AMERICAN MOTORS

69

SERVICE SPECIFICATIONS

RAMBLER
REBEL
AMX
JAVELIN
AMBASSADOR

AMERICAN MOTORS

RAMBLER

AMX

JAVELIN

REBEL

AMBASSADOR

1969 AMERICAN MOTORS SERVICE SPECIFICATIONS

AMERICAN MOTORS CORPORATION
AUTOMOTIVE TECHNICAL SERVICE
3280 S. Clement Avenue, Milwaukee, Wisconsin

AM-69-8006, 1st Printing B-68 Lithographed in U.S.A.

1969 AMERICAN MOTORS SERVICE SPECIFICATIONS

BODY IDENTIFICATION

A unit body number plate riveted to the left front door below the door lock is visible when the door is open.

UNIT BODY NUMBER PLATE

Milwaukee built bodies (10-80 Series) start with Body Number 1.
Kenosha Lake Front Plant built bodies start with Body Number R-1.
Kenosha Main Body Plant built bodies start with Body Number 1.
Brampton (Canada) Assembly Plant built bodies start with Body Number 800001, which is also used as the Car Built sequence number.

This plate includes the model, body, trim, paint code, and car built sequence numbers.

The model number identifies the body style. This number when followed by numbers 2-5 or 7 designates the different groups of optional appointments built into the car as original equipment.

The numbers on these plates must be listed when any references are made to the body or when ordering parts and material for the body.

MODEL NUMBERS

RAMBLER (6901 Series)

Model	Style
6905	4-Door Sedan
6905-5	4-Door Sedan "440"
6906	2-Door Sport Sedan
6908-5	4-Door Station Wagon "440"
6909-7	2-Door Hardtop "Rogue"

REBEL (6910 Series)

Model	Style
6915	4-Door Sedar
6915-5	4-Door Sedan "SST"
6918	4-Door Station Wagon
6918-5	4-Door Station Wagon "SST"
6919	2-Door Hardtop "550" "SST"
6919-5	2-Door Hardtop
6919-7	2-Door Hardtop "SST"

AMX (6930 Series)

Model	Style
6939-7	2-Door Hardtop Sports Coupe

JAVELIN (6970 Series)

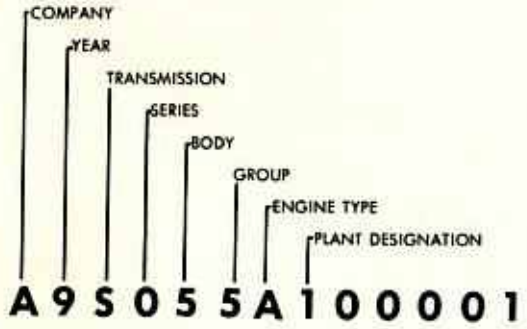
Model	Style
6979-5	2-Door Hardtop
6979-7	2-Door Hardtop "SST"

AMBASSADOR (6980 Series)

Model	Style
6985-2	4-Door Sedan
6985-5	4-Door Sedan "DPL"
6985-7	4-Door Sedan "SST"
6988-5	4-Door Station Wagon "DPL"
6989-2	2-Door Hardtop
6989-5	2-Door Hardtop "DPL"
6989-7	2-Door Hardtop "SST"

VEHICLE IDENTIFICATION

A thirteen (13) digit vehicle identification number plate is riveted into a depression at the upper left corner of the instrument panel and is visible through the windshield.



Vehicle Identification Plate

The vehicle identification number is decoded as follows:

First Digit—"A" for American Motors Corporation.

Second Digit—Year—"9" for 1969

Third Digit—Transmission

S—Standard Column Shift (Floor mounted 70 series) (3 speed)
O—Overdrive Column Shift (3 speed)
A—Automatic Column Shift (3 speed)
C—Floor Shift Automatic (3 speed)
M—Four Speed Floor Shift Floor Mounted

Fourth Digit—Series

0—Rambler
1—Rebel
3—AMX
7—Javelin
8—Ambassador

Fifth Digit—Body

5—4-Door Sedan
6—2-Door Sedan
8—4-Door Station Wagon
9—2-Door Hardtop

Sixth Digit—Group

O—Basic
2—"Ambassador"
5—"440," "Javelin," "DPL"
7—"Rogue," "SST," "AMX"

Seventh Digit—Engine

A—199 OHV Six, 1V
B—232 OHV Six, 1V
C—232 OHV Six, 2V
M—290 V-8, 2V
N—290, 4V
S—343, 2V
T—343, 4V
X—390, 4V

Eighth Through Thirteenth Digit—Sequential Serial Number:

100001 through 700000—Kenosha
700001 through 1000000—Brampton

1969 MODEL AND BODY STYLES

"Rambler" 6901 Series

Model	Style
6905	4-Door Sedan
6905-5	4-Door Sedan "440"
6906	2-Door Sport Sedan
6908-5	4-Door Station Wagon "440"
6909-7	2-Door Hardtop "Rogue"

"Rebel" 6910 Series

Model	Style
6915	4-Door Sedan
6915-7	4-Door Sedan "SST"
6918	4-Door Station Wagon
6918-7	4-Door Station Wagon "SST"
6919	2-Door Hardtop
6919-7	2-Door Hardtop "SST"

"AMX" 6930 Series

Model	Style
6939-7	2-Door Sports Coupe

"Javelin" 6970 Series

Model	Style
6979-5	2-Door Hardtop
6979-7	2-Door Hardtop "SST"

"Ambassador" 6980 Series

Model	Style
6985-2	4-Door Sedan
6985-5	4-Door Sedan "DPL"
6985-7	4-Door Sedan "SST"
6988-5	4-Door Station Wagon "DPL"
6988-7	4-Door Station Wagon "SST"
6989-2	2-Door Hardtop
6989-5	2-Door Hardtop "DPL"
6989-7	2-Door Hardtop "SST"

TREAD WIDTH AND WHEEL BASE

Model	Wheel Base	Front Tread	Rear Tread
6901 Six Cyl.	106"	56.00"	55.00"
6901 V-8	106"	56.40"	55.27"
6910 Six Cyl.	114"	60.00"	58.50"
6910 V-8	114"	60.00"	58.50"
6930 V-8	97"	58.36"	57.00"
6970 Six Cyl.	109"	57.92"	57.00"
6970 V-8	109"	58.36"	57.00"
6980	122"	60.00"	60.00"

OVERALL LENGTH

6901—All	181"
6910—Station Wagon	198"
6910—Two and Four Door Sedans	197"
6930—AMX	177.22"
6970—Javelin	189.22"
6980—Station Wagon	207"
6980—Two Door Hardtop and Four Door Sedan	206.50"

EXTERIOR DIMENSIONS

	6901	6910	6930	6970	6980
Width (01-Incl. Door Handles)	70.84	77.24	71.57	71.89	77.24
Height, Four Door Sedans	54.24	54.61	——	——	54.69
Two Door Sedans	54.21	——	——	——	——
Hardtops	53.36	53.49	51.73	51.81 Six 52.00 V-8	53.57
Station Wagon	55.24	55.06	——	——	55.41
Front Overhang	31.70	31.90	39.70	39.70	32.90
Rear Overhang	43.30	51.10	40.52	40.52	51.60
Station Wagon	43.30	52.10	——	——	52.10

INTERIOR DIMENSIONS

Rambler

	2-Door Sedan	4-Door Sedan	4-Door Wagon	2-Door Hardtop
Headroom, Front	39.00	39.00	39.30	38.20
Headroom, Rear	36.60	36.60	37.00	36.50
Legroom, Front	41.90	41.90	41.90	41.90
Legroom, Rear	35.00	35.00	35.50	35.00
Shoulder Room, Front	54.84	54.84	54.84	54.84
Shoulder Room, Rear	54.82	54.82	54.82	54.20
Hiproom, Front	57.40	57.40	57.40	57.40
Hiproom, Rear	57.12	57.12	57.12	56.38

Rebel

	4-Door Sedan	4-Door Wagon	2-Door Hardtop
Headroom, Front	39.80	39.80	38.70
Headroom, Rear	37.75	38.60	36.50
Legroom, Front	42.00	42.00	42.00
Legroom, Rear	38.60	38.60	35.50
Shoulder Room, Front	60.00	60.00	60.00
Shoulder Room, Rear	60.00	60.00	59.00
Hiproom, Front	60.30	60.30	60.30
Hiproom, Rear	60.40	60.40	59.50

	AMX 2-Door Hardtop	Javelin 2-Door Hardtop
Headroom, Front	37.50	37.50
Headroom, Rear	——	36.00
Legroom, Front	42.70	42.70
Legroom, Rear	——	31.50
Shoulder Room, Front	55.00	55.00
Shoulder Room, Rear	——	53.20
Hiproom, Front	57.60	57.60
Hiproom, Rear	——	56.38

Ambassador

	4-Door Sedan	4-Door Wagon	2-Door Hardtop
Headroom, Front	39.80	39.80	38.70
Headroom, Rear	37.75	38.60	36.50
Legroom, Front	42.00	42.00	42.00
Legroom, Rear	38.60	38.60	35.50
Shoulder Room, Front	60.00	60.00	60.00
Shoulder Room, Rear	60.00	60.00	59.00
Hiproom, Front	60.30	60.30	60.30
Hiproom, Rear	60.40	60.40	59.50

STATION WAGON CARGO DIMENSIONS

	Rambler	Rebel Ambassador
Tailgate Opening Width at Floor	50.50	53.66
Tailgate Opening Width at Beltline	50.00	52.24
Tailgate Opening Height	26.20	27.84
Tailgate-to-Ground Height	23.00	22.46
Cargo Length at Floor to Front Seat	76.78	92.63
Cargo Length at Beltline to Front Seat	70.00	82.73
Cargo Width Between Wheelhouse	41.50	45.08
Cargo Length at Floor to Rear Seat	41.25	56.53
Cargo Length at Beltline to Rear Seat	38.25	46.74

TUNE-UP SPECIFICATIONS

	6 Cylinder	All V-8
Spark Plugs	N-14Y	N-12Y
Spark Plug Gap	.033"-.037"	.033"-.037"
Distributor Rotation	CW @ Rotor End	CW @ Rotor End
Distributor Point Gap	.016"	.016"
Distributor Cam Angle (Dwell)	31°-34°	29°-31°
Breaker Arm Tension	17-21 Oz.	17-21 Oz.
Condenser Capacity	.18-.23 Mfd.	.18-.23 Mfd.
Ignition Timing		
199 Auto.	5°BTDC ± 1°	TDC ± 1°
199 Manual	TDC ± 1°	
232 (Rogue) Auto.	5°BTDC ± 1°	
232 Auto.	TDC ± 1°	
232 Manual	TDC ± 1°	
Cylinder Head Torque Ft. Lbs.	80-85	
Engine Idle RPM @ Operating Temperature		90-100
Manual Transmissions	600	650
Automatic Transmissions	525 (In Drive Range)* If equipped, air conditioning must be "OFF" when setting idle.	550 (In Drive Range)*
Fuel Pump Pressure @ 500 RPM	4 to 5½ PSI	5 to 6½ PSI
Booster Pump Vacuum @ 1000 RPM (Vacuum Lines Off)	14"-19"	14"-19"
Cylinder Compression Rating	145 PSI	145 PSI
Valve Adjustment	Hydraulic Lifters	Hydraulic Lifters

*Set Parking Brake Firmly. Do Not Accelerate Engine.

NOTE: Refer to each particular Technical Service Manual Section for detailed specifications as required.

ENGINE IDENTIFICATION

Code	CID	Carb	Comp. Ratio	Bore
J	199	1V	8.5:1	3.750"
L	232	1V or 2V	8.5:1	3.750"
H	290	2V	9.0:1	3.750"
N	290	4V	10.2:1	3.750"
S	343	2V	9.0:1	4.080"
Z	343	4V	10.2:1	4.080"
W	390	4V	10.2:1	4.165"

GENERAL

ENGINE MODELS	CID
Torque Command Sixes	199
	232
Typhoon V-8	290
	343
AMX V-8	390

TYPE

199-232 ..... In-line, Six, O.H.V.
290-343-390 .... 90°, V-8, O.H.V.

BORE AND STROKE

199	3.750" × 3.000"
232	3.750" × 3.500"
290	3.750" × 3.280"
343	4.080" × 3.280"
390	4.166" × 3.574"

FIRING ORDER

Sixes 1-5-3-6-2-4
V-8 1-8-4-3-6-5-7-2

COMPRESSION RATIO

199-232 All	8.5:1
290 2 V	9.0:1
290 4 V	10.0:1
343 2 V	9.0:1
343 4 V	10.2:1
390 4 V	10.2:1

TAXABLE HORSEPOWER

199-232	33.75
290	45.00
343	53.27
390	55.51

MAXIMUM BRAKE HORSEPOWER*

Bhp @ Eng. R.P.M.

199	128 @ 4400
232, 1 V Carb	145 @ 4300
232, 2 V Carb	155 @ 4400
290, 2 V Carb	200 @ 4600
290, 4 V Carb	225 @ 4700
343, 2 V Carb	235 @ 4400
343, 4 V Carb	280 @ 4800
390, 4 V Carb	315 @ 4600

*Max. bhp and max. torque corrected to 60°F. and 29.92 Hg. atmospheric pressure.

MAXIMUM TORQUE*

(Lbs. Ft. @ R.P.M.)

199	182 @ 1600
232, 1 V Carb	215 @ 1600
232, 2 V Carb	222 @ 1600
290, 2 V Carb	285 @ 2800
290, 4 V Carb	300 @ 3200
343, 2 V Carb	345 @ 2600
343, 4 V Carb	365 @ 3000
390, 4 V Carb	425 @ 3200

*Max. bhp and max. torque corrected to 60°F. and 29.92 Hg. atmospheric pressure.

COMPRESSION PRESSURE

(Cranking Speed at Sea Level) ..... 145 P.S.I.

RECOMMENDED FUEL

199-232-290-343 2 V Carb ..... Regular
290-343-390 4 V Carb .. Premium

ENGINE IDLE RPM

MANUAL TRANSMISSIONS

199-232	600
290-343-390	650

AUTOMATIC TRANSMISSION

199-232	525
290-343-390	550

All idle speed adjustments are made with A/C "OFF"

OIL PRESSURE

All Engines ..... 75 P.S.I. Max.

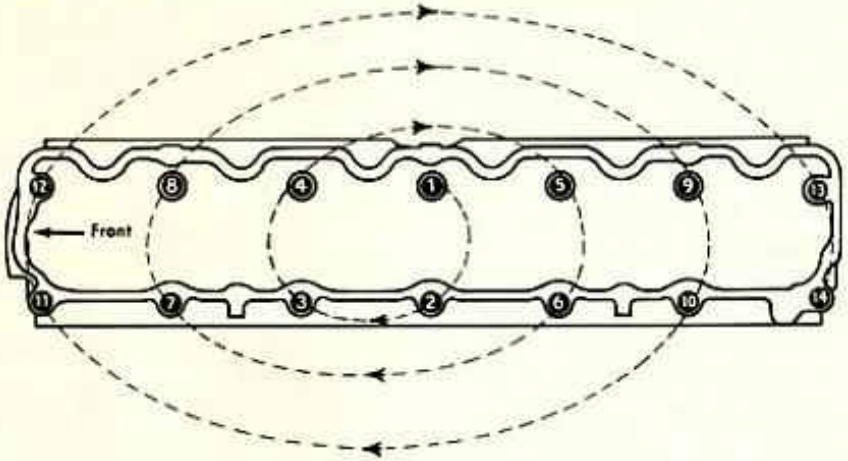
CYLINDER HEAD FLATNESS

.006" Max., .002" in 6", .001" in 1"

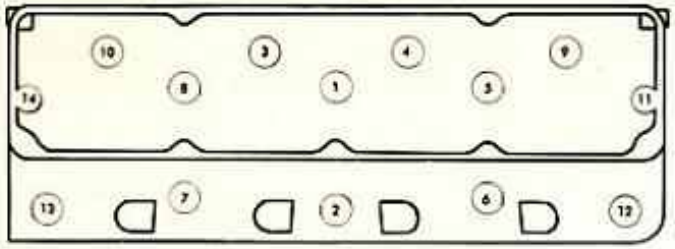
CYLINDER BLOCK FLATNESS

.006" Max., .002" in 6", .001" in 1"

CYLINDER HEAD TORQUE TIGHTENING SEQUENCE



199-232 O.H.V.—80-85 Foot Pounds Torque



290-343-390 V-8—90-100 Foot Pounds Torque

VALVE ARRANGEMENT

Front to Rear
199-232 ..... E1-1E-E1-1E-E1-1E
290-343-390 (1 Bank) . E1-1E-E1-1E

OPERATING TAPPET CLEARANCE

Hydraulic Lifters ..... Zero Lash

VALVE TIMING

	199-232
Intake—	
Opens (°B.T.D.C.)	12°-30′
Closes (°A.B.D.C.)	51°-30′
Duration—deg.	244°
Exhaust—	
Opens (°B.B.D.C.)	52°-30′
Closes (°A.T.D.C.)	10°-30′
Duration—deg.	244°
Valve Opening Overlap	23°

	290-343-390
Intake—	
Opens (°B.T.D.C.)	18°-30′
Closes (°A.B.D.C.)	67°-30′
Duration—deg.	266°
Exhaust—	
Opens (°B.B.D.C.)	60°-30′
Closes (°A.T.D.C.)	25°-30′
Duration—deg.	266°
Valve Opening Overlap	44°

CAM LOBE LIFT

Intake and Exhaust
199-232 ..... .254"
290-343-390 ..... .265"

ROCKER ARM RATIO

199-232 ..... 1.5:1
290-343-390 ..... 1.4:1

VALVE STEM STANDARD DIAMETER

199-232-290-343-390
Intake and Exhaust, .3715"-.3725"
Available for Service in oversizes of .003", .015", and .030".

VALVE MATERIAL

Intake ..... Silichrome #1 or XB Aluminized
Exhaust ..... SAE 21-4N

VALVE HEAD DIAMETER

199-232-290
Intake ..... 1.787"
Exhaust ..... 1.406"
343-390
Intake ..... 2.025"
Exhaust ..... 1.625"

VALVE GUIDE TYPE ..... Integral

VALVE GUIDE I.D.—

Intake and Exhaust
All Engines ..... .3735"-.3745"

VALVE STEM TO GUIDE CLEARANCE

Intake and Exhaust
All Engines ..... .001"-.003"

VALVE LENGTH

All Engines
Intake and Exhaust .... 4.7895"-4.8045"

VALVE FACE ANGLE

199-232
Intake ..... 29°
Exhaust ..... 44°
290-343-390
Intake ..... 29°
Exhaust ..... 44-1/2°

VALVE SEAT ANGLE

All Engines
Intake ..... 30°
Exhaust ..... 44°

VALVE SEAT RUN-OUT

All Engines ..... Max. .0025"

VALVE SEAT WIDTH

199-232
Intake ..... .050"-.075"
Exhaust ..... .040"-.060"
290
Intake ..... .055"-.065"
Exhaust ..... .040"-.060"
343-390
Intake ..... .040"-.060"
Exhaust ..... .040"-.060"

VALVE SPRING TENSION

199-232

Closed	95-105 Lbs.	1-13/16"
Open	188-202 Lbs.	1-7/16"
Free Length	.....	2-17/64"

290-343-390
Closed .... 85-93 Lbs. 1-13/16"
Open .. 193-207 Lbs. 1-25/64"
Free Length .. Approx. 2-13/16"

VALVE SPRING ASSEMBLED HEIGHT LOWER SEAT TO RETAINER
All Engines ..... 1-13/16"

VALVE TAPPET DIAMETER
All Engines ..... .904"-.9045"

VALVE TAPPET TO TAPPET BORE CLEARANCE
All Engines ..... .0005"-.002"

HYDRAULIC LIFTER LEAK DOWN RATE
(KM Oil J-5268, 50 Lb. Load—Travel of .125")
All Engines ..... 20-110 Seconds

ROCKER ARM SHAFT O.D.
199-232 ..... .8575"-.8585"

ROCKER ARM TO SHAFT CLEARANCE
199-232 ..... .003"-.005"

TIMING CHAIN DEFLECTION
All Engines ..... Max. 1/2"

CAMSHAFT END PLAY
.0" Engine Operating

CAMSHAFT BEARING OIL CLEARANCE
All Engines ..... .001"-.003"

CRANKSHAFT MAIN BEARING JOURNAL STANDARD DIAMETER
199-232 ..... 2.4981"-2.5001"
290-343-390 .... 2.7469"-2.7489"
Rear Main 2.7464"-2.7479"

CRANKSHAFT MAIN BEARING CLEARANCE
All Engines ..... .001"-.002"
290-343-390
Rear Main Only .... .002"-.003"

CRANKSHAFT END PLAY
199-232 ..... .0015"-.007"
290-343-390 ..... .008" Max.

CONNECTING ROD JOURNAL DIAMETER
199-232-290-343 . 2.0934"-2.0955"
390 ..... 2.2492"-2.2471"

CONNECTING ROD AND MAIN BEARING JOURNAL—OUT OF ROUND
All Engines ..... Max. .0004"

CONNECTING ROD AND MAIN BEARING JOURNAL TAPER
All Engines ..... Max. .0003"

CONNECTING ROD BEARING CLEARANCE
All Engines ..... .001"-.002"

PISTON TO BORE CLEARANCE
199-232 ..... .0005"-.0013"
290 ..... .001"-.0018"
343 ..... .0012"-.002"
390 ..... .0010"-.0018"

PISTON PIN TO CONNECTING ROD
Press Fit ..... 2,000 Lbs.

PISTON PIN TO PISTON CLEARANCE
(All Pieces Room Temp.)
All Engines ..... .0003"-.0005"

PISTON RING WIDTH
All Engines—Top and Second Compression ..... 5/64"

PISTON RING SIDE CLEARANCE
199-232 1 and 2 .0015"-.0035"
3 .000"-.005"
290-343-390 1 and 2 .002"-.004"
3 .000"-.005"

PISTON RING GAP CLEARANCE
All Engines 1 and 2 .010"-.020"
3 .015"-.055"
(Rail Gaps)

CYLINDER BORE DIAMETER
199-232 ..... 3.7497"-3.7529"
290 ..... 3.7502"-3.7534"
343 ..... 4.0799"-4.0831"
390 ..... 4.165"-4.167"

CYLINDER BORE—OUT OF ROUND
All Engines ..... Max. .005"

CYLINDER BORE TAPER
All Engines ..... Max. .003"

OIL SYSTEM
Oil Pump ..... Gear Type
Normal Oil Pressure
All Engines 13 P.S.I. @ 600 RPM
Oil Pressure Relief ... 75 P.S.I.
199-232
Gear to Body Clearance .... .0005"-.0025"
Gear End Clearance ..... .000"-.004" (Gears Above Body)
290-343-390
Gear to Body Clearance ..... .002"-.004"
Gear End Clearance .... .0025"-.0065" (Gears Above Body)

TORQUE LIMITS—FOOT POUNDS
199-232
Camshaft Sprocket Screw 45-55
Carburetor Hold Down Nuts 12-15
Connecting Rod Bolt Nuts 26-30
Crankshaft Main Bearing Cap Screws 75-85
Cylinder Head Cover Screws ..... 45-55 (In. Lbs.)
Cylinder Head Cap Screws 80-85
Distributor Bracket Retaining Screw 10-15
Intake and Exhaust Manifold Bolts and Stud Nuts .. 20-25
Flywheel to Crankshaft Screws 100-110
Fuel Pump Screws 15-17
Engine Rear Support Cushion to Case Cap Screws .. 35-45
Oil Pump Cover Screws ... 8-12
Oil Pump Screw (Short) ... 8-12
Oil Pump Screw (Long) .. 15-18
Oil Pan Screws
1/4"-20 5-8
5/16"-18 10-12
Front Support, Cushion to Bracket Screws 25-30
Spark Plug 25-30
Thermostat Housing Stud Nuts 10-15
Timing Case Cover Screws 4-6
Vibration Damper Retaining Screw 50-60
Water Pump 10-15
Rocker Arm Assembly Screws 20-23
Drive Plate to Converter 30-35
Drive Plate to Crankshaft 100-110
Clutch Housing to Block Screws (Top) 25-28

Clutch Housing to Block Screws (Bottom) 40-45
All torque values are given in Foot Pounds unless otherwise specified.

290-343-390
Camshaft Gear Screw ... 25-35
Carburetor Hold Down Nuts 12-15
Connecting Rod Bolt Nuts 26-30
(390 Only) 35-40
Crankshaft Main Bearing Cap Screws 95-105
Cylinder Head Cover Screws ..... 20-30 In. Lbs.
Cylinder Head Cap Screws 90-100
Distributor Bracket Retaining Screws 10-15
Engine Rear Support Cushion to Case Cap Screws 30-35
Exhaust Manifold Bolts ... 30-35
Air Injection Tube to Manifold 25-30
Flywheel or Flex Plate to Crankshaft Screw ... 100-110
Front Support Cushion to Bracket Screw 30-35
Fuel Pump Screw 15-17
Intake Manifold Screw ... 40-45
Oil Pump Cover Screw ..... 48-60 In. Lbs.
Oil Pan Screw ....1/4"-20 5-8
5/16"-18 10-12
Rocker Arm Studs to Cyl. Head 65-70
Rocker Arm Retaining Stud Nut 20-25
Spark Plug 25-30
Thermostat Housing Screws 10-15
Timing Chain Cover Screws 20-30
Vibration Damper Retaining Screw 50-60
Water Pump to Timing Case Cover ..... 45-50 In. Lbs.
All torque values are given in Foot Pounds unless otherwise specified.

COOLING

COOLANT CAPACITY INCLUDING HEATER

199 ..... 10.5 Qts.
232 ..... 10.5 Qts.
290 ..... 14 Qts.
343-390 ..... 13 Qts.

RADIATOR CAP

PRESSURE ..... 14 P.S.I.

FAN BELT TENSION

Use Fan Belt Strand Tension Gauge J-7316
New Belt 125-145
Pre-delivery or Belt With Previous Service 90-110

THERMOSTAT

All Engines except 232 "Rogue"
Starts to Open ..... 195°F.±2
Fully Open ..... 218°F.
232 "Rogue"
Starts to Open ..... 205°F.±2
Fully Open ..... 228°F.

TORQUE LIMITS— FOOT POUNDS

Fan Blade to Hub Screw 15-25
Timing Chain Cover To Engine—290-343-390 . 20-30
Thermostat Housing Screw 10-15
Water Pump Mounting Screw—
290-343-390 ..... 45-50 In. Lbs.
199-232 10-15

BATTERY

	199-232-290	343-390	Optional
MAKE	←	Rambler "Clear Power"	→
MODEL	2CM50	2SM60	2SH70
RATING	50 Amp. Hours	60 Amp. Hours	70 Amp. Hours
TOTAL NO. OF PLATES	54	66	66

BATTERY TESTS

Specific Gravity Variation
If specific gravity is above 1.235—more than 50 points variation between cells—unserviceable battery
Battery Load Test
3 Times the Ampere Rating of Battery—150 Amperes for 50 Amp. Hr.
180 Amperes for 60 Amp. Hr.
210 Amperes for 70 Amp. Hr.
Voltmeter ..... 9.6 Volts @ 70° Minimum Battery Load Test
Starter Motor used as Load Tester ..... 9.0 Volts
8.4 Volts (Amb. temp. below 40°F.)
Battery Cable Voltage Drops
Positive Cable ..... .2 Volt
Negative Cable ..... .2 Volt
Relay to Starter ..... .2 Volt

ALTERNATOR

	Motorola	American Motors	Motorola
Make			
Model	A12AM456 (7)	3195534 (5)	A12NAM606 (7)
Rotation	←	CW @ drive end	→
Rated Current Output	35 @ 15 Volts	35 @ 14.2 Volts	55 @ 15 Volts
Field Current Amp.	2.0-2.6	2.4-2.5 @ 10 Volts	1.8-2.4

*Std. All 80 Series
Std. All Series With A/C or "Command Air" Ventilation

VOLTAGE REGULATOR

	Motorola Equipped	American Motors
Make		
Model	R2AM4	VSH-6201F
Type	Solid State	Solid State
Adjustment	None	None

Minimum to Maximum Voltage control at various Ambient Temperatures—10 Ampere Load.

0°	14.6-15.4	80°	14.0-14.8
20°	14.6-15.3	100°	13.8-14.6
40°	14.3-15.0	120°	13.7-14.5
60°	14.1-14.9	140°	13.6-14.4
160°	13.3-14.1		

ROTOR FIELD CURRENT DRAW (ALTERNATOR)

With Fully Charged Battery, 12.6 ± .2 Volts

35 Amp. Motorola	2.0-2.6
35 Amp. American Motors @ 10 V.	2.4-2.5
55 Amp. Motorola	1.8-2.4

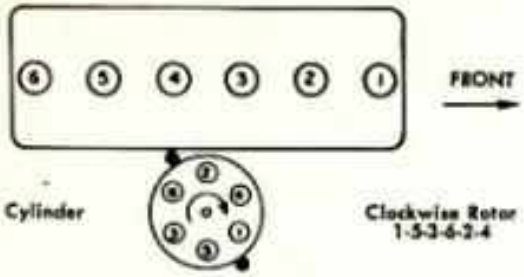
DRIVE BELT TENSION

Use Fan Belt Strand Tension Gauge J-7316

Pre-Delivery or Belt with Previous Service	90-110 Lbs.
New Belt	125-145 Lbs.

STARTER MOTORS

Brush Spring Tension	40 Oz.	Lock Test Maximum	
Free Speed		Amperes	500
Volts	12.0	Volts	4.5
Amperes	70	Brush Length	0.5"
RPM	9500 Max.	Wear Limit	0.2



290-343-390 V-8

DISTRIBUTOR WIRING SEQUENCE AND FIRING ORDER

DISTRIBUTOR

Engine	199-232	290-2V	290-4V	343-2V	343-4V	390-4V
Model	1110444	1111106	1111198	1111472	1111948	1111473
Rotation	CW @ Rotor End					
Point Opening	.016"					
Cam Angle (Dwell)	31°-34°	29°-31°				
Breaker Lever Tension	17-21 Oz.					
Condenser Capacity	.18-.23 MFD					

CENTRIFUGAL ADVANCE (Distributor Degrees and RPM)

Model	1110444	1111106	1111198	1111472		1111948 & 1111473
Start	2°-3° @ 450	0°-1° @ 400	0°-1° @ 375	0°-1° @ 450		0°-1° @ 400
Interm.	8°-10° @ 1000	0°-2° @ 475	7.5°-9.5° @ 800	7.5°-9.5° @ 1000		0°-2.5° @ 450
Interm.		7.5°-9.5° @ 925				8.5°-10.5° @ 800
Max.	12°-14° @ 2200	15°-17° @ 2200	14°-16° @ 1950	13°-15° @ 2200		14°-16° @ 2200

VACUUM CONTROL

Engine	199-232	290-343-2V & 4V	390-4V	
Model	1116207	1115362	1115363	
Inches Of Mercury To:				
Start Advance	5"-7"	4"-6"	8"-10"	
Full Advance	16"-17"	18"-19.5"	18.5"-20.5"	
Max. Advance Dist. Degrees	11°	12°	12°	

IGNITION COIL

Engine	199-232		290-343-390	
Make	Delco-Remy—American Motors		Delco Remy—American Motors	
Model	1115294	AM3191992	1115266	AM3182864
Primary Resistance OHM @ 75° F.	1.40-1.65		1.77-2.05	1.64-1.80
Secondary Resistance OHM @ 75° F.	3,000-20,000		3,000-20,000	9,300-11,800

IGNITION RESISTANCE WIRE

Resistance @ 70°F. ..... 1.35±0.5 OHM (290-343-390)
1.80±0.5 OHM (199-232)

PRIMARY CIRCUIT VOLTAGE DROPS

Positive battery cable to ignition primary terminal of ignition coil (yellow wire at voltage regulator).	Not to exceed .4 Volt
Distributor terminal of ignition coil and ground	Not to exceed .2 Volt
Ignition Cables	Resistance Value Per Foot Spark Plug Lead—3000-7000 OHMS Coil Lead—7500-12,500 OHMS

SPARK PLUG

Engine	6 Cyl.	V-8
Number	N14Y-Champion	N12Y-Champion
Gap	.033"-.037"	
Torque	25-30 Ft. Lbs.	
Thread	14MM 3/4" Proj. Core	

IGNITION TIMING

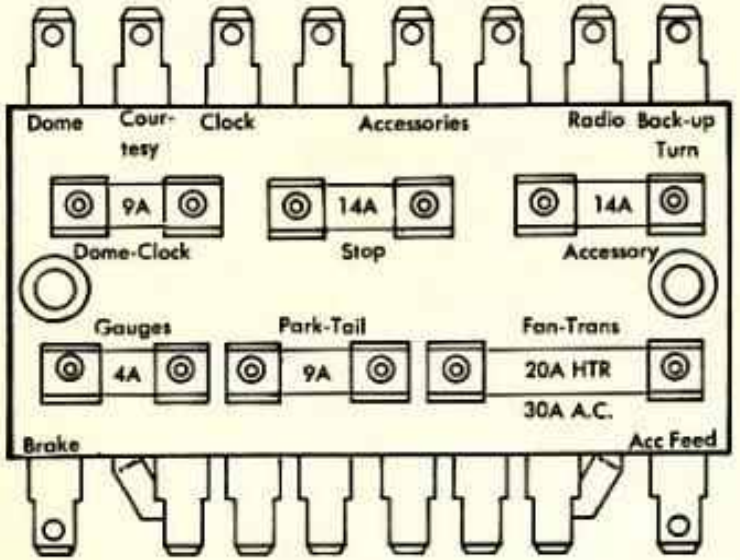
Check or set all ignition timing settings at 500 RPM.
After checking or setting ignition timing, set final idle speeds as listed below. When equipped with Air Conditioning, the final idle RPM must be set with Air Conditioning "OFF."

ENGINE CID	TRANSMISSION	TIMING	FINAL IDLE SPEED
199	Automatic	5° BTDC±1°	525 In Drive Range*
199	Manual	TDC±1°	600
232	Auto. (6909-7 Rogue)	5° BTDC±1°	525 In Drive Range*
232	Automatic	TDC±1°	525 In Drive Range*
232	Manual	TDC±1°	600
290-343-390	Automatic	TDC±1°	550 In Drive Range*
290-343-390	Manual	TDC±1°	650

*CAUTION: Apply Park Brake Firmly, Do Not Accelerate Engine.

FUSES, CIRCUIT BREAKERS AND FUSIBLE LINKS

Electrical circuits are protected with fuses that are mounted on a fuse panel which is located to the far left side under the instrument panel. Circuit breakers and fusible links are used on some individual circuits.



Fuse Panel

CIRCUIT BREAKERS

Circuit Protected	Rated Amps	Location
Headlamps	20	In Switch
Windshield Wipers	6	In Switch
Electric Windows	20	Inst. Panel
Tailgate, Front Switch	20	Inst. Panel
Tailgate, Rear Switch	20	Inst. Panel

FUSIBLE LINKS

Location	Color	Protects
Battery terminal of starter relay to main wire harness	Red	Complete Wiring
Battery Terminal of horn relay to main wire harness	Pink	Horn Circuit
Accessory terminal of ignition switch to wire harness	Brown	Electric Tailgate Instrument Panel Switch, Cigarette Lighter, all Accessories from Fuse Panel and Electric Windshield Wiper

Location	Color	Protects
Ignition terminal of ignition switch to wire harness	Yellow	Alternator Exciter Voltage, Fuel Temperature Indicator, Park Brake Warning Light
There are two additional fusible links which protect optional equipment when the car is so equipped.		
Battery terminal of starter relay to air conditioning blower motor relay (10-80 Series)	Red	Blower Motor Circuit (High Speed)
Battery Terminal of starter relay to junction block for "Rally Pac" ammeter (30-70 Series)	Black	"Rally Pac" Wiring

BULB CHART

TRADE NUMBER	APPLICATION
57	Clock or Tachometer (30-70) Glove Box (All)
67	License Plate Light
89	Trunk Light
94	Courtesy Light (Instrument Panel)
158	Instrument Illumination, Hi-Beam—Alternator, Oil Pres., Turn Signal and Brake Warning (Indicator)
211	Rear Quarter H.T. (01)
257	Park Brake Warning
1004	Courtesy (H.T. Rear Quarter), Cargo (Wagon), Dome (Sedans)
1156	Back-Up
1157	Park and Front Turn Signal, Stop, Tail, Rear Turn Signal, Hazard Warning
1157A	Park & Front Turn Signal (30)
1445	Control Illumination, Cigarette Lighter, Ignition Switch, Light Switch, Wiper Switch, Gear Selector Indicator A/C Thermostat Ash Receiver
1815	Radio Dial (30-70) AM, (10-80) AM/FM, (30-70) AM/Tape
1816	Clock (10-80)
1881	Heater and A/C Control (30-70)
1892	Radio Dial (01)
1893	Radio Dial (30-70) AM/FM
1895	Tachometer (01-10-80)
4001	Headlamp Hi-Beam (10-80)
4002	Headlamp Low-Beam (10-80)
6012	Headlamp (01-30-70)

EMISSION CONTROL SYSTEMS

Two systems are used; "Engine-Mod" and "Air-Guard"

199-232 CID engines with manual or automatic transmission use the "Engine-Mod" system.

290-343-390 CID engines with automatic transmissions use the "Engine-Mod" system.

290-343-390 CID engines with manual transmissions use the "Air-Guard" system.

"Engine-Mod" systems incorporate the following:

199-232

"Low-Quench" combustion chamber.
Emission calibrated distributor and carburetor.
"Closed" positive crankcase ventilation system.

290-343-390—Automatic Transmission

Emission calibrated distributor and carburetor.
"Thermostatically-Controlled" carburetor air-cleaner.
"Closed" positive crankcase ventilation system.

"Air-Guard" system incorporates the following:

290-343-390—Manual Transmissions

"Air-Guard" air pump system.
Emission calibrated distributor and carburetor.
"Thermostatically-Controlled" carburetor air-cleaner (4V only).
"Closed" positive crankcase ventilation system.

ENGINE IDLE SETTING PROCEDURES

The engine and all related systems must be in proper operating condition prior to performing carburetor idle speed and mixture adjustments. The idle speed and mixture adjustments must be made with the engine at operating temperature and air cleaner in place.

Plastic idle limiter caps are installed over the idle mixture screw(s) on all model carburetors except the Model AFB (4V) carburetor when used in combination with a 4-speed manual transmission. The limiters are designed to regulate the adjustment range of the idle mixture screw(s), thereby, effectively controlling the exhaust emission level at idle speeds to comply with Federal Standards for emission control.

The limiter caps are never to be damaged in any way to gain an adjustment beyond the normal adjustment range of the limiter. In isolated cases, when idle quality is unsatisfactory after performing a normal adjustment, refer to "Corrective Procedures to Improve Idle Quality" in the "EMISSION CONTROL" section of the Technical Service Manual.

Proper idle speed and mixture adjustments can be made by following a standard tachometer procedure, in which the idle mixture is adjusted to obtain a "lean best idle" setting. An optional combustion analyzer procedure, listed in the "EMISSION CONTROL" section of the Technical Service Manual, in which the idle mixture is adjusted to obtain a specified air-fuel ratio, may also be used. When following either the standard or optional procedure, adjustments must be made in the exact detailed sequence outlined to obtain "lean best idle" settings and satisfactory idle quality.

CAUTION: Set park brake firmly. Do not accelerate engine.

TACHOMETER PROCEDURE (Standard)

To compensate for fuel and temperature variations while performing the idle

mixture adjustment:

A—Do not idle engine for over 3 minutes at a time.

B—If the idle mixture adjustment is not completed within 3 minutes, run engine at 2000 RPM for one (1) minute.

C—Recheck the idle mixture adjustment at the specified RPM and adjust as required. If the idle mixture adjustment is not completed within three (3) minutes, repeat Step B.

IMPORTANT: The tachometer used should have an expanded scale of 400 to 800 or 0 to 1000 RPM. The instrument should be periodically inspected and calibrated to allow not more than 2% error.

ALL CARBURETORS—EXCEPT 4 V WITH MANUAL TRANSMISSIONS

Start engine and allow to warm up to operating temperature. Adjust idle speed to specified RPM.

6 Cylinder with Manual Transmission—600 RPM

6 Cylinder With Automatic Transmission—525 RPM in "DRIVE" Range

V-8 with Manual Transmission—650 RPM

V-8 with Automatic Transmission—550 RPM in "DRIVE" Range

Adjust Idle Mixture as follows:

Starting from the full rich stop(s), turn mixture screw(s) clockwise (leaner) until a loss of engine RPM is indicated, then, turn mixture screw(s) counterclockwise (richer) until the highest RPM reading is obtained at the "lean best idle" setting. On carburetors incorporating two mixture screws, turn both screws equally unless the engine demands otherwise. If the idle speed changed more than 30 RPM during the mixture adjustment, reset to the specified RPM and repeat the adjustment. Adjust final curb idle speed.

NOTE: If unable to obtain satisfactory idle quality when adjusting according to the foregoing procedure, the idle speed and mixture may be adjusted as outlined under "Corrective Procedures to Improve Idle Quality" in the Emission Control section of the Technical Service Manual.

4 V CARBURETOR—MANUAL TRANSMISSION (AIR GUARD)

Start engine and allow to warm up to operating temperature. Stop engine and disconnect by-pass valve air inlet hose. Turn mixture screws clockwise until seated lightly, then, turn screws counterclockwise 2 turns off their seats as a starting point. Adjust idle speed to specified RPM.

V-8 with manual transmission—650 RPM

Adjust idle mixture as follows:

Turn mixture screws counterclockwise (richer) until a loss of engine RPM is indicated. Turn both screws equally unless the engine demands otherwise. Turn mixture screws clockwise (leaner) until RPM increases, then, continue turning clockwise until the RPM decreases. Turn mixture screws counterclockwise (richer) until the highest RPM reading is obtained at the "lean best idle" setting. If the idle speed changed more than 30 RPM during the mixture adjustment, reset to the specified RPM and repeat the adjustment. Adjust final curb idle speed.

Connect by-pass valve air inlet hose.

POSITIVE CRANKCASE VENTILATION (PCV) VALVE

The positive crankcase ventilation system prevents crankcase vapors from entering the atmosphere under varying engine conditions. The system will work efficiently when the correct PCV valve is installed and the system maintained in serviceable condition.

The valve must be replaced and the system hoses inspected and cleaned at the mileage intervals specified in the Mechanical Maintenance Schedule.

American Motors PCV valves may be identified as to engine application by the color of the valve, as shown in the following chart.

PCV VALVE FLOW (C.F.M.) CHART

ENGINE MANIFOLD VACUUM		In. Hg.	Air Flow 232-290-343-390 Black Color Valve	C.F.M. 199-222 Regve Silver Color Valve
IDLE TEST POINT	Min. Flow	20	1.3-1.7	1.3-1.7
		18	1.3-1.7	1.3-1.7
		16	1.3-1.7	1.3-1.7
		14	1.5-2.0	1.3-1.7
		12	1.7-2.5	1.3-1.7
		10	2.1-2.8	1.3-1.7
		8	2.4-3.4	1.3-1.7
CRANKING* SPEED TEST POINT	Max. Flow	6	2.7-3.7	1.3-1.7
		4	3.2-4.2	1.7
		2	3.3-4.4	1.7

* Coil Secondary Wire Removed and Grounded, Carburetor Throttle at Curb Idle.

PCV VALVE TEST

PCV Valve Tester J-23111 will test the valve and system for correct flow rate (CFM).

The valve may be tested for minimum flow rate using two different manifold vacuum test points as indicated in the "PCV Valve Flow Chart."

To test, remove the PCV valve from the grommet in the intake manifold (V-8) or cylinder head cover (Six Cylinder), connect the valve to the tester hose.

Connect a vacuum gauge to read intake manifold vacuum.

NOTE: The PCV valve must be in a horizontal position and be lightly tapped during tests.

Start the engine, allow to idle, compare vacuum and tester readings to flow chart, record reading.

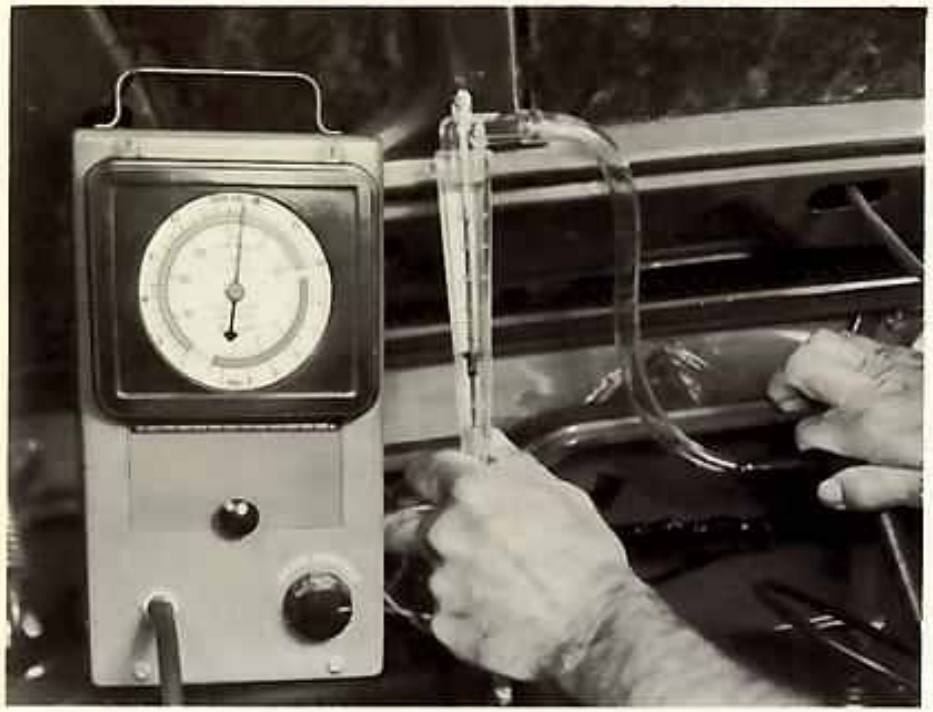
Stop the engine. Remove secondary coil wire from distributor cap and ground to engine.

NOTE: Throttle must be at curb idle position (off fast idle) for cranking speed test.

Crank engine, compare vacuum and tester readings with chart.

A valve that flows above or below the chart specification in either test, must be cleaned or replaced.

Replacement should be made with the correct American Motors PCV valve.



TESTING PCV VALVE AND SYSTEM

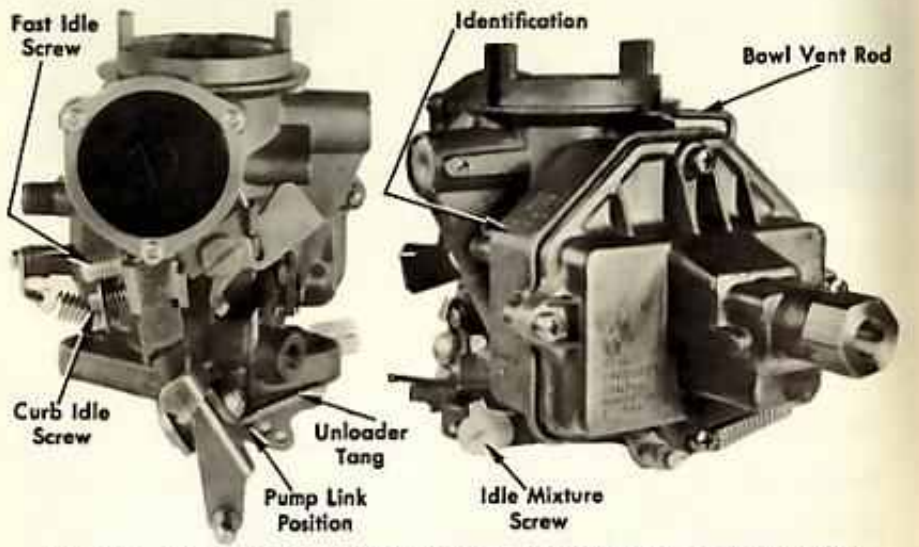
FUEL PUMP SPECIFICATIONS

Fuel Pump Pressure 4 to 5-1/2 P.S.I. on Six cylinder engines and 5 to 6-1/2 P.S.I. on V-8 engines.
Fuel Pump Volume—One Quart in One Minute @ 500 R.P.M.
Vacuum Test—14" to 19" hg. @ 1000 RPM.

FUEL TANK CAPACITIES (U.S. GALS.)

Rambler	16
AMX and Javelin	19
Rebel Sedans and 2-Seat Sta. Wag.	21.5
Ambassador Sedans	21.5
Rebel 3-Seat Wagons—All Ambassador Sta. Wag.	19

CARBURETOR SERVICE ADJUSTMENTS
MODEL 1931—ONE VENTURI CARBURETOR



232 CID—AUTO. TRANSMISSION (ROGUE, 6909-7)—CODE NUMBER 4294A

Float Level—With fuel bowl removed and inverted, measure vertical distance from float ends to inside of bowl. Bend float arm to adjust.
4294A ..... 5/16" (.300") Gauge

Initial Choke Valve Clearance—Hold choke piston against stop screw, measure clearance between upper edge of choke valve and air horn. Turn stop screw to adjust.
4294A ..... 1/8" (.125") Drill

Automatic Choke—Rotate cover to adjust.
4294A ..... 1 Notch Rich

Fast Idle Speed—With engine at operating temperature, align fast idle screw with

second step on fast idle cam. Turn screw to adjust.
4294A ..... 1600 RPM

Bowl Vent—Measure clearance between vent valve and seat at curb idle. Bend rod to adjust.
4294A ..... 1/16" (.065") Gauge

Accelerator Pump Link Position—Install link in specified hole in throttle lever (holes numbered from throttle shaft out).
4294A ..... No. 1 Hole

Unloader—With throttle valve fully opened and choke valve rotated toward closed position, measure clearance between upper edge of choke valve and air horn.
4294A ..... 15/64" (.230") Gauge

Idle Speed—Refer to "Engine Idle Setting Procedures."

MODEL RBS—ONE VENTURI CARBURETOR

199 CID—MAN. TRANSMISSION—CODE NUMBER 4633S
199 CID—AUTO. TRANSMISSION—CODE NUMBER 4634S
232 CID—MAN. TRANSMISSION—CODE NUMBER 4631S
232 CID—AUTO. TRANSMISSION—CODE NUMBER 4666S

Float Level—With carburetor inverted and fuel bowl removed, measure vertical distance from the casting to the small bumps at the outer ends of the float. Bend float arm to adjust.
All ..... 9/16" (.5625")

Initial Choke Valve Clearance—Insert a .026" gauge in choke piston cylinder and measure clearance between lower edge of choke valve and air horn. Bend choke piston lever to adjust.
4631S, 4633S ..... 3/16" (.190") Gauge
4634S, 4666S ..... 7/32" (.215") Gauge

Automatic Choke—Rotate cover to adjust.
4631S, 4633S ..... Index
4634S, 4666S ..... 2 Notches Rich

Fast Idle Cam Linkage—With choke fully closed, align fast idle tang with index mark on fast idle cam. Bend connector rod at offset portion to adjust.

Fast Idle Speed—With engine at operating temperature, align fast idle tang with index mark on fast idle cam. Bend tang to adjust.
All ..... 2000 RPM

Accelerator Pump—With throttle valve fully closed, measure clearance between

shoulder on pump plunger shaft and pump arm. To obtain specified clearance, turn pump adjusting nut.
All ..... 1/64" (.015") Gauge

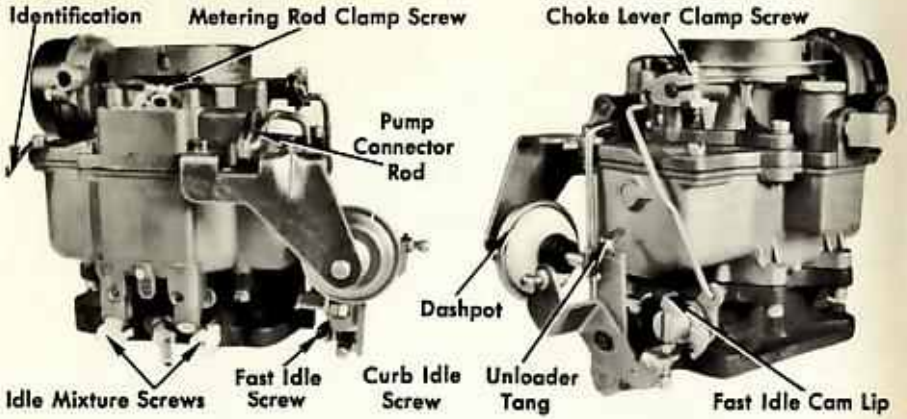
Bowl Vent—Measure clearance between vent valve and air horn casting with throttle set at curb idle. Bend connector rod at pump end to adjust.
All ..... 5/64" (.080") Gauge

Unloader—With throttle valve fully opened, measure clearance between upper edge of choke valve and air horn. Bend tang on throttle lever to adjust.
4631S, 4666S ..... 1/8" (.125") Drill
4633S, 4634S ..... 3/16" (.190") Gauge

Dashpot—With dashpot stem fully depressed, measure clearance between stem and throttle lever at curb idle. Adjust by turning dashpot.
4631S, 4633S ..... 3/32" (.095") Gauge

Idle Speed—Refer to "Engine Idle Setting Procedures."

MODEL WCD—TWO VENTURI CARBURETOR



232 CID—MAN. TRANSMISSION—CODE NUMBER 4667S
232 CID—AUTO. TRANSMISSION—CODE NUMBER 4668S

Float Level—Invert bowl cover and measure clearance between tops of floats and bowl cover, gasket removed. Bend float arms to adjust.
All ..... 7/32" (.215") Gauge

Automatic Choke—Rotate cover to adjust.
All ..... Index

Fast Idle Cam Linkage—With specified gauge between lip of fast idle cam and throttle body boss, hold choke valve and linkage toward closed position. Tighten clamp screw.
All ..... (.010") Gauge

Fast Idle Speed—With engine at operating temperature, align fast idle screw with index mark on fast idle cam. Turn screw to adjust.
All ..... 2000 RPM

Accelerator Pump—With throttle valves closed, top surface of pump arm must be parallel with casting. Bend connector rod at upper angle to adjust.

Metering Rod—With throttle valves closed and pump adjustment completed, hold metering rods in maximum down position. Rotate metering rod arm until finger contacts lip of vacuumeter link. Tighten clamp screw.

Unloader—With throttle fully open, measure clearance between upper edge of choke valve and air horn. Bend tang on throttle lever to adjust.

All ..... 3/16" (.190") Gauge

Dashpot—With dashpot stem fully depressed, measure clearance between stem and throttle lever at curb idle. Turn dashpot to adjust.

All ..... 7/64" (.110") Gauge

Idle Speed—Refer to "Engine Idle Setting Procedures."

MODEL 6200—TWO VENTURI CARBURETOR

290 CID—MAN. TRANSMISSION—CODE NUMBER 9HM2
290 CID—AUTO. TRANSMISSION—CODE NUMBER 9HA2
343 CID—AUTO. TRANSMISSION—CODE NUMBER 9ZA2

Float Level (Dry)—With air horn and gasket removed, raise float until fuel inlet needle is lightly seated. Measure the distance from the fuel bowl machined surface to the float seam at a point 1/8" from the free end. Bend float tab to adjust.

All ..... 1/2" (Depth Gauge)

Fuel Level (Wet)—Idle engine minimum of three minutes to stabilize fuel level. Rotate air horn rearward and remove gasket. With engine idling, measure distance from fuel bowl machined surface to surface of fuel. Measurement must be made at least 1/4" away from any vertical surface. Bend tab on float lever to adjust. Stop engine while adjusting.

All ..... 13/16" (Depth Gauge)

Initial Choke Valve Clearance—Insert a .035" gauge in choke piston cylinder and rotate the choke piston lever counterclockwise until the piston contacts the gauge. Measure the clearance between the lower edge of the choke valve and the air horn. Turn the choke rod clevis nut to adjust.

9HM2 ..... 1/8" (.125") Drill
9HA2, 9ZA2 ..... 9/64" (.140") Gauge

Fast Idle Cam Linkage—Position choke cover 1/4 turn counterclockwise (rich) from index. With fast idle screw aligned with fast idle cam index mark, measure clearance between lower edge of choke valve and air horn. Turn fast idle cam lever screw to adjust (reset choke).

All ..... 7/64" (.120") Gauge

Automatic Choke—Rotate cover to adjust.

All ..... Index

Fast Idle Speed—With engine at operating temperature, align fast idle screw with index mark on fast idle cam. Turn screw to adjust.

All ..... 1600 RPM

Accelerator Pump Rod Position—Install rod in specified hole of pump lever and throttle over-travel lever. Holes on over-travel lever numbered from throttle shaft out.

All ..... Inboard Hole—Pump Lever
No. 3 Hole—Over-Travel Lever

Bowl Vent—Measure clearance between vent valve and air horn casting with throttle set at curb idle. Bend accelerator pump lever up or down at the vent rod end to adjust. Avoid excessive bending.

All ..... 1/16" (.065") Gauge

Unloader—With throttle fully opened, measure the clearance between upper edge of choke valve and air horn. Bend tang on fast idle speed lever to adjust.

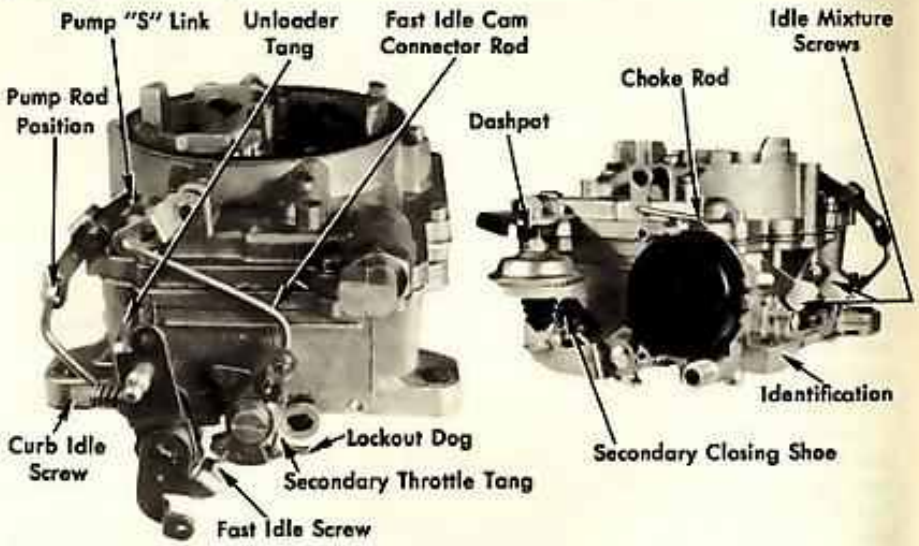
All ..... 5/64" (.080") Gauge

Dashpot—With dashpot stem fully depressed, measure clearance between stem and throttle lever at curb idle. Turn dashpot to adjust.

All ..... 9/64" (.140") Gauge

Idle Speed—Refer to "Engine Idle Setting Procedures."

MODEL AFB—FOUR VENTURI CARBURETOR



290 CID—MAN. TRANSMISSION—CODE NUMBER 4660S
290 CID—AUTO. TRANSMISSION—CODE NUMBER 4661S
343 CID—MAN. TRANSMISSION—CODE NUMBER 4662S
343 CID—AUTO. TRANSMISSION—CODE NUMBER 4663S
390 CID—MAN. TRANSMISSION—CODE NUMBER 4664S
390 CID—AUTO. TRANSMISSION—CODE NUMBER 4665S

Float Level—With air horn removed and gasket in place, measure clearance between the air horn and each float at the free end (not at seam). Bend float levers to adjust.

All ..... 11/32" (.350") Gauge

Float Drop—With air horn in upright position and gasket in place, measure distance from air horn to bottom of each float at the free end (not at seam).

All ..... 2"

Initial Choke Valve Clearance—Insert a .026" gauge in choke piston cylinder and rotate choke piston lever clockwise until piston contacts gauge. Measure clearance between upper edge of choke valve and air horn. Bend choke rod to adjust.

4660S ..... 5/64" (.075") Gauge
4661S, 4663S, 4665S ..... 1/8" (.120") Gauge
4662S, 4664S ..... 7/64" (.110") Gauge

Fast Idle Cam Linkage—With choke valve tightly closed, align fast idle screw with index mark on fast idle cam. Bend fast idle cam connector rod to adjust.

Automatic Choke—Rotate cover to adjust.

4660S ..... 2 Notches Rich
4661S, 4662S, 4663S, 4664S, 4665S ..... Index

Fast Idle Speed—With engine at operating temperature, align fast idle screw with index mark on fast idle cam. Turn screw to adjust.

All ..... 2000 RPM

Accelerator Pump Stroke—With throttle fully closed and pump rod positioned in center hole of pump lever, measure clearance between bowl cover and bottom of "S" link. Bend pump rod to adjust.

All ..... 21/64" (.325") Gauge

Unloader—With throttle fully opened, measure clearance between upper edge of choke valve and air horn. Bend tang on throttle lever to adjust.

4660S, 4662S, 4664S ..... 5/32" (.160") Gauge
4661S, 4663S, 4665S ..... 11/64" (.170") Gauge

Secondary Throttle Lever—With carburetor inverted and choke valve fully opened, open primary throttle valves until secondary valves just begin to open. Measure clearance between lower edge of primary valve and carburetor bore. Bend throttle connector rod to adjust.

All ..... 7/16" (.432")

Closing Shoe—With throttle fully closed, measure clearance between primary and secondary shoes. Bend secondary shoe to adjust.

All ..... (.020") Gauge

Secondary Throttle Lockout—With choke valve fully closed, measure clearance between secondary throttle lever. Bend tang to adjust.

All ..... 1/64" (.015") Gauge

Dashpot—With dashpot stem fully depressed, measure clearance between stem and throttle lever at curb idle. Turn dashpot to adjust.

4660S, 4662S, 4664S ..... 5/32" (.160") Gauge
4661S, 4663S, 4665S ..... 11/64" (.170") Gauge

Idle Speed—Refer to "Engine Idle Setting Procedures."

DRIVEN MEMBER DIAMETER

199-232 ..... 9-1/8"
290 ..... 10"
343-390 ..... 10-1/2"

CLUTCH PEDAL FREE TRAVEL

7/8" to 1-1/8"—1" Desired

CLUTCH PEDAL ADJUSTMENT

290-343-390 ..... Aligning Pin
199 only ... 6-1/2" Bare Floor Pan to Bottom of Pedal

Clutch Lever Height	Engine CID
Flush	290—4-Speed and 3-Speed H.D.
1/32" Above Hub	290—3-Speed
3/32" Above Hub	343-390—4-Speed
3/32" Below Hub	199-232

CLUTCH HOUSING ALIGNMENT

Maximum Indicator Reading of Clutch Housing Bore Concentricity to Center Line ..... .010"
Maximum Indicator Reading of Clutch Housing Transmission Mounting Face to Crankshaft Center Line .. .010"

TORQUE LIMITS—FOOT POUNDS

Clutch Cover Screw J & L 30
H-Z 40
Clutch Housing to Motor Dowel Bolt Nut 45
Clutch Housing to Motor Screw 290-343 45
Clutch Housing to Engine Block Screw 199-232 (Top) 35
(Bottom) 45
290-343-390 30
Clutch Housing Spacer to Block Screw 290-343 15
Clutch Throwout Lever Pivot 35
Transmission Case to Clutch Housing Screw 55

PEDAL ADJUSTMENT

199 CID ENGINE

The clutch pedal stop bracket must be adjusted to obtain a 6-1/2" dimension from the bare floor pan to the bottom of the clutch pedal. After this adjustment is made, the clutch pedal free play must be adjusted.

232 CID AND ALL V-8 ENGINES

Clutch pedal height is important to obtain proper clutch pedal and overcenter spring operation.

To obtain the correct clutch pedal height, insert a 5/16" pin approximately 4-1/2" long through the two aligning holes in the clutch pedal support bracket. Adjust the pedal stop until the pedal lever hole aligns with the pin and the pin slides freely through all three holes.

After the clutch pedal height is adjusted, clutch free play must be adjusted.

MANUAL AND OVERDRIVE

3-SPEED TRANSMISSION END PLAY SPECIFICATIONS

	199 CID	232 CID	290 CID
First Speed Gear		.003" to .012"	.003" to .014"
Second Speed Gear	.003" to .010"	.003" to .018"	.003" to .018"
Countershaft Gear	.003" to .006"	.005" to .019"	.005" to .018"

First and second speed gear end play is governed by selective fit of main shaft, gear, and synchro-clutch.

Countershaft gear end play is governed by bronze thrust washers.

4-SPEED TRANSMISSION END PLAY SPECIFICATIONS

290, 343, 390 CID

First Speed Gear	.003" to .021"
Second Speed Gear	.003" to .014"
Third Speed Gear	.003" to .018"
Countershaft Gear	.004" to .017"

First, Second and Third speed gear end play is governed by selective fit of main shaft, gear, and synchro-clutch.

Countershaft gear end play is governed by bronze thrust washers.

Gear Ratios

199 3-Speed

1st	2.605 to 1
2nd	1.630 to 1
High	1 to 1
Reverse	3.536 to 1

232 3-Speed

1st	2.636 to 1
2nd	1.605 to 1
High	1 to 1
Reverse	2.636 to 1
O.D.	.700 to 1

290 3-Speed

1st	2.548 to 1
2nd	1.558 to 1
High	1 to 1
Reverse	2.548 to 1
O.D.	.700 to 1

V-8 4-Speed

1st	2.23 to 1
2nd	1.77 to 1
3rd	1.35 to 1
4th	1.00 to 1
Reverse	2.16 to 1

SHIFT-COMMAND AUTOMATIC TRANSMISSION

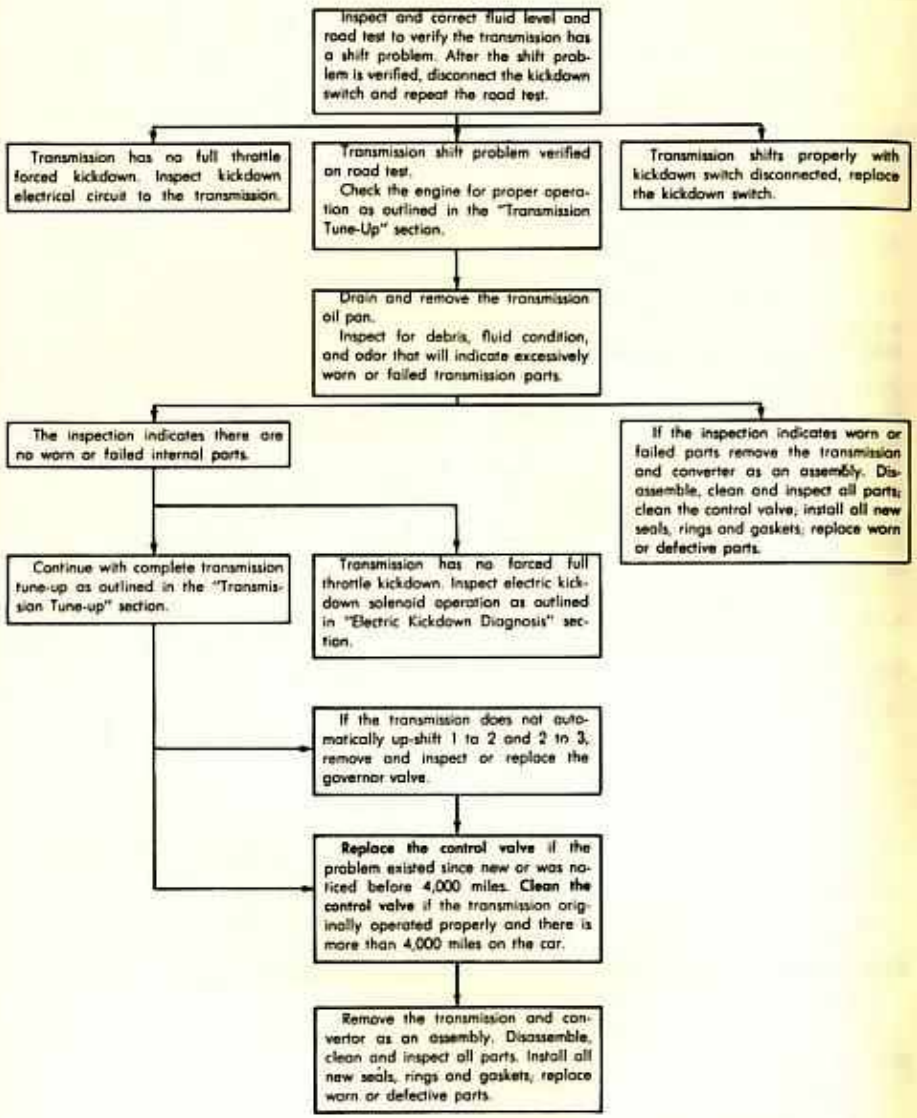
DIAGNOSIS GUIDE

In most instances, the customer will describe the Shift-Command transmission difficulty as one of the following type problems:

IMPROPER TRANSMISSION SHIFTS (GUIDE "A")
ABNORMALLY NOISY (GUIDE "B")
FLUID LEAKS (GUIDE "C")
CAR WILL NOT MOVE (GUIDE "D")

When it has been determined that a transmission Shift-Command complaint exists, use the corresponding diagnosis guide.

GUIDE "A" — IMPROPER TRANSMISSION SHIFTS



GUIDE "B" — ABNORMAL NOISE

Inspect and correct the transmission fluid level, road test to verify that an abnormal noise exists, identify the type of noise, driving ranges, and conditions when the noise occurs.

- **Gear noise or grinding**
  - Remove the transmission and converter as an assembly; disassemble, clean and inspect all parts; clean the control valve; install all new seals, rings, and gaskets; replace worn or defective parts.
- **Whine or buzz noise**
  - Listen to transmission and converter for source of noise.
    - **Transmission has buzz or whine**
      - Remove the transmission pan; inspect for debris indicating worn or failed parts.
        - **No debris present**
          Replace control valve if problem existed since new or noticed before 4,000 miles. **Clean control valve** if transmission originally operated properly and there is more than 4,000 miles on the car.
        - **Debris present**
          Remove transmission and converter as an assembly; disassemble, clean and inspect all parts; clean the control valve; install all new seals, rings and gaskets; replace worn or defective parts.
    - **Converter has loud buzz or whine**
      - Replace torque converter
- **Knock, click, or scrape noise**
  - Remove torque converter and inspect for loose or cracked converter drive plate; inspect for contact of the starter drive with the starter ring gear.

GUIDE "C" — FLUID LEAKS

Visually inspect for source of leak. If the source of leak cannot be readily determined, clean the exterior of the transmission. Check transmission fluid level. Correct if necessary.

- The following leaks may be corrected without removing the transmission:
  - Manual lever shaft oil seal.
  - Kick-down wire terminal case plug seal.
  - Pressure gauge plug.
  - Vacuum control unit "O" ring seal.
  - Pan gasket.
  - Oil cooler fittings.
  - Extension housing to case gasket.
  - Rear case adapter plugs (M-11, M-12 only).
  - Rear oil seal.
  - Speedometer adapter "O" ring.
- The following leaks require removal of the transmission and torque converter for correction.
  - Transmission fluid leaking from the lower edge of the converter housing; caused by front pump seal, pump to case gasket, or torque converter weld.
  - Cracked or porous transmission case.

GUIDE "D" — CAR WILL NOT MOVE

Check the transmission fluid level before starting the engine. If no fluid is visible on the dip stick add fluid to the "L" mark before starting the engine. Then start the engine with the transmission in neutral and listen for noise.

- **No abnormal noise, move the selector to a forward drive range and observe the propeller shaft for turning.**
  - **Propeller shaft turns but rear wheels do not turn, inspect for broken rear axle parts.**
  - **Propeller shaft does not turn, remove the transmission oil pan. Inspect for debris.**
    - **No debris, internal linkage disconnected. Repair linkage problem.**
    - **No debris and linkage is connected.** Remove the transmission and converter as an asembly; disassemble, clean, and inspect all parts; clean the control valve; install all new seals, rings and gaskets; replace worn or defective parts.
    - **Debris is present.** Remove transmission and converter as an assembly; disassemble, clean and inspect all parts; clean the control valve; install all new seals, rings, and gaskets; replace worn or defective parts.
- **Abnormal noise, stop engine immediately,** remove the transmission and converter as an assembly. Disassemble, clean and inspect all parts. Clean control valve; install all new seals, rings, and gaskets; replace worn or defective parts.

Shift-Command Transmission Overhaul Diagnosis Chart

ENGAGEMENTS	Code
Harsh	c f
Delayed Forward	a z
Delayed Reverse	a
None	a k l m o
No Forward D	a b i z
No Forward 2	a b z
No Reverse	a e h
No Neutral	c

UPSHIFTS	
No 1-2	a y
No 2-3	a e t y
Shift Points Too High	a
Shift Points Too Low	a

UPSHIFT QUALITY	
1-2 Delayed Followed Close By 2-3 Shift	a b g
2-3 Slips	a e g t
1-2 Harsh	b
2-3 Harsh	f
1-2 Ties Up	f j

DOWNSHIFTS	
No 2-1 in D	i y
No 2-1 in 1	h y
No 3-2	g y
Shift Points Too High	a
Shift Points Too Low	a

FORCED DOWNSHIFTS	Code
2-1 Slips	b l z
3-2 Slips	a e g t
3-1 Shifts Above—mph.	a g
2-1 Harsh	a b i
3-2 Harsh	e f

REVERSE	
Slips Or Chatters	a c e h t
Tie Up	a c

LINE PRESSURE	
Low Idle Pressure	a m
Low Stall Pressure	a m y

STALL SPEED	
Too Low (200 RPM Or More)	a
Too High D	u v a b i k o z
Reverse Too High	u v h e k o

OTHERS	
Poor Acceleration	y o
Noisy in Neutral	f p d o
Noisy in Park	p d o
Noisy in All Gears	p r o
Noisy in 1st & 2nd Gear Only	p r w
Park Brake Does Not Hold	q
Oil Out Breather	a x x-1
Oil Out Fill Tube	a x x-1
Ties Up in 1, 1st Gear	f a
Ties Up in D, 1st Gear	f a
Ties Up in 2nd Gear	f a j
Ties Up in 3rd Gear	f a j
Chatters—D, 2 or 1	a b z

Correction Code Key

- a. Sealing rings missing, leaking or broken
- b. Front clutch slipping, worn plates or faulty parts
- c. Front clutch seized or distorted plates
- d. Front clutch hub thrust washer missing (detectable in N, P, R only)
- e. Rear clutch slipping, worn or faulty parts
- f. Rear clutch seized or distorted plates
- g. Front band worn or broken
- h. Rear band worn or broken
- i. One-way (sprag) clutch slipping or incorrectly installed
- j. One-way (sprag) clutch seized
- k. Broken input shaft
- l. Pump drive tangs or converter hub broken
- m. Pump worn
- o. Converter
- p. Pump
- q. Parking linkage
- r. Planetary assembly
- s. Fluid distributor sleeve in output shaft (V-8)
- t. Rear clutch piston ball check leaks
- u. Broken output shaft
- v. Broken gears
- w. Forward sun gear thrust washer missing
- x. Breather baffle missing
- x-1 Fluid aerated or overfull
- y. Output shaft plug missing (6 cyl.)
- z. Front clutch piston check valve leaks

SHIFT-COMMAND "TUNE-UP"

FLUID LEVEL CHECK

Only AM automatic transmission fluid or "Dexron" must be used to fill the transmission.

NOTE: Cold weather automatic transmission fluid, Part Number 8992375, may be used to improve initial transmission operation and decrease transmission warm-up time in cold weather.

This fluid must be used as an additive only. NEVER USE MORE THAN 3 QUARTS.

The F "FULL" mark on the fluid level indicator (dip stick) is calibrated to indicate full. When the transmission fluid is at the normal (190°F.) operating temperature.

This operating temperature can only be obtained after a minimum of 15 highway miles or the equivalent of city driving.

If the transmision is filled to the "F" mark on the dip stick when cool or moderately warm, an overfilled condition will exist when the fluid is at normal operating temperature.

Overfilled transmissions will cause the fluid to aerate. Aerated fluid will lower transmission pressure and may result in fluid being forced out of the vent or fill tube.

Fluid Level Check at Operating Temperature

The vehicle must be level for an accurate check.

Apply the parking brake and start the engine.

Place the selector lever in neutral, check the fluid level indicated on the dip stick, it should be at the "F" full mark.

Fluid Level Check When Cold

It may be impractical to drive the car to obtain the desired normal operating temperature, therefore, the fluid level may be checked at room temperature (70°F.) in the following manner:

The vehicle must be level for an accurate check. Apply the parking brake and start the engine.

Move the selector lever to all drive range positions and return the lever to neutral. With the engine idling, the oil level should be at the level indicated in the following chart:

Transmission Model	Fluid Level
M-36	1/4" below "L"
M-37	1/4" below "L"
M-40	5/16" above "L"
M-11	"L"
M-12	"L"

Refilling After Draining

The M-36, 37, and 40 transmission capacities are approximately 9 quarts; the M-11 and 12 transmission capacities are approximately 11 quarts.

The amount of fluid drained from the transmission to perform repairs is dependent on extent of the repair. Transmission overhaul or replacement usually requires more fluid to obtain the correct level because the units have been completely drained. Initial filling of 4 quarts of fluid is suggested.

If the transmission pan was removed for internal service only, an initial fill of 3 quarts may be used.

Apply the parking brake and place the selector lever in neutral and start the engine. DO NOT RACE THE ENGINE.

Add fluid and check the level until fluid is visible on the dip stick.

Move the selector lever momentarily to all positions to fill the units and then return the selector to neutral.

NOTE: Avoid operating in drive ranges with the brakes applied, because the fluid will warm up and an accurate cold level check cannot be made. Continue to add fluid until it is at the specified cold level.

LINKAGE ADJUSTMENT

Adjust linkage at the transmission outer lever for a free pin fit, with the transmission and the selector lever in the Neutral (N) position.

Front Band Adjustment (Self-Adjusting)

To verify, insert a .250" gauge between actuating arm and servo body. Tighten adjusting screw to 10 Inch Pounds torque.

NOTE: M-11 and M-12 front servo adjusting screws have left hand threads.

Rear Band Adjustment

Remove cross member at side sills and lower the transmission for access to the adjusting screw. Loosen the adjusting screw lock nut and tighten the adjusting screw with Tool J-22698 until tool clicks. Back off adjusting screw 3/4 turns (199, 232, and 290 (2V) CID engines). Back off adjusting screw 1-1/4 turns (290-4V, 343 and 390 CID engines). Tighten lock nut. Raise transmission and tighten crossmember to side sill bolts.

CAUTION: It is necessary to open the hood on Javelin and AMX Series equipped with power steering to avoid damage to the hood from the power steering pump reservoir wing nut.

FRONT BAND ADJUSTMENT

REAR BAND ADJUSTMENT

Control Pressure Adjustment

Connect oil pressure gauge to transmission.
Connect vacuum gauge.
Connect tachometer to engine.
Apply Park Brake and block wheel.

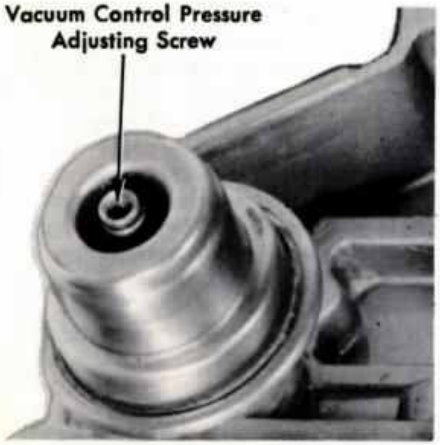
With engine running at a normal operating temperature, place selector lever in reverse. Accelerate engine to 1000 RPM. The pressure gauge should indicate pressure shown on chart.

TRANSMISSION PRESSURES			
Engine Type CID	Vacuum	(R) Reverse	D, 2, 1
199	9.0"	95 P.S.I.	90-100 P.S.I.
232	13.5"	95 P.S.I.	90-100 P.S.I.
290—2V	13.5"	95 P.S.I.	90-100 P.S.I.
290—4V	13.5"	100 P.S.I.	70-80 P.S.I.
343	13.5"	100 P.S.I.	70-80 P.S.I.
390—4V	15.0"	120 P.S.I.	75-85 P.S.I.

Idle Pressure, check with engine at normal operating temperature.		
	Reverse	Forward
199 CID Engine	55-68 P.S.I.	55-68 P.S.I.
232-290—2V CID Engine	55-68 P.S.I.	55-68 P.S.I.
290-4V—343-390 CID Engine	57-67 P.S.I.	42-52 P.S.I.

Adjust vacuum control unit to obtain correct pressure.

Vacuum Control Pressure Adjusting Screw



When pressure is adjusted to specification in "R" (Reverse), move selector lever to each of the forward ranges and check the pressure at 1000 RPM. The pressure should match the chart.

Do Not Adjust the pressure in forward ranges.

When pressure is not correct in the forward ranges, check governor for sticking. If governor is free refer to step IV of the Diagnosis Guide.

When pressure cannot be adjusted to specifications in "R" (Reverse), inspect the vacuum control for leak. If vacuum control is satisfactory, check for restriction or leak in vacuum line from the engine and check the length of the Vacuum Unit Push Rod. (Altitude Compensator Push Rod is 3.439" ± .005", Diaphragm Type Push Rod is 4.116" ± .005".) If the problem still is present, refer to Step IV of the Diagnosis Guide.

ELECTRICAL KICKDOWN

No 2-3 Upshift

If no 2-3 shift occurs, disconnect wire from kickdown switch and road test. If the 2-3 shift occurs on the road test the problem is in the switch.

Forced Downshift

If no forced downshift occurs check the operation of the solenoid by disconnecting the solenoid wire at transmission case and connecting a jumper wire to the positive terminal of the battery. Momentarily energize the solenoid by touching the jumper wire to the solenoid connector. If a click is audible from the solenoid, the solenoid is operating satisfactorily and the problem may be the kickdown switch. If no click occurs the problem may be the valve body solenoid.

TRANSMISSION POWER FLOW AND RATIOS

199-232 and 290 (2V) CID Engines

Gear	Selector Lever Position	Clutch Applied	Band Applied	Gear Ratio
Neutral	N	None	None	
First	D or 1	Front	Rear*	2.39:1
Second	D or 2	Front	Front	1.45:1
Third	D	Front & Rear	None	1.00:1
Reverse	R	Rear	Rear	2.09:1

*1 range only. D Planet Carrier held by one-way clutch.

OVERHAUL CHECKS AND ADJUSTMENTS

199-232 and 290 (2V) CID Engines

Transmission End Play	.009"-.032"
Available selective thrust washers	.062"-.080"
Rear Clutch Plate Inspection for "Dish"	.010"-.015"
Planetary Pinion End Play	.010"-.020"

TORQUE—FOOT POUNDS

199-232 and 290 (2V) CID Engines

Converter to Drive Plate Cap Screws	35
Transmission Case to Converter Housing	20
Rear Extension to Case	35
Oil Pan to Case	15
Front Servo to Case	12
Front Servo Self Adjusting Bracket Screws	22*
Rear Servo to Case	20
Pump Adapter to Front Pump Housing	20
Pump Adapter to Case	15
Rear Case Adapter to Case	75*
Center Support to Case	20
Manual Shaft Lock Nut	11
Front Servo Adjusting Screw Lock Nut	23
Rear Servo Adjusting Screw Lock Nut	30
Valve Body Screws No. 10-24 N.C.	25*
Valve Body to Case 1/4-20 N.C.	75*
Oil Screen 1/4-20 N.C.	75*
Governor Valve Body to Counter Weight	75*
Governor Valve Body Cover to Governor	25*
Case Line Pressure Plug	10

*Inch Pounds

TRANSMISSION POWER FLOW AND RATIOS

290 (4V)—343-390 CID Engines

Gear	Selector Lever Position	Clutch Applied	Band Applied	Gear Ratio
Neutral	N	None	None	
First	D or 1	Front	Rear*	2.40:1
Second	D or 2	Front	Front	1.467:1
Third	D	Front & Rear	None	1.00:1
Reverse	R	Rear	Rear	2.00:1

*1 range only. D Planet Carrier held by one-way clutch.

OVERHAUL CHECKS AND ADJUSTMENTS

290 (4V)—343-390 CID Engines

End Play	.010" to .029"
Available selective thrust washers	.062"
	.068"
	.075"
	.082"
Rear Clutch Plate Inspection for "Dish"	.010"-.020"
Planetary Pinion End Play	.010"-.020"
Converter Housing Bore Run-out	.010"
Converter Housing Face Run-out	.007"

TORQUE—FOOT POUNDS

290 (4V)—343-390 CID Engines

Converter to Flex Plate	35
Converter Housing to Engine	28
Transmission to Converter Housing	55
Case Line Pressure Plug	15
Front Pump Assembly to Pump Body	20
Front Pump Assembly to Transmission Case	20
Manual Control Lever to Manual Control Shaft	45
Center Support to Transmission Case	25
Front Servo Adjusting Screw Locknut	20
Front Servo to Case	35
Front Servo Self Adjusting Bracket Screws	22*
Rear Servo to Case	45
Extension to Case	35
Valve Body Screws	30*
Upper Valve Body, Lower Valve Body & Cover, Bolts	10
Valve Body to Transmission	10
Oil Screen to Valve Body Screws	30*
Governor Body to Counter Weight	75*
Vacuum Control Unit to Case	15
Oil Pan to Case	15

*Inch Pounds

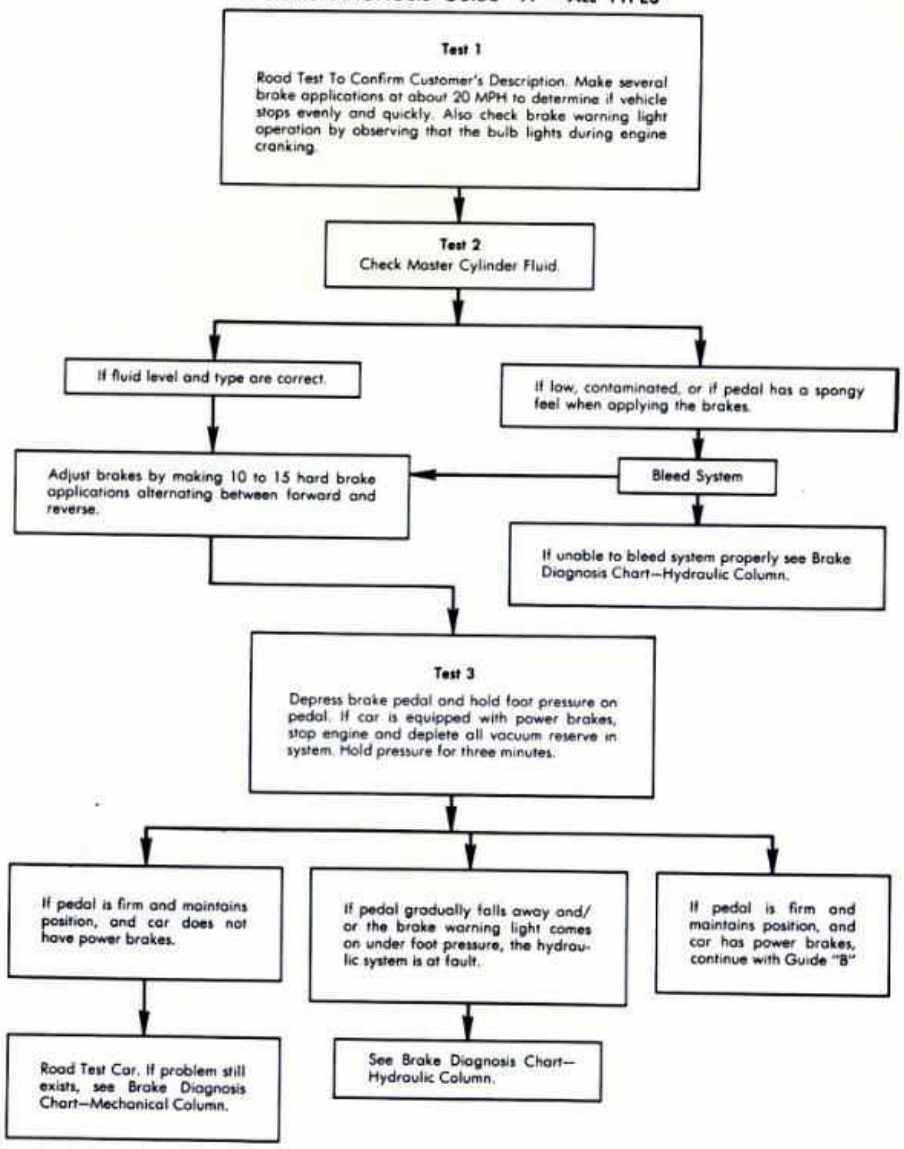
DIAGNOSIS GUIDE

In most instances, the customer will describe the difficulty as one or more of the conditions listed in the brake diagnosis guide. Road test the car with the customer to confirm the difficulty and obtain additional information which will be helpful.

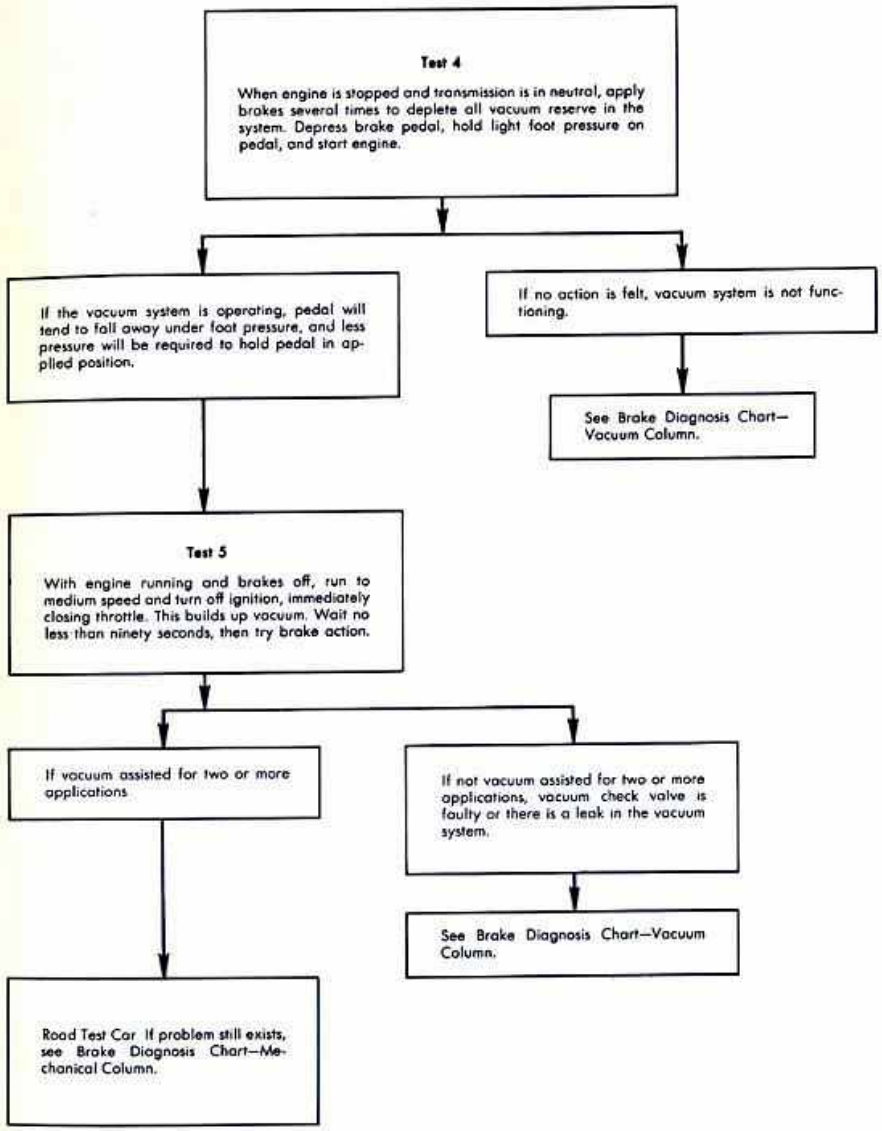
The following diagnosis guide is a sequential procedure to aid in determining the cause of a brake problem.

Guide "A" is to be used for all cars and Guide "B" is to be used for cars equipped with power brakes after completing the steps outlined in guide "A."

BRAKE DIAGNOSIS GUIDE "A"—ALL TYPES



BRAKE DIAGNOSIS GUIDE "B"—POWER BRAKES ONLY



BRAKE DIAGNOSIS CHART

CONDITION	MECHANICAL	HYDRAULIC	VACUUM (Power Unit)
LOW PEDAL (Excessive Pedal Travel to Apply Brakes)	F G I M f g	T	k
SPONGY PEDAL (A Springy Sensation at Pedal Upon Application)	I	P Q U	
HARD PEDAL (Excessive Pedal Pressure Needed to Stop Vehicle)	A F G K V a	R T U W	c e h k
FADING PEDAL (A Falling Away of Pedal Under Steady Foot Pressure)	I	P Q S T W	
GRABBING OR PULLING	A D E G H I K L N V X Y Z a	R W	k
NOISE (Squealing, Clicking or Scraping Noise)	F G H I J L M N		
CHATTER OR SHUDDER (May be Accompanied by Brake Roughness or Pedal Pumping)	D G I L N O		
DRAGGING BRAKES (Slow or Incomplete Release of Brakes)	A B C F G H K L V a f g	R U T W	k

A — Pedal linkage — binding. (Check by bleeding one wheel cylinder using light pedal effort. Observe for smooth full travel of pedal)
B — Parking brake cables and linkage sticking, dirty or corroded.
C — Parking brake improperly adjusted (Too loose or too tight)
D — Wheel Bearings loose.
E — Front Wheel alignment or uneven tire tread.
F — Brake Shoes improperly adjusted. Automatic adjuster parts — corroded, distorted or broken.
G — Brake linings or disc pads worn, contaminated or distorted.
H — Shoe return spring — weak, broken, improperly installed.
I — Drums — cracked, thin (beyond .060" of original specification) scored, hard spotted, or out of round.
J — Missing or misaligned anti-noise spring (10" non-servo brake) or weak shoe hold-down springs.
K — Brake Support Plate ledges — rusted, or grooved.
L — Support Plate — loose, worn, or distorted.
M — Disc brake — pad knock back (loose or worn wheel bearings or steering parts)
N — Caliper — not aligned with disc or loose.
O — Disc — Excessive lateral runout. Excessively out of parallel
P — Hydraulic system fluid — Air in system, improper quality (low boiling point)
Q — Hoses and lines — soft or weak (expanding under pressure)
R — Hoses and lines — kinked, collapsed, dented, or clogged
S — Hoses and lines — loosely connected, ruptured, or damage (causing leakage)
T — Master cylinder — primary cup worn or damaged, bore worn, rough, corroded.
U — Master cylinder — check valve faulty, or compensator port blocked
V — Wheel or caliper cylinder pistons — frozen or seized.
W — Wheel or caliper cylinders — cups swollen, worn or damaged seals, bores rough or corroded
X — Wheel or caliper cylinders mismatched (Size)
Y — Check tire pressure
Z — Rear wheels (both) grabbing. Rear brake line proportional valve defective — replace.
a — Power unit valve rod linkage binding.
c — Vacuum lines — loose, broken, collapsed. Engine vacuum low
e — Vacuum check valve — defective — sticking
f — Power unit hydraulic push rod improperly adjusted
g — Air trapped in hub cavity of master cylinder — inspect and remove master cylinder boot if installed.
h — Air filter — dirty, clogged
k — Corrosion or lack of lubrication in power cylinder. Control Valve, power cylinder, piston or diaphragm defective.

BRAKE LINE PRESSURE DIFFERENTIAL WARNING LIGHT SWITCH

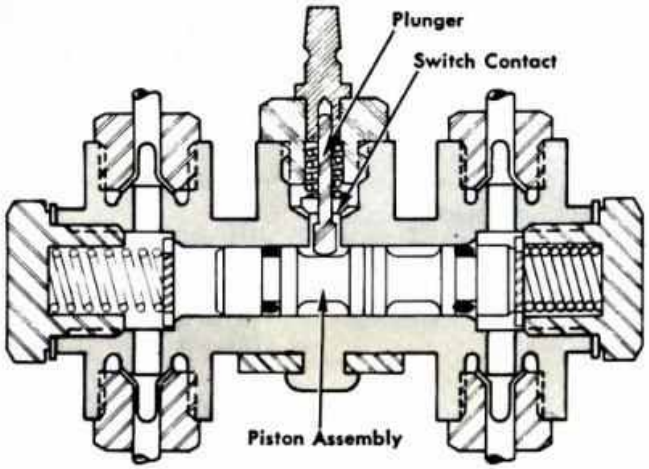
A warning light is located on the instrument cluster to warn the driver when a differential of 80 to 150 P.S.I. exists between the front and rear brake systems.

NOTE: WHEN THE IGNITION SWITCH IS TURNED TO THE START POSITION, THE WARNING LIGHT WILL LIGHT. THIS FEATURE IS INCORPORATED TO ASSURE THE DRIVER THE WARNING LIGHT BULB IS OPERATING.

A hydraulically actuated warning light switch is attached to the engine compartment side of the dash panel below the blower housing. Both front and rear brake systems are connected to the valve switch assembly.

The valve assembly consists of two valves in a common bore that are spring loaded toward the centered position. The spring loaded switch contact plunger rests on top of the valves in the centered position.

When a pressure differential of 80 to 150 P.S.I. occurs between the front and rear brake systems, the valves will shuttle toward the side with the low pressure. The spring loaded switch plunger is "triggered" and the ground circuit for the warning light is completed lighting the light.



Warning Light Switch Assembly—Actuated by Pressure

Once the switch plunger has been triggered by a pressure differential, the warning light will remain "on" when the ignition switch is turned "on."

The hydraulic brake problem must then be corrected and the warning light "reset."

Prior to correcting a brake system problem, or bleeding the brakes, disconnect the switch terminal wire and remove the nylon switch terminal, contact plunger actuating spring, and nylon plunger (with contact).

NOTE: In the event the valve was "triggered," the valve centering spring pressure may hold the switch plunger. Therefore, apply a slight amount of brake pressure while releasing the plunger from the valve body.

If the valve has been triggered, the plunger will be cocked in the bore. By observing the direction the plunger is leaning, it can be determined whether the failure is in the front or rear system. The top of the plunger will point to the side which has the low pressure.

After correcting the hydraulic system problem and bleeding the brakes, assemble the plunger spring on the plunger and install in the valve with the contact down.

Install the nylon terminal and connect the warning light wire to the valve terminal.

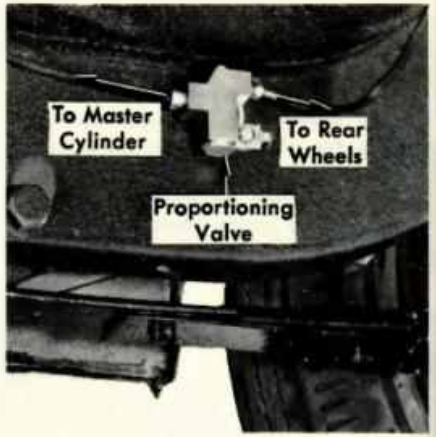
NOTE: In the event hydraulic brake fluid leaks from the center terminal valve body opening when the terminal is removed, replace the valve assembly.

REAR BRAKE PROPORTIONING VALVE

A rear brake proportioning valve is used on all Series cars equipped with Disc Brakes. The valve is located in the rear brake hydraulic line and is fastened to the body side sill forward of the rear axle.

Both the front and rear brakes receive full master cylinder pressure up to 200 P.S.I. on Rambler, AMX and Javelin Series and 400 P.S.I. on Rebel and Ambassador Series. At higher pressures, the proportioning valve regulates the pressure to the rear wheel brake units.

NOTE: The 200 P.S.I. proportioning valve used on Rambler, AMX and Javelin Series identified by a daub of blue paint and is not interchangeable with the 400 P.S.I. proportioning valve used on Rebel and Ambassador Series, identified by a daub of black paint.



Rear Brake Proportioning Valve

Any failure of the valve mechanism will cause only an early rear wheel slide. The proportioning valve is serviced as an assembly and never adjusted or overhauled.

FRONT WHEEL BEARING ADJUSTMENT

FRONT WHEEL BEARING END PLAY CLEARANCE ..... Zero

To adjust the wheel bearings, tighten the spindle nut to 20 Foot pounds torque while rotating the wheel to seat the bearings. Then loosen the spindle nut 1/3 turn and, with the wheel rotating, retorque the spindle nut to 12 Inch Pounds torque. Place the nut retainer on the spindle nut with the slots of the retainer aligned with the cotter pin hole on the spindle. Install cotter pin and dust cap.

TORQUE LIMITS—FOOT POUNDS

Disc Brake Caliper to Mounting Bracket Screw	95
Disc Brake Caliper Housing Screw	105
Front Brake Support Plate Screw Nut	65
Rear Brake Support Plate Screw Nut	35
Wheel to Hub Nut	75
Rear Hub to Axle Shaft Nut	250 (Min.)

Model App.	Type Lining	Braking Area (Sq. In.)	Lining Size Front		Lining Size Rear		Wheel Cylinder Bore Size	
			Primary	Secondary	Primary	Secondary	Front	Rear
All 6 Cyl. Ramblers, Javelin Canadian Built 6 Cyl., Rebel	9" Bendix Duo-Servo	159.03"	2.50" X 7.69"	2.50" X 9.98"	2.00" X 7.69"	2.00" X 9.98"	1-1/8"	15/16"
Kenosha Built 6 Cyl. Rebel Sed., H.T.	9" Wagner Compound Shoe	153.76"	2.25" X 7.62"	2.50" X 9.82"	2.00" X 7.62"	2.00" X 9.97"	1-1/8"	15/16"
Rebel 6 Cyl. Sta. Wag. All V-8, All Ambassador	10" Bendix Duo-Servo	167.49"	2.50" X 8.90"	2.50" X 11.06"	1.75" X 8.46"	1.75" X 10.88"	1-3/32" (6) 1-3/16" (V-8)	15/16" (10, 80) 7/8" (01, 30, 70)
Rear Rambler, AMX, Javelin with Disc Brakes	10" Bendix Duo-Servo	67.72"			1.75" X 8.46"	1.75" X 10.88"	(Rear Only) 7/8" (30, 70) 15/16" (10, 80 Sed.) 1" (10, 80 Sta. Wag.)	
Optional All Series With V-8 Engines and Export 6 or V-8	Bendix Caliper Disc.	36"					2"	

Master Cylinder Bore (All)—1.000"
Master Cylinder Bore Clearance—.001"-.003"
Maximum Drum Diameter—9"-9.060"
10"-10.060

Disc Diameter—11-3/16"
Disc Thickness—.500" (.450" Min.)

TIRE SIZE

	MODEL	Standard	Optional	Export Opt.
RAMBLER 6 Cylinder	Sed., Hardtop Station Wagon	6.45 X 14 6.95 X 14	6.95 X 14	6.85 X 15
RAMBLER	All V-8	6.95 X 14	7.35 X 14	
JAVELIN	6 Cylinder All V-8	6.95 X 14 7.35 X 14	7.35 X 14 E70	
AMX		E70	7.35 X 14	
REBEL 6 Cylinder	Sed., Hardtop Station Wagon	7.35 X 14 7.75 X 14	7.75 X 14 7.35 X 14 8.25 X 14	7.75 X 15 7.75 X 15
REBEL V-8	Sed., Hardtop Station Wagon	7.35 X 14 7.75 X 14	7.75 X 14 F78 8.25 X 14	7.35 X 15 7.75 X 15 7.75 X 15
AMBASSADOR	Sed., Hardtop Station Wagon	7.75 X 14 8.25 X 14	8.25 X 14 F78	7.75 X 15

TIRE INFLATION PRESSURES

Recommended Tire Inflation Pressures—Pounds Per Square Inch (Cold)
Do Not Reduce Tire Pressure If Tires Are Warm

MODEL	STANDARD INFLATION For Up To And Includng Full Loads		OPTIONAL INFLATION For Reduced Loads	
	Front	Rear	Front	Rear
Rambler Less A/C	28	28	26	26
Rambler With A/C	28	28	28	28
All AMX	24	24	—	—
All Javelins	24	24	—	—
Rebel 6 Cyl. Except Sta. Wag.	24	28	24	24
Rebel V-8 Except Sta. Wag.	28	28	26	26
All Rebel Sta. Wag.	24	30	24	24
Ambassadors Except Sta. Wag.	24	28	24	24
All Ambassador Sta. Wag.	24	30	24	24

For sustained speeds over 75 MPH; add 4 PSI to the recommended pressures above. Do not exceed 32 PSI.

Tire Loading, Selection and Pressure.

The original equipment 4-ply rated 2-ply tires are designed and thoroughly tested to meet all normal operating requirements within the vehicle capacity (including full-load service) when inflated to pressures listed in the table.

The inflation table shows the recommended tire pressures for average service up to five-passenger load and also the tire pressures for use at full-load service conditions. When properly inflated, the original equipment, standard-size tires will give satisfactory service for full-load conditions with passengers and luggage, which is listed (below) for each series.

Full-Load Service of the Car Is:

(each passenger is considered 150 lbs.)

Rambler	
All Models: 1075 lbs.	3 passengers, front seat 2 passengers, rear seat 175 lbs. luggage
AMX	
All Models: 500 lbs.	2 passengers, front seat 200 lbs. luggage
Javelin	
All Models: 800 lbs.	2 passengers, front seat 2 passengers, rear seat 200 lbs. luggage
Rebel and Ambassador	
All Models Except Station Wagons: 1100 lbs.	3 passengers, front seat 3 passengers, rear seat 200 lbs. luggage
2-Seat Station Wagons: 1200 lbs.	3 passengers, front seat 3 passengers, rear seat 300 lbs. of luggage
3-Seat Station Wagons: 1200 lbs.	3 passengers, front seat 3 passengers, second seat 2 passengers, third seat or 300 lbs. luggage

NOTE: Station Wagon roof rack luggage should be limited to 150 lbs. evenly distributed included in above capacity.
When towing trailers, the allowable passenger and cargo load must be reduced by an amount equivalent to the trailer tongue load.

Optional oversize tires are available for extra service life. Also, optional 8-ply rated 4-ply tires are offered when space does not permit the use of oversize tires. When continued full-load service is anticipated, these optional tires provide increased tread life to cope with the more severe operating conditions. For these special conditions, the tires should be inflated to the same pressures as shown in the inflation table. The stated full-load service capacity of the vehicle should not be exceeded.

For cars driven at sustained high speeds, as on a trip, tire pressures should be increased as noted below the tire inflation table. These pressures will improve fuel economy under all driving conditions with some sacrifice in riding quality.

To achieve optimum riding smoothness, it is suggested that tire pressures be set at reduced load pressures for conditions up to and including five-passenger loads without luggage, and at speeds under 75 MPH.

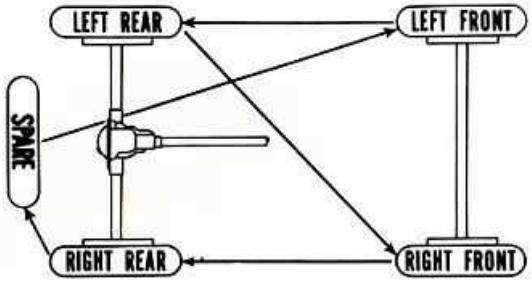
Tire Condition

Check tires often for visible under-inflation and for signs of uneven wear, which may indicate need for front-end alignment and/or wheel balancing, which are suggested services at 8,000 mile intervals.

As a further visible check of tire condition and wear, a tread wear indicator is molded into the bottom of the tread grooves on most tires. This indicator will appear as several 1/2-inch-wide bands across the tread when 1/16-inch tread depth remains.

In accordance with the diagram, rotating tires every 8,000 miles is recommended to assure longer overall tire life by equalizing wear.

If no spare tire is used, move right rear to left front and follow balance of diagram.



REAR AXLE

REAR AXLE TESTING AND DIAGNOSIS

The action of transmitting engine torque through a 90 degree turn to drive the rear wheels will produce some noise in the rear axle.

The first important step in diagnosing an alleged rear axle noise condition is to obtain a complete description of the noise and driving conditions when the noise occurs. Slight axle noises that are confined to a short speed range or to a specific period are considered normal. Therefore, road test the car with the customer for a demonstration of the complaint condition, wherever possible.

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

Rear axle noise conditions are usually related to car speed rather than engine RPM or transmission gears. Tests should be performed using different engine, transmission gear and car speed combinations to "pin-point" the unit affected.

Rear Axle Testing

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

Drive the car a sufficient distance to warm the axle to the required operating temperature.

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

Tire Noise Tests

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

Wheel Bearing Tests

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

Rear Axle Tests

Lock out the overdrive, if so equipped, to eliminate the overdrive planetary gears.

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

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

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

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

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

Rear Axle Backlash

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

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

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

Other Axle Conditions

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

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

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

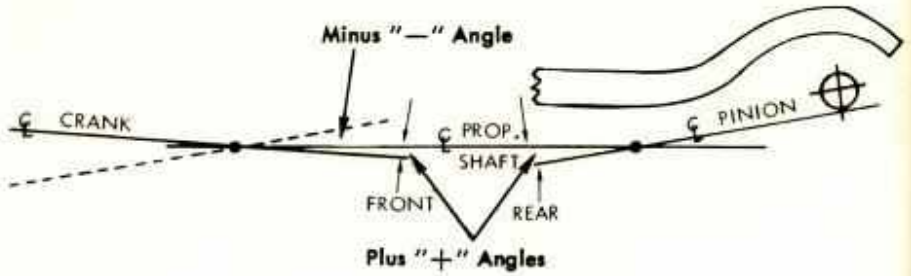
When the noise is determined to be caused by the drive pinion and drive gear at low mileages; then the need for bearing replacement is dependent upon inspection of the bearings during overhaul.

UNIVERSAL JOINT ANGLES

When universal joints operate at an angle, the driven yoke rotation speed will fluctuate even though the driving yoke speed is constant. The driven yoke will speed up and slow down twice each revolution. This fluctuation in speed is proportional to the operating angle of the universal joint, the greater the angle, the greater the fluctuation.

Therefore, the operating angles of the two universal joints on the propeller shaft must be controlled to minimize this effect. A wide difference of angles will result in a vibration of the driveline.

Universal joint angles must be inspected when excessive vibration is encountered, the engine mounts changed, or the rear suspension upper control arm crossmember is changed.



Front and Rear Universal Joint Angles

REAR AXLE

When the included angles illustrated are below the propeller shaft center line the angles are considered to be positive (+).

When the included angle illustrated is above the propeller shaft center line the angle is considered to be negative (—). Negative angles must be avoided.

The difference in the readings taken at the drive pinion yoke and the front propeller shaft yoke is the rear universal joint angle and should be +3-1/2°. The difference in the readings taken at the front propeller shaft yoke and the transmission yoke is the front universal joint angle and should be +1°. For detailed service information refer to "REAR AXLE—PROPELLER SHAFT" section of the Technical Service Manual.

REAR AXLE RATIOS

	TRANSMISSION	REAR AXLE STANDARD	REAR AXLE OPTIONAL
RAMBLER 199 CID ENGINE	Manual 3-Speed Transmission	3.08:1 (13-40)	3.58:1 (12-43)
	Overdrive Transmission	3.31:1 (13-43)	3.58:1 (12-43)
	Automatic Transmission Sedans & Hardtops without Air Conditioning	2.73:1 (15-41)	3.08:1 (13-40)
	Automatic Transmission Sedans, Hardtops with Air Conditioning & All Station Wagons	3.08:1 (13-40)	2.73:1 (15-41)
RAMBLER—JAVELIN 232 CID ENGINE	Manual 3-Speed Transmission	3.08:1 (13-40)	3.31:1 (13-43) 3.58:1 (12-43)
	Automatic Transmission Except Rogue	3.08:1 (13-40)	3.31:1 (13-43)
	Automatic Transmission Rogue (except Export)	2.37:1 (15-41)	3.08:1 (13-40)
REBEL—AMBASSADOR 232 CID ENGINE	Manual 3-Speed Transmission	3.15:1 (13-41)	———
	Overdrive Transmission	3.54:1 (11-39)	———
	Automatic Transmission	3.15:1 (13-41)	———
RAMBLER—JAVELIN—REBEL—AMBASSADOR 290 CID ENGINE (2 V)	Manual 3-Speed Transmission (Rambler-Javelin only)	3.15:1 (13-41)	———
	Automatic Transmission	2.87:1 (15-43)	3.15:1 (13-41)
	Manual 4-Speed Transmission (Rambler-Javelin only)	3.54:1 (11-39)	———
AMX 290 CID ENGINE (4 V)	Automatic Transmission	3.15:1 (13-41)	2.87:1 (15-43)
	Manual 4-Speed Transmission	3.54:1 (11-39)	———
AMX—JAVELIN—REBEL—AMBASSADOR 343 CID ENGINE	Automatic Transmission	2.87:1 (15-43)	3.15:1 (13-41)
	Manual 4-Speed Transmission (AMX-Javelin only)	3.54:1 (11-39)	3.15:1 (13-41)
AMX—JAVELIN—AMBASSADOR 390 CID ENGINE	Automatic Transmission	2.87:1 (15-43)	3.15:1 (13-41)
	Manual 4-Speed Transmission (AMX-Javelin only)	3.54:1 (11-39)	3.15:1 (13-41)
AMX—JAVELIN Optional 343 or 390 "Performance Group"	Automatic Transmission	3.15:1 (13-41)	2.87:1 (15-43)

REAR AXLE ADJUSTMENT

	01—199-232 CID 70—232 CID	10-80—232 CID All 290-343 CID
Drive Pinion Bearing Preload	15-25 In. Lbs.	17-28 In. Lbs.
Type of Adjustment	Shims	Collapsible Sleeve
Differential Bearing Preload	.008"	.008"
Type of Adjustment	Shims	Shims
Drive Gear to Drive Pinion Backlash	.005"-.009" (.008" Desired)	.005"-.009" (.008" Desired)
Type of Adjustment	Shims	Shims
Differential Case Flange Run-Out (Drive Gear Flange) Inspection Only—No Adjustment	.002" Total	.002" Total
Differential Side Gear to Case Clearance	.000"-.008"	.000"-.008"
Preload	0-60 Inch Pounds	0-180 Inch Pounds
Type of Adjustment	Oversize Thrust Washers	Oversize Thrust Washers
Axle Shaft End Play	.004"-.008" (.006" Desired)	.004"-.008" (.006" Desired)
Type of Adjustment	Shims	Shims

TORQUE TIGHTENING SPECIFICATIONS —FOOT POUNDS

	01—199-232 CID 70—232 CID	10-80 (232) All 290-343-390
Rear Axle Housing Cover Screws	15	15
Rear Brake Support Plate	35	35
Rear Spring "U" Bolts	60	
Rear Spring Shackle Bolts (9/16"-18")	50	
Rear Spring Shackle Bolts (3/8"-24")	30	
Rear Hub to Axle Shaft Nut (Min.)	250	250 (Min.)
Differential Bearing Cap	60	90
Drive Gear to Case Screw	50	80
Drive Pinion Nut	190	
Wheel to Hub Nut	75	75
Rear Universal Joint "U" Bolts	15	15 (150 In. Lbs. with adapter)
Rear Axle Control Arms (6810-80)		60
Rear Axle Control Arm Crossmember Bolts (6810-80)		75
Rear Axle Drive Pinion Yoke Nut	65	
"Twin-Grip" Case Screws	24	40

FRONT WHEEL ALIGNMENT SPECIFICATIONS

Turning Angle	
Inside Wheel	25°
Outside Wheel	22°
Caster Angle	
01-30-70 Without Power Steering	−1/2° to +1/2°
01-30-70 With Power Steering	+1/2° to +1-1/2°
10-80 All	0° to −1°, −1/2° Desired
Camber	−3/8° to +3/8°
Toe-In	1/16" to 3/16"−1/8" Total desired

ADJUSTMENTS

Manual Steering Gear Adjustments—
Pitman Arm Disconnected—Measured in Pounds Pull at Steering Wheel

	01-30-70	10-80
Worm Bearing Preload (One Turn from Straight Ahead)	1/4—5/8	1/8—3/8
Pitman Shaft Mesh (Straight Ahead-Gear on High Point)	7/8—1-1/8	3/4—1-1/8

FRONT WHEEL BEARING ADJUSTMENT

Front Wheel Bearing End Play Clearance ..... Zero

To adjust the wheel bearings, tighten the spindle nut to 20 Foot pounds torque while rotating the wheel to seat the bearings. Then loosen the spindle nut 1/3 turn and, with the wheel rotating, retorque the spindle nut to 12 Inch Pounds torque. Place the nut retainer on the spindle nut with the slots of the retainer aligned with the cotter pin hole on the spindle. Install cotter pin and dust cap.

TORQUE LIMITS—FOOT POUNDS

Steering	All Series
Idler Arm Nut	55
Idler Arm Bracket to Sill Bolt Nut	35
Pitman Arm Nut	115
Tie Rod Adjusting Clamp Screw Nut	10
Tie Rod Ball Joint Nut	35
Steering Wheel Nut	20
Gear to Adapter and Side Sill Bolts	45
Flexible Coupling Bolt Nuts	20
Flexible Coupling Pinch Bolt	30
Manual Steering Gear	
Pitman Shaft Adjusting Screw Lock Nut	25
Cover and End Plate Attaching Screws	35
Worm Bearing Adjuster Lock Nut	85
Power Steering Gear	
Pressure and Return Hose Fittings	25
Pitman Shaft Adjusting Screw Lock Nut	35

Side Cover Bolts	30
Adjuster Plug Lock Nut	80
Return Guide Clamp Screws	10
Power Steering Pump	
Belt Adjustment	
Use Belt Adjustment Gauge J-7316	
New Belt	125-145
Belt With Previous Service	90-110
Vane Type Pump	All 6 Cyl.
Mounting Studs to Reservoir	35
Union to Reservoir	35
Roll Type Pump	All V-8
Pump Body to Cover Screws	25
Flow Control Valve Cap	35
Reservoir to Pump Body Bolt	35
Reservoir Cover Attaching Stud	5
Pulley Screw	20
Suspension	
Crossmember Bolt or Stud Nut	65
Shock Absorber Bayonet Nut	30
Shock Absorber Lower Eye Bolt Nut	55
Spindle to Support Plate Bolt Nut	65
Sway Bar Bracket	35
Lower Control Arm	
Strut Rod Bracket Bolt Nut	55
Strut Rod to Cushion Nut	85
Strut Rod Bolt Nut	65
Ball Joint Nut	45
Eccentric Bolt Nut	95
Pivot Bolt Nut	55

Upper Control Arm	01-30-70	10-80
Trunnion Bushing Bolt Nut	65	—
Spacer Bolt Nut	85	85
Knuckle Pin to Trunnion Nut	35	Tighten nut to 15 Ft. Lbs. Back off to first pin hole
Trunnion Bushing	—	Tighten bushing until "bottomed" in control arms

Energy Absorbing Steering Column	All
Bracket Mounting Bolts to Plate Welded on Column	15
Instrument Panel Bracket Rear Stud Nuts	10
Instrument Panel Bracket Front Bolt or Stud Nut	10

American Motors Mechanical Maintenance and Lubrication recommendations have been developed to provide the owner with optimum performance of his car and maximum protection under reasonable driving conditions.

The intervals at which the various lubrication and maintenance services should be performed are detailed in the Mechanical Maintenance Schedule provided with each car. The Maintenance Schedule is designed to advise the owner of what is expected of him in continuance of the quality performance designed and engineered into his American Motors Product and also outlines the maintenance required for warranty validity.

The Maintenance Schedule will aid American Motors Dealers and Service Technicians in serving the owner's needs at the recommended intervals.

Information concerning the types of lubricants specified, the quantities required, and the location of various points of application are listed and consolidated in this section.

Detailed service procedures and specifications are listed in the respective sections of the Technical Service Manual.

Maintenance service is service that is required through everyday driving of any car—engine or transmission tune-ups, minor adjustments beyond 4,000 miles, lubrication . . . service or repairs for any reason other than defects covered by the Warranty. Maintenance services are specified by the American Motors Engineering Staff. Some are required for best operation on a mileage or time basis, as outlined in the Mechanical Maintenance Schedule (listed as "R") and as listed in the Warranty; others should be performed as the need appears.

Services listed as "E—Required for Emission Control" are items necessary to maintain the Emission Control System at the proper control level.

Services listed as "O"—Optional as Car Operation Service—are related to individual car use and driving conditions; for example, a brake inspection may be needed more often in stop-and-go use than in highway driving.

The services outlined are those which experience and testing have indicated are the most likely needed, at the intervals shown. Protective Maintenance, performed at regular intervals, is the key to long and trouble-free car life.

The Mechanical Maintenance Schedule on the following pages will serve as quick reference to the periodic maintenance and lubrication intervals recommended for American Motors vehicles.

Protective Maintenance

Mechanical Maintenance Schedule for 1969 Cars

R—Required E—Emission Control O—Optional

SERVICES SCHEDULED BY TIME OR MILEAGE INTERVALS

CHANGE ENGINE OIL and INSTALL NEW OIL FILTER	Required (R) as indicated on Engine Oil and Oil Filter Change Chart (page 59), based on the individual driving conditions under which the car is operated.
REPLACE ENGINE COOLANT (Suggest A.M. All Seasons Coolant)	Required (R) after first 24 months, and every 12 months thereafter.

SERVICES SCHEDULED BY ACCUMULATED MILEAGE

		ODOMETER READING (THOUSANDS)				
FOR NORMAL USE AND SERVICE		4	8 16 32 40	12 36	20 28 44	24 48
Clean V-8 engine oil filler cap.	(E)	R	R	R	R	R
Inspect and correct fluid levels (including battery)		R	R	R	R	R
Inspect and correct operation of exhaust manifold heat valve	(E)	R	R	R	R	R
Verify manual transmission clutch adjustment to specifications		R		R		R
Adjust automatic transmission rear band		R				
*Tune automatic transmission						R
*Carburetor air cleaner element (Suggest A.M. element) — Clean	(E)	R	R	R	R	
*Carburetor air cleaner element (Suggest A.M. element) — Replace	(E)					R
Inspect and correct drive belts (condition and tension)	(E)		R			R
Clean 6-cyl. engine PCV wire gauze filter (in hose at air cleaner)	(E)		R			R
Replace PCV (Positive Crankcase Ventilation) valve	(E)			R		R
Replace fuel filter at carburetor (Suggest A.M. element)						R
*Perform major chassis lubrication						R
Inspect and adjust choke; adjust carburetor idle speed and mixture				E		E
Inspect spark plugs, clean and re-gap (or replace) if required				E		E
Inspect ignition points, coil and spark plug wires, and replace if required				E		E
Distributor cam lubricator — Rotate				E		
Distributor cam lubricator — Replace						E
Check ignition timing				E		E
Inspect "Air Guard" hose connections (V-8 engine with manual transmission)				E		E
Perform factory recommended road test to evaluate performance and handling		O	O	O	O	O
Inspect brake lining condition and parts				O		O
Align front suspension			O			O
Perform body lubrication			O			O
Verify tire pressure to specifications		O	O	O	O	O
Balance tires			O			O
Rotate tires			O			O
FOR HEAVY-DUTY AND OTHER SPECIAL DRIVING CONDITIONS						
Tune automatic transmission		R		O		R
Carburetor air cleaner element (Suggest A.M. element) — Clean	(E)	R	R		R	
Carburetor air cleaner element (Suggest A.M. element) — Replace	(E)			R		R
Perform major chassis lubrication	(E)			R		R

(E) Also required as indicated, to help assure compliance with U.S. national emission control standards.

*If applicable, follow maintenance schedule (above) for heavy-duty and other special driving conditions.

LUBRICATION

ENGINE OIL CHANGES

The initial change of oil and oil filter unit should be made at 4,000 miles. As periods for subsequent drains are affected by a variety of conditions, no single mileage figure can apply to all types of driving. Under normally favorable conditions, draining at 4,000 mile intervals or every four (4) months, whichever first occurs is good practice. When changing oil, drain crankcase after engine has reached normal operating temperature to insure complete removal of used oil.

ENGINE OIL AND OIL FILTER CHANGE CHART

Engine Oil and Oil Filter should be changed at the months or at the mileage intervals (whichever first occurs) that apply for your individual driving conditions as outlined on this chart. (Suggest A.M. Motor Oil and Oil Filter)	Every 4 Months or 4,000 Miles	Every 2 Months or 2,000 Miles	Every 2 Months or 1,000 Miles
Normal Driving Conditions (nearly all trips over 10 Miles)	R		
Summer Conditions (over 32°F. average) with less than 10 miles average per trip		R	
Winter Conditions (below 32°F. average) with less than 10 miles average per trip			R
Predominantly Dusty Driving Conditions			R

ENGINE OIL QUALITY

For maximum engine protection under all driving conditions encountered during the recommended oil change intervals shown in the chart, it is necessary to use only "MS" certified sequence-tested oils. The term "MS" must appear on the oil container singly or in conjunction with other designations. "MS" designated oils are heavy-duty detergent oils that are formulated to withstand all service conditions in modern powerplants. Engine oils designated only as "ML" and/or "MM" are not recommended and should not be used except in an emergency when "MS" oil is not available. Certified sequence-tested engine oils are described on their containers by such phrases as: meets, exceeds, excels, or has proven superior in the test requirements, test sequences, MS Service tests, standards, and service requirements of automotive manufacturers, automakers, or car manufacturers for MS service of Service MS.

ENGINE OIL VISCOSITY

Single viscosity or multi-viscosity types of oil are equally acceptable if refined and sold by a reputable marketer. Refer to the following for oil viscosity number.

Oil viscosity number used should be determined by the lowest anticipated temperature before the next oil change period.

Lowest Temperature Anticipated	Recommended Single-Viscosity	Recommended Multi-Viscosity
Above 32° F.	SAE 20W-20	SAE 10W-30 or 10W-40
Above 0° F.	SAE 10W	SAE 10W-30 or 10W-40
Below 0° F.	SAE 10W*	SAE 5W-20 or 5W-30

*Sustained high speeds (above 65 M.P.H.) should be avoided when using SAE 10W engine oil since oil consumption may be greater under this condition.

ENGINE OIL LEVEL

Form the habit of having the oil level checked whenever fuel is purchased. Allow the oil level to stabilize to assure an accurate check. If the oil level is down to the ADD oil mark on the oil level gauge, add one quart of oil to bring it up to the FULL mark. DO NOT OVERFILL past FULL mark. It is not unusual to expect oil conditions between oil changes due to varying conditions of car usage. Crankcase capacity is 4 quarts. With filter change, capacity is 5 quarts.

OIL FILTER

A full flow oil filter is mounted on the lower front right side on V-8 Engines and on the lower center right side on Six Cylinder Models.

The throw-away filter unit can be removed from the adapter with use of Oil Filter Remover J-9614. (6 Cylinder), J-22700 (V-8). The replacement unit is turned on by hand until the gasket contacts the seat and is then tightened an additional half to full turn.

The oil filter unit should be changed every four (4) months or 4,000 miles whichever first occurs. An additional quart of oil is required at this time.

TRANSMISSION LUBRICATION

Standard and Overdrive

The oil level should be checked at 4,000 mile intervals. The oil level plugs are located on the right side of the transmission and/or overdrive case.

The oil should only drip out of the oil level holes after removing the plugs. If oil should run out in a steady stream, let the oil drain and when it stops dripping, replace the plug and tighten securely.

The following is the recommended lubricant:

SAE 80 Gear Lubricant (3 and 4-Speed)
SAE 20W-20 Engine Oil (3-Speed)
SAE 10W-30 Engine Oil (3-Speed)
AM Automatic Transmission Fluid or "Dexron" (3-Speed)

CAUTION: Always use the recommended grade and type of oil. DO NOT MIX OILS.

"SHIFT-COMMAND" Automatic Transmission

Fluid level should be checked at 4,000 mile intervals.

The correct oil and oil level is of utmost importance for smooth operation, proper shifting, and longevity of the unit. Avoid using non-authorized oils which may cause trouble. American Motors oil is of the approved type. It is wise to check the sealed cans for the approved symbol "Dexron" Automatic Transmission Fluid. Refer to "Shift Command" section for detailed fluid level check procedure.

REAR AXLE LUBRICATION

"Twin-Grip" rear axle lubricant is to be used in all new assemblies or following the installation of replacement parts. After the rear axle has been run-in, an SAE #80 (use SAE 90 if 80 is not available) Gear Lubricant of API-GL-4 quality may be used. Naturally, the results of such use are the responsibility of the lubricant supplier or servicing dealer.

American Motors "Twin-Grip" Rear Axle Lubricant is to be used in all cases requiring additional lubricant or at time of other rear axle service in all "Twin-Grip" equipped rear axle assemblies. "Twin-Grip" Rear Axle Lubricant is also satisfactory for use in place of Multi-Purpose lubricants commonly used for the regular (Hypoid) rear axle.

Check oil level every 4,000 miles. Regular drain and refill periods are not required.

FRONT SUSPENSION

Rebel and Ambassador

The upper control arm trunnion bushings are to be lubricated at 24,000 mile intervals. At every lubrication, remove the plug from each trunnion bushing and lubricate using manual gun and hose, Tool No. J-9669, with Special Chassis (Sodium Base) cartridge Lubricant. (Gun and cartridge identified with red label.)

NOTE: Remove one plug at a time, lubricate, and replace the plug before moving to next fitting. This will purge old lubricant from both bushings. The lower section of the upper spring seat column provides a lubricant reservoir with a relief valve.

Under severe driving conditions, such as wet, snow, and mud, the bushings should be inspected every 12,000 miles or one year, whichever first occurs and lubricated if required.

All Series

The lower ball joint assemblies are to be lubricated at 24,000 mile intervals. At every lubrication, remove the plug in bottom of each assembly and lubricate using low pressure manual gun with Chassis (Lithium Base) Lubricant or Multi-Purpose Chassis Lubricant.

After lubrication, install plugs in ball joint assemblies.

Under severe driving conditions, such as wet, snow, and mud, the ball joints should be inspected every 12,000 miles or one year, whichever first occurs and lubricated if required.

STEERING LINKAGE BALL JOINTS

All Series

The steering linkage ball joints are to be lubricated every 24,000 miles interval, under ideal or normal driving conditions. A plug is provided for inspection and lubrication. Lubricate with Lithium Base Chassis Lubricant. Under severe driving conditions, such as wet, snow, and mud, the ball joints should be inspected every 12,000 miles or one year, whichever first occurs and lubricated if required.

CLUTCH IDLER LEVER INNER AND OUTER PIVOTS

Rambler, AMX, Rebel and Ambassador Series

Lubricate at 24,000 mile intervals.
Remove plug and lubricate with Chassis (Lithium Base) Lubricant.
Install plug after lubrication.

Rambler and Javelin Series (199-232)

Lubricate at 24,000 mile interval.

The clutch release idler lever must be disassembled to lubricate the ball studs. Use Lithium Base Chassis Lubricant. Check clutch pedal free play when assembled.

POWER STEERING RESERVOIR

No regular drain or refill intervals recommended, only at time of overhaul or other service. Check level at 4,000 miles. Use "Dexron" Automatic Transmission Fluid or Type "A," "AQ-ATF" Suffix "A." Fill until oil level is at correct level on dip stick on Six cylinder models, 1" below top of reservoir on V-8 Models.

BRAKE MASTER CYLINDER

Check level 4,000 miles, 1/4" from top. Add or refill with SAE J-1703 (70-R-3) heavy duty hydraulic brake fluid for Standard Brakes, American Motors Part Number 8991860 for Disc Brakes.

FRONT WHEEL BEARINGS

Wheel Bearing Lubricant: 24,000 mile intervals.

REAR WHEEL BEARINGS

Only at time of overhaul or other service. Wheel Bearing Lubricant.

STEERING GEAR

No regular drain or refill intervals recommended, only at time of overhaul or other service. Check level at 4,000 mile intervals. Add chassis lubricant (less Power Steering) if required.

EXHAUST MANIFOLD HEAT VALVE

Use Part Number 8991632—Special Lubricant.

PARKING BRAKE LINKAGE

"Lubriplate."

ACCELERATOR LINKAGE

Engine Oil.

DISTRIBUTOR CAM

Distributor cam grease at overhaul or contact point set replacement.

Rotate distributor cam lubricator 1/2 turn on Six Cylinder Models—V-8, turn end for end every 12,000 miles. Replace distributor cam lubricators every 24,000 miles.

BODY LUBRICATION

Door & Window Weather Strips ..... Clean sealer rubbers. Apply silicone oil (A.M. Silicone Lub. Spray).

Key-Lock Cylinders	Apply silicone oil to key and insert in lock cylinder, repeat several times.
Door, Hood, Trunk & Tailgate Lock Mechanisms	Apply "Lubriplate."
Door, Hood, Trunk & Tailgate Hinge Pivots	Apply engine oil.
Glove Box Latch & Hinge	Apply "Lubriplate."
Ashtray Slides	Apply "Lubriplate."
Front Seat Adjustment Slides	Apply "Lubriplate."
Courtesy Light Switch Button	Apply "Petrolatum," "Lubriplate," on the button.
Convertible Top Pivot Points	Lightly apply engine oil.

CAPACITIES

CAPACITIES	U.S.A.	British Imperial
CRANKCASE	Quarts	
All Engines	4	3.3
(Add 1 Qt. with Filter Change)		
COOLING SYSTEM	Quarts	
199, 232	10.5	8.7
Less Heater	9.5	7.9
290	14	11.7
Less Heater	13	10.8
343-390	13	10.8
Less Heater	12	10.0
TRANSMISSIONS	Pints	
3-Speed		
199 (01 Series)	1.5	1.25
232	2.5	2.1
290	3.0	2.5
Overdrive		
199	2.5	2.1
232	3.25	2.7
4-Speed		
290, 343, 390	2.5	2.1
	Quarts	
Shift Command		
199, 232, 290	9.5	7.9
343, 390	10	8.3
DIFFERENTIAL	Pints	
232 (01-70), 199	3	2.5
290 (01-70), 232, 290, 343, 390—(10, 80)	4	3.3

CAPACITIES	U.S.A.	British Imperial
GAS TANK	Gallons	
01	16	13.3
30-70	19	15.8
10 and 80	21.5	17.9
10 3-Seat Wagon and 80 Wagons	19	15.8

DECIMAL EQUIVALENTS AND TAP DRILL SIZES

DRILL SIZE	DECIMAL	TAP SIZE	DRILL SIZE	DECIMAL	TAP SIZE	DRILL SIZE	DECIMAL	TAP SIZE
1/64	.0156		17	.1730		Q	.3320	3/8-24
1/32	.0312		16	.1770	12-24	R	.3390	
60	.0400		15	.1800		11/32	.3437	
59	.0410		14	.1820	12-28	S	.3480	
58	.0420		13	.1850	12-32	T	.3580	
57	.0430		3/16	.1875		23/64	.3594	
56	.0465		12	.1890		U	.3680	7/16-14
3/64	.0469	0-80	11	.1910		3/8	.3750	
55	.0520		10	.1935		V	.3770	
54	.0550	1-56	9	.1960		W	.3860	
53	.0595	1-64, 72	8	.1990		25/64	.3906	7/16-20
1/16	.0625		7	.2010	1/4-20	X	.3970	
52	.0635		13/64	.2031		Y	.4040	
51	.0670		6	.2040			.4062	
50	.0700	2-56, 64	5	.2055		13/32	.4130	
49	.0730		4	.2090		Z	.4219	1/2-13
48	.0760		3	.2130	1/4-28	27/64	.4375	
5/64	.0781		7/32	.2187		7/16	.4531	1/2-20
47	.0785	3-48	2	.2210		29/64	.4687	
46	.0810		1	.2280		15/32	.4844	9/16-12
45	.0820	3-56, 4-32	A	.2340		31/64	.5000	
44	.0860	4-36	15/64	.2344		1/2	.5156	9/16-18
43	.0890	4-40	B	.2380		33/64	.5312	5/8-11
42	.0935	4-48	C	.2420		17/32	.5469	
3/32	.0937		D	.2460		35/64	.5625	
41	.0960		E, 1/4	.2500		9/16	.5781	5/8-18
40	.0980		F	.2570	5/16-18	37/64	.5937	11/16-11
39	.0995		G	.2610		19/32	.6094	
38	.1015	5-40	17/64	.2656		39/64	.6250	11/16-16
37	.1040	5-44	H	.2660		5/8	.6406	
36	.1065	6-32	I	.2720	5/16-24	41/64	.6562	3/4-10
7/64	.1093		J	.2770		21/32	.6719	
35	.1100		K	.2810		43/64	.6875	3/4-16
34	.1110	6-36	9/32	.2812		11/16	.7031	
33	.1130	6-40	L	.2900		45/64	.7187	
32	.1160		M	.2950		23/32	.7344	
31	.1200		19/64	.2968		47/64	.7500	
1/8	.1250		N	.3020		3/4	.7656	7/8-9
30	.1285		5/16	.3125	3/8-16	49/64	.7812	
29	.1360	8-32, 36	O	.3160		25/32	.7969	
28	.1405	8-40	P	.3230		51/64	.8125	7/8-14
9/64	.1406		21/64	.3281		13/16	.8281	
27	.1440					53/64	.8437	
26	.1470	10-24				27/32	.8594	
25	.1495					55/64	.8750	1-8
24	.1520					7/8	.8906	
23	.1540					57/64	.9062	
5/32	.1562	10-30				29/32	.9219	
22	.1570	10-32				59/64	.9375	1-12, 14
21	.1590					15/16	.9531	
20	.1610					61/64	.9687	
19	.1660					31/32	.9844	
18	.1695					63/64	1.000	
11/64	.1719					1		

PIPE THREAD SIZES

THREAD	DRILL	THREAD	DRILL
1/8-27	R	1-1/2 11-1/2	1-47/64
1/4-18	7/16	2 11-1/2	2-7/32
3/8-18	37/64	2-1/2 8	2-5/8
1/2-14	23/32	3-8	3-1/4
3/4-14	59/64	3-1/2 8	3-3/4
1 11-1/2	1-5/32	4-8	4-1/4
1-1/4 11-1/2	1-1/2