAL SYSTEM TROUBLESHOOTING

## EXTERIOR LIGHTS

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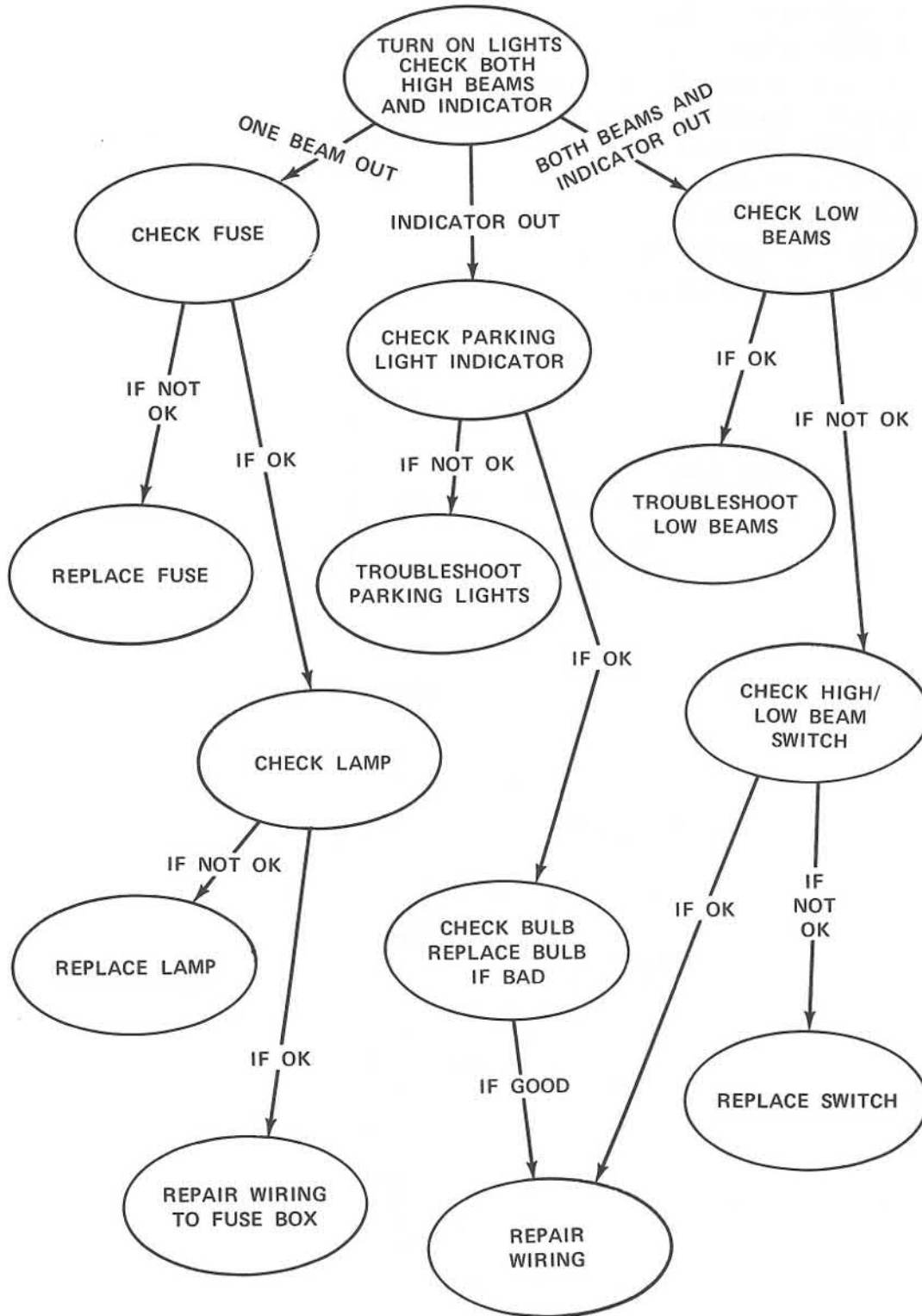
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# ELECTRICAL SYSTEM TROUBLESHOOTING

## EXTERIOR LIGHTS

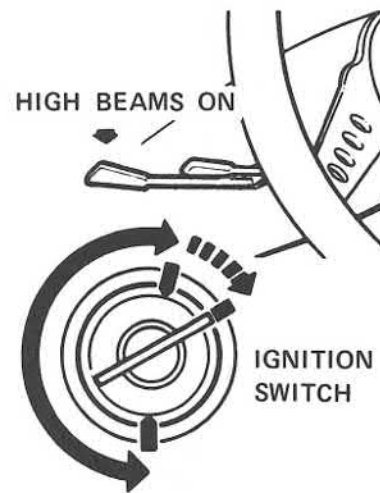
### LEFT OR RIGHT HIGH BEAM WILL NOT WORK



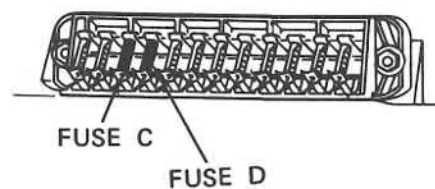
## EXTERIOR LIGHTS

### LEFT OR RIGHT HIGH BEAM WILL NOT WORK

- 1.a. Turn ignition switch on. Turn on outer lighting switch. If low beams work, go to step b. If low beams do not work, troubleshoot LOW BEAMS.
- b. Turn on high beams. See if either high beam or indicator is lit.



- c. If both high beams and indicator are out, go to step 2.
- d. If left high beam and indicator are out, check fuse C. Replace fuse if blown.
- e. If right high beam is out, check fuse D. Replace fuse, if blown. If fuse is good, go to step 3.
- f. If indicator is lit and left high beam is out, go to step 3.
- g. If left high beam is lit and indicator is out, go to step 4.
- h. If front parking lights are out, troubleshoot PARKING LIGHTS.

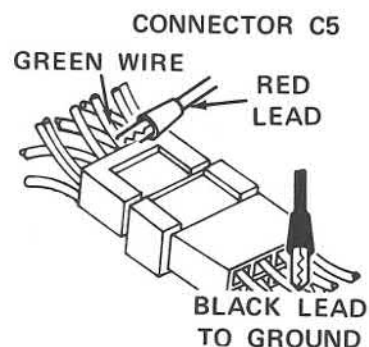


- 2.a. Remove 5 screws and remove cover from steering column.
- b. Find connector C5. Get voltmeter.

#### NOTE

Connector C5 is an 8 pin connector. It is located on left side of steering column.

- c. Connect red meter lead to green wire in connector. Connect black lead to ground.
- d. If meter does not read voltage, check green wire to switch. If wire is good, replace switch.
- e. If meter reads voltage, check connector for defects. If connector is good, repair green wire to fuse box.

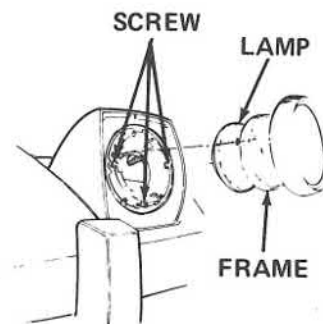


- 3.a. If one high beam is out, disconnect plug from lamp. Connect plug to good lamp. If high beam does not work go to step d.

#### CAUTION

Be very careful working around the headlights. Do not turn the top of the motor to raise or lower the headlight.

- b. If high beam lights, remove 3 screws thru trim and remove trim. Loosen 3 screws thru frame. Turn frame to left and remove frame and lamp.
- c. Connect plug to lamp. Position new lamp in frame. Position frame on screws. Turn frame to right. Tighten screws thru frame. Install trim.

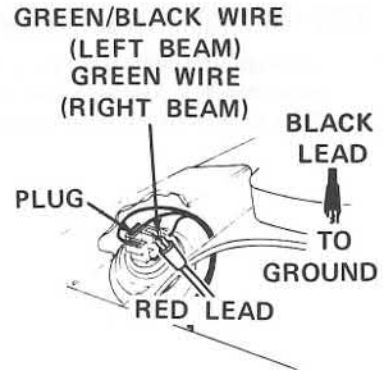




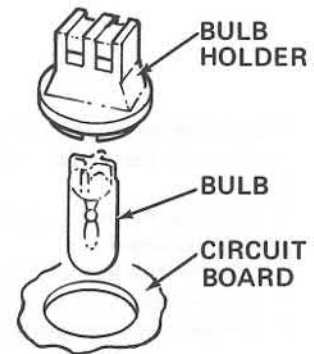
# ELECTRICAL SYSTEM TROUBLESHOOTING

## EXTERIOR LIGHTS

- d. Get voltmeter. Disconnect plug from lamp.
- e. Connect red meter lead to green/black wire (left beam) or green wire (right beam) in plug. Connect black lead to ground.
- f. If meter reads voltage check plug for dirt or defects.
- g. If meter does not read voltage, repair wire from plug to fuse box.



- 4.a. Check parking light indicator. If indicator is on, go to step b. If indicator is out, troubleshoot PARKING LIGHTS.
- b. Remove 5 screws thru instrument panel. Pull panel out. Disconnect 3 connectors and speedometer cable.
- c. Turn socket for indicator to left. Remove bulb. Install new bulb. Connect connectors to panel.
- d. If indicator is lit, install instrument panel.

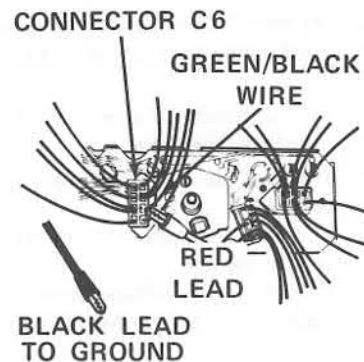


- e. If indicator is not lit, disconnect connector C6. Get voltmeter.

### NOTE

Connector C6 is an 8 pin connector.

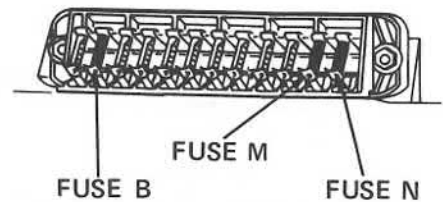
- f. Connect red meter lead to green/black wire in connector. Connect black lead to ground.
- g. If meter does not read voltage, repair green/black wire from connector C6 to fuse box.
- h. If meter reads voltage, check connector, circuit board, and bulb holder for defects.



## EXTERIOR LIGHTS

### HEADLIGHT MOTORS WILL NOT WORK

- 1.a. If motors will not raise lights, check fuses B and N. If fuses are good, go to step c.
- b. If motors will not lower lights, check fuses B and M. If fuses are good, go to step 3.
- c. If motors will not raise lights, check parking lights. If lights are out, go to PARKING LIGHTS troubleshooting.

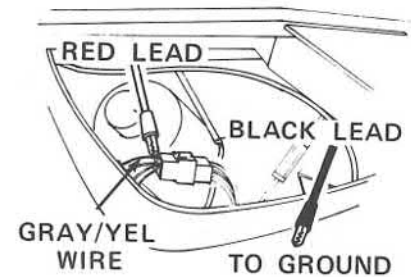


- d. If only one motor will not raise light, go to step 2. If both motors will not raise lights, get voltmeter. Find connector C19.

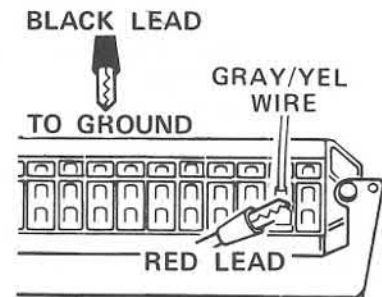
**NOTE**

Connector C19 is a 4 pin connector. It is in left headlight motor compartment.

- e. Connect red meter lead to gray/yellow wires in connector. Connect black lead to ground.
- f. If meter reads voltage, repair light blue wire from fuse box to terminal 87 of left motor relay.



- g. If meter does not read voltage, connect red meter lead to gray/yellow wire in back of fuse N. Connect black lead to ground.
- h. If meter reads voltage, repair gray/yellow wire from fuse box to connector C19.
- i. If meter does not read voltage, check fuse box and brown wire from fuse G to fuse N for defects.

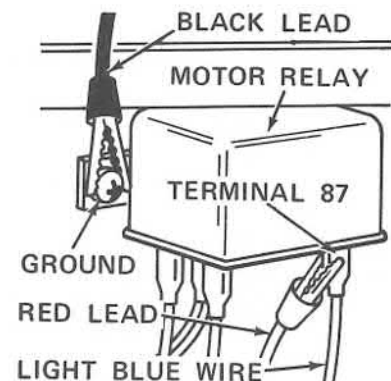


- 2.a. If left motor will not work, go to step f.
- b. If right motor will not work, get voltmeter. Connect red meter lead to terminal 87 (light blue wire) of motor relay. Connect black lead to ground.

**NOTE**

Relay is mounted in compartment for right headlight motor.

- c. If meter reads voltage, go to step d. If meter does not read voltage, repair light blue wire from relay to connector C19.



# ELECTRICAL SYSTEM TROUBLESHOOTING

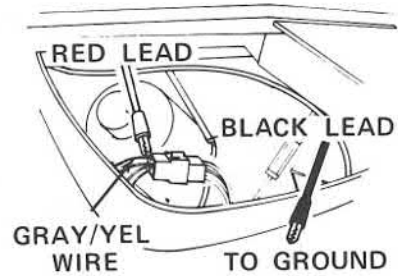
## EXTERIOR LIGHTS

- d. Connect red meter lead to gray/yellow wire in connector C20. Connect black lead to ground.

**NOTE**

Connector C20 is a 4 pin connector. It is in compartment for right motor.

- e. If meter reads voltage, go to step f. If meter does not read voltage, repair gray/yellow wire from connector C20 to connector C19.

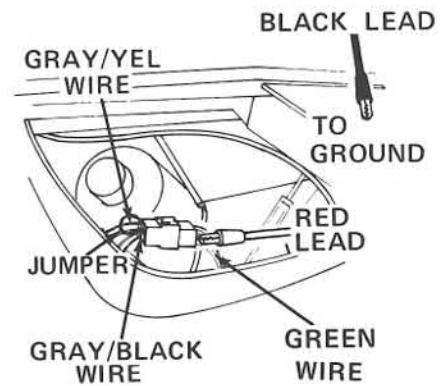


- f. Set outer lighting switch off. Disconnect connector C19 (left motor) or C20 (right motor).

**NOTE**

Connectors are 4 pin connectors. They are in compartment for motors.

- g. Connect jumper wire between gray/yellow and gray/black wire in connector.
- h. Connect red meter lead to green wire in connector. Connect black lead to ground.
- i. If meter did not read voltage, leave jumper on wires. Go to step 4.
- j. If meter reads voltage, check connector and wires from motor for defects. Check black wire under motor mounting bolt for defects. If wires and connector are good, replace motor.

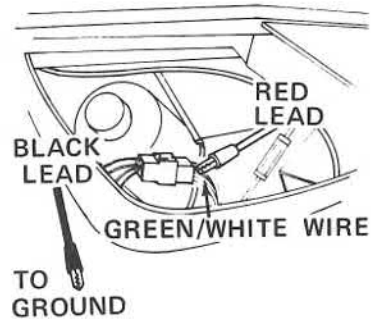


- 3.a. If only left motor will not work, go to step e.
- b. If right motor will not work, get voltmeter.
- c. Connect red meter lead to green/white wire in connector C20. Connect black lead to ground.

**NOTE**

Connector C20 is a 4 pin connector. It is in compartment for right motor.

- d. If meter reads voltage, go to step e. If meter does not read voltage, repair green/white wire from connector C20 to C19.

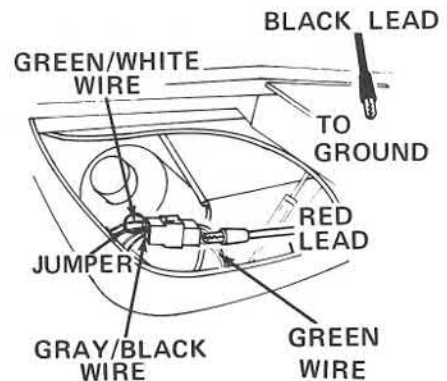


- e. Disconnect connector C19 (left motor) or C20 (right motor). Connect jumper wire between green/white and gray/black wires in connector.

**NOTE**

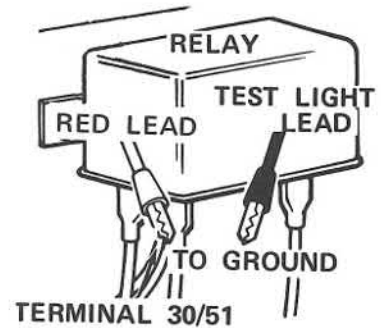
Connectors are 4 pin connectors. They are in compartments for motors.

- f. Connect red meter lead to green wire in connector. Connect black lead to ground.
- g. If meter does not read voltage, leave jumper on wires. Go to step 4.
- h. If meter reads voltage, check connector and wires from motor for defects. Check black wire under motor mounting bolt for defects. If connector and wires are good, replace motor.

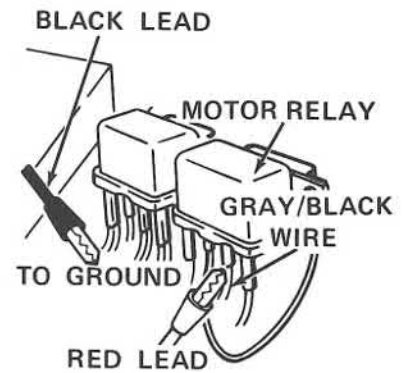


## EXTERIOR LIGHTS

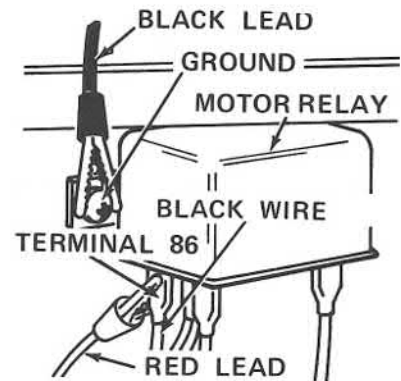
- 4.a. Connect red meter lead to terminal 30/51 (green wire) of motor relay. Connect black lead to ground.
- b. If meter reads voltage, repair green wire from relay to connector.



- c. If meter does not read voltage, connect red meter lead to terminal 85 (gray/black wire) of relay. Connect black lead to ground.
- d. If meter does not read voltage, repair gray/black wire from relay to connector.



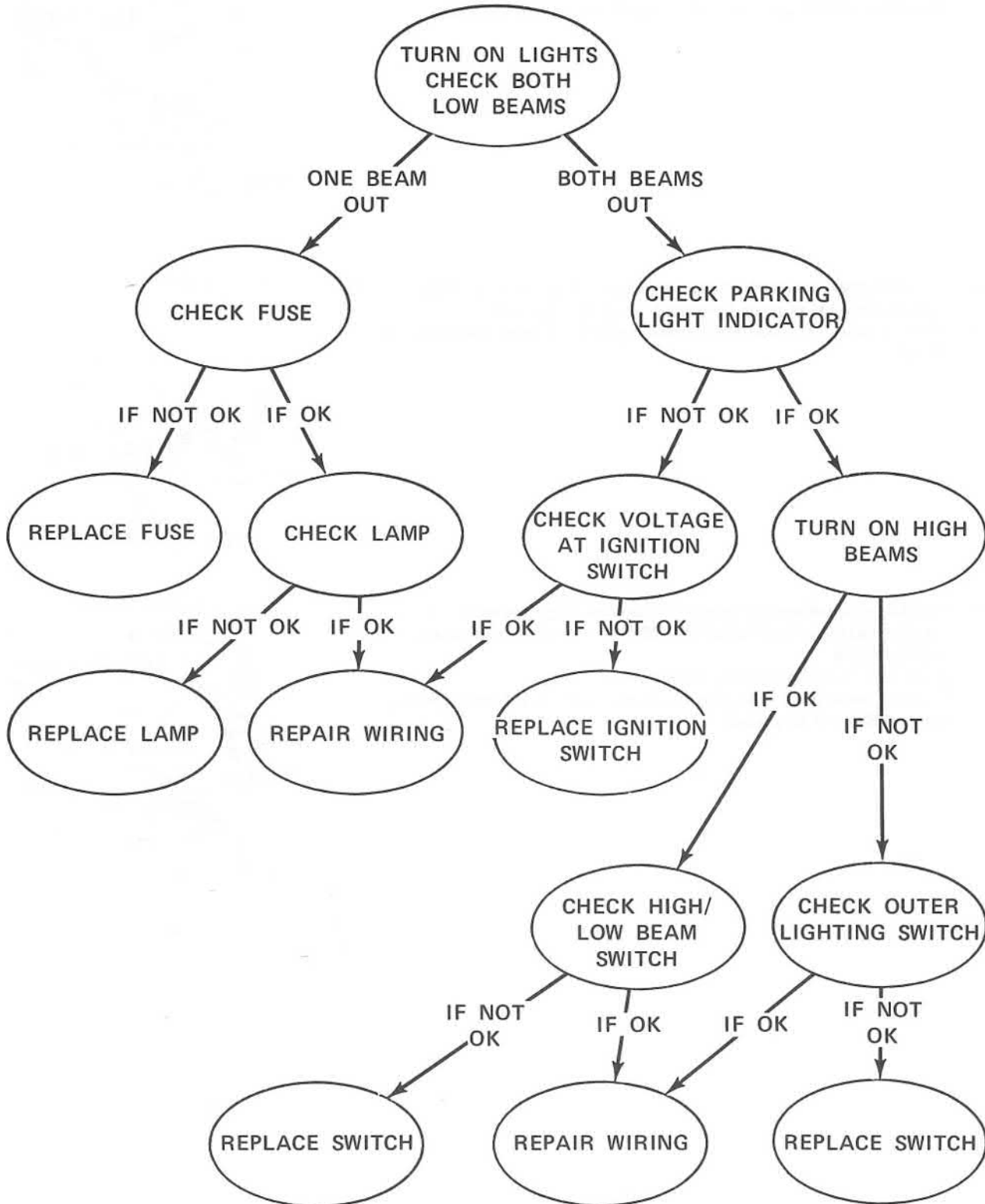
- e. If meter reads voltage, get ohmmeter. Set outer lighting switch off.
- f. Connect red meter lead to terminal 86 (black wire) of relay. Connect black lead to ground.
- g. If meter reads 5 ohms or less, replace relay.
- h. If meter reads more than 5 ohms, check black wire from terminal 86 to terminal 87b and to ground.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## EXTERIOR LIGHTS

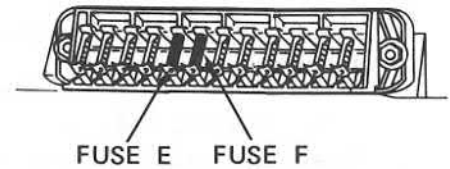
LEFT OR RIGHT LOW BEAM WILL NOT WORK



## EXTERIOR LIGHTS

### LEFT OR RIGHT LOW BEAM WILL NOT WORK

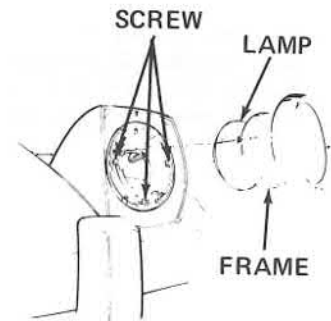
- 1.a. Turn on ignition switch. Turn on outer lighting switch. Check both low beams.
- b. If left low beam is out, check fuse E. If blown, replace fuse. If fuse is good, go to step 2.
- c. If right low beam is out, check fuse F. If blown, replace fuse. If fuse is good, go to step 2.
- d. If both low beams are out, turn on high beams. If high beams work, go to step 3. If high beams do not work, go to step 4.
- e. Check parking light indicator, if indicator is out go to step 5.



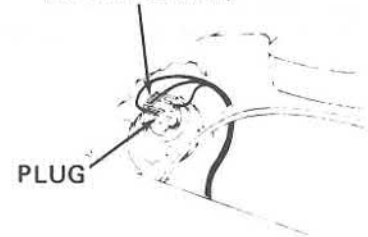
### CAUTION

Be very careful working around the headlights. Do not turn the top of the motor to raise or lower the headlight.

- 2.a. Disconnect plug from headlight lamp. Connect plug to new lamp. If lamp will not light, go to step d.
- b. If lamp lights, disconnect plug. Remove 3 screws thru trim and remove trim. Loosen 3 screws thru frame and turn frame to left. Remove frame and lamp.
- c. Install new lamp. Place frame on screws and turn frame to right. Place trim on and install 3 screws.
- d. Get voltmeter. Disconnect plug from lamp. Connect red meter lead to gray wire (right beam) or gray/black wire (left beam). Connect black lead to ground.
- e. If meter does not read voltage, repair wire to fuse box.
- f. If meter reads voltage, check plug for dirt or defects.



GRAY/BLACK WIRE  
(LEFT BEAM)  
GRAY WIRE  
(RIGHT BEAM)

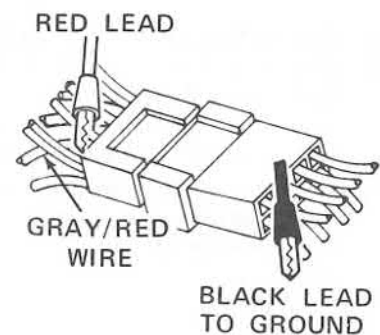


- 3.a. Remove 5 screws thru steering column cover. Remove cover. Get voltmeter.
- b. Connect red meter lead to gray/red wire in connector C5. Connect black lead to ground.

### NOTE

Connector C5 is an 8 pin connector.

- c. If meter reads voltage, check connector for defects. If connector is good, repair red/gray wire to fuse box.
- d. If meter does not read voltage, check wire to switch. If wire is good, replace switch.



# ELECTRICAL SYSTEM TROUBLESHOOTING

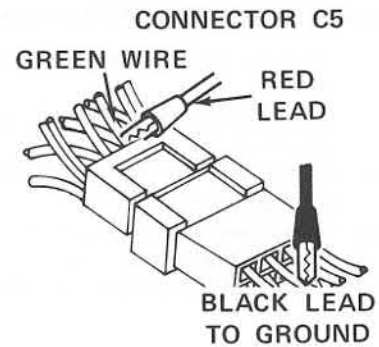
## EXTERIOR LIGHTS

- 4.a. Remove 5 screws thru steering column cover. Remove cover. Get volt-meter.
- b. Connect red meter lead to green wire in connector C5. Connect black lead to ground.

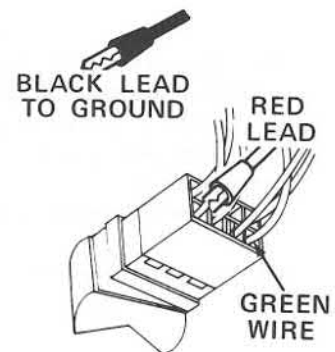
### NOTE

Connector C5 is an 8 pin connector.

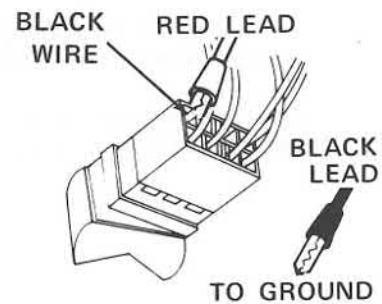
- c. If meter does not read voltage, go to step e.
- d. If meter reads voltage, check wire from connector to switch. If wire is good, replace switch.



- e. Pull outer lighting switch out. Connect red meter lead to green wire (terminal I) of switch. Connect black lead to ground.
- f. If meter does not read voltage, replace switch.
- g. If meter reads voltage, repair green wire from switch to connector C5.



- 5.a. Pull outer lighting switch out. Make sure wires do not touch panel.
- b. Get voltmeter. Connect red meter lead to terminal H (black wire) of switch. Connect black lead to ground.
- c. If meter does not read voltage, go to step e.
- d. If meter reads voltage, replace switch.

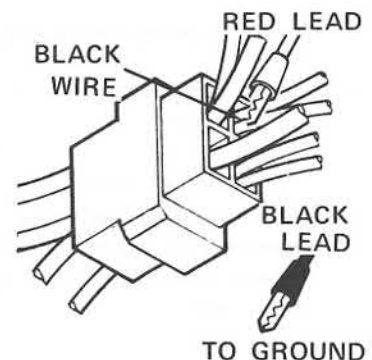


- e. Remove 5 screws thru steering column cover. Remove cover.
- f. Connect red meter lead to black wire in connector C12. Connect black lead to ground.

### NOTE

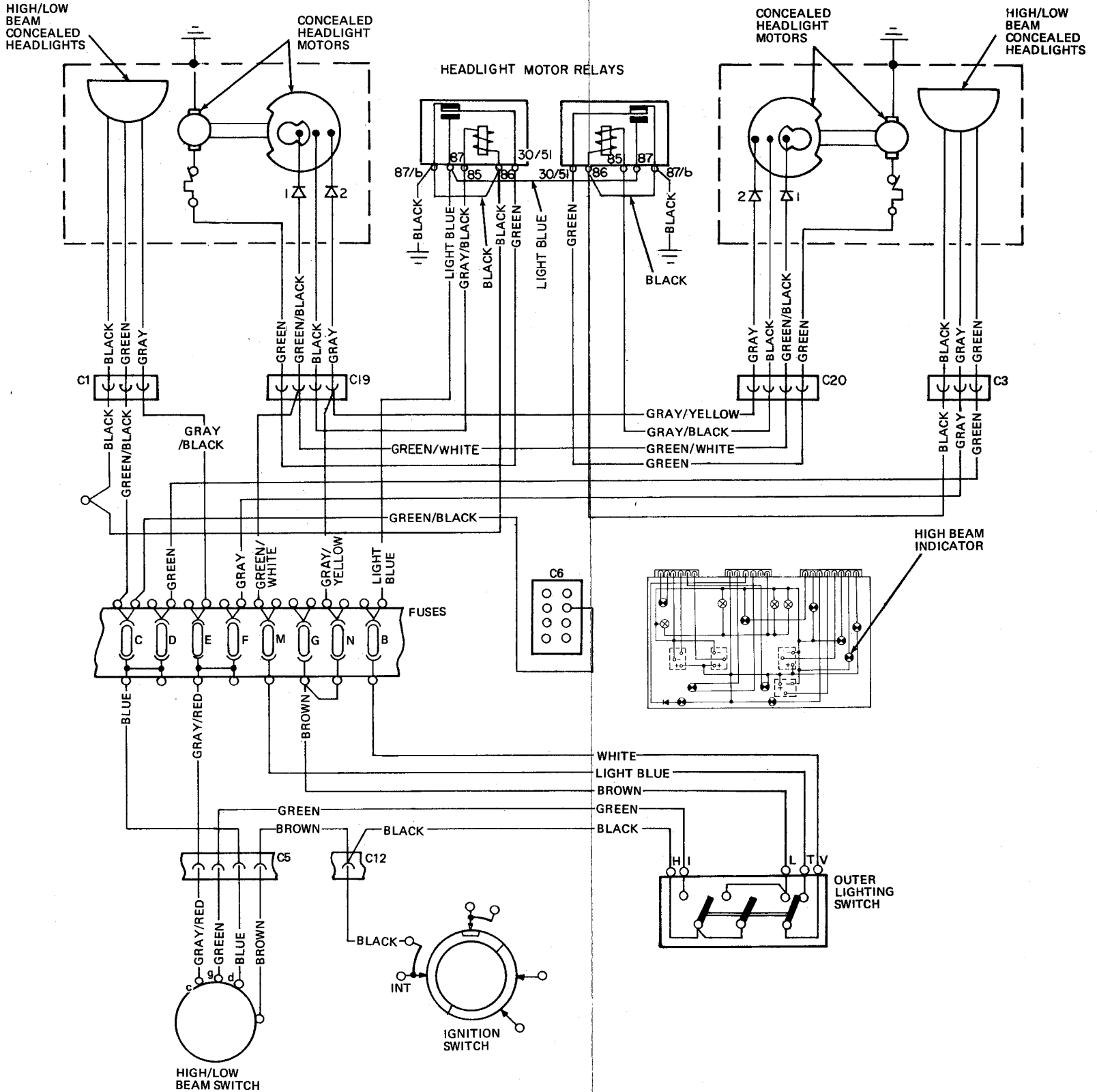
Connector C12 is a 4 pin connector.

- g. If meter reads voltage, check wire and connector for ignition switch. If good, replace ignition switch.
- h. If meter reads voltage, repair black wire from connector C5 to outer lighting switch.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## EXTERIOR LIGHTS

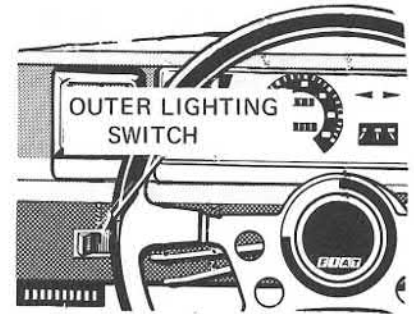




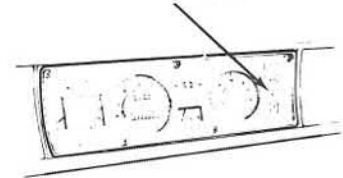
## EXTERIOR LIGHTS

### PARKING LIGHTS, SIDE MARKER LIGHTS, AND LICENSE PLATE LIGHTS WILL NOT WORK/PARKING LIGHT INDICATOR OUT

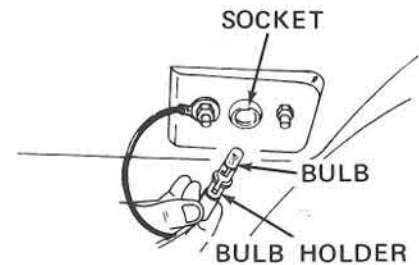
- 1.a. Turn outer lighting switch on. Check parking lights, side marker lights, and parking light indicator.
- b. If only one bulb is out, go to step 2.
- c. If all lights are out, check headlights. If headlights are out, troubleshoot LOW BEAMS. If headlights are on, go to step 3.
- d. If any combination or all of the left rear side marker and parking lights, right license plate light and right front parking light and side marker light are out, go to step 4.
- e. If any combination or all of the right side marker and parking lights, left license plate light and left front parking and side marker lights are out go to step 5.
- f. If only parking light indicator light is out, go to step 6.



PARKING LIGHT INDICATOR

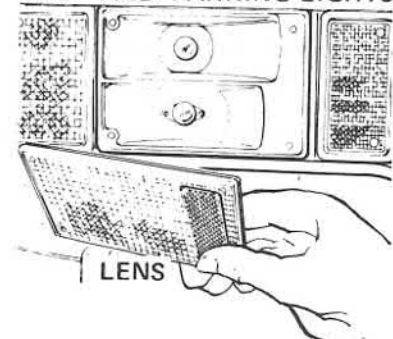


- 2.a. The rear side marker lights are reached from inside the trunk.
- b. Pull bulb holder out of fender. Pull bulb out of holder. Replace bulb.
- c. If new bulb will not work, go to step m.
- d. The front side marker lights are reached from inside the headlight motor compartment.
- e. Pull bulb holder out of fender. Pull bulb out of holder. Replace bulb.
- f. If new bulb will not work, go to step m.



- g. Rear parking and stop bulbs can be reached by removing 4 screws and the lens.
- h. Replace the parking light bulb. If bulb still does not work, go to step m.

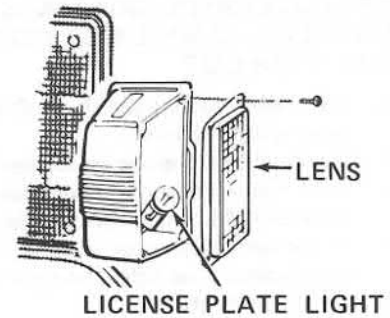
STOP AND PARKING LIGHTS



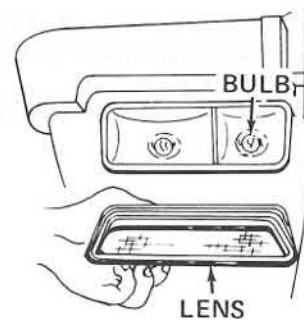
# ELECTRICAL SYSTEM TROUBLESHOOTING

## EXTERIOR LIGHTS

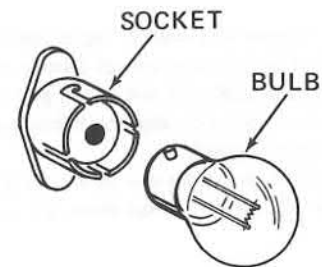
- i. The license plate light bulbs can be reached by removing the screw and pulling the lens out.
- j. Replace the bulb. If the bulb will not work, go to step m.



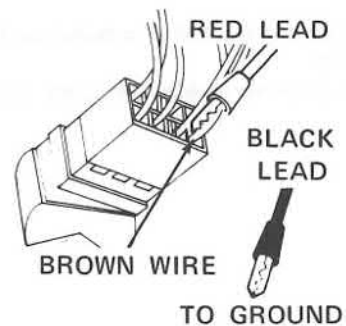
- k. The front parking lights can be reached by removing 2 screws and the lens.
- l. Replace the bulb. If the bulb still does not work, go to step m.



- m. If bulb did not work, check socket for dirt, corrosion, or defect. Check wires to next light for break. Repair or replace any damaged part.



- 3.a. Pull outer lighting switch out of dash panel. Make sure wires do not touch switch housing.
- b. Get voltmeter. Connect red meter lead to terminal L (brown wire) of switch. Connect black lead to ground.
- c. If meter reads voltage, repair brown wire from switch to fuse box.
- d. If meter does not read voltage, replace outer lighting switch.

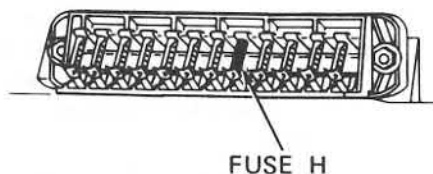


## EXTERIOR LIGHTS

- 4.a. If all left rear side marker and parking lights, right license plate light and right front parking and side marker lights are out, check fuse H. Replace fuse if blown.
- b. If fuse is good, repair yellow/red wire from fuse box to connector C14.

**NOTE**

Connector C14 is a red 8 pin connector. It is behind center console.

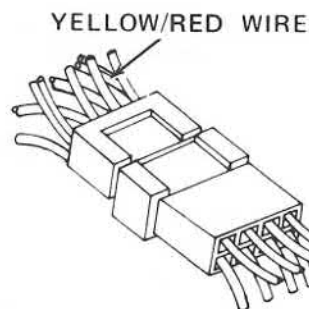


- c. If left rear side marker and parking lights and right license plate light are out, find connector C14.

**NOTE**

Connector C14 is a red 8 pin connector. It is behind center console.

- d. Check connector for tightness. If connector is good, repair yellow/red wire from connector C14 to side marker.
- e. If left rear parking light and right license plate light are out, repair yellow/red wire from side marker to parking light.



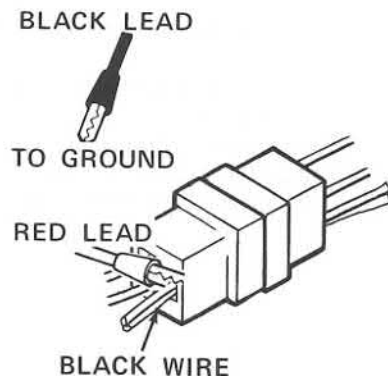
CONNECTOR C14

- f. If right front parking and side marker lights are out, check connector C4 for tightness.

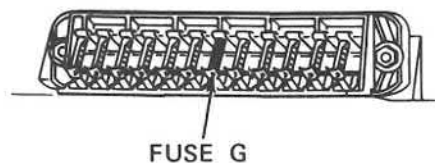
**NOTE**

Connector C4 is a 3 pin connector. It is in the left headlight motor compartment.

- g. If connector is good, get ohmmeter. Connect red meter lead to black wires in connector. Connect black lead to ground.
- h. If meter reads 3 ohms or less, repair yellow/red wire from connector C4 to connector C14.
- i. If meter reads more than 3 ohms, repair black wire from connector C4 to connector for headlight.



- 5.a. If all the right rear side marker and parking lights, left license plate light, parking light indicator, and left front side marker and parking lights are out, check fuse G. Replace fuse G if blown.



# ELECTRICAL SYSTEM TROUBLESHOOTING

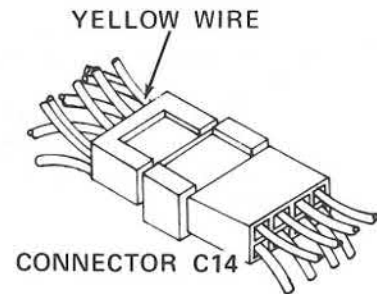
## EXTERIOR LIGHTS

- b. If right rear side marker and parking lights and left license plate light are out, check connector C14 for tightness. If connector is good, repair yellow wire from fuse box to connector C14.

**NOTE**

Connector C14 is a red 8 pin connector. It is behind center console.

- c. If right rear parking light and side marker light are out, repair yellow/black wire from right license plate light to parking light.



- d. If parking light indicator and left front parking and side marker lights are out, repair yellow/black wire from fuse box to connector C6.

**NOTE**

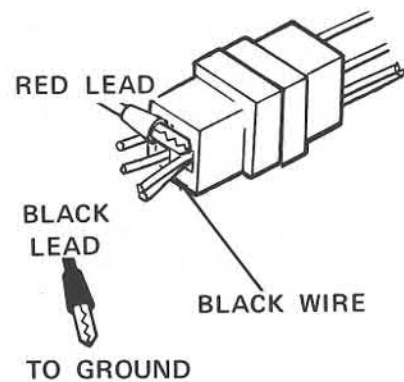
Connector C6 is an 8 pin connector for the instrument panel.

- e. If indicator is lit and other lights are out, check connector C2 for tightness.

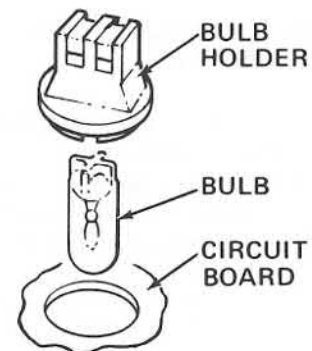
**NOTE**

Connector C2 is a 3 pin connector. It is in left headlight motor compartment.

- f. If connector is good, get ohmmeter. Connect red meter lead to black wires in connector. Connect black lead to ground.
- g. If meter reads 3 ohms or less repair yellow/black wire from connector C2 to connector C6. If meter reads more than 3 ohms, repair black wire from connector C2 to headlight connector.



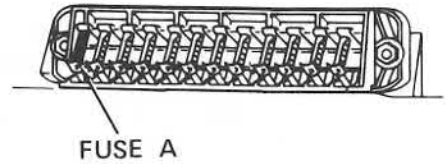
- 6.a. If indicator light is out, remove 5 screws thru instrument panel. Pull panel out.
- b. Disconnect 3 connectors and speedometer cable from panel.
- c. Turn socket to left and remove bulb holder from panel. Pull bulb out. Replace bulb. Install bulb holder.
- d. Connect connectors to panel. Check indicator. If indicator is lit, install panel. If light is not lit, check circuit board and connector for defects.



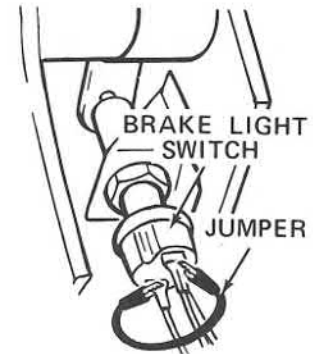
## EXTERIOR LIGHTS

### BRAKE LIGHTS WILL NOT WORK

- 1.a. If only one light is out, go to step 2. If both lights are out, check fuse A. If fuse is blown, replace it.
- b. If fuse is good, turn on directional lights. If lights do not work, repair orange wire from fuse box to brake switch.



- c. Go to brake light switch mounted above brake pedal. Connect jumper between terminals on switch.
- d. Turn on ignition switch. If brake lights work, replace brake light switch.

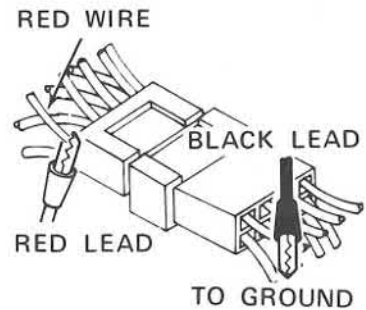


- e. Find connector C14. Get voltmeter.

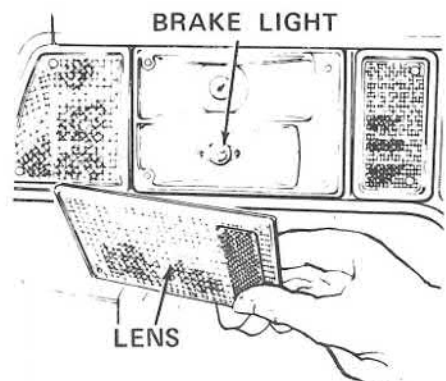
**NOTE**

Connector C14 is a red 8 pin connector. It is behind center console.

- f. Connect red meter lead to red wire in connector. Connect black lead to ground.
- g. If meter reads voltage, repair red wire from connector C14 to left brake light.
- h. If meter does not read voltage, check connector C14 for defects. If connector is good, repair red wire from connector to brake light switch.



- 2.a. Remove 4 screws and lens from parking light. Remove bulb. Install new bulb.
- b. If light works, install 4 screws and lens.
- c. If light does not work, remove bulb. Check that brass terminal inside socket and wall of socket are bright and shiny. If not clean them.
- d. If light still does not work, check red wire connection to socket. If right brake light does not work, check red wire from left brake light.

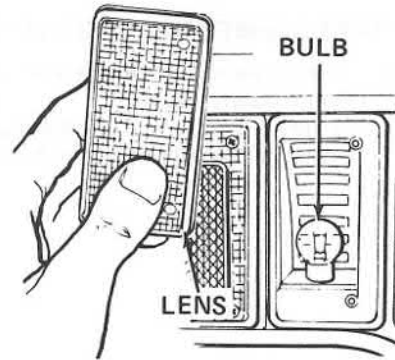


# ELECTRICAL SYSTEM TROUBLESHOOTING

## EXTERIOR LIGHTS

### BACK-UP LIGHTS DO NOT WORK

- 1.a. If both lights are out, go to step 2.
- b. If only one light is out, remove 2 screws and lens. Turn bulb to left and remove it.
- c. Install new bulb. If bulb lights, install lens. If light does not work, check bulb holder for defects.

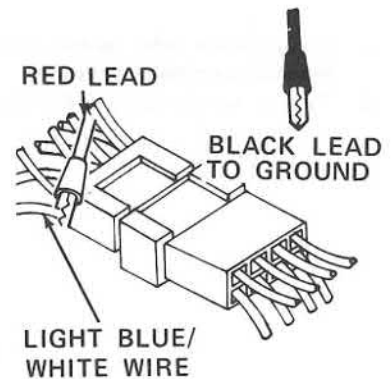


- 2.a. If both lights are out, check fuse A. If fuse is blown, replace it.
- b. If fuse is good, get voltmeter. Connect red meter lead to light blue/white wire in connector C14. Connect black lead to ground.

#### NOTE

Connector C14 is a red 8 pin connector. It is behind center console.

- c. If meter reads voltage, go to step d. If meter does not read voltage, repair light blue/white wire from connector C14 to fuse box.

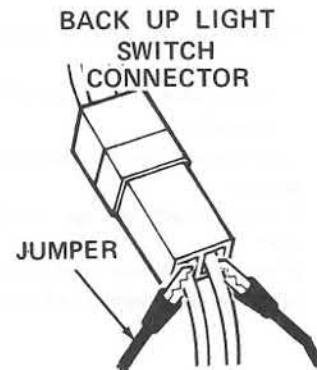


- d. Locate connector for back-up light switch. Get jumper.

#### NOTE

Connector for back-up light switch is located on left forward side of transmission. It is a 2 pin connector.

- e. Connect jumper to wires in switch. If light works, check wires to switch. If wires are good, replace switch.
- f. If light does not work, repair light blue/white wire from connector to light on left side.



## EXTERIOR LIGHTS

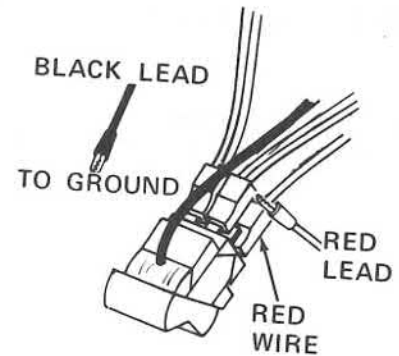
### VEHICLE WARNING LIGHTS WILL NOT WORK

- 1.a. If only one light is out, go to DIRECTIONAL LIGHTS troubleshooting.
- b. If all lights are not flashing, go to step 2.
- c. If lights on one side are not working, turn on directional lights for that side.
- d. If directional lights are not working, go to DIRECTIONAL LIGHTS troubleshooting. If lights are working, go to step 3.

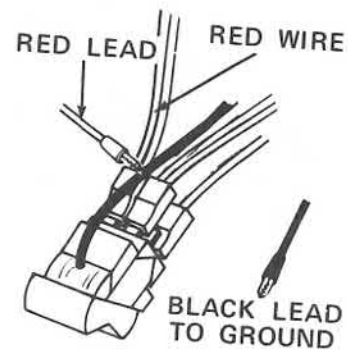


HAZARD WARNING SWITCH

- 2.a. Check fuse I. Replace fuse if blown.
- b. Get voltmeter. Connect red meter lead to terminal H (red wire) of hazard switch. Connect black lead to ground.
- c. If meter reads voltage, go to step e.
- d. If meter does not read voltage, check cigar lighter for operation. If lighter works, repair red wire from lighter to switch. If lighter does not work, repair red wire from lighter to fuse box.



- e. Connect red meter lead to terminal V (red wire) of switch. Connect black lead to ground.
- f. If meter does not read voltage, replace hazard switch.

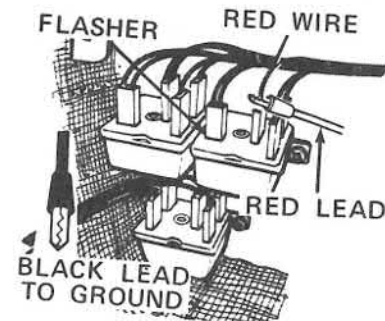


- g. If meter reads voltage, go to hazard warning light flasher.

#### NOTE

Flasher is located forward of fuse box under rug.

- h. Connect red meter lead to terminal P (red wire) of flasher. Connect black lead to ground.
- i. If meter reads voltage, replace flasher. If meter does not read voltage, repair red wire from flasher to switch.



# ELECTRICAL SYSTEM TROUBLESHOOTING

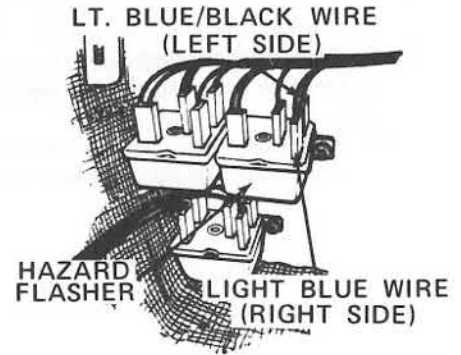
## EXTERIOR LIGHTS

- 3.a. Get voltmeter. Go to hazard flasher.

### NOTE

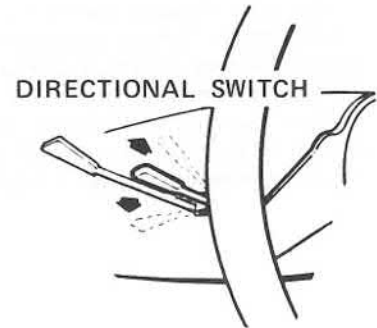
Flasher is located forward of fuse box under rug.

- b. Connect red meter lead to terminal 2 (light blue/black) for left side or terminal 5 (light blue) for right side. Connect black lead to ground.
- c. If meter reads voltage, repair light blue/black wire (left side) or light blue wire (right side) from flasher to connector C5.
- d. If meter does not read voltage, replace flasher.

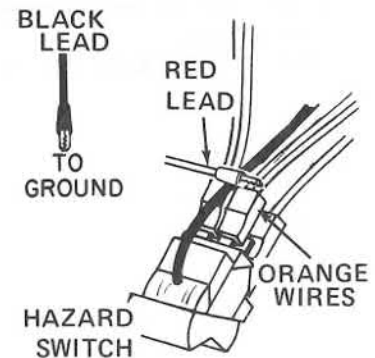


## DIRECTIONAL LIGHTS WILL NOT WORK

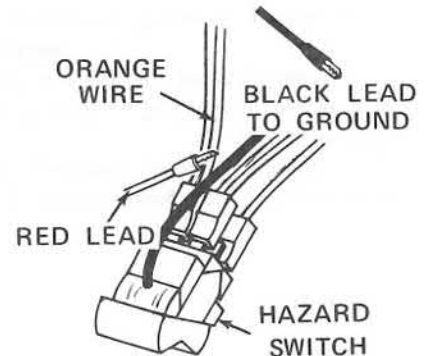
- 1.a. Turn ignition switch on. Set directional switch for one side and then the other.
- b. If none of the directional lights are working, go to step 2.
- c. If only one side is not working, go to step 4.
- d. If only one light is not working, go to step 5.



- 2.a. Check brake lights. If brake lights do not work, go to BRAKE LIGHTS troubleshooting.
- b. If lights work, pull hazard switch out. Get voltmeter.
- c. Connect red meter lead to terminal 1 (2 orange wires) of switch. Connect black lead to ground.
- d. If meter does not read voltage, repair orange wire from switch to stop light switch.



- e. If meter reads voltage, connect red meter lead to other orange wire at switch. Connect black lead to ground.
- f. If meter does not read voltage, replace hazard switch.





# ELECTRICAL SYSTEM TROUBLESHOOTING

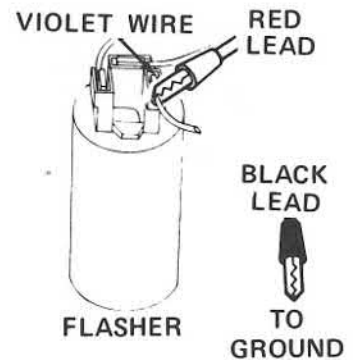
## EXTERIOR LIGHTS

- g. If meter reads voltage, go to directional flasher.

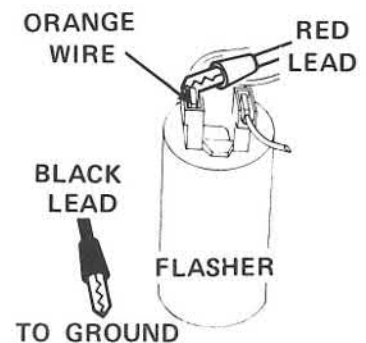
### NOTE

Flasher is located in a clip above fuse box.

- h. Connect red meter lead to terminal L (violet wire) of flasher. Connect black lead to ground.  
i. If meter reads voltage, go to step 3.



- j. If meter did not read voltage, connect red meter to terminal + (orange wire) of flasher. Connect black lead to ground.  
k. If meter reads voltage, replace flasher.  
l. If meter does not read voltage, repair orange wire from flasher to hazard switch.

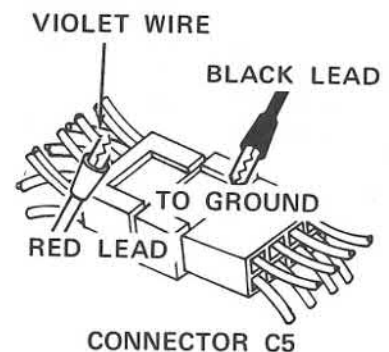


- 3.a. Remove 5 screws thru steering column cover. Remove cover.  
b. Connect red meter lead to violet wire in connect C5. Connect black lead to ground.

### NOTE

Connect C5 is an 8 pin connector.

- c. If meter reads voltage, check violet wire and connector from directional switch. If connector and wires are good, replace switch.  
d. If meter does not read voltage, repair violet wire from connector to flasher.



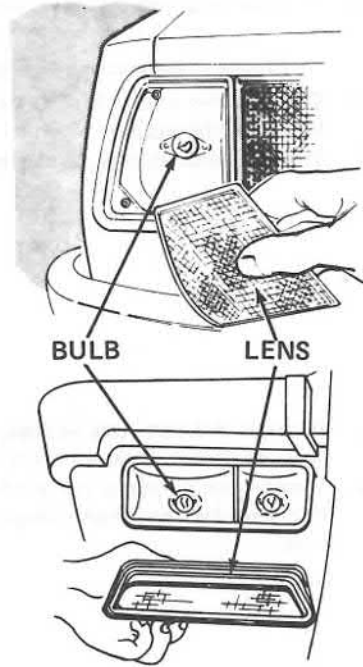
- 4.a. If one side is not working, turn hazard switch on.  
b. If lights are working, check connector C5 and wires from directional switch. If connector and wires are good, replace switch.  
c. If lights do not work, repair light blue/black wire (left side) or light blue wire (right side) from connector C5 to connector C14.



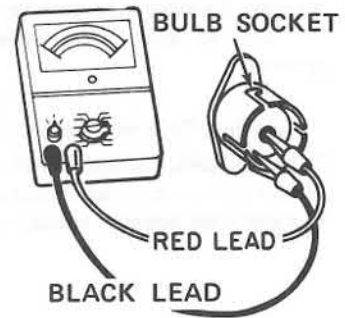
# ELECTRICAL SYSTEM TROUBLESHOOTING

## EXTERIOR LIGHTS

- 5.a. If one light is out, remove 2 screws thru lens (rear lights) or 4 screws (front lights). Remove lens. Replace bulb.
- b. Try lights. If working, install lens.
- c. If not working, turn on parking lights. If parking lights do not work, ground wire or ground connection is bad. Troubleshoot PARKING LIGHTS.

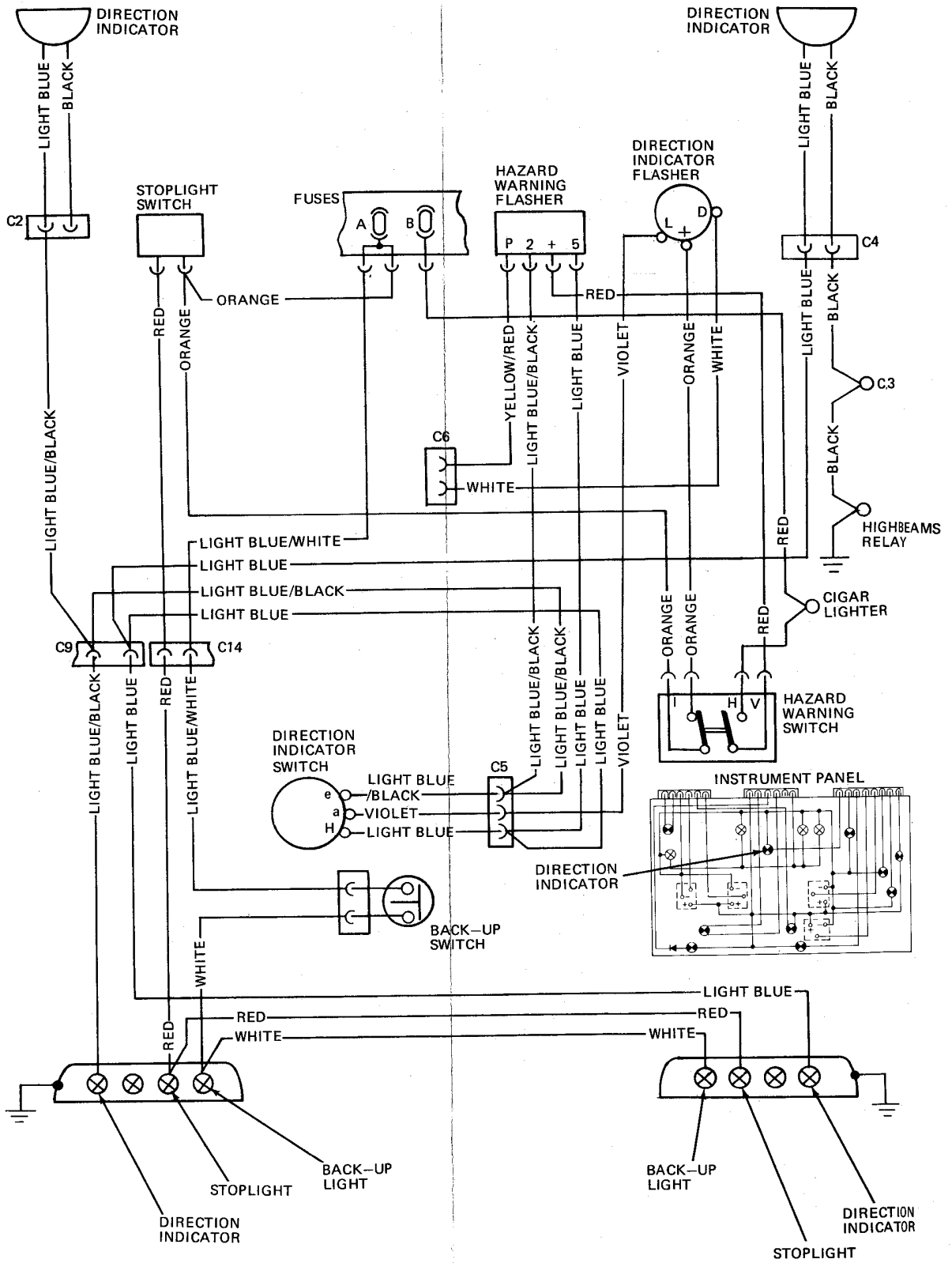


- d. If parking lights work, remove bulb. Get voltmeter. Hold red meter lead to center contact. Hold black lead to ground.
- e. If meter reads voltage, replace socket.
- f. If meter does not read voltage, repair wire from socket to connector.



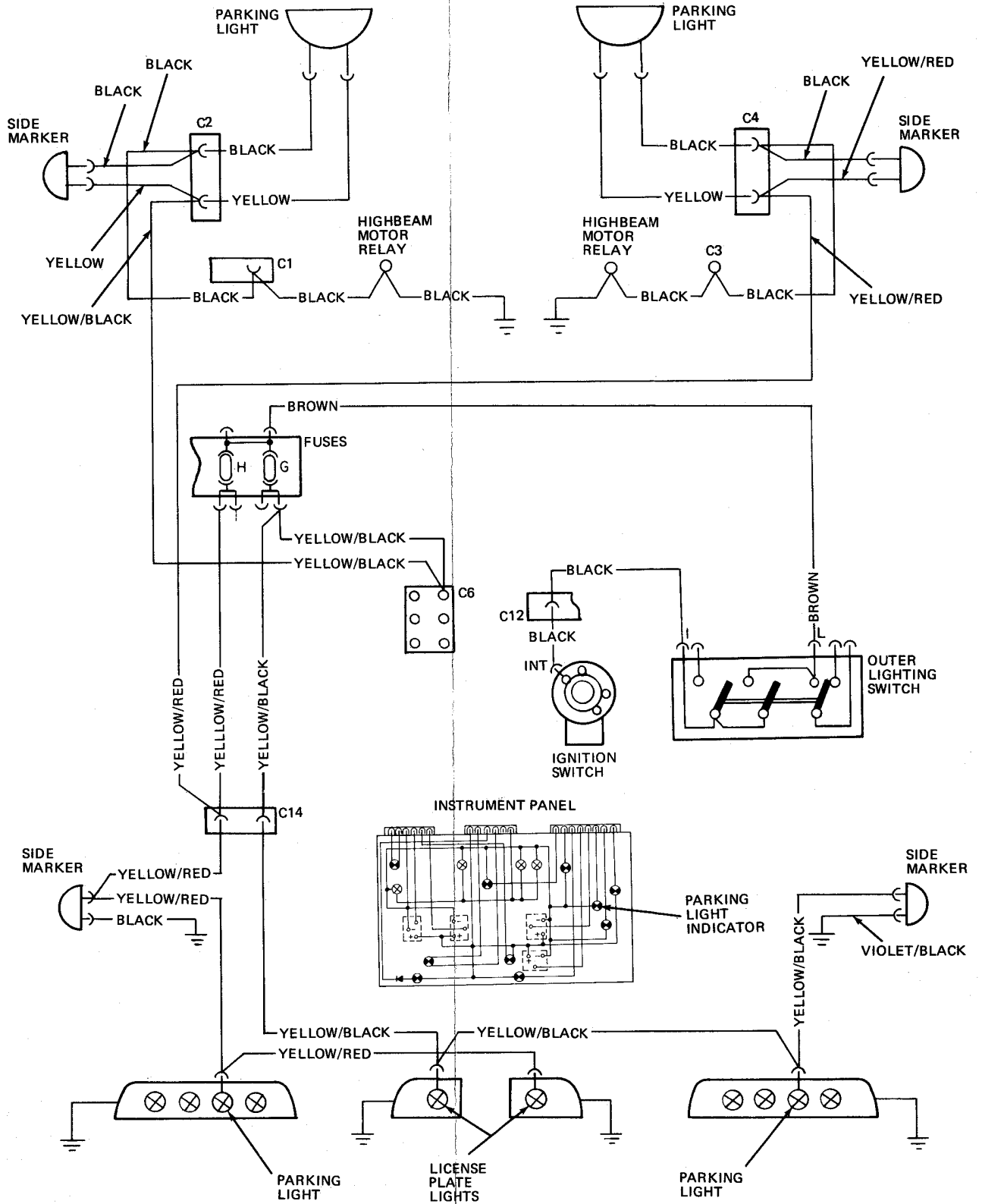
# ELECTRICAL SYSTEM TROUBLESHOOTING

## EXTERIOR LIGHTS



# ELECTRICAL SYSTEM TROUBLESHOOTING

## EXTERIOR LIGHTS

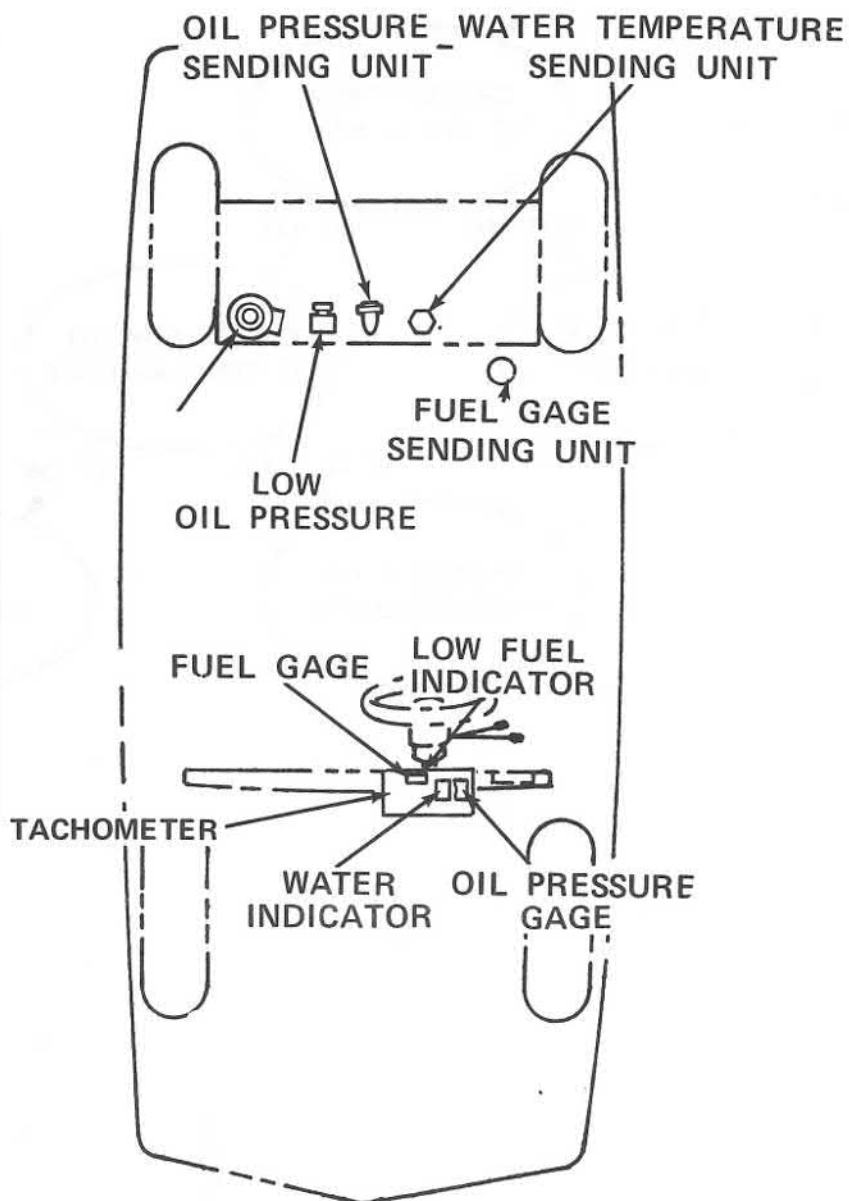


# ELECTRICAL SYSTEM TROUBLESHOOTING

## INSTRUMENTS

### TABLE OF CONTENTS

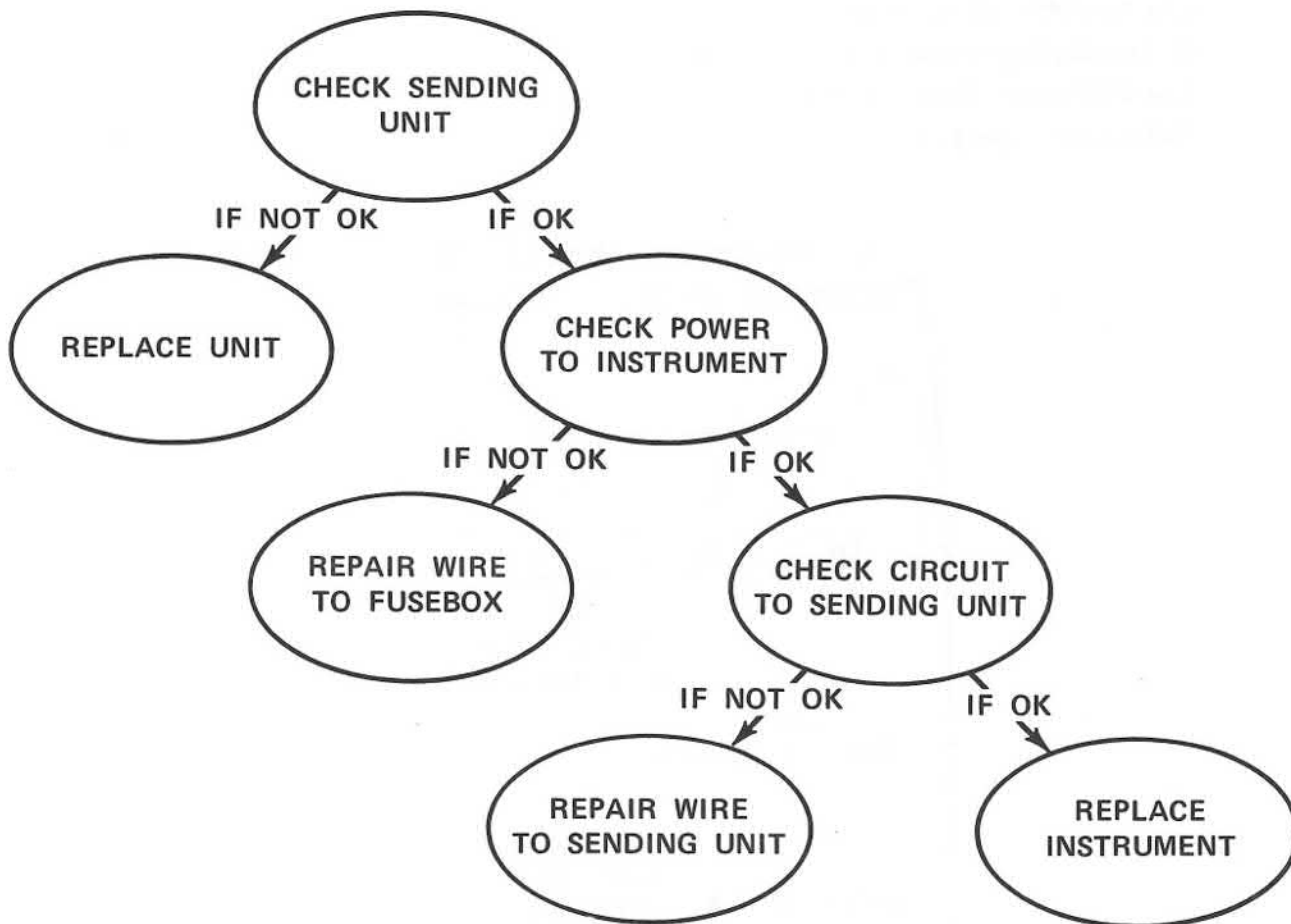
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Oil Pressure Gage Inoperative	322
Low Oil Pressure Warning Inoperative	324
Tachometer Inoperative	325



# ELECTRICAL SYSTEM TROUBLESHOOTING

## INSTRUMENTS

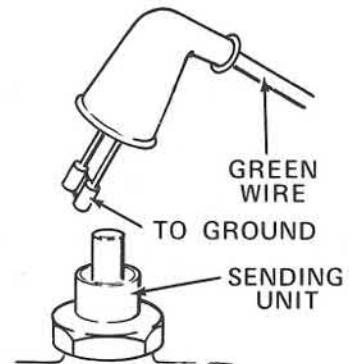
## INSTRUMENTS



## INSTRUMENTS

### TEMPERATURE GAGE INOPERATIVE

- 1.a. Check indicators in instrument panel. If indicators are not working, replace fuse A.
- b. Disconnect green wire from sending unit. Touch wire to ground. Check gage.
- c. Gage should read cold with wire disconnected and hot with wire touched to ground.
- d. If gage works properly, replace sending unit.

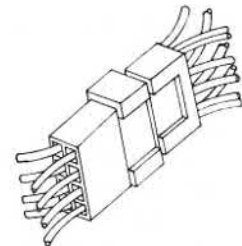


- e. If gage does not work properly, locate connector C13. Get jumper.

#### NOTE

Connector C13 is a white 8 pin connector. It is behind center console.

- f. If gage reads cold all the time, go to step 2. If gage reads hot, disconnect connector C13.
- g. Check gage. If gage moves to cold, repair green wire from connector C13 to sending unit.



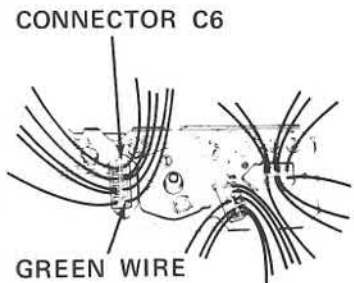
CONNECTOR C13

- h. If gage does not move to cold, connect connector C13.
- i. Remove 5 screws thru instrument panel. Pull panel out. Disconnect connector C6.

#### NOTE

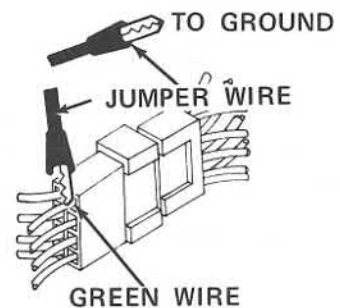
Connector C6 is an 8 pin connector.

- j. If gage moves to cold, repair green wire from connector C6 to connector C13.
- k. If gage does not move, check connector, and circuit board for defects. If connector and board are good, replace temperature gage.



INSTRUMENT PANEL

- 2.a. Connect jumper between green wire in connector C13 and ground.
- b. If gage moves toward hot, repair green wire from connector C13 to sending unit.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## INSTRUMENTS

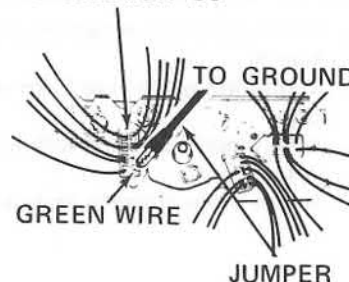
- c. If gage does not move, connect connector C13. Remove 5 screws thru instrument panel. Pull panel out.
- d. Connect jumper to green wire in connector C6.

### NOTE

Connector C6 is an 8 pin connector.

- e. If gage moves toward hot, repair green wire from connector C6 to connector C13.
- f. If gage does not move, check connector C6, circuit board for defects. If connector and circuit board are good, replace temperature gage.

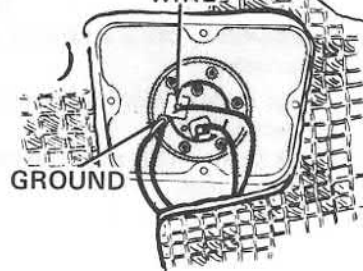
CONNECTOR C6



## FUEL GAGE INOPERATIVE

- 1.a. Check indicators in instrument panel. If indicators are not working, replace fuse A.
- b. If gage reads empty, make sure tank is full.
- c. Disconnect 4 hoses from top of fuel tank on forward left side of engine compartment. Remove 4 screws thru cover. Remove cover.
- d. Disconnect light blue/yellow wire from terminal T of sending unit. Touch wire to ground. Check gage.
- e. Gage should read empty with wire disconnected and full with wire touched to ground. If gage reads properly, replace sending unit.

LIGHT BLUE/YELLOW WIRE



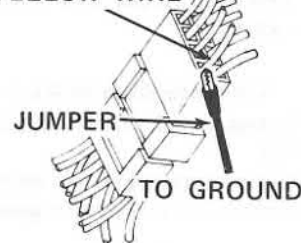
- f. If gage does not read properly, locate connector C13. Get jumper.

### NOTE

Connector C13 is a white 8 pin connector. It is behind center console.

- g. If gage reads full all the time, go to step 2. If gage reads empty, connect jumper to light blue/yellow wire in connector and to ground.
- h. If gage moves toward full, repair light blue/yellow wire from connector C13 to sending unit.

LIGHT BLUE/YELLOW WIRE



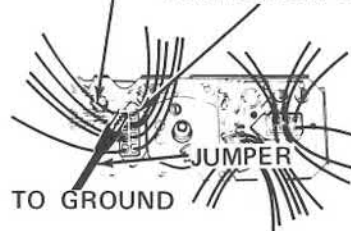
- i. If gage does not move, connect connector C13. Remove 5 screws thru instrument panel. Pull panel out.
- j. Connect jumper to light blue/yellow wire in connector C6 and to ground.

### NOTE

Connector C6 is an 8 pin connector.

- k. If gage moves toward full, repair light blue/yellow wire from connector C6 to connector C13.
- l. If gage does not move, check connector and circuit board for defects. If connector and circuit board are good, replace fuel gage.

LIGHT BLUE/YELLOW WIRE  
CONNECTOR C6

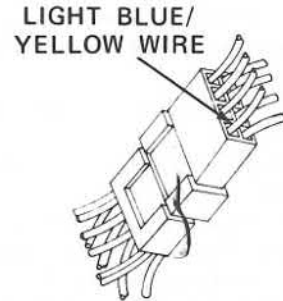




# ELECTRICAL SYSTEM TROUBLESHOOTING

## INSTRUMENTS

- 2.a. Disconnect connector C13. Check gage.
- b. If gage moves toward empty, repair light blue/yellow wire from connector C13 to sending unit.



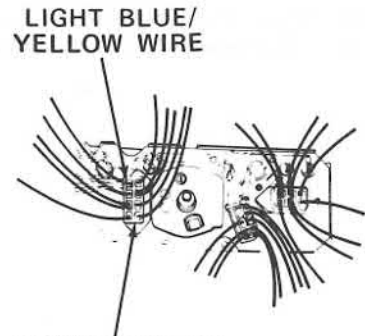
CONNECTOR C13

- c. If gage does not move, connect connector. Remove 5 screws thru instrument panel. Pull panel out.
- d. Disconnect Connector C6. Check gage.

### NOTE

Connector C6 is an 8 pin connector.

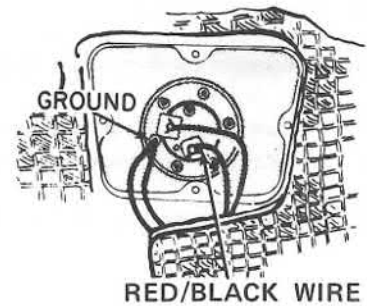
- e. If gage moves toward empty, repair light blue/yellow wire from connector C6 to Connector C13.
- f. If gage does not move, check circuit board for defects. If circuit board is good, replace fuel gage.



CONNECTOR C6

## LOW FUEL WARNING INOPERATIVE

- 1.a. Disconnect 4 hoses from top of fuel tank. Remove 4 screws thru cover. Remove cover.
- b. Disconnect red/black wire from terminal W of sending unit. Touch wire to ground. Check indicator.
- c. Warning light should go out with wire disconnected and come on with wire touched to ground.
- d. If light works properly, replace sending unit.



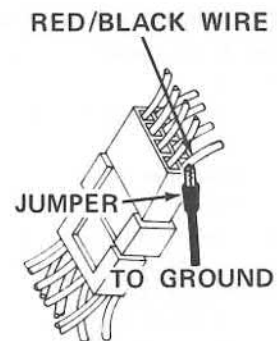
RED/BLACK WIRE

- e. If light did not work properly, locate connector C14. Get jumper.

### NOTE

Connector C14 is an 8 pin connector. It is behind center console.

- f. If light is on all the time, go to step 2. If light is off, connect jumper to red/black wire in connector and to ground.
- g. If light comes on repair red/black wire from connector C14 to sending unit.

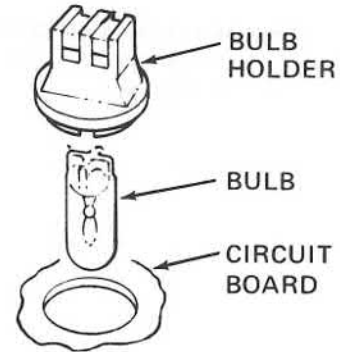


TO GROUND

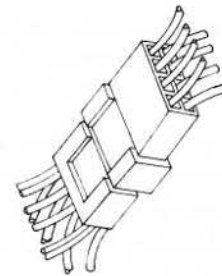
# ELECTRICAL SYSTEM TROUBLESHOOTING

## INSTRUMENTS

- h. If light did not come on, connect connector. Remove 5 screws thru instrument panel. Pull panel out. Disconnect speedometer cable and three connectors.
- i. Turn bulb holder for warning light to left and remove bulb. Install new bulb.
- j. Connect connectors to instrument panel. Check light. If light is on, install instrument panel.
- k. If light is out check circuit board and connector for defects. If they are good, connect jumper to red/black wire in connector C6 and to ground.
- l. If light comes on repair red/black wire from connector C6 to connector C14. If light does not come on, replace bulb holder.



- 2.a. Disconnect connector C14. Check light.
- b. If light goes out, repair red/black wire from connector C14 to sending unit.



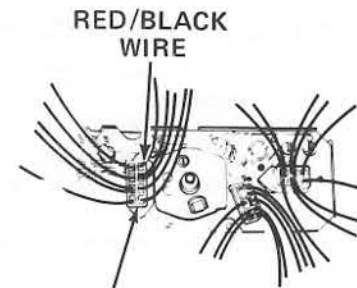
CONNECTOR C14

- c. If light did not go out, connect connector C14. Remove 5 screws thru instrument panel. Pull panel out.
- d. Disconnect connector C6. Check light.

### NOTE

Connector C6 is an 8 pin connector.

- e. If light goes out, repair red/black wire from connector C6 to connector C14.
- f. If light did not go out, check circuit board and bulb holder for defects.



CONNECTOR C6

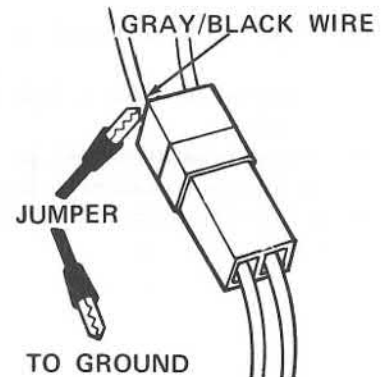
## OIL PRESSURE GAGE INOPERATIVE

- 1.a. Check indicators in instrument panel. If indicators are not working, replace fuse A.
- b. Locate connector for sending unit. Get jumper.

### NOTE

Connector is located on forward side of engine below distributor.

- c. Disconnect connector. Connect jumper to gray/black wire in connector and to ground.
- d. Check gage. Gage should move towards high pressure with wire jumped to ground and to low pressure with connector disconnected.
- e. If gage reads properly, replace sending unit.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## INSTRUMENTS

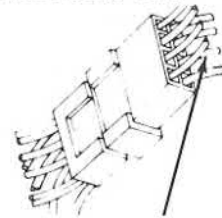
- f. If gage does not read properly, connect connector. Locate connector C13.

### NOTE

Connector C13 is a white 8 pin connector. It is behind center console.

- g. If gage reads high, disconnect connector. If gage moves towards low pressure, repair gray/black wire from connector C13 to connector for sending unit.

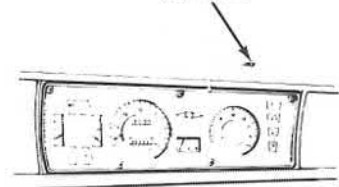
CONNECTOR C13



GRAY/BLACK WIRE

- h. If gage does not move, remove 5 screws thru instrument panel. Pull panel out.  
i. Disconnect connector C8. If gage moves, repair gray/black wire from gage to connector C13.  
j. If gage does not move, check connectors, circuit board, and gage. Replace defective part.

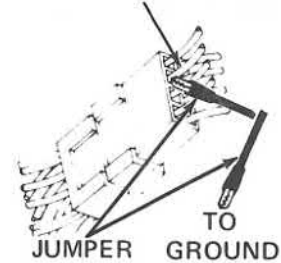
SCREW



INSTRUMENT PANEL

- 2.a. Connect jumper between gray/black wire in connector C13 and ground.  
b. If gage moves towards high pressure, repair gray/black wire from connector C13 to connector for sending unit.

GRAY/BLACK WIRE



JUMPER TO GROUND

- c. If gage did not move, remove 5 screws thru instrument panel. Pull panel out.  
d. Connect jumper between gray/black wire in connector C8 and ground.

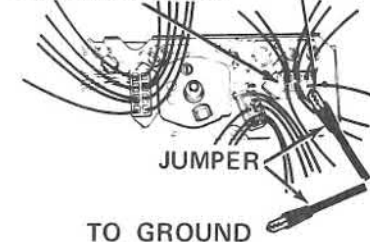
### NOTE

Connector C8 is a 6 pin connector.

- e. If gage moves towards high pressure, repair gray/black wire from connector C13 to connector C6.  
f. If gage does not move, check connector and circuit board for defects. If connector and board are good, replace oil pressure gage.

GRAY/BLACK WIRE

CONNECTOR C8



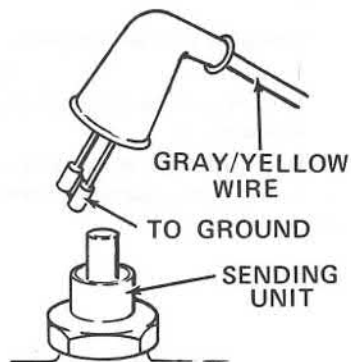
JUMPER TO GROUND

# ELECTRICAL SYSTEM TROUBLESHOOTING

## INSTRUMENTS

### LOW OIL PRESSURE WARNING INOPERATIVE

- 1.a. Check indicators in instrument panel. If indicators are not working, replace fuse A.
- b. Disconnect gray/yellow wire from sending unit. Touch wire to ground.
- c. Check indicator light. Light should be out with wire disconnected and on with wire touched to ground. If light works properly, replace sending unit.

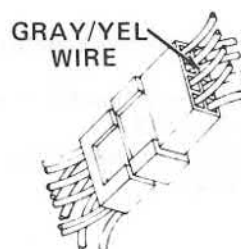


- d. If light does not work, locate connector C13. Get jumper.

#### NOTE

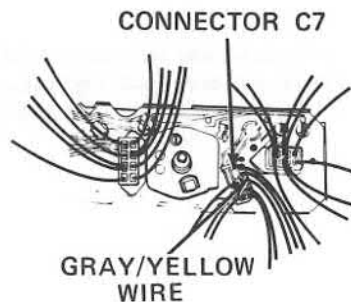
Connector C13 is a white 8 pin connector. It is behind center console.

- e. If light is out all the time, go to step 2. If light is on all the time, disconnect connector.
- f. If light goes out, repair gray/yellow wire from connector C13 to sending unit.



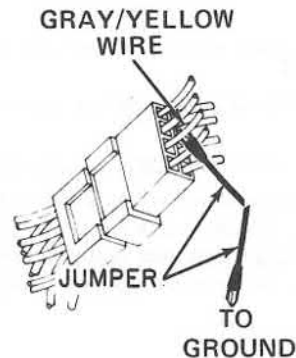
CONNECTOR C13

- g. If light stays on, remove 5 screws thru instrument panel. Pull panel out.
- h. Check connector C7, circuit board, and bulb holder for defects. If they are good, repair gray/yellow wire from connector C7 to connector C13.



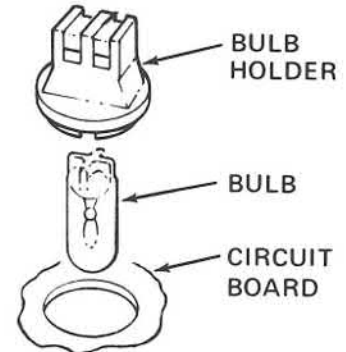
CONNECTOR C7

- 2.a. Connect jumper to gray/yellow wire in connector C13 and to ground.
- b. If light comes on, repair gray/yellow wire from connector C13 to sending unit.



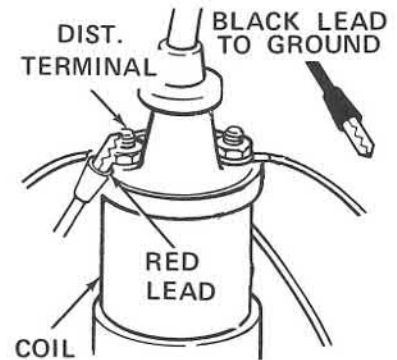
## INSTRUMENTS

- c. If light does not come on, remove 5 screws thru instrument panel. Pull panel out.
- d. Disconnect 3 connectors and speedometer cable from panel. Turn bulb holder for indicator light to left. Replace bulb.
- e. Connect connectors to panel. If light comes on install panel.
- f. If light does not come on, connect jumper to gray/yellow wire in connector C7 and to ground.
- g. If light comes on, repair gray/yellow wire from connector C7 to connector C13.
- h. If light does not come on, check connector and circuit board, and bulb holder for defects.



## TACHOMETER INOPERATIVE

- 1.a. Check other instruments. If not working, replace fuse A.
- b. If working, get voltmeter. Connect red meter lead to terminal D (brown/white wire) of coil. Connect black lead to ground.
- c. Start engine. Increase and decrease engine speed. Check that meter reading increases and decreases.
- d. If meter readings are good, go to step e. If readings are not good, check green/black wire to distributor.

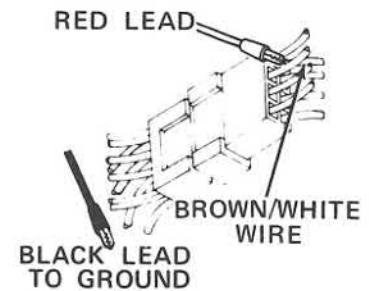


- e. Find connector C13. Connect red meter lead to brown/white wire in connector. Connect black lead to ground.

### NOTE

Connector C13 is a white 8 pin connector. It is behind center console.

- f. Increase and decrease engine speed. If meter readings increase and decrease go to step h.
- g. If readings are not good, repair brown/white wire from connector C13 to coil.

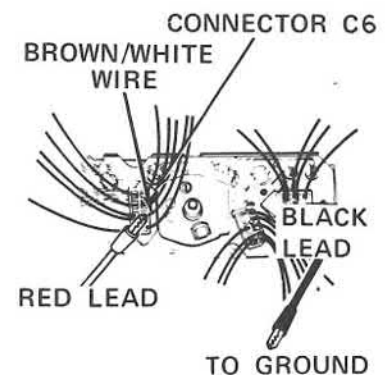


- h. Remove 5 screws thru instrument panel. Pull panel out. Connect red meter lead to brown/white wire in connector C6. Connect black lead to ground.

### NOTE

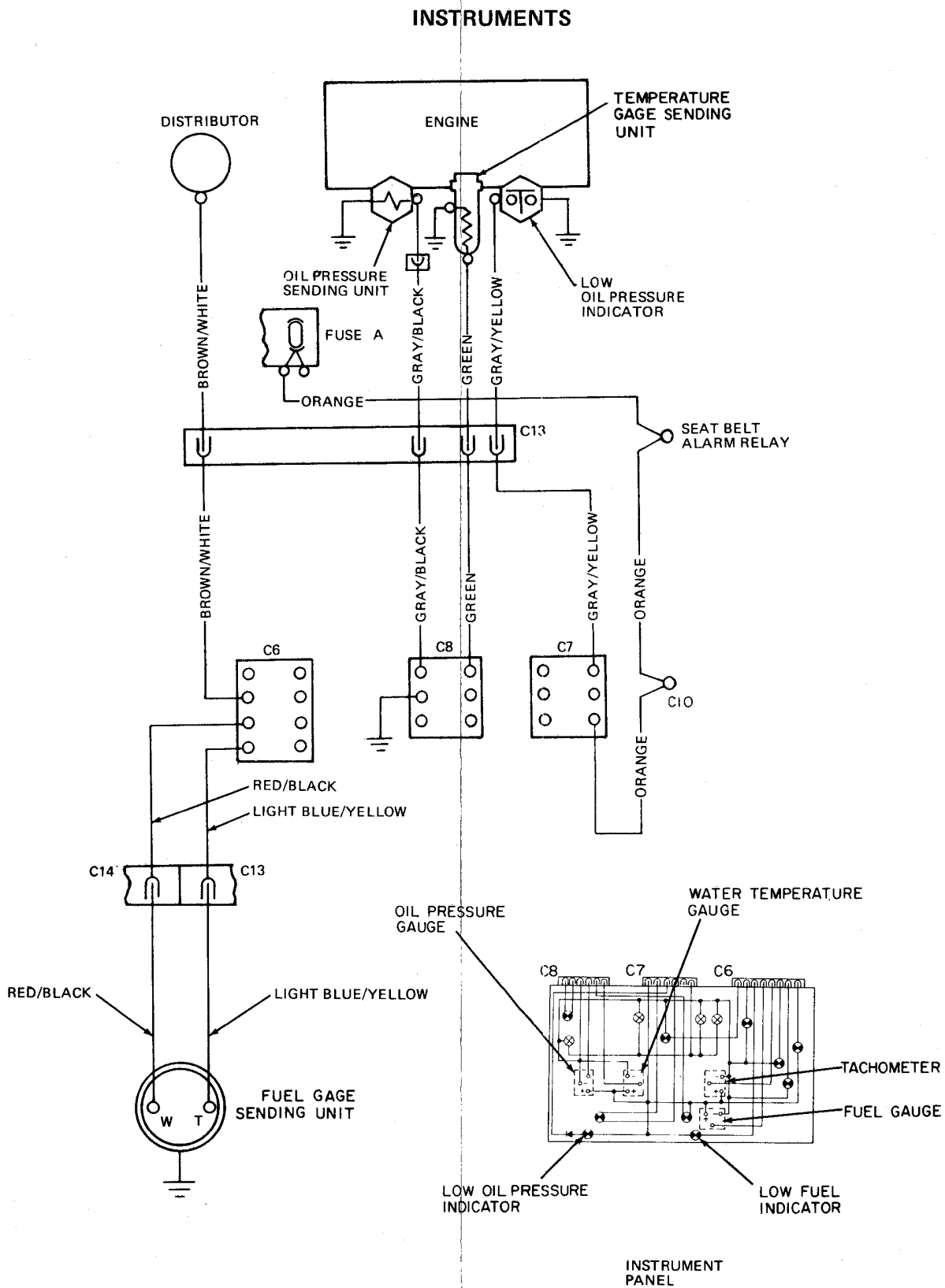
Connector C6 is an 8 pin connector.

- i. Increase and decrease engine speed. If meter readings increase and decrease check circuit board and connector for defects. If board and connector are good, replace tachometer.
- j. If readings are not good, repair brown/white wire from connector C6 to connector C13.





# ELECTRICAL SYSTEM TROUBLESHOOTING

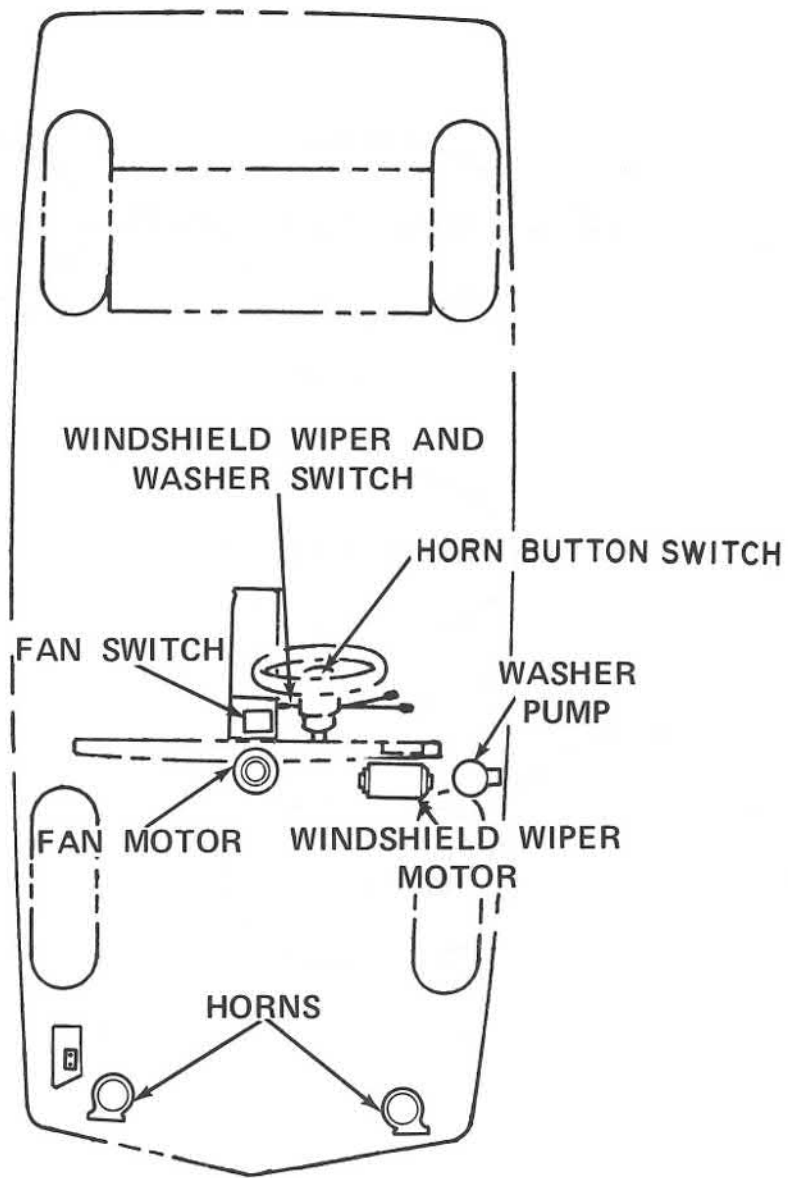


# ELECTRICAL SYSTEM TROUBLESHOOTING

## ACCESSORIES

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Windshield Washer Pump Will Not Work	333
Windshield Wipers Will Not Work	333
Heater Fan Will Not Work	335

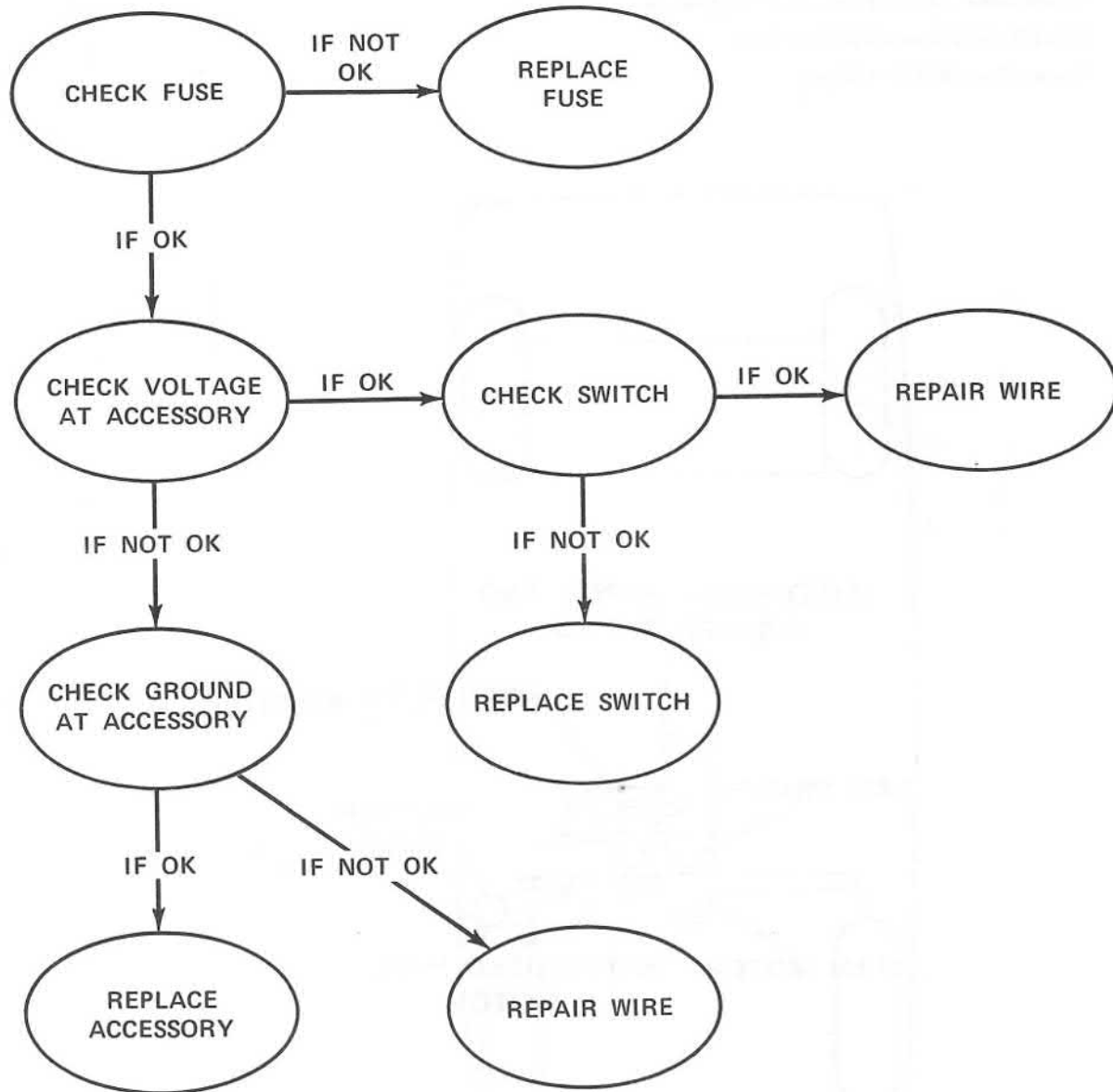




# ELECTRICAL SYSTEM TROUBLESHOOTING

## ACCESSORIES

## ACCESSORIES



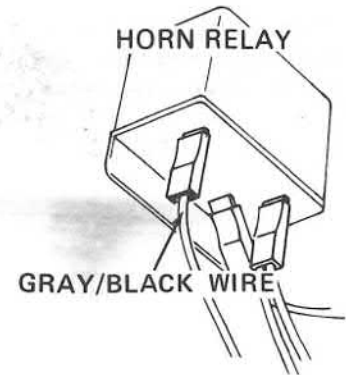
## ACCESSORIES

### HORN WILL NOT STOP BLOWING

- 1.a. Disassemble horn button and reassemble. Use new parts if necessary.
- b. If horns do not stop blowing, disconnect gray/black wire from terminal 3 of horn relay.
- c. If horns do not stop blowing, replace relay.

#### NOTE

Relay is located in right headlight motor compartment.



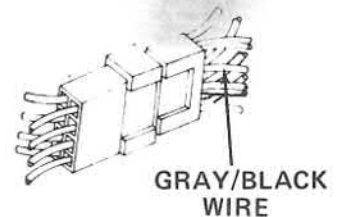
- d. If horns stop blowing, connect wire to relay.
- e. Remove 5 screws thru steering column cover. Remove cover.
- f. Disconnect connector C5. If horns do not stop blowing, repair gray/black wire from connector C5 to relay.

#### NOTE

Connector C5 is an 8 pin connector.

- g. If horns stop blowing, replace horn switch.

### CONNECTOR C5



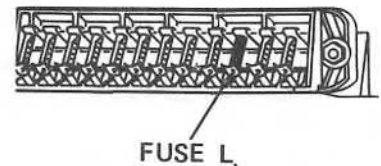
### HORNS WILL NOT BLOW

- 1.a. If only one horn will not blow, go to step 2.
- b. Check instrument panel lights. If lights will not work, repair black wire from connector C10 to ground.

#### NOTE

Connector C10 is located under steering column cover. It is a 6 pin connector.

- c. If both horns will not blow check fuse L. Replace fuse if blown.

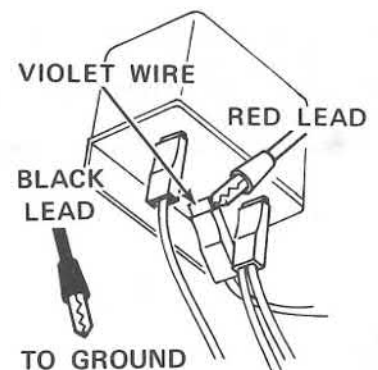


- d. If fuse is good, get voltmeter. Connect red meter lead to terminal 1 (violet wire) of horn relay. Connect black lead to ground.

#### NOTE

Horn relay is located in right headlight motor compartment.

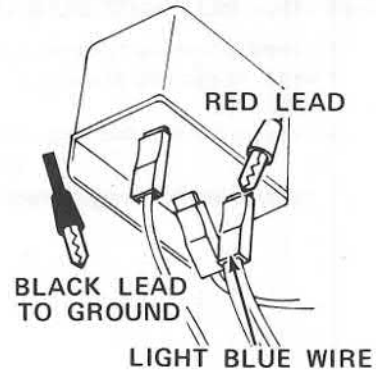
- e. If meter reads voltage go to step f. If meter does not read voltage, repair light blue wire from relay to fuse box.



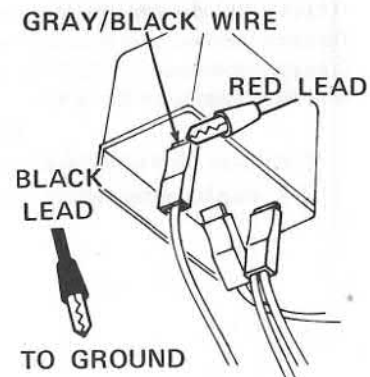
# ELECTRICAL SYSTEM TROUBLESHOOTING

## ACCESSORIES

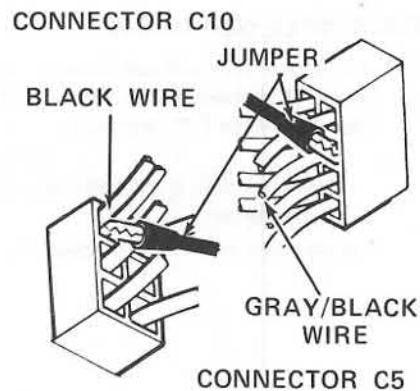
- f. Connect red meter lead to terminal 4 (light blue wires) of horn relay. Connect black lead to ground.
- g. If meter reads voltage, repair light blue wires from relay to horns.



- h. If meter does not read voltage, get ohmmeter. Connect red meter lead to terminal 3 (gray/black wire). Connect black lead to ground.
- i. Press horn button. If meter reads 5 ohms or less, replace relay.



- j. If meter reads more than 5 ohms, remove 5 screws thru steering column cover. Remove cover.
- k. Connect a jumper between gray/black wire in connector C5 and black wires in connector C10.



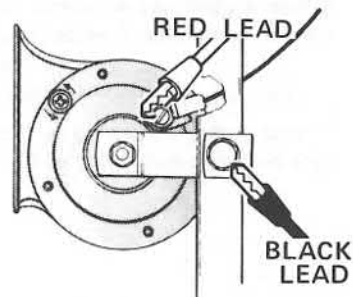
### NOTE

Connector C5 is an 8 pin connector. Connection C10 is a 6 pin connector.

- l. If horns blow, check gray/black wire from connector C5 and black/violet wire from connector C10 to horn button. Check horn button. Repair or replace parts or wires as necessary.
- m. If horns do not blow, repair gray/black wire from connector C5 to relay.

- 2.a. Get voltmeter. Connect red meter lead to terminal on horn. Connect black lead to ground. Press horn.

- b. If meter does not read voltage, repair wire from horn to relay.
- c. If meter reads voltage, remove horn and bracket. Check bracket, horn, and body for dirt or corrosion. If ground connection is good, replace horn.



## ACCESSORIES

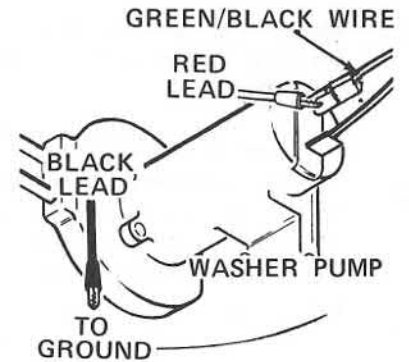
### WINDSHIELD WASHER PUMP WILL NOT WORK

- 1.a. Turn on windshield wipers. If wipers do not work go to WINDSHIELD WIPER.
- b. If wipers work, get voltmeter. Go to washer pump.

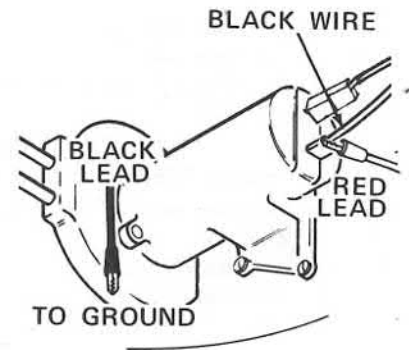
**NOTE**

Pump is located in front of windshield on left side.

- c. Connect red meter lead to green/black wire at pump. Connect black lead to ground. Operate washer switch.
- d. If meter reads voltage, go to step e. If meter does not read voltage, go to step 2.



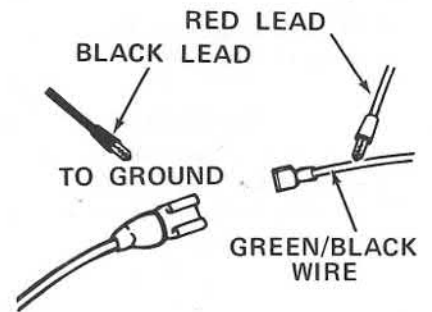
- e. Get ohmmeter. Connect red meter lead to black wire at pump. Connect black lead to ground.
- f. If meter reads 5 ohms or less, replace pump.
- g. If meter reads more than 5 ohms, repair black wire from pump to connector C18 for windshield wiper motor.



- 2.a. Remove 5 screws in steering column cover. Remove cover.
- b. Connect red meter lead to green/black wire in separate connector. Connect black lead to ground.
- c. If meter reads voltage, repair green/black wire from connector to pump.
- d. If meter does not read voltage, check green/black wire from connector to switch and yellow/black wire from connector C10 to switch. If wires are good, replace switch.

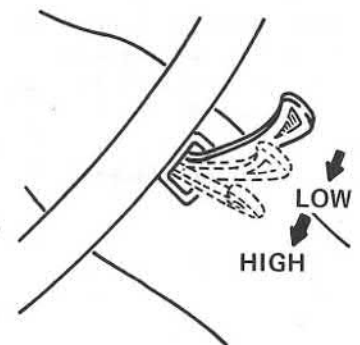
**NOTE**

Connector C10 is a 6 pin connector.



### WINDSHIELD WIPERS WILL NOT WORK

- 1.a. Set wiper switch to low speed. Set wiper switch to high speed.
- b. If wipers work in one speed but not the other, go to step 2.
- c. If wipers do not work at all, go to step 3.



# ELECTRICAL SYSTEM TROUBLESHOOTING

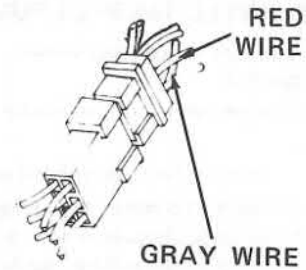
## ACCESSORIES

- 2.a. Remove 4 screws and bolt holding grill on left side in front of windshield.
- b. Disconnect connector C18. Get voltmeter. Set switch to speed that will not work.

### NOTE

Connector C18 is located under grill on left rear side of luggage compartment. It is a 6 pin connector.

- c. Connect red meter lead to red wire (low speed) or gray wire (high speed) in connector. Connect black lead to ground.
- d. If meter reads voltage, check wires to motor. If wires are good, replace motor.



CONNECTOR C18

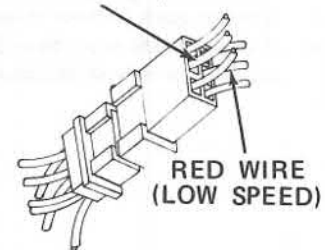
- e. If meter does not read voltage, remove 5 screws thru steering column cover. Remove cover.
- f. Connect red meter lead to red wire (low speed) or gray wire (high speed) in connector C10.

### NOTE

Connector C10 is a 6 pin connector.

- g. If meter does not read voltage, check wires to switch. If wires are good replace switch.
- h. If meter reads voltage, repair red wire (low speed) or gray wire (high speed) from connector C18 to wiper motor connector C18.

GRAY WIRE  
(HIGH SPEED)



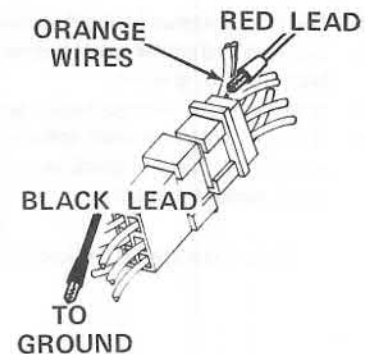
CONNECTOR C10

- 3.a. Remove 4 screws and bolt holding grill on left side in front of windshield. Remove grill.

### NOTE

Connector C18 is located under grill. It is a 6 pin connector.

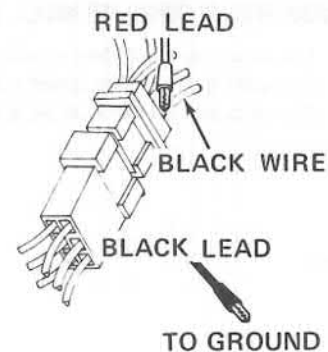
- c. Connect red meter lead to orange wires in connector. Connect black lead to ground.
- d. If meter reads voltage, go to step e. If meter does not read voltage, go to step j.



- e. Get ohmmeter. Connect red meter lead to black wire in connector. Connect black lead to ground.
- f. If meter reads more than 5 ohms, repair black wire from connector C18 to connector C8.

### NOTE

Connector C8 is a 6 pin connector for the instrument panel.



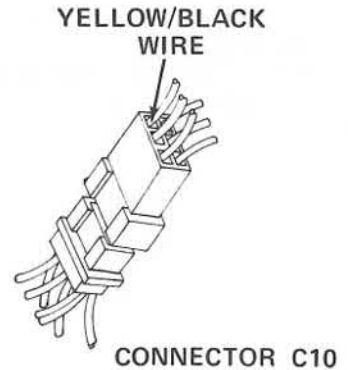
## ACCESSORIES

- g. If meter reads 5 ohms or less, remove 5 screws thru steering column cover. Remove cover.
- h. Check connector C10 and yellow/black wire from connector to switch for defects.

### NOTE

Connector C10 is a 6 pin connector.

- i. If connector and wire are good, replace switch.

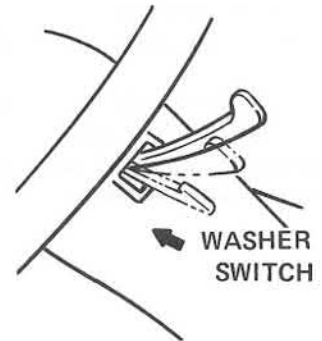


- j. Operate windshield washer. If washer works, repair orange wire from connector C10 to connector C18.

### NOTE

Connector C10 is a 6 pin connector. It is located under the steering column cover.

- k. If washer does not work, operate the seat belt system buzzer. If buzzer does not work, go to SEAT BELT INTERLOCK troubleshooting.
- l. If buzzer works, repair orange wire from terminal 86 of buzzer relay to connector C10.

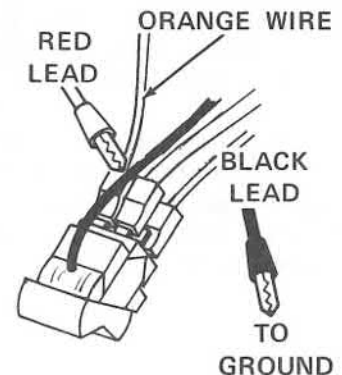


## HEATER FAN WILL NOT WORK

- 1.a. If fan works in one speed but not the other, go to step 2.
- b. If fan will not work, turn on hazard warning lights. If lights will not work, go to HAZARD WARNING LIGHTS troubleshooting.



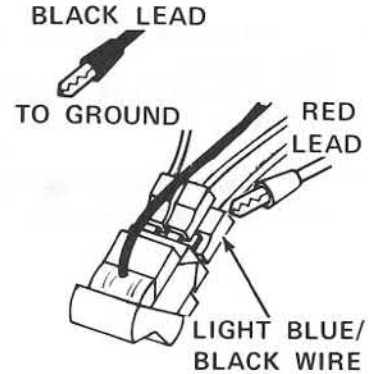
- c. If lights work, get voltmeter. Pull switch out. Make sure wires do not touch dash panel.
- d. Connect red meter lead to orange wire at switch. Connect black lead to ground.
- e. If meter reads voltage, go to step f. If meter does not read voltage, repair orange wire from switch to hazard warning switch.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## ACCESSORIES

- f. Connect red meter lead to light blue/black wire at switch. Connect black lead to ground.
- g. Set switch to low speed. If meter reads voltage, go to step h. If meter does not read voltage, replace fan switch.

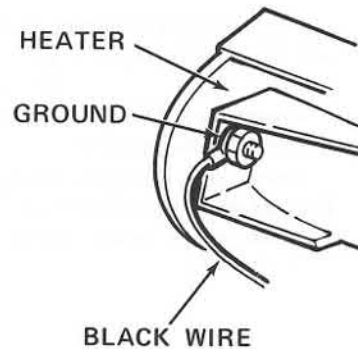


- h. If meter reads voltage, check ground connection for heater for dirt, corrosion, and tightness. Tighten and clean, if necessary.

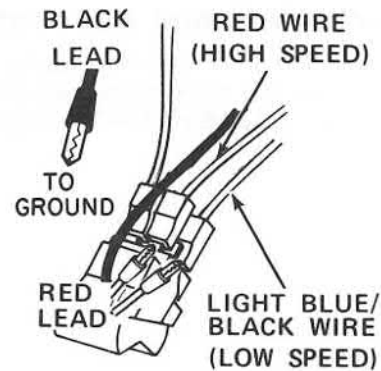
### NOTE

The ground terminal is located on mounting bolt for heater on left rear side of heater.

- i. If ground is good, check black wire from fan motor to ground. If wire is good, replace fan motor.



- 2.a. If fan did not work in one speed, set switch to that speed. Get voltmeter.
- b. Pull switch out. Make sure wires do not touch panel.
- c. Connect red meter lead to red wire (high speed) or light blue/black wire (low speed) at switch. Connect black lead to ground.
- d. If meter reads voltage, go to step e. If meter does not read voltage, replace switch.

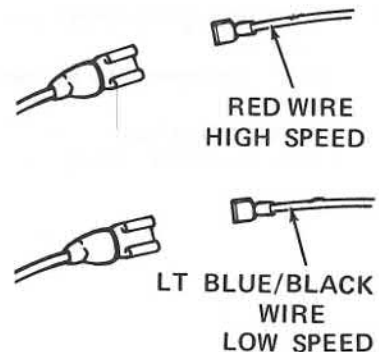


- e. If meter reads voltage, find connectors for wires from switch. Connect red meter lead to red wire (high speed) or light blue/black wire (low speed). Connect black lead to ground.

### NOTE

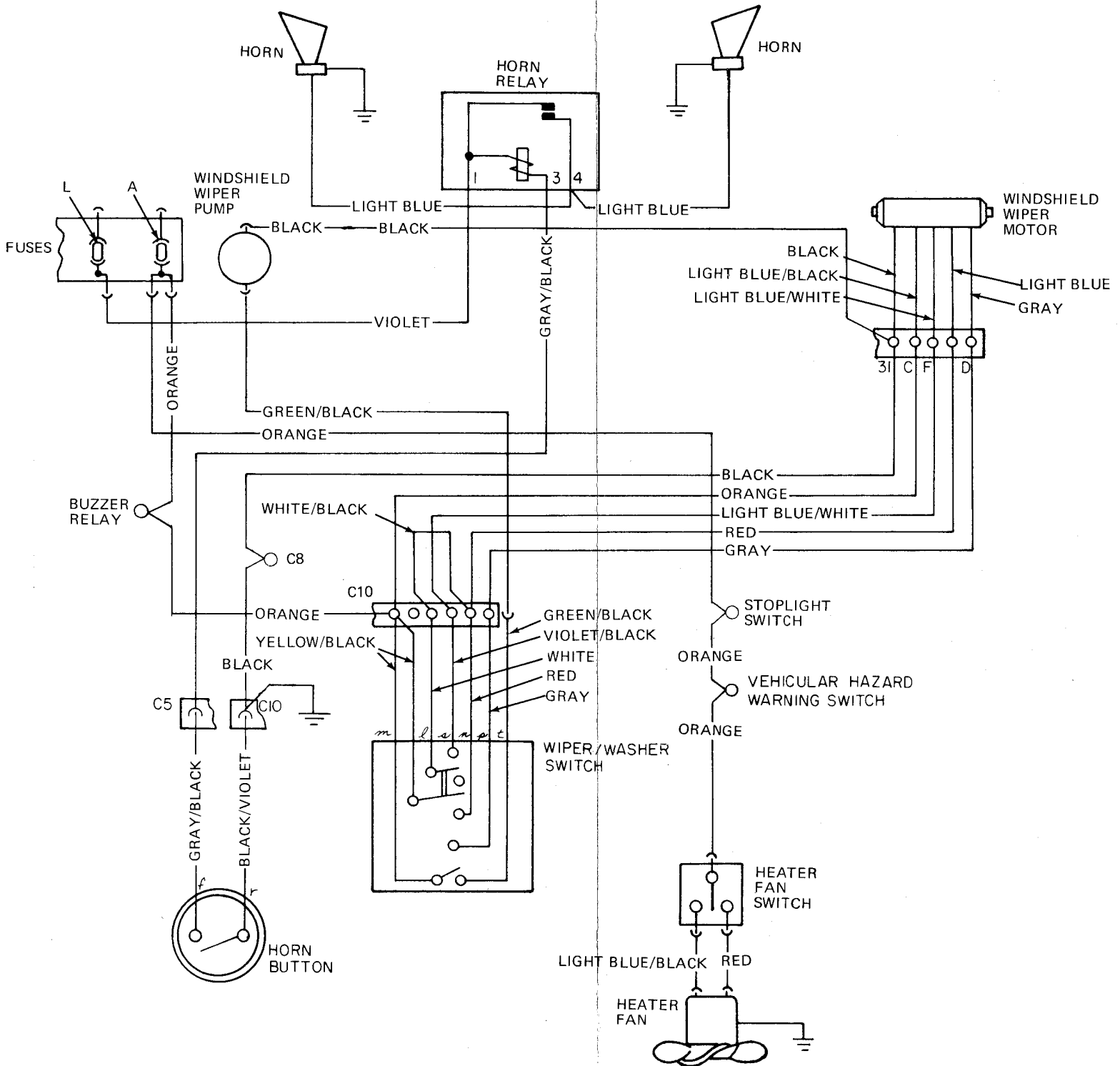
The connectors are one wire connectors. They are located between heater and steering column.

- f. If meter does not read voltage, repair wire from connector to switch.
- g. If meter reads voltage, check wires to heater for damage. Repair wires or replace heater.



# ELECTRICAL SYSTEM TROUBLESHOOTING

## ACCESSORIES





## FUSES

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Fuse L Blows Repeatedly	355
Fuse M Blows Repeatedly	356
Fuse N Blows Repeatedly	356

# ELECTRICAL SYSTEM TROUBLESHOOTING

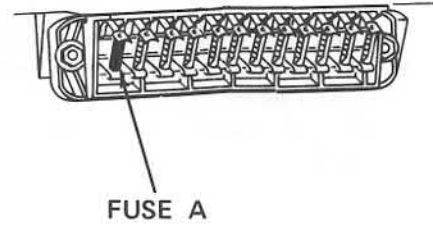
## FUSES FUSE LOCATION

FUSE	SIZE (Amps)	PROTECTED CIRCUITS	
A	8	Stop lights Back-up lights Hand brake and brake system effectiveness indicator Seat belt interlock control box Turn signal and indicator Tachometer Oil pressure gage and indicator	Fuel gage and indicator Engine water temperature gage Heater fan motor Windshield wiper Fasten belts indicator Fasten belts buzzer relay Windshield washer
B	8	Retractable headlights motor Interlock control box Fasten belts and remove key buzzer	
C	8	Left high beam and indicator	
D	8	Right high beam	
E	8	Left low beam	
F	8	Right low beams	
G	8	Left front parking light Parking light indicator Rear right side marker light Rear right tail light Front left side marker light License plate light (one bulb only)	Light source, ideograms optical fiber illumination Cigar lighter spot light Light source, heater fan ideogram illumination
H	8	Front right parking light Front right side marker light Rear left tail light	Rear left side marker light License plate light (one bulb only)
I	16	Cigar lighter Vehicular hazard warning signal and indicator	
L	16	Engine fan motor Horn and relay	
M	3	Retractable headlights control relay (on closing)	
N	3	Retractable headlights control relay (on opening)	

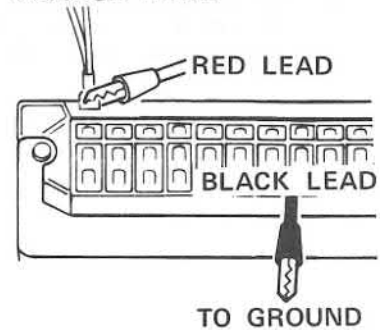
## FUSES

### FUSE A BLOWS REPEATEDLY

- 1.a. If fuse blows when windshield wipers are turned on, go to step 5.
  - b. If fuse blows when windshield washer is operated, go to step 6.
  - c. If fuse blows when brake pedal is depressed, go to step 7.
  - d. If fuse blows when gearshift is placed in reverse, go to step 8.
  - e. If fuse blows when fan is turned on, go to step 4.
  - f. If fuse blows when directional indicators are used, go to step 9.
- 
- g. Set all switches off. Set gearshift in neutral. Pull hand brake on.
  - h. Remove fuse A. Disconnect 2 orange wires from back of fuse box. Get ohmmeter.
  - i. Connect red meter lead to wires. Connect black lead to ground.
  - j. If meter reads 9 ohms or more, go to step 3. If meter reads less than 9 ohms, go to step 2.



### ORANGE WIRES

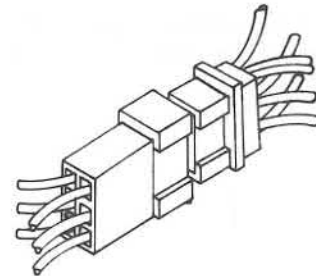


- 2.a. With meter connected to wires, disconnect connector C16 from seat belt interlock control box.

#### NOTE

Connector C16 is a red 6 pin connector.

- b. If meter reads 9 ohms or more, replace control box.
- c. If meter reads less than 9 ohms, remove 4 screws thru steering column cover. Remove cover.



CONNECTOR C16

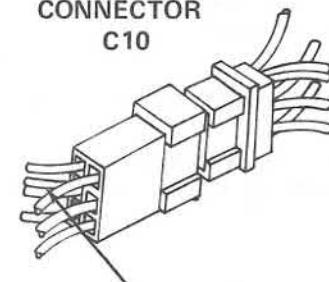
- d. Disconnect connector C10.

#### NOTE

Connector C10 is a 6 pin connector.

- e. If meter reads less than 9 ohms, go to step f. If meter reads 9 ohms or more, check connector C10 and 2 yellow/black wires to wiper switch. If connector and wires are good, replace switch.

### CONNECTOR C10

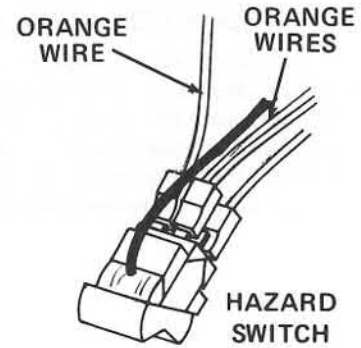


YELLOW/BLACK WIRE

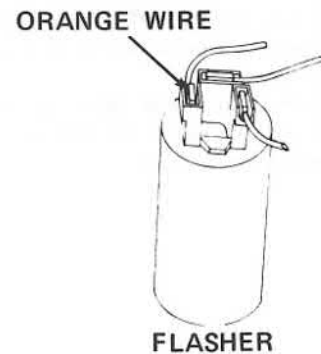
# ELECTRICAL SYSTEM TROUBLESHOOTING

## FUSES

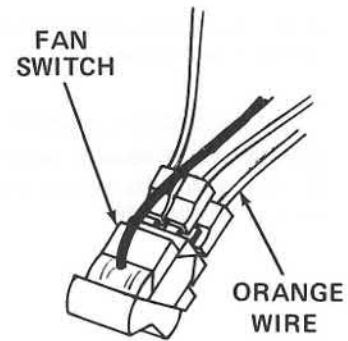
- f. Pull hazard switch out of panel. Disconnect 2 orange wires from switch.
- g. If meter reads less than 9 ohms, go to step 1. If meter reads 9 ohms or more, connect orange wires to switch.
- h. Disconnect orange wire from switch. If meter reads less than 9 ohms, replace switch.
- i. If meter reads 9 ohms or more, connect orange wire to switch. Install switch.



- j. Disconnect plug from directional indicator flasher terminal +.
- k. If meter reads 9 ohms or more, replace flasher. If meter reads less than 9 ohms, repair orange wire from flasher to switch.



- l. Pull fan switch out of panel. Disconnect orange wire from fan switch.
- m. If meter reads 9 ohms or more, replace switch.

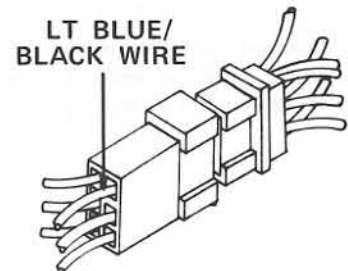


- n. If meter reads less than 9 ohms, disconnect connector C18 for windshield wiper motor.

### NOTE

Connector C18 is located just forward of windshield on left side.

- o. If meter reads 9 ohms or more, check light blue/black wire from connector to motor. If wire and connector are good, replace motor.

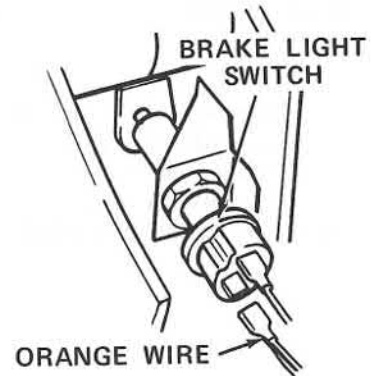


# ELECTRICAL SYSTEM TROUBLESHOOTING

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## FUSES

- p. If meter reads less than 9 ohms, disconnect orange wires from brake light switch.
- q. If meter reads 9 ohms or more, replace switch. If meter reads less than 9 ohms, go to step r.

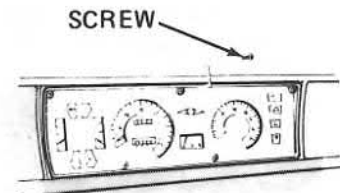


- r. Remove 5 screws thru instrument panel. Remove instrument panel. Disconnect connector C7.

### NOTE

Connector C7 is a 6 pin connector.

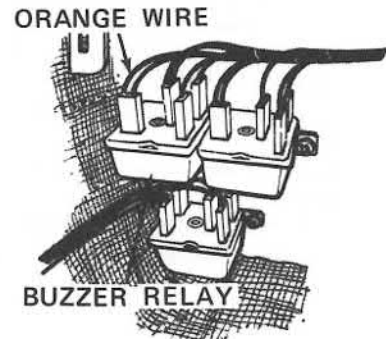
- s. If meter does not read infinity go to step t. If meter reads infinity, check circuit board and connector for defects. Repair or replace defective parts.



- t. Disconnect orange wires from terminal 86 of buzzer relay. If meter reads infinity ( $\infty$ ) replace relay.
- u. If meter does not read infinity, wiring is defective.

### NOTE

One orange wire goes to brake light switch, hazard switch, and fan switch. The other wire goes to buzzer relay, connector C10, C18, C7, and C16.

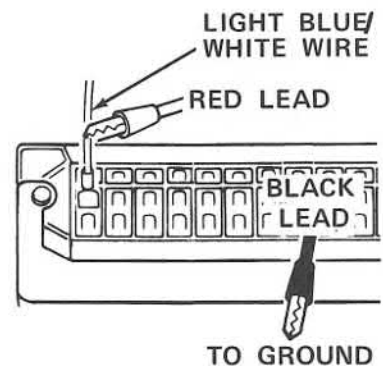


- 3.a. Connect orange wires to fuse box. Disconnect light blue/white wire from fuse box. Connect red meter lead to wire. Connect black lead to ground.
- b. Disconnect connector C14.

### NOTE

Connector C14 is an 8 pin connector. It is behind center console.

- c. If meter reads 5 ohms or less, go to step d. If meter reads more than 5 ohms, repair light blue/white wire from connector C14 to fuse box.



# ELECTRICAL SYSTEM TROUBLESHOOTING

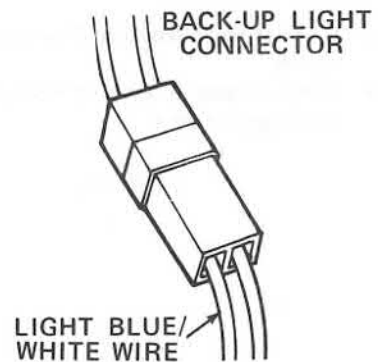
## FUSES

- d. Connect connector C14. Find connector for back-up switch. Disconnect connector.

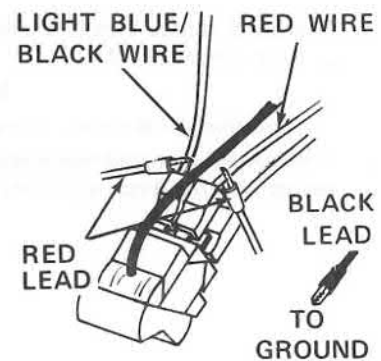
### NOTE

Connector for back-up switch is on forward left side of engine.

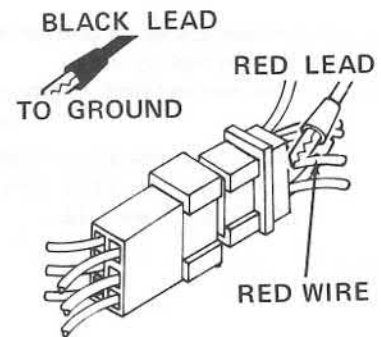
- e. If meter reads infinity, check wires to switch. If wires and connector are good, replace switch.
- f. If meter does not read infinity, wire is defective. Repair light blue/white wire from fuse box to connector C14 and to connector for back-up switch.



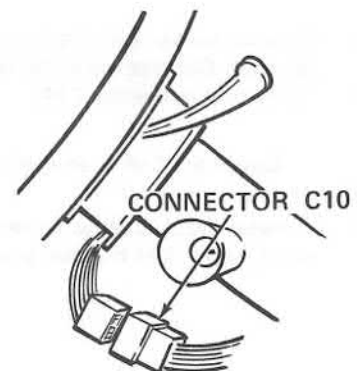
- 4.a. Pull fan switch out. Disconnect red wire from switch. Connect red meter lead to wire. Connect black lead to ground.
- b. If meter reads less than 3 ohms, check red wire from switch to motor for short to ground.
- c. If meter reads 3 ohms or more, disconnect light blue/black wire from switch. Connect red lead to wire. Connect black lead to ground.
- d. If meter reads 3 ohms or more, replace switch.
- e. If meter reads less than 3 ohms, check light blue/black wire to motor for short to ground.
- f. If meter reads less than 3 ohms on either wire and the wires look good, replace motor.



- 5.a. Remove grill on left side in front of windshield. Disconnect connector C18 for windshield wiper motor.
- b. Connect red meter lead to red wire in connector. Connect black lead to ground.
- c. If meter reads infinity, go to step d. If meter does not read infinity go to step f.
- d. Connect red meter lead to gray wire in connector. Connect black lead to ground.
- e. If meter reads infinity, check connector and wires to motor for shorts. If connector and wires are good, replace windshield motor.



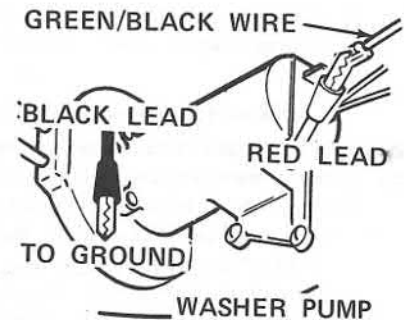
- f. If meter did not read infinity, remove 5 screws thru steering column cover. Remove cover.
- g. With meter connected to wire in connector C18, disconnect connector C10 for wiper switch.
- h. If meter reads infinity, check connector and wires to switch. If wires and connector are good, replace switch.
- i. If meter does not read infinity, repair red or gray wire from connector C18 to connector C10.



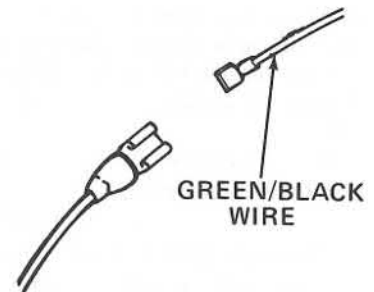
# ELECTRICAL SYSTEM TROUBLESHOOTING

## FUSES

- 6.a. Disconnect green/black wire from washer pump. Connect red lead of ohmmeter to wire. Connect black lead to ground.
- b. If meter reads infinity, replace pump.
- c. If meter does not read infinity, leave meter connected to wire.



- d. Remove 5 screws thru steering column cover. Remove cover.
- e. Disconnect green/black wire in single connector.
- f. If meter reads infinity, check wire to switch. If wire is good, replace switch.
- g. If meter does not read infinity, repair green/black wire to pump.

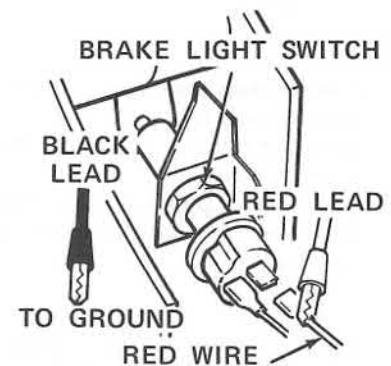


- 7.a. Disconnect red wire from brake switch. Get ohmmeter. Connect red meter lead to wire. Connect black lead to ground.
- b. If meter reads 3 ohms or more, replace brake switch. If meter reads less than 3 ohms, disconnect connector C14.

### NOTE

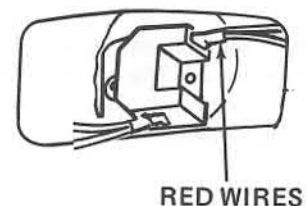
Connector C14 is an 8 pin connector. It is behind the center console.

- c. If meter reads less than 3 ohms, repair red wire from connector C14 to brake switch. If meter reads 3 ohms or more, connect connector C14.



- d. Remove 4 nuts and washers holding left tail light assembly in car. Disconnect red wires from assembly.
- e. If meter reads 3 ohms or more, replace assembly.
- f. If meter reads less than 3 ohms, remove right tail light assembly. Disconnect red wire from assembly.
- g. If meter reads 3 ohms or more, replace assembly. If meter reads less than 3 ohms, repair red wire from connector C14 to left tail light and to right tail light.

### PARKING LIGHT



# ELECTRICAL SYSTEM TROUBLESHOOTING

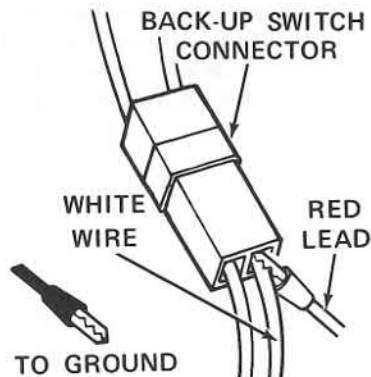
## FUSES

- 8.a. Disconnect connector for backup switch. Get ohmmeter. Connect red meter lead to white wire in connector. Connect black lead to ground.

### NOTE

Connector for back up light is on left forward side of engine.

- b. If meter reads 1 ohm or more, replace switch in transmission.  
c. If meter reads less than 1 ohm, disconnect connector for left backup light. If meter reads 1 ohm or more, replace tail light assembly.  
d. If meter reads less than 1 ohm, remove right tail light assembly. Disconnect white wire from assembly.  
e. If meter reads 1 ohm or more, replace assembly. If meter reads less than 1 ohm, repair white wire from switch connector to left tail light and to right tail light assembly.



- 9.a. If fuse blows when directional indicators are turned on, turn on hazard warning lights. If fuse 1 blows, go to step c.  
b. If fuse 1 does not blow, replace directional indicator switch.  
c. Remove 5 screws thru steering column cover. Remove cover. Get ohmmeter.  
d. Connect red meter lead to light blue/black wire in connector C5. Connect black lead to ground.

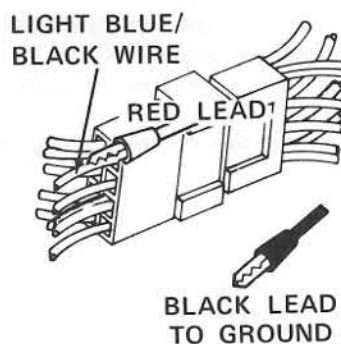
### NOTE

Connector C5 is an 8 pin connector.

- e. If meter reads more than 1 ohm, go to step 10. If meter reads 1 ohm or less, disconnect connector C15.

### NOTE

Connector C15 is a 2 pin connector. It is behind the center console.

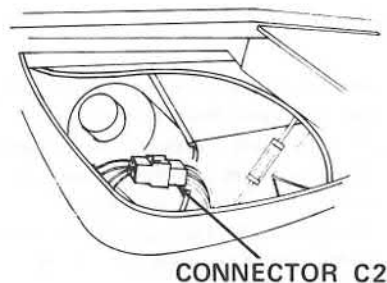
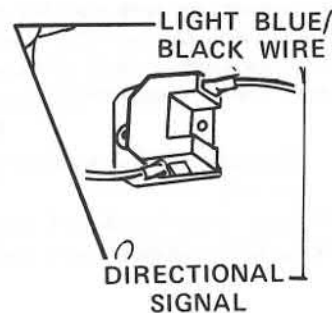


- f. If meter reads more than 2 ohms, go to step g. If meter reads 2 ohms or less, go to step i.  
g. Connect connector C15. Disconnect light blue/black wire from left rear directional indicator.  
h. If meter reads 3 ohms or less, repair light blue/black wire from connector C15 to indicator light. If meter reads more than 3 ohms, replace tail light assembly.  
i. Disconnect connector C2. If meter reads infinity ( $\infty$ ) go to step k. If meter does not read infinity, disconnect light blue/black wire from hazard flasher.

### NOTE

Connector C2 is a 3 pin connector. It is in compartment for left headlight motor.

- j. If meter reads infinity, replace flasher. If meter does not read infinity, repair light blue/black wire from connector C5 to connector C15 and to connector C2. The other wire runs to the hazard flasher.  
k. Check connector C2 and light blue/black wire from connector to directional indicator for short. If wire is good, replace light.





## FUSES

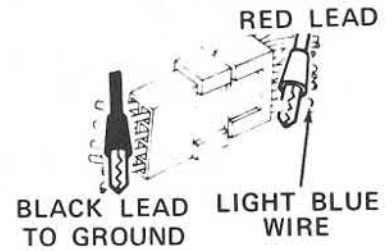
- 10.a. Connect red meter lead to light blue wires in connector C5. Connect black lead to ground. Disconnect connector C15.

### NOTE

Connector C15 is a 2 pin connector. It is behind center console.

- b. If meter reads 2 ohms or less, go to step e. If meter reads more than 2 ohms, connect connector C15.
- c. Disconnect light blue wire from directional indicator on right rear side.
- d. If meter reads 2 ohms or less, repair light blue wire from connector C15 to light. If meter reads more than 2 ohms, replace light.

CONNECTOR C5



- e. If meter reads 2 ohms or less, disconnect connector C4. If meter reads infinity, check light blue wire from connector C4 to light.

### NOTE

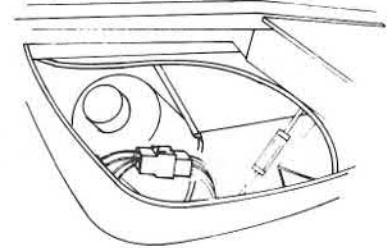
Connector C4 is a 3 pin connector. It is in compartment for right headlight motor.

- f. If meter does not read infinity, disconnect light blue wire from hazard flasher.
- g. If meter reads infinity, replace flasher. If meter does not read infinity, wiring is defective.

### NOTE

One light blue wire goes to hazard flasher. The other wire goes to connector C15 and to connector C4.

CONNECTOR C4



# ELECTRICAL SYSTEM TROUBLESHOOTING

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## FUSES

### FUSE B BLOWS REPEATEDLY

- 1.a. If fuse blows when headlights are raised, go to step 2.
- b. Disconnect red wire from back of fuse box. Connect red meter lead to red wire. Connect black lead to ground.
- c. Disconnect connector C16 from seat belt interlock control box.

#### NOTE

Connector C16 is a red 6 pin connector.

- d. If meter reads infinity ( $\infty$ ), replace control box.

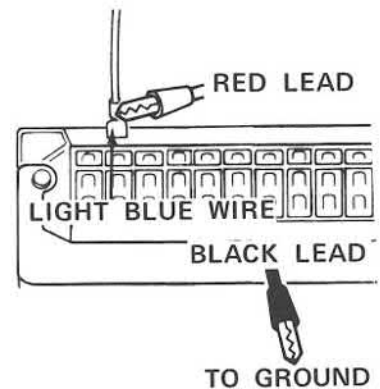
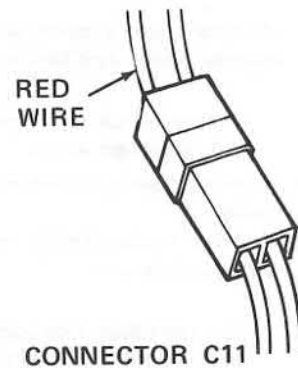
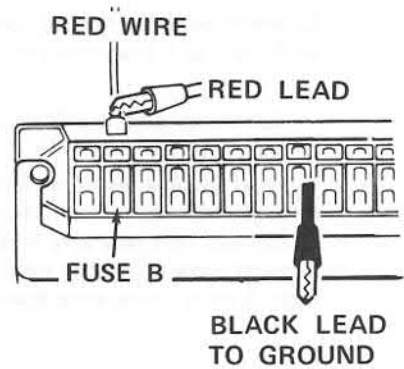
- e. If meter does not read infinity, remove 5 screws thru steering column cover. Remove cover.
- f. Disconnect connector C11. If meter reads infinity ( $\infty$ ), check wires and connector for ignition key switch.

#### NOTE

Connector C11 is a 2 pin connector.

- g. If meter does not read infinity, repair red wire from fuse box to connector C11 and to connector C16.

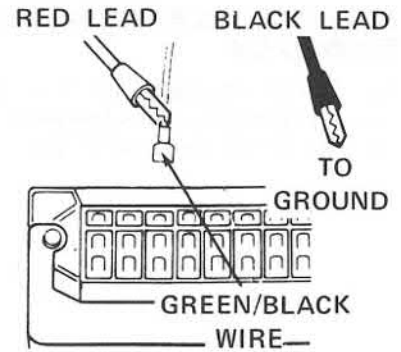
- 2.a. Disconnect light blue wire from fuse box. Connect red meter lead to light blue wire. Connect black lead to ground.
- b. Disconnect light blue wire from terminal 87 of relay (left headlight). If meter reads more than 20 ohms, replace relay.
- c. If meter reads less than 20 ohms disconnect light blue wire from terminal 87 of relay (right headlight).
- d. If meter reads infinity, replay relay. If meter does not read infinity, repair light blue wire from fuse box to relay (left headlight) and to relay (right headlight).



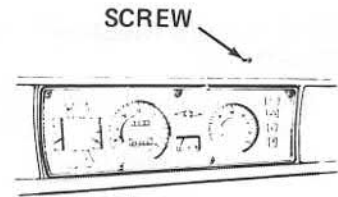
## FUSES

### FUSE C BLOWS WHEN HIGH BEAMS ARE TURNED ON

- 1.a. Remove fuse C from fuse box. Get ohmmeter. Disconnect thin green/black wire to high beam indicator from fuse box.
- b. Connect red meter lead to wire. Connect black lead to ground. If meter reads more than 10 ohms, go to step 2.

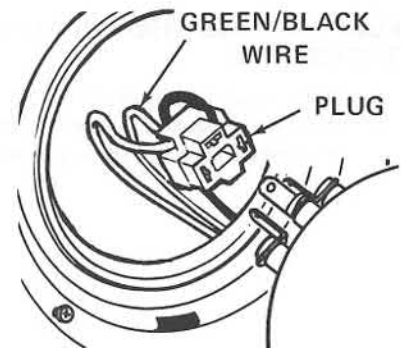


- c. Remove 5 screws thru instrument panel. Pull panel out. Disconnect Connector C6 from instrument panel.
- d. If meter reads infinity, check connector and circuit board for a short to ground.
- e. If meter does not read infinity, repair green/black wire from fuse box to connector C6.



INSTRUMENT PANEL

- 2.a. Disconnect large green/black wire from fuse box. Connect red meter lead to wire. Connect black lead to ground.
- b. Disconnect plug for left headlight. Check plug for damage.
- c. If plug is good, check fuse box for short. If fuse box is good, repair wire from fuse box to plug.

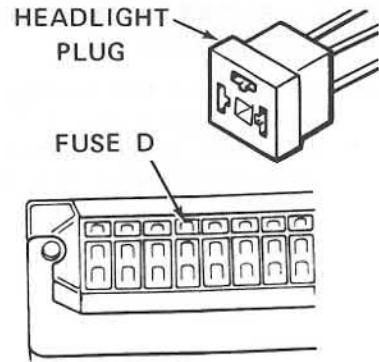


# ELECTRICAL SYSTEM TROUBLESHOOTING

## FUSES

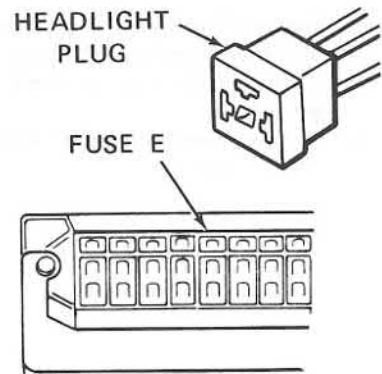
### FUSE D BLOWS WHEN HIGH BEAMS ARE TURNED ON

- 1.a. Disconnect plug for right headlight. Check plug for damage.
- b. If plug is good, check fuse box for short.
- c. If fuse box is good, repair gray wire from fuse box to plug.



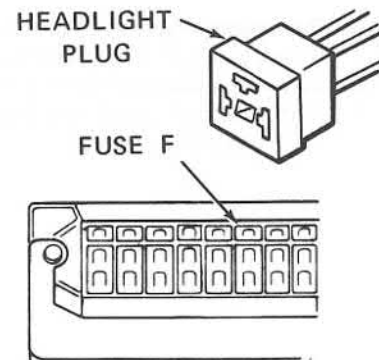
### FUSE E BLOWS WHEN HEADLIGHTS ARE TURNED ON

- 1.a. Disconnect plug from left headlight. Check plug for short.
- b. If plug is good, check fuse box for short at gray/black wire.
- c. If fuse box is good, repair gray/black wire from fuse box to plug.



### FUSE F BLOWS WHEN HEADLIGHTS ARE TURNED ON

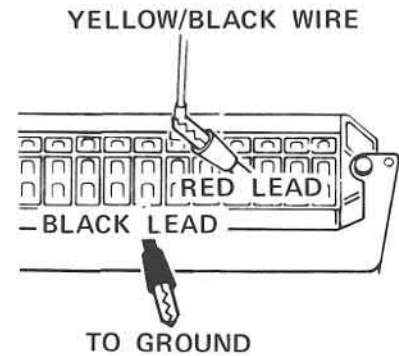
- 1.a. Disconnect plug from right headlight. Check plug for short.
- b. If plug is good, check fuse box for short at gray wire.
- c. If fuse box is good, repair gray wire from fuse box to plug.



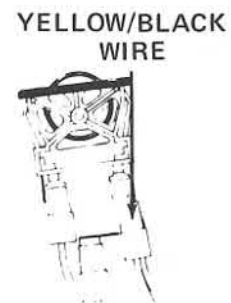
## FUSES

### FUSE G BLOWS REPEATEDLY

- 1.a. Disconnect single yellow/black wire from back of fuse box. Get ohmmeter.
- b. Connect red meter lead to wire. Connect black lead to ground. If meter reads 4 ohms or more, go to step 2.



- c. If meter reads less than 4 ohms, pull rheostat out. Disconnect yellow/black wires.
- d. If meter reads 4 ohms or more, replace rheostat.
- e. If meter reads less than 4 ohms, disconnect light socket from cigar lighter. If meter reads 4 ohms or more, replace lighter.
- f. If meter reads less than 4 ohms, repair yellow/black wire from fuse box to rheostat and to lighter.

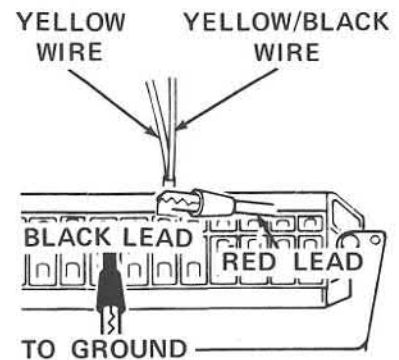


- 2.a. Disconnect yellow and yellow/black wires from fuse box. Connect red meter lead to wires. Connect black lead to ground.
- b. Disconnect connector C14. If meter reads less than 4 ohms, go to step 3.

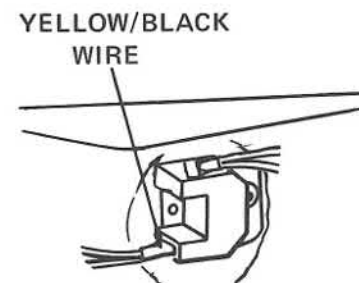
#### NOTE

Connector C14 is a red 8 pin connector. It is behind center console.

- c. If meter reads 4 ohms or more, connect C14. Disconnect connector for left license plate light.
- d. If meter reads less than 4 ohms, go to step e. If meter reads 4 ohms or more, replace license plate light.



- e. Remove right rear tail light assembly. Disconnect yellow/black wires.
- f. If meter reads 4 ohms or more, replace assembly. If meter reads less than 4 ohms, disconnect yellow/black wire from side marker light.
- g. If meter reads 4 ohms or more, replace light socket. If meter reads less than 4 ohms, repair yellow wire from connector C14 to left license plate light and yellow/black wire from license plate to tail light and to side marker light.



# ELECTRICAL SYSTEM TROUBLESHOOTING

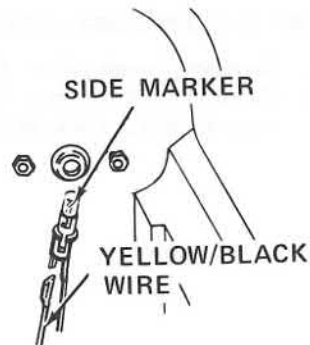
## FUSES

- 3.a. Disconnect connector C2. If meter reads 5 ohms or more, go to step c.

### NOTE

Connector C2 is a 3 pin connector. It is in compartment for left headlight motor.

- b. If meter reads less than 5 ohms, disconnect yellow/black wire from left side marker light. If meter reads 5 ohms or more replace side marker light socket.
- c. Remove left front parking light. Check yellow/black wire from connector C2 to light assembly.
- d. If wire is good, replace assembly.

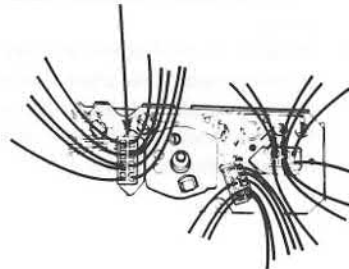


- e. If meter reads less than 4 ohms, remove 5 screws thru instrument panel. Pull panel out.
- f. Disconnect connector C6. If meter reads infinity, check connector and circuit board for defects.
- g. If meter does not read infinity, wiring is defective.

### NOTE

Yellow/black wire runs from fuse box to connector C6 and to connector C2 and to left side marker light. Yellow wire runs from fuse box to connector C14.

CONNECTOR C 6



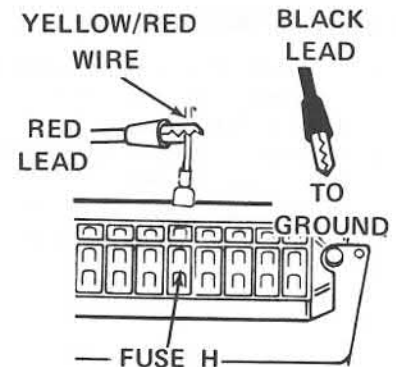
## FUSES

### FUSE H BLOWS REPEATEDLY

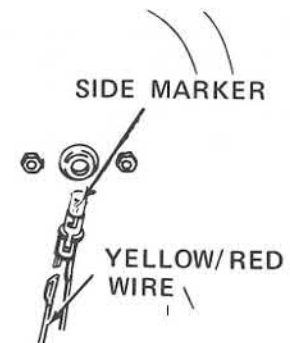
- 1.a. Disconnect yellow/red wire from fuse H. Get ohmmeter.
- b. Connect red meter lead to wire. Connect black lead to ground.
- c. Disconnect connector C14. If meter reads 1 ohm or more, go to step 2.

#### NOTE

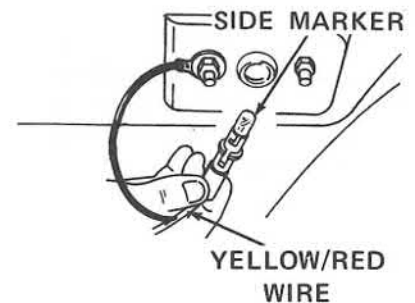
Connector C14 is a red 8 pin connector. It is behind center console.



- d. If meter reads less than 1 ohm, disconnect connector C4. If meter reads 5 ohms or more, check parking light and yellow/red wire from connector C4 for short to ground.
- e. If meter reads less than 5 ohms, disconnect yellow/red wire from front right side marker light.
- f. If meter reads infinity, replace side marker light socket. If meter does not read infinity, repair yellow/red wire from fuse box to connector C14, C4 and front right side marker light.

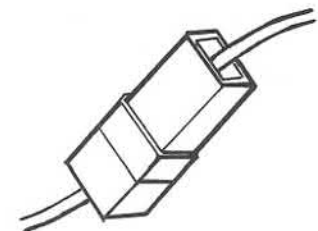


- 2.a. Connect connector C14. Disconnect yellow/red wires from left rear side marker light. If meter reads 1 ohm or more, replace light socket.
- b. If meter reads less than 1 ohm, remove left tail light assembly. Disconnect yellow/red wires from assembly.



- c. If meter reads 1 ohm or more, replace assembly. If meter reads less than 1 ohm, disconnect connector for right license plate light.
- d. If meter reads 1 ohm or more, check wire to license plate light. If wire is good, replace light.
- e. If meter reads less than 1 ohm, repair yellow/red wire from connector C14 to left side marker light, left tail light, and right license plate light.

#### LICENSE PLATE CONNECTOR



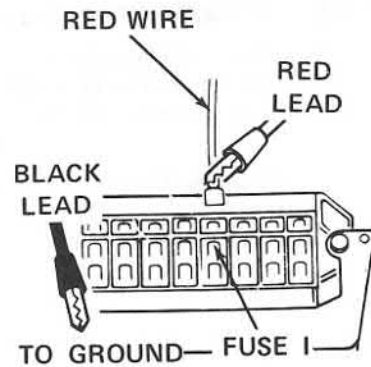
# ELECTRICAL SYSTEM TROUBLESHOOTING

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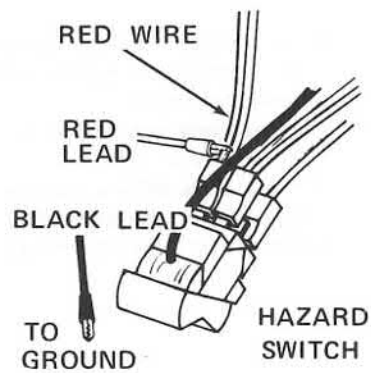
## FUSES

### FUSE I BLOWS REPEATEDLY

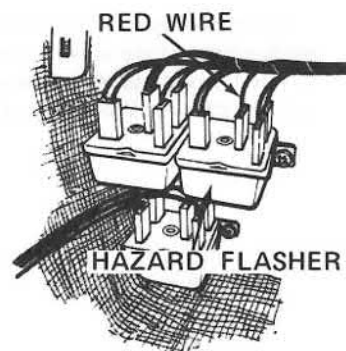
- 1.a. If fuse blows when hazard warning lights are turned on, go to step 2.
- b. Disconnect red wire from fuse I. Connect red meter lead to wire. Connect black lead to ground.
- c. Disconnect red wire from terminal H of hazard switch. If meter reads infinity, replace switch.
- d. If meter does not read infinity, check cigar lighter for short to ground. If lighter is good, repair red wire from fuse to lighter and to hazard switch.



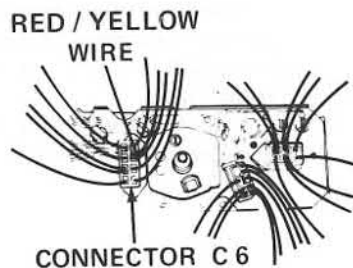
- 2.a. If fuse blows when hazard lights are turned on, turn on directional lights. If they blow a fuse, go to FUSE A troubleshooting.
- b. Disconnect red wire from terminal V of hazard switch. Connect red meter lead to wire. Connect black lead to ground.
- c. If meter reads 10 ohms or more, replace hazard switch.



- d. If meter reads less than 10 ohms, disconnect red wire from hazard flasher.
- e. If meter reads infinity, go to step f. If meter does not read infinity, repair red wire from switch to flasher.
- f. Connect red wire to flasher. Disconnect red/yellow wire from flasher.
- g. If meter reads 60 ohms or more, go to step h. If meter reads less than 60 ohms, replace flasher.



- h. Connect red/yellow wire to flasher. Remove 5 screws thru instrument panel. Pull panel out.
- i. Disconnect connector C6. If meter does not read infinity, repair red/yellow wire from flasher to connector C6.
- j. If meter reads infinity, check connector and circuit board for short to ground.



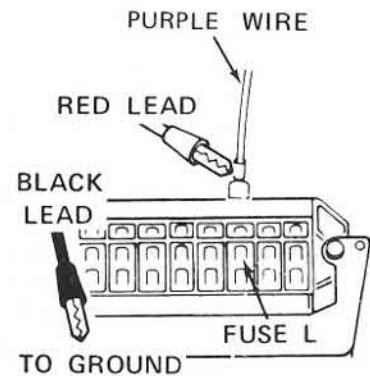


# ELECTRICAL SYSTEM TROUBLESHOOTING

## FUSES

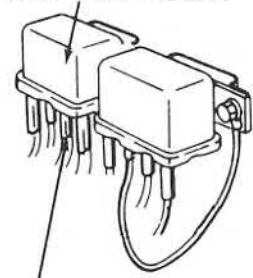
### FUSE L BLOWS REPEATEDLY

- 1.a. If fuse blows when engine is running hot, go to step 2. If fuse blows when horn is used, go to step 3.
- b. Disconnect one purple wire. Connect red meter lead to wire. Connect black lead to ground.
- c. If meter does not read infinity, go to step d. If meter reads infinity, disconnect other purple wire. Connect red meter lead to it.



- d. Disconnect purple wire from terminal 30/51 of fan relay. If meter reads infinity, replace relay.
- e. If meter does not read infinity, disconnect purple wire from terminal 1 of horn relay.
- f. If meter reads infinity, replace relay. If meter does not read infinity, repair purple wire to fan relay or purple wire to horn relay.

### COOLING FAN RELAY



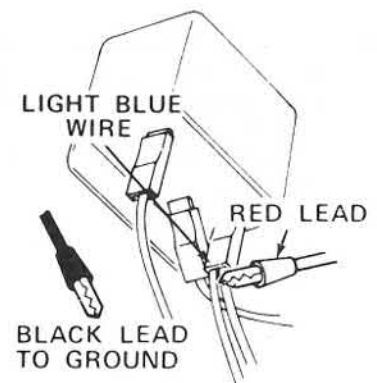
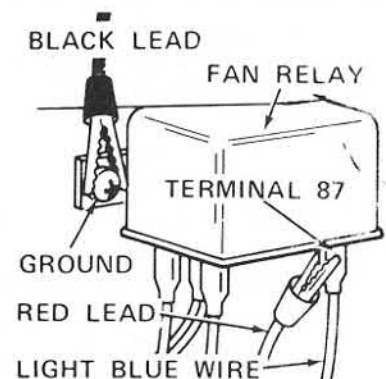
TERMINAL 30/51

- 2.a. Disconnect light blue wire from terminal 87 of fan relay. Connect red meter lead to light blue wires. Connect black lead to ground.
- b. If meter reads 3 ohms or more, replace relay. If meter reads less than 3 ohms, disconnect connector C21.

### NOTE

Connector C21 is a 2 pin connector. It is above the fan motor.

- c. If meter reads infinity, check wire to fan motor. If wire is good, replace motor.
- d. If meter does not read infinity, repair light blue wire to connector C21.



- 3.a. Disconnect light blue wires from terminal 4 of horn relay. Connect red meter lead to wires. Connect black lead to ground.
- b. If meter reads 3 ohms or more, replace relay. If meter reads less than 3 ohms, disconnect wire from right horn.
- c. If meter reads 7 ohms or more, replace horn. If meter reads less than 7 ohms, disconnect wire from left horn.
- d. If meter reads infinity, replace horn. If meter does not read infinity, repair wires to horns.

# ELECTRICAL SYSTEM TROUBLESHOOTING

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## FUSES

### FUSE M BLOWS REPEATEDLY

- 1.a. Disconnect green/white wire from fuse M. Connect red meter lead to wire. Connect black lead to ground.
- b. Disconnect connector C19. If meter reads infinity, go to step 2.

#### NOTE

Connector C19 is a 4 pin connector. It is in compartment for left headlight motor.

- c. If meter does not read infinity, disconnect connector C20. If meter reads infinity, go to step 2. If meter does not read infinity, repair green/white wire from fuse box to connector C19 and C20.

#### NOTE

Connector C20 is a 4 pin connector. It is in compartment for right headlight motor.

- 2.a. Connect red meter lead to gray/black wire in connector for headlight motor. Connect black lead to ground.
- b. If meter reads 25 ohms or more, check wires to headlight motor. If wires are good, replace motor.
- c. If meter reads less than 25 ohms, disconnect gray/black wire from terminal 85 of relay.
- d. If meter reads infinity, replace relay. If meter does not read infinity, repair gray/black wire from connector to relay.

### FUSE N BLOWS REPEATEDLY

- 1.a. Disconnect gray/yellow wire from fuse N. Connect red meter lead to wire. Connect black lead to ground.
- b. Disconnect connector C19. If meter reads infinity, go to step 2.

#### NOTE

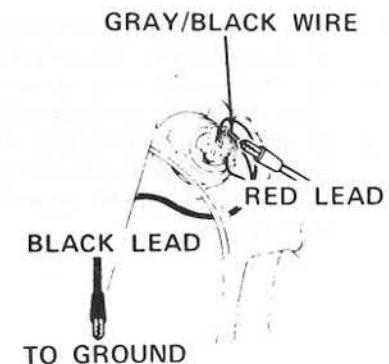
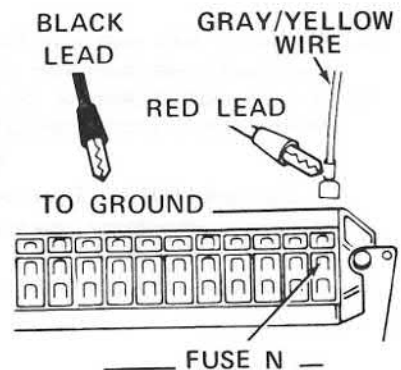
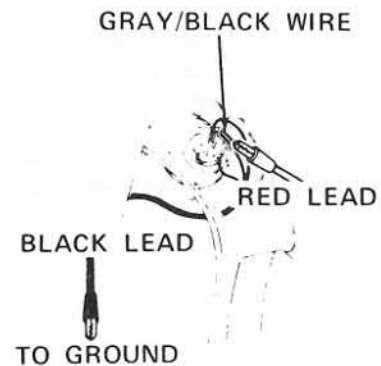
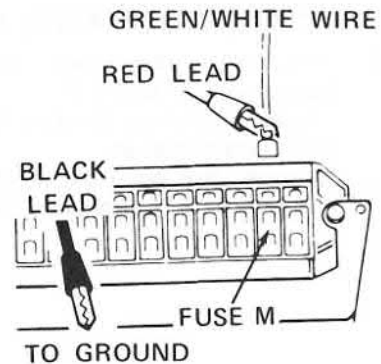
Connector C19 is a 4 pin connector. It is in compartment for left headlight motor.

- c. If meter does not read infinity, disconnect connector C20. If meter reads infinity, go to step 2. If meter does not read infinity, repair gray/yellow wire from fuse box to connector C19 and C20.

#### NOTE

Connector C20 is a 4 pin connector. It is in compartment for right headlight motor.

- 2.a. Connect red meter lead to gray/black lead in connector for headlight motor. Connect black lead to ground.
- b. If meter reads 25 ohms or more, check wires to headlight motor. If wires are good, replace motor.
- c. If meter reads less than 25 ohms, disconnect gray/black wire from terminal 85 of relay.
- d. If meter reads infinity, replace relay. If meter does not read infinity, repair gray/black wire from connector to relay.



MEMORANDUM FOR THE DIRECTOR, FBI

DATE: 10/15/54

TO: SAC, NEW YORK

FROM: SAC, NEW YORK

SUBJECT: [Illegible]

[Illegible text]

[Illegible text]

[Illegible text]