1981
TECHNICAL SERVICE MANUAL

Jeep®

FOREWORD

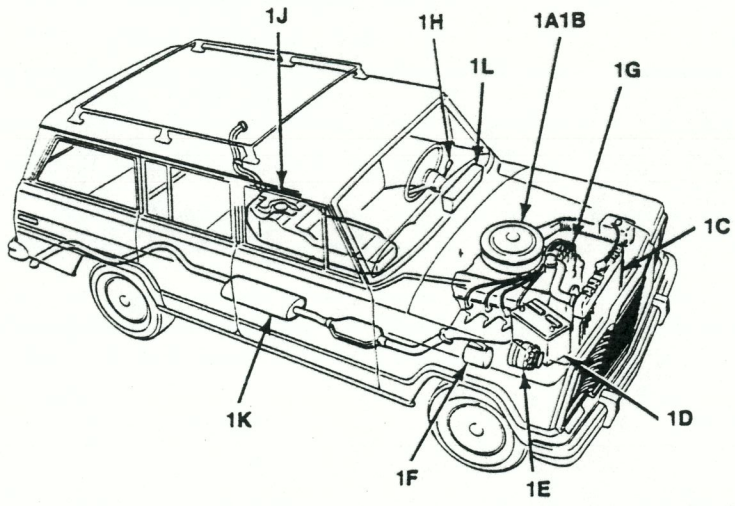
All information and specifications in this manual are based on the latest data available at the time of publication. Jeep Corporation reserves the right to discontinue models and change specifications or design without notice or incurring obligation.

Brand names mentioned in this manual are for convenience only and are not intended as a recommendation to use a specific brand of product. They are indicative of a class or type and may be substituted by their equivalent.

Proper service and repair are essential to the safe and reliable operation of a motor vehicle. This manual contains recommended methods for performing proper service and repair. Use of improper methods could cause personal injury and render the vehicle unsafe.

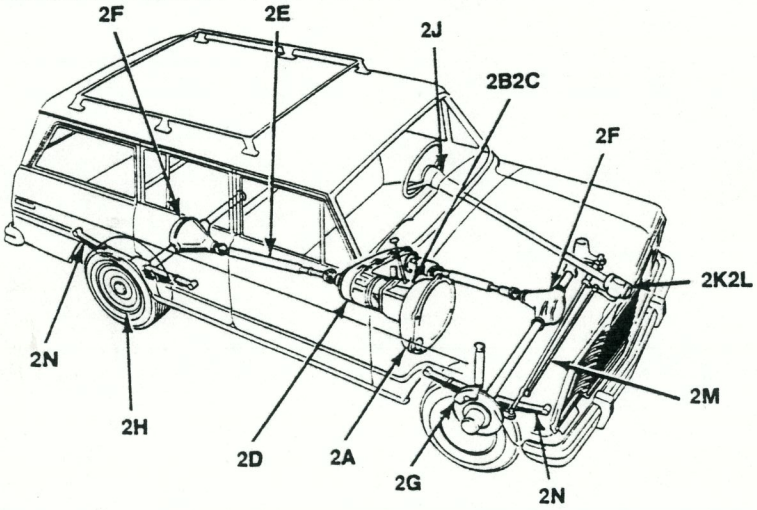
Detailed descriptions of standard workshop safety procedures are not included in this manual. This manual does contain WARNINGS for some service procedures that could cause personal injury, and CAUTIONS for some procedures that could damage the vehicle or its components. Please understand that these WARNINGS and CAUTIONS do not cover all conceivable ways which service might be done or all possible hazardous consequences of each conceivable way. Anyone using service procedures or tools (whether or not recommended by Jeep Corporation) must satisfy himself that neither personal nor vehicle safety will be jeopardized by the procedures or tools selected.

1981 JEEP TECHNICAL SERVICE MANUAL



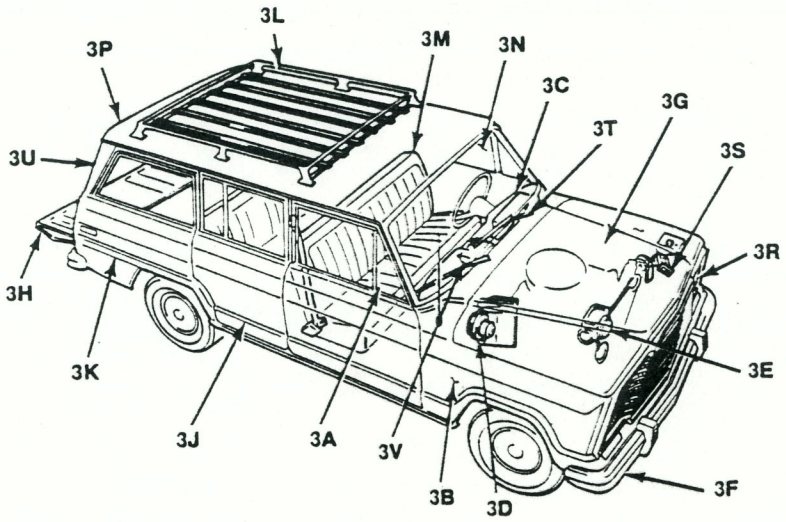
PART 1 POWER PLANT

CHAPTERS
- 1A GENERAL SERVICE AND DIAGNOSIS
- 1B ENGINES
- 1C COOLING SYSTEMS
- 1D BATTERIES
- 1E CHARGING SYSTEM
- 1F STARTING SYSTEM
- 1G IGNITION SYSTEM
- 1H CRUISE COMMAND
- 1J FUEL SYSTEMS
- 1K EXHAUST SYSTEMS
- 1L POWER PLANT INSTRUMENTATION



PART 2 CHASSIS

CHAPTERS
- 2A CLUTCH
- 2B MANUAL TRANSMISSION
- 2C AUTOMATIC TRANSMISSION
- 2D TRANSFER CASE
- 2E PROPELLER SHAFT
- 2F AXLES
- 2G BRAKES
- 2H WHEELS AND TIRES
- 2J STEERING COLUMNS
- 2K MANUAL STEERING GEAR
- 2L POWER STEERING GEAR AND PUMP
- 2M STEERING LINKAGE
- 2N SUSPENSION



PART 3 BODY

CHAPTERS
- 3A WATER LEAK/WIND NOISE DIAGNOSIS AND REPAIR
- 3B METAL REPAIR AND PAINTING
- 3C INSTRUMENT PANELS AND COMPONENTS
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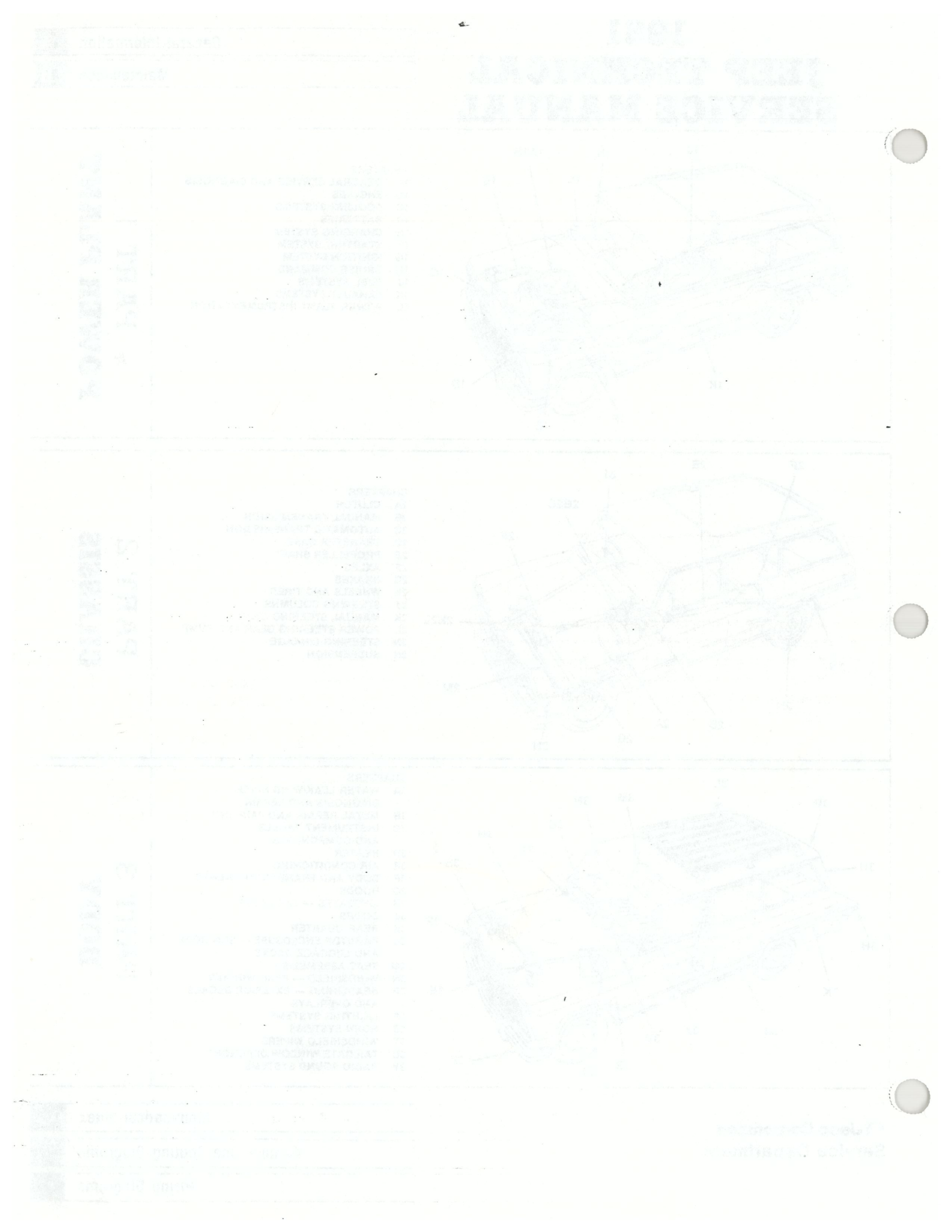
- 3R LIGHTING SYSTEMS
- 3S HORN SYSTEMS
- 3T WINDSHIELD WIPERS
- 3U TAILGATE WINDOW DEFOGGER
- 3V RADIO SOUND SYSTEMS

Jeep Corporation
Service Department



GENERAL INFORMATION A

INDEX

HOW TO USE THIS MANUAL

Organization

This manual is divided into three major parts: Part 1—Power Plant, Part 2—Chassis and Part 3—Body. These parts are comprised of chapters pertaining to the various topics. The Index at the front of this manual has a locator tab for each part.

The first page of each chapter in this manual contains a black tab in a position corresponding to the tab on the Chapter Index page for each part. To locate a desired chapter, simply fold back the manual slightly so that the outside edges of the pages are exposed. Find the black tab that aligns with the tab on the Chapter Index page and open to the desired chapter.

Each chapter begins with an alphabetical index of subjects. Locate the desired subject and turn to the appropriate page. If the subject is broad, the chapter is divided into sections and a subject index of each section is also included. An alphabetical index of all subjects is located at the back of this manual.

Each chapter ends with specifications, torque charts and special tools pertinent to that chapter.

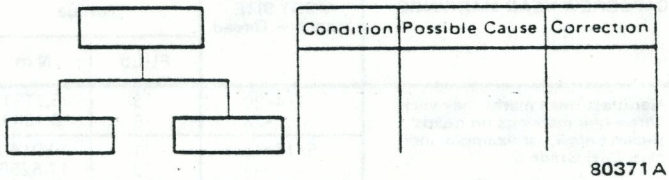
Warnings and Cautions

Detailed descriptions of standard workshop safety procedures are not included in this manual. This manual does contain WARNINGS for some service procedures that could cause personal injury, and CAUTIONS for some procedures that could damage the vehicle or its components. Please understand that these WARNINGS and CAUTIONS do not cover all conceivable ways which service might be done or all possible hazardous consequences of each conceivable way. Anyone using service procedures or tools (whether or not recommended by Jeep Corporation) must satisfy himself that neither personal nor vehicle safety will be jeopardized by the procedures or tools selected.

Diagnosis and Repair Simplification (DARS) Charts

In several places throughout this manual, Jeep Corporation's new Diagnosis and Repair Simplification (DARS) charts provide a graphic method of diagnosis and troubleshooting through the use of pictures and symbols.

The DARS charts are different from the ones you have used before. They are not "go-no go" decision trees or tables.



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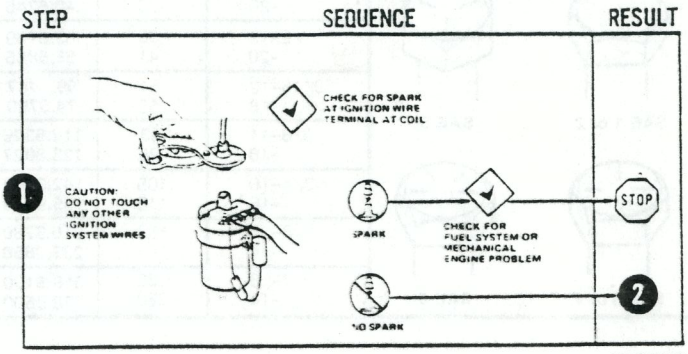
Instead, the new DARS charts use pictures plus a few words to help you solve a problem. . .



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and symbols and words help guide you through each step. . .

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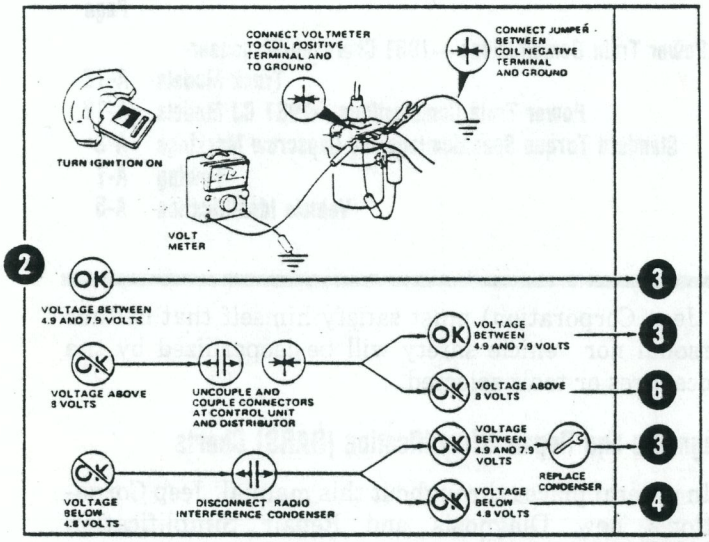
The charts are divided into three sections: **step, sequence** and **result.** Always start at the first step and go through the complete sequence from left to right.



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A sequence could be checking pressure in all tires and inflating to specified pressures. If the problem is solved, the symbol OK will send you to STOP. If the problem is not solved, the symbol OK will send you through another sequence of checks which ends with a result and tells you the next step to go to.

Work through each step of the DARS charts until the system is repaired STOP.

Service Diagnosis Charts

You will also find Service Diagnosis Charts throughout this manual. These charts list causes of specific problems in descending order of probability. It is more likely that a problem would result from the first listed "possible cause" than the fourth, for instance.

Visual inspection often leads directly to the correct solution. All service procedures should begin with a careful visual inspection of any suspected part or assembly.

Torque Information

Individual torque charts appear at the end of each chapter. Torque values are expressed two ways, Set-To and In-Use Recheck. The Set-To value is used when assembling components. The In-Use Recheck value is used to check pretightened items.

Refer to the Standard Torque Specifications and Capscrew Markings Chart in this chapter for torques not listed in individual torque charts. Note that torque specifications given in the chart are based on use of clean and dry threads. Reduce torque by 10 percent when threads are lubricated with engine oil and by 20 percent if new plated capscrews are used.

Standard Torque Specifications and Capscrew Markings Chart

CAPSCREW HEAD MARKINGS	CAPSCREW BODY SIZE Inches – Thread	SAE GRADE 1 or 2 (Used Infrequently)		SAE GRADE 5 (Used Frequently)		SAE GRADE 6 or 7 (Used at Times)		SAE GRADE 8 (Used Frequently)	
		Torque		Torque		Torque		Torque	
		Ft-Lb	Nm	Ft-Lb	Nm	Ft-Lb	Nm	Ft-Lb	Nm
Manufacturer's marks may vary. Three-line markings on heads shown below, for example, indicate SAE Grade 5.   SAE 1 or 2  SAE 5  SAE 6 or 7  SAE 8	1/4-20	5	6.7791	8	10.8465	10	13.5582	12	16.2698
	-28	6	8.1349	10	13.5582			14	18.9815
	5/16-18	11	14.9140	17	23.0489	19	25.7605	24	32.5396
	-24	13	17.6256	19	25.7605			27	36.6071
	3/8-16	18	24.4047	31	42.0304	34	46.0978	44	59.6560
	-24	20	27.1164	35	47.4536			49	66.4351
	7/16-14	28	37.9629	49	66.4351	55	74.5700	70	94.9073
	-20	30	40.6745	55	74.5700			78	105.7538
	1/2-13	39	52.8769	75	101.6863	85	115.2445	105	142.3609
	-20	41	55.5885	85	115.2445			120	162.6960
	9/16-12	51	69.1467	110	149.1380	120	162.6960	155	210.1490
	-18	55	74.5700	120	162.6960			170	230.4860
	5/8-11	83	112.5329	150	203.3700	167	226.4186	210	284.7180
	-18	95	128.8027	170	230.4860			240	325.3920
	3/4-10	105	142.3609	270	366.0660	280	379.6240	375	508.4250
	-16	115	155.9170	295	399.9610			420	569.4360
	7/8- 9	160	216.9280	395	535.5410	440	596.5520	605	820.2590
	-14	175	237.2650	435	589.7730			675	915.1650
	1- 8	235	318.6130	590	799.9220	660	894.8280	910	1233.7780
	-14	250	338.9500	660	894.8280			990	1342.2420

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Torx-Head Fasteners

Various sizes of internal and external hex-lobular (Torx) head fasteners are used as attaching hardware on numerous components and assemblies in 1981 Jeep vehicles. Due to the ever-changing usage and application of automotive fasteners, Torx-head fasteners may not be identified as such throughout this manual. However, these fasteners may be removed or installed using Tool Set J-25359-C.

Service Manual Improvements

You are encouraged to report any errors, omissions, or recommendations for improving this publication. A form provided for this purpose is included at the end of this chapter.

1981 MODEL JEEP VEHICLES

CJ Models

Two CJ models are available for 1981: the 83.5-inch wheelbase CJ-5, model 85, and the 93.5-inch wheelbase CJ-7, model 87. See figures A-1 and A-2. Beyond the 10-inch difference in wheelbase, CJ-5 and CJ-7 differ primarily in available options. CJ-7 models are available with an automatic transmission, soft top with metal doors, moulded hardtop and moon roof. These options are not available on CJ-5 models.

The Renegade package continues to be offered on CJ models for 1981. The package features "Tracker PG" L78x15 tubeless tires mounted on 8-inch wide, styled-steel wheels along with unique exterior and interior trim.

The Laredo package is available on CJ models for 1981. It includes unique exterior paint and decals; chrome front bumper, rear bumperettes, mirror heads and arms, and body side steps; 15-inch x 8-inch chrome styled-steel wheels with 9Rx15 "Wrangler" radial tires, and a deluxe interior with tachometer and clock.

Refer to the Power Train Combinations Chart in this section for engine and transmission availability.

Cherokee Models

For 1981, three Cherokee models are offered: the base 2-door model 16, the Wide Track model 17, and the 4-door model 18. See figures A-3, A-4 and A-5.

The 2-door model 16 is a dual purpose vehicle in the sports/utility class featuring an all-steel top, front disc brakes and foldup rear seat as standard.

The Wide Track model 17 features steel wheel opening extensions to accommodate L78x15 tubeless tires mounted on 8-inch wide, styled-steel wheels.

The 4-door model 18 features the convenience of rear doors in a station wagon-type vehicle. The model 18 has the same grille and taillamps as other Cherokee models.

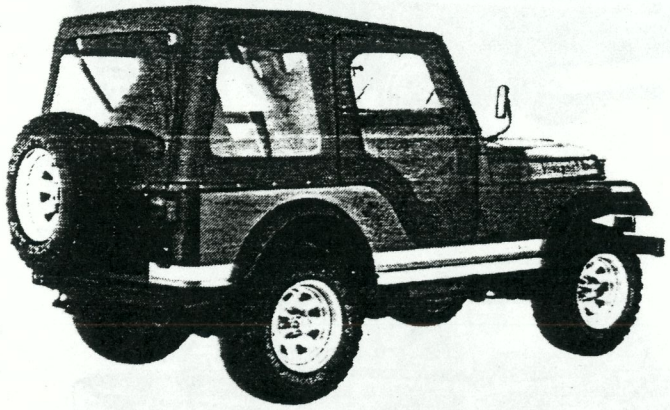

Fig. A-1 CJ-5 Model

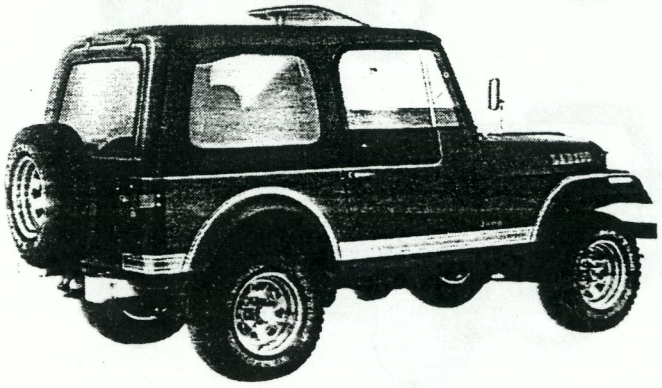

Fig. A-2 CJ-7 Model

Three trim packages are offered for 1981 Cherokee models. The "S" package is available on all Cherokee models. The Chief and Laredo packages are available on the model 17. All three packages feature deluxe interior trim and carpeting, chrome bumpers, and unique exterior trim.

Refer to the Power Train Combinations Chart in this section for engine and transmission availability.

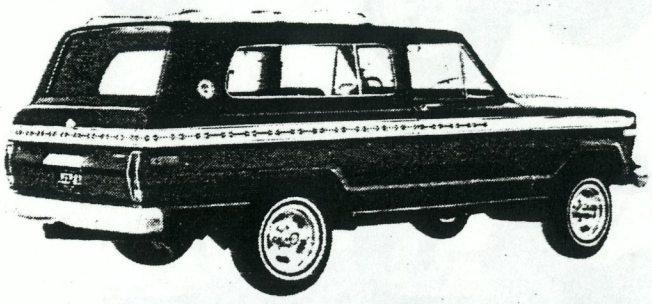

Fig. A-3 Cherokee Model 16

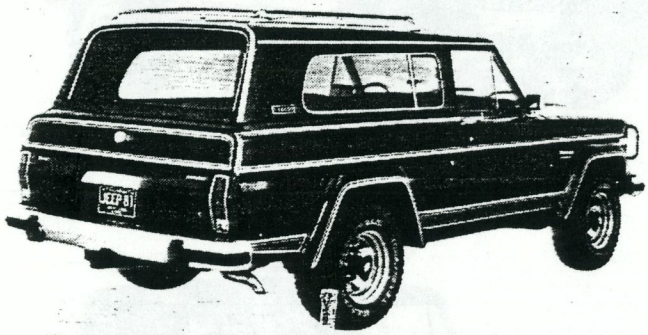

Fig. A-4 Cherokee Model 17

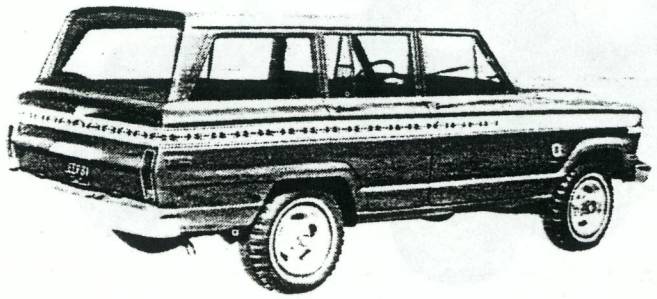

Fig. A-5 Cherokee Model 18

Wagoneer Model

For 1981, one Wagoneer model is offered: the model 15. The 4-door Wagoneer station wagon features deluxe interior trim and carpeting, chrome bumpers, power steering, and automatic transmission with Quadra-Trac full-time 4-wheel drive as standard. A luxury trim package, the Limited, is offered. It features a leather and corduroy interior, unique exterior woodgrain with vinyl surround mouldings, and forged aluminum wheels. See figure A-6.

Refer to the Power Train Combinations Chart in this section for engine transmission and transfer case availability.

Fig. A-6 Wagoneer Model 15

Truck Models

The truck models are available in two series: the J-10 Series model 24, 25 and 26, and the J-20 Series model 27 (figs. A-7, A-8 and A-9).

The J-10 models differ from the J-20 model in gross vehicle weight (GVW) ratings. For 1981, the J-10 Series GVW for models 24, 25 and 26 is 6200 while the J-20 model 27 GVW remains at 6800 with optional GVW of 7600 and 8400.

The Truck models are also identified by wheelbase. Models 24 and 25 have a 119-inch wheelbase; models 26 and 27 have a 131-inch wheelbase. The following chart outlines Truck differences by wheelbase and GVW ratings.

Truck Model Identification

Series	Model Number	Wheelbase (Inches)	Gross Vehicle Weight Rating		
			Standard	Option 1	Option 2
J-10	24	119	6200	–	–
J-10	25	119	6200	–	–
J-10	26	131	6200	–	–
J-20	27	131	6800	7600	8400

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Three trim packages are available on Truck models: Custom, Honcho and Laredo. The Custom package is available on all Trucks and features deluxe interior and exterior trim. The Honcho package is only available on model 25 and features denim interior, unique exterior trim, and 10-inch by 15-inch tires mounted on 8-inch wide, styled-steel wheels.

The Laredo package is available on 1981 J-10 model 25 Trucks. The package includes unique exterior paint and decals, 10-inch by 15-inch radial tires mounted on 8-inch wide chrome styled-steel wheels, chrome rear step bumper, and deluxe interior.

Refer to the Power Train Combinations Chart in this section for engine and transmission availability.

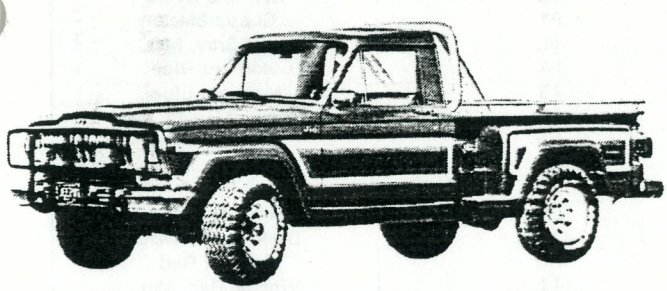


Fig. A-7 J-10 Truck Model 24

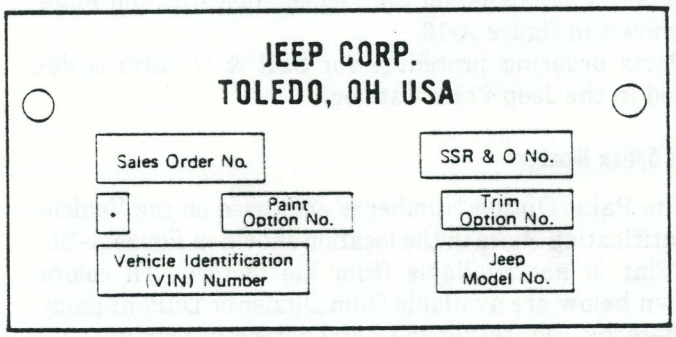
Fig. A-8 J-10 Truck Model 25

Fig. A-9 J-20 Truck Model 27

VEHICLE IDENTIFICATION

Vehicle Identification Plate

A metal vehicle identification plate is affixed to the left-hand side of the dash panel under the hood (fig. A-10). The plate shows the Sales Order Number; the Vehicle Identification Number (VIN); Special Sales Request & Order (SSR & O) Number; Paint Option Number; Trim Option Number; and the Jeep Model Number.



*Disregard – for factory use only

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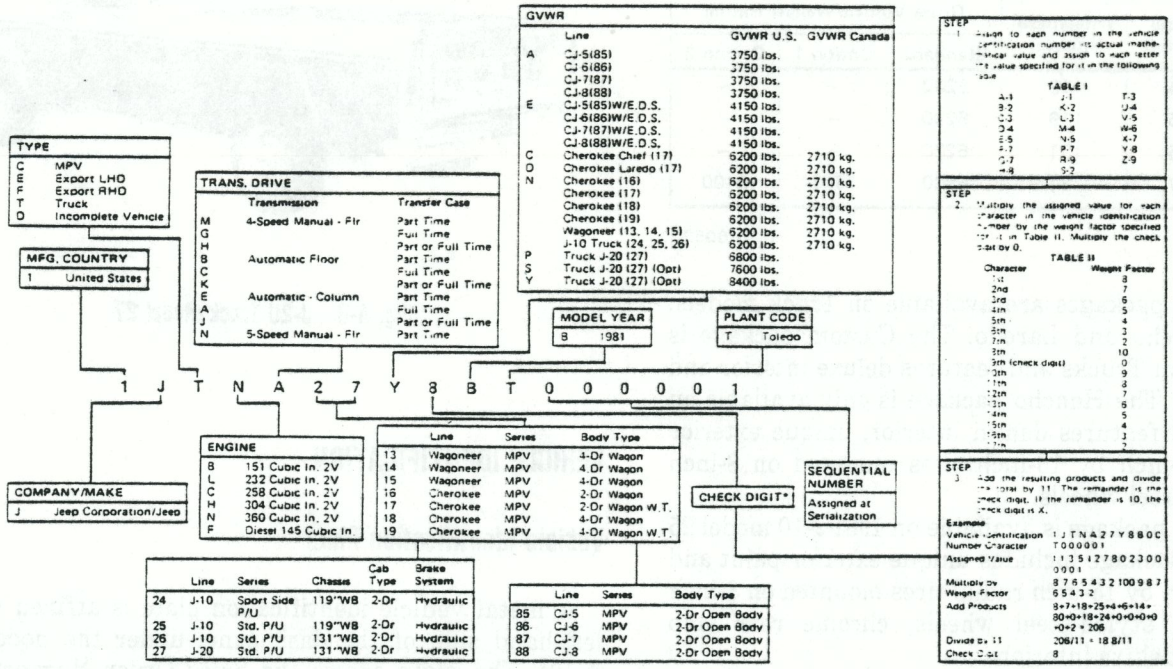
Fig. A-10 Vehicle Identification Plate

Vehicle Identification Number (VIN)

All Vehicle Identification Numbers contain 17 characters in a combination of letters and numbers that provide specific information about the vehicle. VIN's for all Jeep vehicles can be decoded using the following chart.

VIN Decoding Chart



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Special Sales Request and Order (SSR & O) Number

Certain Jeep vehicles are built to special order with other than standard parts or equipment. To assist the dealer in ordering correct replacement parts, an SSR & O number is assigned and a permanent record of the deviation is maintained by the factory. The SSR & O number is embossed on the Vehicle Identification Plate as shown in figure A-10.

Parts ordering procedure for SSR & O parts is detailed in the Jeep Parts Catalog.

Paint Option Number

The Paint Option Number is embossed on the Vehicle Identification Plate in the location shown in figure A-10.

Paint is not available from the factory. All colors shown below are available from Ditzler or DuPont paint jobbers by requesting the paint intermix formula. All colors are available from Sherwin-Williams in factory package cans. Option No. 999 indicates special paint. To obtain information on special paint, contact your Jeep Parts Distribution Center and provide the Vehicle Identification Number (VIN).

Trim Option Number

The Trim Option Number is embossed on the Vehicle Identification Plate as shown in figure A-10. Consult your Jeep Parts Catalog for trim ordering procedure. Special trim is indicated by trim option number 999. To obtain information on special trim, contact your Jeep Parts Distribution Center and provide the Vehicle Identification Number (VIN).

Paint Option Numbers

Paint Option Number	Color
9B	Olympic White
P1	Classic Black
1L	Steel Gray, Met.
1A	Montana Blue
1B	Moolight Blue
1C	Sherwood Green, Met.
1D	Autumn Gold
OK	Cameo Tan
1E	Copper Brown, Met.
1H	Chestnut Brown, Met.
OM	Dark Brown, Met.
1M	Oriental Red
1J	Vintage Red, Met.
1K	Deep Maroon, Met.

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Safety Certification Sticker

A safety sticker is placed on all vehicles to show that they meet federal motor vehicle safety certification standards (fig. A-11). It lists the VIN, month and year built, Gross Vehicle Weight Rating (GVWR), and Gross Axle Weight Rating (GAWR).

The sticker is located on the inside panel directly below the door opening on the drivers side on CJ-5 and CJ-7 models. On Cherokee, Wagoneer and Truck models, it is on the door lock pillar on the driver's side.

KEYS AND LOCKS

Two square-headed and two oval-headed keys are provided, as applicable, with each vehicle. The square-headed (code D) key operates the ignition switch, front door locks, and Cherokee/Wagoneer tailgates. The oval-

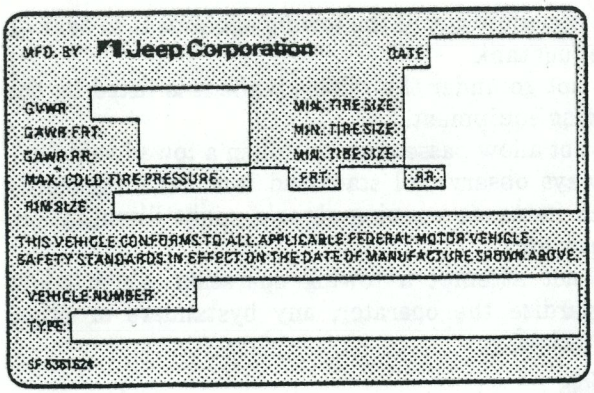

Fig. A-11 Safety Sticker

headed (code E) key operates the glove box lock. Each key has a code number stamped on the knock-out plug. In the event a key is lost, a new key can be made by converting the key code number to a key bitting number. Key bitting numbers can be obtained from a key cutting machine manufacturer's cross-reference list or by contacting your Zone office.

If a key is lost and the key code number is unknown, the correct number can be identified by the Zone office from the vehicle identification number.

If the ignition key is lost and the key code number is not available, a new key can be made by removing a door lock and taking it to a locksmith. The locksmith can determine the key bitting by inserting a blank key into the lock cylinder and cutting the blank to match the tumblers.

If the ignition switch lock is defective and the key is available, the cylinder and individual tumblers can be ordered and matched to the existing key. To determine the tumbler arrangement, place the key over the template (fig. A-12). Starting from the left, read across the horizontal lines and record first digit (number 1 position) of the key code. Continue this process for subsequent numbers 2 through 5.

NOTE: *The template shown in figure A-12 may be used to determine the key bitting code of a key for which the key code number is unknown.*

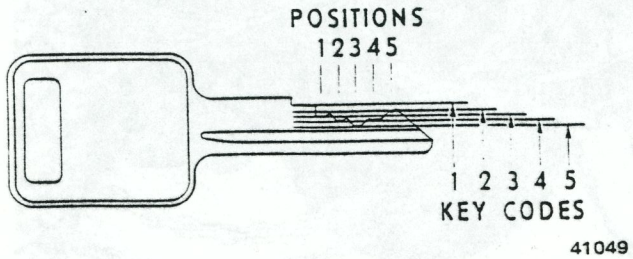

Fig. A-12 Key Coding Template

TOWING

General

A conventional towing sling is recommended for use on all Jeep vehicles because of its stability and reduced likelihood of damage. The following instructions apply only to this device. When using other than sling-type towing equipment, be sure to follow the manufacturer's instructions.

A safety chain system that is completely independent of the lifting and towing attachment must be used. Be careful when installing safety chains so that they do not damage the vehicle.

If additional ground clearance is required, a towing dolly may be used. The end of the vehicle to be placed on the dolly should be lifted with the same equipment as when towing.

CJ Models

Front Towing—Front End Raised

Part Time Transfer Case

Do not exceed a towing speed of 30 mph (48 km/h) and do not exceed a towing distance of 15 miles (24 km). Index and disconnect rear propeller shaft or place a dolly under rear wheels.

Rear Towing—Rear End Raised

Part Time Transfer Case

Do not exceed a towing speed of 30 mph (48 km/h) and do not exceed a towing distance of 15 miles (24 km). Index and disconnect front propeller shaft or place a dolly under front wheels.

If ignition key is available, turn ignition to Off position to unlock steering column. Clamp the steering wheel in the straight-ahead position. Do not use the steering column lock as a substitute for a clamping device.

If ignition key is not available, place front wheels on a dolly.

Cherokee-Wagoneer-Truck Models

Front Towing—Front End Raised

Part Time Transfer Case—Manual Transmission

Do not exceed a towing speed of 30 mph (48 km/h) and do not exceed a towing distance of 15 miles (24 km).

(1) Shift transmission into gear and the transfer case into N (Neutral).

Part Time Transfer Case—Automatic Transmission

Do not exceed a towing speed of 30 mph (48 km/h) and do not exceed a towing distance of 15 miles (24 km).

(1) Shift automatic transmission into Park.

(2) Shift transfer case into Neutral position.

Quadra-Trac—Automatic Transmission

Do not exceed a towing speed of 30 mph (48 km/h) and do not exceed a towing distance of 15 miles (24 km).

(1) Turn ignition switch to Off position to unlock steering wheel.

(2) Shift automatic transmission into Park.

(3) Shift transfer case into Neutral position.

Rear Towing—Rear End Raised

Part Time Transfer Case—Manual Transmission

Do not exceed a towing speed of 30 mph (48 km/h) and do not exceed a towing distance of 15 miles (24 km).

If ignition key is available, turn ignition to Off position to unlock steering column. Clamp the steering wheel in the straight-ahead position. Do not use steering column lock as a substitute for a clamping device. Shift transmission into gear and transfer case into Neutral. Turn selective drive hubs to 4 x 4/LOCK position.

If ignition key is not available, place front wheels on a dolly.

Part Time Transfer Case—Automatic Transmission

Do not exceed a towing speed of 30 mph (48 km/h) and do not exceed a towing distance of 15 miles (24 km).

If ignition key is available, turn ignition to Off position to unlock steering column. Clamp the steering wheel in the straight-ahead position. Do not use steering column lock as a substitute for a clamping device. Shift transmission into Park and transfer case into Neutral. Turn selective drive hubs to 4 x 4/LOCK position.

If ignition key is not available, place front wheels on a dolly.

Quadra-Trac—Automatic Transmission

Do not exceed a towing speed of 30 mph (48 km/h) and do not exceed a towing distance of 15 miles (24 km).

If ignition key is available, turn ignition to Off position to unlock steering column. Clamp steering wheel in the straight-ahead position. Do not use steering column lock as a substitute for a clamping device. Shift transmission into Park and transfer case into Neutral.

If ignition switch is not available, place front wheels on a dolly.

Safety Precautions

- Whenever possible, tow the vehicle from the rear to prevent damage to the transmission or rear axle.
- Secure loose or protruding parts of a damaged vehicle.
- The end of the vehicle being towed should be lifted a minimum of four inches off the ground. Check opposite end for adequate ground clearance.
- Always use a safety chain system that is independent of the lifting and towing attachment.
- Do not allow any of the towing equipment to bear on the fuel tank.
- Do not go under the vehicle while it is lifted by the towing equipment.
- Do not allow passengers to ride in a towed vehicle.
- Always observe all state and local laws regarding such items as warning signals, night illumination, speed, etc.
- Do not attempt a towing operation which could jeopardize the operator, any bystanders or other motorists.

CJ Models

Front (Refer to Figure A-13)

(1) Attach J-hooks over axle outboard of springs.

(2) Place towbar under spring shackles.

(3) Attach safety chains around spring shackles.

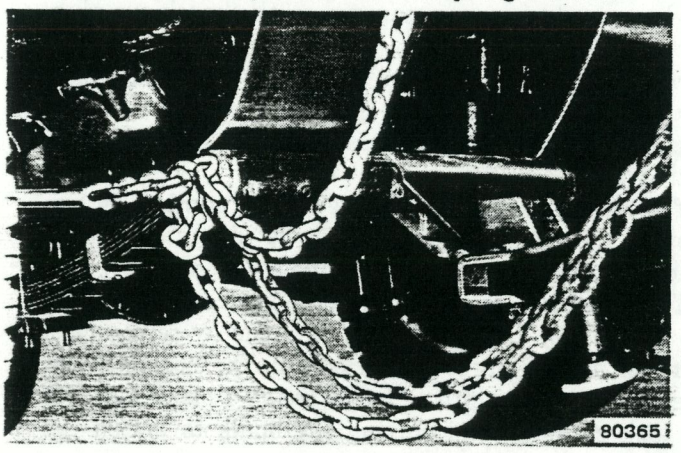

Fig. A-13 Front Towing—CJ Models

Rear (Refer to Figure A-14)

(1) Attach J-hooks around axle outboard of springs.

(2) Place towbar under bumper plate.

(3) Attach safety chains around spring shackles.

CAUTION: *To prevent damage to drive line members shift the transmission and transfer case into the correct position as outlined in the general towing instructions.*

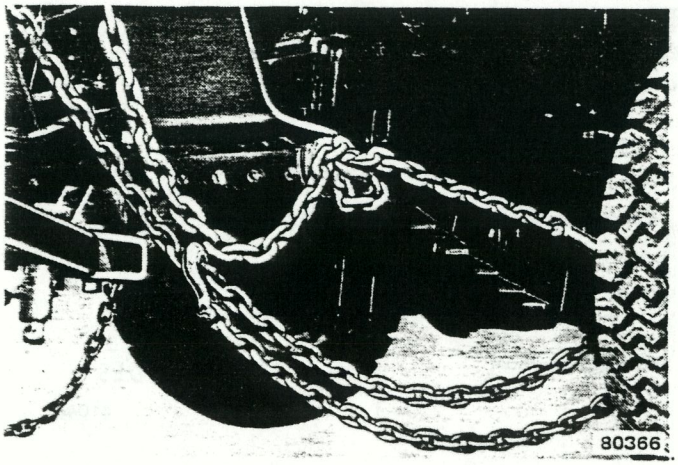

Fig. A-14 Rear Towing—CJ Models

Cherokee and Wagoneer Models

Front (Refer to Figure A-15)

(1) Attach J-hooks around axle outboard of shock absorbers.
(2) Place towbar under spring shackles.
(3) Attach safety chains around spring shackles.

CAUTION: *To prevent damage to drive line members, shift the transmission and transfer case into the correct position as outlined in the general towing instructions.*

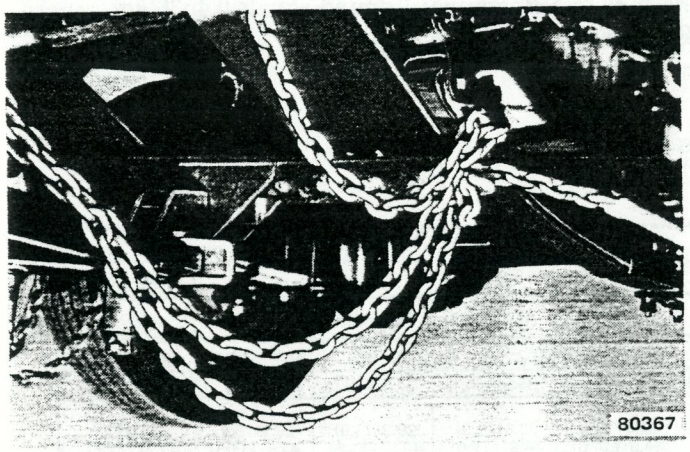

Fig. A-15 Front Towing—Cherokee and Wagoneer Models

Rear (Refer to Figure A-16)

(1) Attach J-hooks around axle outboard of shock absorber brackets.
(2) Place towbar under bumper.
(3) Attach safety chains around frame rails.

CAUTION: *To prevent damage to drive line members, shift the transmission and transfer case into the correct position as outlined in the general towing instructions.*

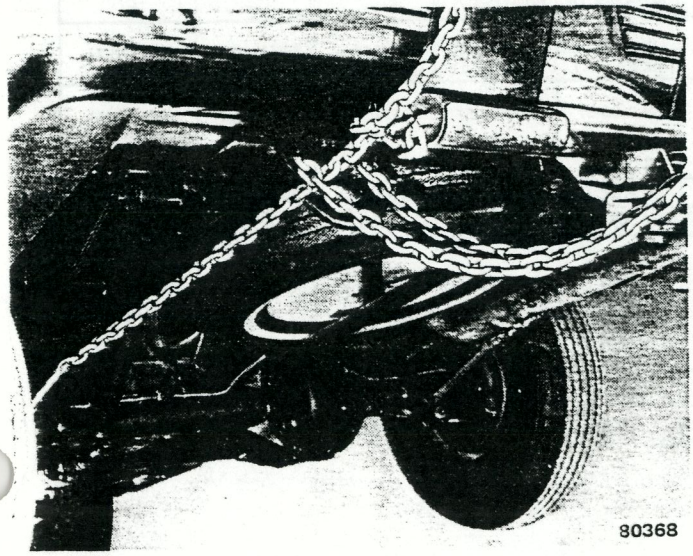

Fig. A-16 Rear Towing—Cherokee and Wagoneer Models

Truck Models

Front (Refer to Figure A-17)

(1) Attach J-hooks around axle outboard of shock absorbers.
(2) Place towbar under spring shackles.
(3) Attach safety chains around spring shackles.

CAUTION: *To prevent damage to drive line members, shift the transmission and transfer case into the correct position as outlined in the general towing instructions.*

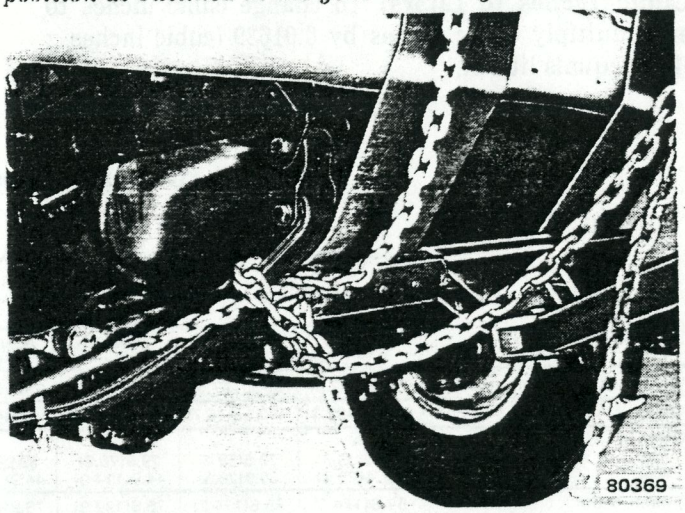

Fig. A-17 Front Towing—Truck Models

Rear (Refer to Figure A-18)

(1) Attach J-hooks around axle outboard of shock absorbers.
(2) Place towbar under frame cross rail.
(3) Attach safety chains around spring shackles.

CAUTION: *To prevent damage to drive line members, shift the transmission and transfer case into the correct position as outlined in the general towing instructions.*

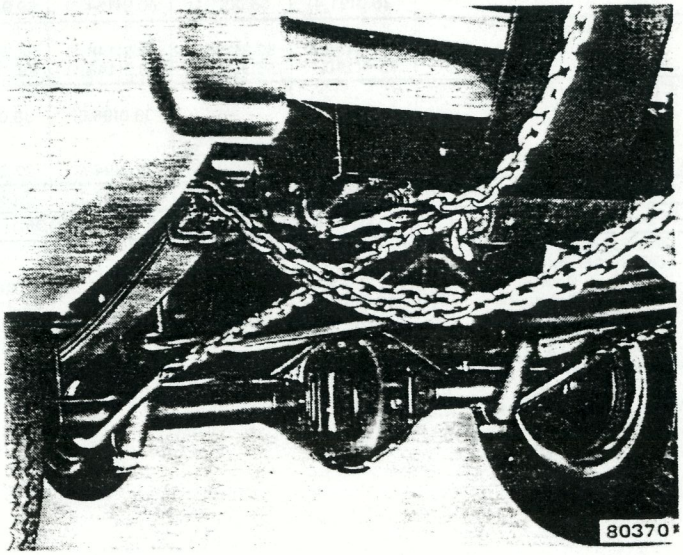

Fig. A-18 Rear Towing—Truck Models

CONVERSION OF ENGLISH AND METRIC MEASURES

Cubic Centimeters to Inches: To change cubic centimeters to cubic inches, multiply cubic centimeters by 0.061 (cc x 0.061 equals cubic inch).

Cubic Inches to Centimeters: To change cubic inches to cubic centimeters, multiply cubic inches by 16.39 (cubic inch x 16.39 equals cc).

Liters to Cubic Inches: To change liters to cubic inches, multiply liters by 61.02 (liter x 61.02 equals cubic inches).

Cubic Inches to Liters: To change cubic inches to liters, multiply cubic inches by 0.01639 (cubic inches x 0.01639 equals liters).

Cubic Centimeters to Liters: To change centimeters to liters, divide by 1000 (simply move the decimal point three figures to the left).

Liters to Cubic Centimeters: To change liters to cubic centimeters, move the decimal point three figures to the right.

Miles to Kilometers: To change miles to kilometers, multiply miles by 1.609 (miles x 1.609 equals kilometers).

Kilometers to Miles: To change kilometers to miles, multiply kilometers by 0.6214 (kilometers x 0.6214 equals miles).

Pounds to Kilograms: 1 pound equals 0.4536 kg.

Kilograms to Pounds: 1 kg equals 2.2046 pounds.

General Dimensions (Inches)

	CJ Models		Cherokee Models			Wagoneer Models	Truck Models		
							J-10 Series		J-20 Series
	CJ-5	CJ-7	Model 16 2-Dr.	Model 17 2-Dr.	Model 18 4-Dr.	Model 15	Model 25	Model 26	Model 27
Wheelbase	83.5(212.0)	93.5(237.5)	108.7(276.1)	108.7(276.1)	108.7(276.1)	108.7(276.1)	118.7(301.5)	130.7(332.0)	130.7(332.0)
Overall Length	138.4(402.3)	147.9(375.7)	183.5(466.1)	183.5(466.1)	183.5(466.1)	183.5(466.1)	192.5(489.0)	204.5(519.4)	204.5(519.4)
Overhang									
Front	23.5(59.7)	23.5(59.7)	29.9(75.9)	29.9(75.9)	29.9(75.9)	29.9(75.9)	29.9(75.9)	29.9(75.9)	29.9(75.9)
Rear	31.4(79.8)	30.9(78.5)	44.9(114.0)	44.9(114.0)	44.9(114.0)	44.9(114.0)	43.9(111.5)	43.9(111.5)	43.9(111.5)
Overall Width	68.6(174.2)	68.6(174.2)	75.6(192.0)	78.9(200.4)	75.6(192.0)	75.6(192.0)	78.9(200.4)	78.9(200.4)	78.9(200.4)
Overall Height	–	–	66.9(169.9)	67.6(171.7)	66.9(169.9)	66.7(169.4)	69.3(176.0)	69.1(175.5)	70.7(179.6)
Open Body	67.6(171.7)	67.6(171.7)	–	–	–	–	–	–	–
Soft Top	71.4(181.4)	71.3(181.1)	–	–	–	–	–	–	–
Hard Top	71.3(181.1)	70.5(179.1)	–	–	–	–	–	–	–
Step Height									
Front	27.0(68.6)	26.1(66.3)	19.9(50.5)	20.7(52.6)	19.9(50.5)	19.9(50.5)	20.7(52.6)	20.7(52.6)	22.1(56.1)
Rear	–	–	–	–	20.8(52.8)	20.8(52.8)	–	–	–
Front Tread	51.5(130.8)	51.5(130.8)	59.4(150.9)	65.4(166.1)	59.4(150.9)	59.4(150.9)	63.3(160.8)	63.3(160.8)	64.6(164.1)
Rear Tread	50.0(127.0)	50.0(127.0)	57.8(146.8)	62.3(158.2)	57.8(146.8)	57.8(146.8)	63.8(162.1)	63.8(162.1)	65.9(167.4)
Minimum Ground Clearance	6.9(17.5)	6.9(17.5)	7.7(19.6)	8.6(21.8)	7.7(19.6)	7.7(19.6)	7.7(19.6)	7.7(19.6)	8.1(20.6)
Min. Turning Diameter-feet(m)	33.5(10.2)	35.9(10.9)	37.7(11.5)	39.4(12.0)	37.7(11.5)	37.7(11.5)	40.6(12.4)	44.5(13.6)	44.5(13.6)
Effective Leg Room									
Front (Accelerator)	37.9(96.3)	39.1(99.3)	41.6(105.7)	4.16(105.7)	41.6(105.7)	41.6(105.7)	41.6(105.7)	41.6(105.7)	41.6(105.7)
Rear (Minimum)	30.5(77.5)	35.0(88.9)	37.0(94.0)	37.0(94.0)	37.0(94.0)	37.0(94.0)	–	–	–
Hip Room									
Front	55.4(140.7)	53.8(136.7)	60.5(153.7)	60.5(153.7)	60.5(153.7)	60.5(153.7)	60.5(153.7)	60.5(153.7)	60.5(153.7)
Rear	36.0(91.4)	36.0(91.4)	60.9(154.7)	60.9(154.7)	60.9(154.7)	60.9(154.7)	–	–	–
Shoulder Room									
Front	55.4(140.7)	53.8(136.7)	58.3(148.1)	58.3(148.1)	58.3(148.1)	58.3(148.1)	58.3(148.1)	58.3(148.1)	58.3(148.1)
Rear	55.4(140.7)	56.3(143.0)	58.3(148.1)	58.3(148.1)	58.3(148.1)	58.3(148.1)	–	–	–
Effective Head Room									
Front	–	–	38.0(96.5)	38.0(96.5)	38.0(96.5)	38.0(96.5)	40.2(102.1)	40.2(102.1)	40.2(102.1)
Soft Top	39.8(101.1)	40.6(103.1)	–	–	–	–	–	–	–
Hard Top	40.8(103.6)	39.9(101.3)	–	–	–	–	–	–	–
Rear Hard Top	40.9(103.9)	39.6(100.6)	37.2(94.5)	37.2(94.5)	37.2(94.5)	37.2(94.5)	–	–	–
Cargo Floor Height	25.2(64.0)	25.1(63.8)	24.9(63.2)	25.6(65.0)	24.9(63.2)	24.7(62.7)	26.8(68.0)	26.4(67.0)	28.2(71.6)
Cargo Capacity-cubic feet ( )	10.2(288.8)*	13.6(385.1)*	95.1(2692.9)*	95.1(2692.9)*	95.1(2692.9)*	95.1(2692.9)*	67.0(1897.2)	76.6(2169.1)	76.6(2169.1)
Cargo Space									
Overall Length	–	–	–	–	–	–	86.5(219.7)	98.5(250.2)	98.5(250.2)
Length at Floor	40.2(102.1)	46.8(118.9)	81.6(207.3)	81.6(207.3)	81.6(207.3)	81.6(207.3)	83.6(212.3)	95.6(242.8)	95.6(242.8)
Width at Wheelhouse	36.0(91.4)	36.0(91.4)	44.3(112.5)	44.3(112.5)	44.3(112.5)	44.3(112.5)	50.0(127.0)	50.0(127.0)	50.0(127.0)
Width at Floor	36.0(91.4)	36.0(91.4)	60.9(154.7)	60.9(154.7)	60.9(154.7)	60.9(154.7)	68.0(172.7)	68.0(172.7)	68.0(172.7)
Width of Tailgate Opening	35.8(90.9)	34.5(87.6)	54.9(139.4)	54.9(139.4)	54.9(139.4)	54.9(139.4)	57.2(145.3)	57.2(145.3)	57.2(145.3)
Height of Sides and Tailgate	–	–	–	–	–	–	20.5(52.1)	20.5(52.1)	20.5(52.1)

*With rear seat removed.

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Metric System-SI

The International System of Units (Systeme International d'Unites) officially abbreviated "SI" in all languages – the modern metric system

QUANTITY	EXAMPLES OF APPLICATIONS	METRIC UNIT	SYMBOL
Length	Dimensions Tire rolling circumference Turning circle/ radius Braking distance	meter	m
	Greater than 999 meter	kilometer	km
	Dimensions	millimeter	mm
	Depth of surface finish	micrometer	um
Area	Glass & Fabrics Brake & Clutch linings Radiator area etc.	square centimeter	cm^2
	Small areas	square millimeter	mm^2
Volume	Car Luggage Capacity	cubic meter	m^3
	Engine Capacity	liter	l
	Vehicle fluid capacity	cubic centimeter	cm^3
Volume Flow	Gas & Liquid	liter per second	l/s
Time Interval	Measurement of elapsed time	second minute hour day	s min h d
Velocity	General use Road speed	meter per second kilometer per hour	m/s km/h
Acceleration & Deceleration	General use	meter per second squared	m/s^2
Frequency	Electronics	hertz kilohertz megahertz	Hz kHz mHz
Rotational Speed	General use	revolution per minute revolution per second	rpm rps
Mass	Vehicle mass Legal load rating	megagram	t
	General use Small masses	kilogram gram milligram	kg g mg
Density	General use	kilogram per cubic meter gram per cubic centimeter kilogram per liter	kg/m^3 g/cm^3 kg/l
Force	Pedal effort Clutch spring force Handbrake lever effort etc.	newton	N
Moment of Force (Torque)	Torque	newton meter	N-m
Power, Heat Flow Rate	General use Bulbs Alternator output Engine performance Starter performance	watt kilowatt	W kW

QUANTITY	EXAMPLES OF APPLICATIONS	METRIC UNIT	SYMBOL
Celsius Temperature	General use	degree Celsius	^oC
Thermodynamic Temperature	General use	kelvin	k
Electric Current	General use	ampere milliampere microampere	A mA µA
Potential Difference (Electromotive Force)	General use	kilovolt volt millivolt microvolt	kV V mV µV
Electric Resistance	General use	megohm kilohm ohm	MΩ kΩ Ω
Electric Capacitance	General use	farad microfarad picofarad	F µF pF
Fuel Consumption	Vehicle performance	liter per 100 kilometer	l/100 km
Oil Consumption	Vehicle performance	liter per 1000 kilometer	l/1000 km
Stiffness	Linear stiffness	kilonewton meter	kN/m
Tire Revolutions	Tire Data	revolution per kilometer	rev/km
Pressure	Tire Coolant Lubricating oil Fuel pump delivery Engine compression Manifold Brake line (hydraulic) Car heating & ventilation Barometric pressure	kilopascal	kPa
Luminous Intensity	Bulbs	candela	cd
Accumulator Storage Rating	Battery	ampere hour	A-h

U.S.A./METRIC COMPARISON

QUANTITY	USA	METRIC – SYMBOL	
Length	Inch-Foot-Mile	Meter	m
Weight (mass)	Ounce-Pound	Kilogram	Kg
Area	Square inch/Foot	Square Meter	m^2
Volume-Dry	Cubic inch/Foot	Cubic Meter	m^3
-Liquid	Ounce-Pint-Quart-Gallon	Liter	l
Velocity	Feet Per Second	Meter per Second	m/s
Road Speed	Miles Per Hour	Kilometer per Hour	km/h
Force	Pound-Force	Newton	N
Torque	Foot-Pounds	Newton meter	N-m
Power	Horsepower	Kilowatt	kW
Pressure	Pounds Per Square Inch	Kilopascal	kPa
Temperature	Degrees Fahrenheit	Degrees Kelvin and Celsius	K ^oC

Power Train Combinations—1981 CJ Models

Series	GVRW	Engine	Transmission			Transfer Case		Clutch (in.)	Axle Ratio		Trac-Lok	Axle Model		Brakes (in.)		Standard Wheels
			SR-4	T-176	A	300	QT		S	O		Front	Rear	Front	Rear	
CJ-7 Model 87 93.5 Inch Wheelbase	Open Body 3750 W/EDS. 4/50 (1)	4-151-2V	S		NA	S	NA	9.250	3.73		O	Dana 30 Open End	AMC/ Jeep	11.7 Inch Dics. Std.	11 x 2 Drum	15 x 6 5 Bolt 5.50 B.C.
		6-258-2V	S	S	NA	S	NA	10.50	2.73	3.31						
		8-304-2V		S	NA	S	NA	10.50	2.73	3.31						
CJ-5 Model 85 83.5 Inch Wheelbase	Open Body 3750 W/EDS. 4/50 (1)	4-141-2V	S		904	S	NA	9.250	3.73		O	Dana 30 Open End	AMC/ Jeep	11.7 Inch Dics. Std.	11 x 2 Drum	15 x 6 5 Bolt 5.50 B.C.
		6-258-2V	S	S	999	S	NA	10.50	2.73	3.31						
		8-304-2V		S	999	S	NA	10.50	2.73	3.31						

Notes:

(1) With Extra Duty Suspension

Abbreviations:

B.C. - Bolt Circle
GVWR - Gross Vehicle Weight Rating
O - Optional Equipment
QT - Quadra-Trac
S - Standard Equipment

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Power Train Combinations—1981 Cherokee-Wagoneer-Truck Models

Series	GVWR	Engine	Transmission			Transfer Case		Clutch (in.)	Axle Ratio (2)			Trac-Lok (3)	Axle Model		Brakes		Standard Wheels
			176 4M	T-18 4M	727 Auto.	208	QT		2.73	3.31	3.73		Front	Rear	Front	Rear	
Cherokee Models 16, 17 & 18 168.7 Inch Wheelbase	6200	6-258-2V (1)	S(1)			S(1)		11.0		S		O	Dana Open End	AMC/ Jeep	12 Inch Disc	11 x 2 Drum	15 x 6 6 Bolt 5.5 B.C. Models 16-18
					O(1)		O(1)										
		8-360-2V	S(1)			S(1)		11.0(1)		S*		O					15 x 8 6 Bolt 5.5 B.C. Model 17
					O		O		S(5)(6)	S(4)** O(5)(6)							
Wagoneer Model 15 109 Inch Wheelbase	6200	6-258-2V (1)	O(1)			O(1)		11.0	S	O		O	Dana Open End	AMC/ Jeep	12 Inch Disc	11.2 Drum	15 x 6 6 Bolt 5.5 B.C.
					S(1)		S(1)										
		8-360-2V	O(1)			O(1)		11.0									
					S		S										
J-10 Truck Mod.24&25 119 Inch Wheelbase Model 26 131 Inch Wheelbase	6200	6-258-2V (1)	S(1)			S(1)		11.0	S(5)(6)	S(4) O(5)(6)		O	Dana Open End	AMC/ Jeep	12 Inch Disc	11 x 2 Drum	15 x 6 6 Bolt 5.5 B.C.
					O(1)		O(1)										
		8-360-2V	S(1)			S(1)		11.0	S(5)(6)	S(4) O(5)(6)		O					
					O		O										
J-20 Truck Model 27 130.7 Inch Wheelbase	6800 (Std.) 7600 (Opt.) 8400 (Opt.)	8-360-2V		S(1)		S(1)		11.0			S	O	Dana Open End	Dana 60	12.5 Inch Disc.	12 x 2.50 Drum	16.5 x 6 8 Bolt 6.5 B.C.
					O		O										

Notes:

(1) NA California
(2) Trac-Lok available with all ratios.
(3) NA with QT
(4) Manual Transmission/Part-Time Transfer Case
(5) Automatic Transmission/Part-Time Transfer Case
(6) Automatic Transmission/Quadra-Trac

Abbreviations:

B.C. - Bolt Circle
GVWR - Gross Vehicle Weight Rating
NA - Not Available
O - Optional Equipment
S - Standard Equipment

*Model 17
**Models 16 and 18

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Decimal Equivalents

Milli-meter	Decimal	Fraction	Drill Size
.1	.0039		
.15	.0059		
.2	.0079		
.25	.0098		
.3	.0118		
	.0135		80
.35	.0138		
	.0145		79
.39	.0156	1/64	
.4	.0157		
	.0160		78
.45	.0177		
	.0180		77
.5	.0197		
	.0200		76
	.0210		75
.55	.0217		
	.0225		74
.6	.0236		
	.0240		73
	.0250		72
.65	.0256		
	.0260		71
	.0280		70
.7	.0276		
	.0292		69
.75	.0295		
	.0310		68
.79	.0312	1/32	
.8	.0315		
	.0320		67
	.0330		66
.85	.0335		
	.0350		65
.9	.0354		
	.0360		64
	.0370		63
.95	.0374		
	.0380		62
	.0390		61
1.0	.0394		
	.0400		60
	.0410		59
1.05	.0413		
	.0420		58
	.0430		57
1.1	.0433		
1.15	.0452		
	.0465		56
1.19	.0469	3/64	
1.2	.0472		
1.25	.0492		
1.3	.0512		
	.0520		55
1.35	.0531		
	.0550		54
1.4	.0551		
1.45	.0570		
1.5	.0591		
	.0595		53
1.55	.0610		
1.59	.0625	1/16	
1.6	.0629		
	.0635		52
1.65	.0649		
1.7	.0669		
	.0670		51
1.75	.0689		
	.0700		50
1.8	.0709		
1.85	.0728		
	.0730		49
1.9	.0748		
	.0760		48
1.95	.0767		
1.98	.0781	5/64	
	.0785		47
2.0	.0787		
2.05	.0807		
	.0810		46
	.0820		45
2.1	.0827		
2.15	.0846		
	.0860		44
2.2	.0866		
2.25	.0885		
	.0890		43
2.3	.0905		
2.35	.0925		
	.0935		42
2.38	.0937	3/32	
2.4	.0945		
	.0960		41
2.45	.0964		
	.0980		40
2.5	.0984		
	.0995		39
	.1015		38
2.6	.1024		
	.1040		37
2.7	.1063		
	.1065		36
2.75	.1082		
2.78	.1094	7/64	
	.1100		35
2.8	.1102		
	.1110		34
	.1130		33
2.9	.1141		
	.1160		32
3.0	.1181		
	.1200		31
3.1	.1220		
3.18	.1250	1/8	
3.2	.1260		
3.25	.1279		
	.1285		30
3.3	.1299		
3.4	.1338		
	.1360		29
3.5	.1378		
	.1405		28
3.57	.1406	9/64	
3.6	.1417		
	.1440		27
3.7	.1457		
	.1470		26
3.75	.1476		
	.1495		25
3.8	.1496		
	.1520		24
3.9	.1535		
	.1540		23
3.97	.1562	5/32	
	.1570		22
4.0	.1575		
	.1590		21
	.1610		20
4.1	.1614		
4.2	.1654		
	.1660		19
4.25	.1673		
4.3	.1693		
	.1695		18
4.37	.1719	11/64	
	.1730		17
4.4	.1732		
	.1770		16
4.5	.1771		
	.1800		15
4.6	.1811		
	.1820		14
4.7	.1850		13
4.75	.1870		
4.76	.1875	3/16	
4.8	.1890		12
	.1910		11
4.9	.1929		
	.1935		10
	.1960		9
5.0	.1968		
	.1990		8
5.1	.2008		
	.2010		7
5.16	.2031	13/64	
	.2040		6
5.2	.2047		
	.2055		5
5.25	.2067		
5.3	.2086		
	.2090		4
5.4	.2126		
	.2130		3
5.5	.2165		
5.56	.2187	7/32	
5.6	.2205		
	.2210		2
5.7	.2244		
5.75	.2263		
	.2280		1
5.8	.2283		
5.9	.2323		
	.2340		A
5.95	.2344	15/64	
6.0	.2362		
	.2380		B
6.1	.2401		
	.2420		C
6.2	.2441		
6.25	.2460		D
6.3	.2480		
6.35	.2500	1/4	E
6.4	.2520		
6.5	.2559		
	.2570		F
6.6	.2598		
	.2610		G
6.7	.2638		
6.75	.2657	17/64	
6.75	.2657		
	.2660		H
6.8	.2677		
6.9	.2716		
	.2720		I
7.0	.2756		
	.2770		J
7.1	.2795		
	.2811		K
7.14	.2812	9/32	
7.2	.2835		
7.25	.2854		
7.3	.2874		
	.2900		L
7.4	.2913		
	.2950		M
7.5	.2953		
7.54	.2968	19/64	
7.6	.2992		
	.3020		N
7.7	.3031		
7.75	.3051		
7.8	.3071		
7.9	.3110		
7.94	.3125	5/16	
8.0	.3150		
	.3160		O
8.1	.3189		
8.2	.3228		
	.3230		P
8.25	.3248		
8.3	.3268		
8.33	.3281	21/64	
8.4	.3307		
	.3320		Q
8.5	.3346		
8.6	.3386		
	.3390		R
8.7	.3425		
8.73	.3437	11/32	
8.75	.3445		
8.8	.3465		
	.3480		S
8.9	.3504		
9.0	.3543		
	.3580		T
9.1	.3583		
9.13	.3594	23/64	
9.2	.3622		
9.25	.3641		
9.3	.3661		
	.3680		U
9.4	.3701		
9.5	.3740		
9.53	.3750	3/8	
	.3770		V
9.6	.3780		
9.7	.3819		
9.75	.3838		
9.8	.3858		
	.3860		W
9.9	.3898		
9.92	.3906	25/64	
10.0	.3937		
	.3970		X
	.4040		Y
10.32	.4062	13/32	
	.4130		Z
10.5	.4134		
10.72	.4219	27/64	
11.0	.4330		
11.11	.4375	7/16	
11.5	.4528		
11.51	.4531	29/64	
11.91	.4687	15/32	
12.0	.4724		
12.30	.4843	31/64	
12.5	.4921		
12.7	.5000	1/2	
13.0	.5118		
13.10	.5156	33/64	
13.49	.5312	17/32	
13.5	.5315		
13.89	.5469	35/64	
14.0	.5512		
14.29	.5625	9/16	
14.5	.5709		
14.68	.5781	37/64	
15.0	.5906		
15.08	.5937	19/32	
15.48	.6094	39/64	
15.5	.6102		
15.88	.6250	5/8	
16.0	.6299		
16.27	.6406	41/64	
16.5	.6496		
16.67	.6562	21/32	
17.0	.6693		
17.06	.6719	43/64	
17.46	.6875	11/16	
17.5	.6890		
17.86	.7031	45/64	
18.0	.7087		
18.26	.7187	23/32	
18.5	.7283		
18.65	.7344	47/64	
19.0	.7480		
19.05	.7500	3/4	
19.45	.7656	49/64	
19.5	.7677		
19.84	.7812	25/32	
20.0	.7874		
20.24	.7969	51/64	
20.5	.8071		
20.64	.8125	13/16	
21.0	.8268		
21.03	.8281	53/64	
21.43	.8437	27/32	
21.5	.8465		
21.83	.8594	55/64	
22.0	.8661		
22.23	.8750	7/8	
22.5	.8858		
22.62	.8906	57/64	
23.0	.9055		
23.02	.9062	29/32	
23.42	.9219	59/64	
23.5	.9252		
23.81	.9375	15/16	
24.0	.9449		
24.21	.9531	61/64	
24.5	.9646		
24.61	.9687	31/32	
25.0	.9843		
25.03	.9844	63/64	
25.4	1.0000	1	

NOTES

MAINTENANCE B

INDEX

GENERAL

This section describes the service procedures required to keep Jeep vehicles in good running condition. These services are based on changes in driving conditions, accumulated odometer mileage or time intervals (whichever comes first), or are unscheduled as required by changes in usage, handling or performance. The section is divided into three parts: (1) Maintenance Schedule, (2) Description of Services according to components (listed alphabetically), (3) Unscheduled Maintenance.

Maintenance Schedule

Two maintenance schedules are listed: one for Engine Maintenance; one for Chassis Maintenance (including body).

The services listed are those which experience and testing have indicated are most likely needed at the time or distance intervals shown.

Perform the maintenance services as indicated in the **Engine Maintenance Schedule** and the **Chassis Maintenance Schedule**. The schedule tells you the component and required service, followed by the time and/or distance interval (mileage) at which the service should be performed, under both normal and heavy-duty operation.

For example:

Miles (Thousands)	Each Fuel Fill	5	12.5	20
Kilometers (Thousands)		8	20	32
Months		5	12.5	20
1) Check Engine Oil	•			
2) Change Engine Oil		•	•	•

Number 1 tells you that the engine oil level should be checked at each fuel fill. Number 2 tells you to change the engine oil every five months or 5,000 miles (8 000 km), whichever comes first, **under normal use**. The numbers appearing to the left of each component correspond with those on the **Engine and Chassis Illustrations** (figs. B-1, B-2, B-3 and B-4).

Fuel Requirements

U.S. Models

All engines require the use of unleaded fuel to reduce exhaust emissions, and to protect the catalytic converters. Use a fuel with an antiknock index (AKI) of at least 87. A lower octane AKI is acceptable at elevations above 1,500 feet (450 meters).

Canadian Models

1981 Jeep model J-20 Truck vehicles only, sold in Canada, are equipped with a catalytic converter and must operate on unleaded fuel only. All Jeep CJ, Cherokee, Wagoneer and J-10 Truck models sold in Canada are designed to operate on regular, low-lead, or unleaded fuel. Select a fuel with a Research Octane Number of at least 91 and a Motor Octane Number of at least 83 (Antiknock Index of at least 87).

Owner's Responsibility

It is the owner's responsibility to determine driving conditions (normal or heavy-duty operation), to have the vehicle serviced according to the **Maintenance Schedule**, and to pay for the necessary parts and labor.

CAUTION: *Failure to perform maintenance services at the proper intervals as outlined in the Maintenance Schedule constitutes negligence and may void provisions of the new-vehicle warranty.*

Heavy-Duty Operation

Heavy-duty operation consists of off-road or dusty conditions for over thirty percent of use, commercial

load-carrying or delivery, snow plowing, pulling trailers weighing over 2,000 pounds (900 kg) loaded, or extended engine idling during normal use. If your vehicle is used in heavy-duty operation, perform the service listed in the **Engine Maintenance Schedule** and the **Chassis Maintenance Schedule** according to the intervals designated under heavy-duty. (If no heavy-duty service is indicated for a particular component, perform the service at the normal time and/or distance interval noted.)

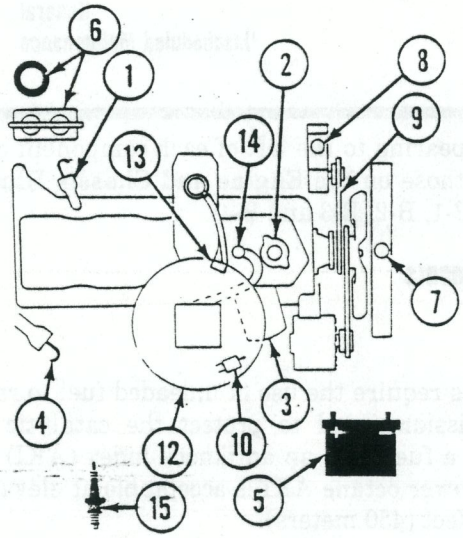
CAUTION: *Immediately after extended operation in sand, mud or water, thoroughly clean brakelinings, brakedrums and front axle U-joints and yokes, to prevent undue wear and unnecessary part failure.*

CAUTION: *If the vehicle is driven through water deep enough to cover the hubs, the wheel ends and axle differentials should be disassembled and inspected for water damage or contamination.*

After First 200 Miles (300 km)

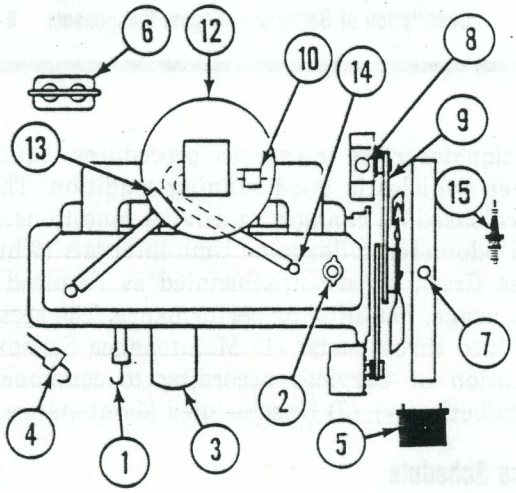
Check and retighten wheel nuts securely, if necessary. Tighten CJ models to 80 foot-pounds (108 N•m) torque, Cherokee, Wagoneer and J-10 Truck models to 75 foot-pounds (102 N•m) torque. Tighten J-20 (6800, 7600, 8400 GVWR) Truck to 130 foot-pounds (176 N•m) torque.

1981 JEEP MAINTENANCE SCHEDULE



(11) NOT APPLICABLE

Fig. B-1 Four-Cylinder Engine



(11) NOT APPLICABLE

Fig. B-2 Six-Cylinder Engine

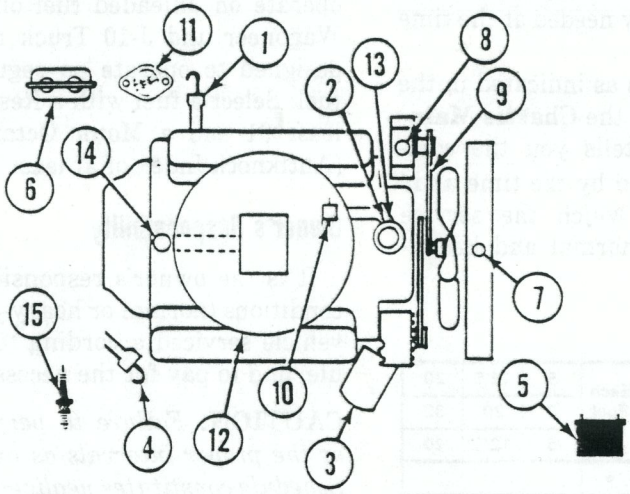


Fig. B-3 Eight-Cylinder Engine

1981 JEEP ENGINE MAINTENANCE SCHEDULE

Miles (Thousands) / Kilometers (Thousands) / Months	Each Fuel Fill	5 / 8 / 5	12.5 / 20 / 12.5	20 / 32 / 20	27.5 / 44 / 27.5	30 / 48 / 30	35 / 56 / 35	42.5 / 68 / 42.5	50 / 80 / 50
1) Check Engine Oil	●								
2) Change Engine Oil		●	●	●	●		●	●	●
3) Change Engine Oil Filter (6 and 8 Cylinder)		●	●	●	●		●	●	●
3) Change Engine Oil Filter (4 Cylinder)		●	◆	●	◆		●	◆	●
4) Check Automatic Transmission Fluid		●	●	●	●		●	●	●
5) Check Battery		●	●	●	●		●	●	●
6) Check Brake Master Cylinder Fluid Level		●	●	●	●		●	●	●
6) Check Hydraulic Clutch Reservoir (4 Cylinder Manual Transmission)		●	●	●	●		●	●	●
7) Check Coolant Level		●	●	●	●		●	●	●
7) Drain, Flush and Change Coolant ①			●						
8) Check Power Steering Pump Fluid Level		●	●	●	●		●	●	●
9) Check Drive Belt Tension (California)		◆				●		◆	
9) Check Drive Belt Tension (49 State)		●				●		●	
10) Fuel Filter (California)			◆		◆			◆	
10) Fuel Filter (49 State)			●		●			●	
11) Lubricate Exhaust Heat Valve (8 Cylinder Only)						●			
12) Replace Air Cleaner Filter ②						●			
13) Replace PCV Filter (4 Cylinder)						●			
13) Clean PCV Filter (6 and 8 Cylinder) ③						●			
14) Replace PCV Valve (California)						◆			
14) Replace PCV Valve (49 State)						●			
14) Check PCV Hoses and Connections (California)						◆			
14) Check PCV Hoses and Connections (49 State 6 and 8 Cylinder)						●			
14) Check PCV Hoses and Connections (49 State 4 Cylinder)			●		●			●	
15) Tune-Up									
Check and Adjust Curb and Fast Idle Speed (California)		●				◆			
Check and Adjust Curb and Fast Idle Speed (49 State 6 Cylinder)		●				◆			
Check and Adjust Curb and Fast Idle Speed (49 State 4 and 8 Cylinder)		●				●			
Check Distributor Vacuum and Centrifugal Advance Mechanism (49 State 6 Cylinder and All California)						◆			
Check Distributor Vacuum and Centrifugal Advance Mechanism (49 State 8 Cylinder)						●			
Check Distributor Vacuum and Centrifugal Advance Mechanism (49 State 4 Cylinder)			●		●			●	
Check Distributor Cap and Rotor (California)						◆			
Check Distributor Cap and Rotor (49 State)						●			
Check and Adjust Carburetor Mounting Bolts (4 Cylinder)		●							
Clean Choke System (49 State)		●			●			●	
Clean Choke System (California)						●			
Check TAC Control System (49 State 6 and 8 Cylinder)						●			
Check TAC Control System (California)						◆			
Check TAC Control System (49 State 4 Cylinder)		●			●				
Check Fuel System Filler Cap, Tank, Lines, Hoses and Connections			●		●			●	
Check Air System Hoses (8 Cylinder)						●			
Check Vacuum Fittings, Hoses and Connections						◆			
Check Exhaust System		●	●	●	●		●	●	●
Check Coil and Spark Plug Wires			◆		◆			◆	
Check Ignition Timing (California)						◆			
Check Ignition Timing (49 State 4 and 6 Cylinder)						●			
Check Ignition Timing (49 State 8 Cylinder)			●		●			●	
Replace Spark Plugs						●			
Replace Oxygen Sensor (California 4 Cylinder)						●			
Reset Oxygen Sensor Signal (California 4 Cylinder)						●			
Inspect and Lubricate Exhaust Manifold Heat Valve (8 Cylinder)						●			
Replace Charcoal Canister Air Inlet Filter (49 State 4 and 8 Cylinder)						●			

● - Required ◆ - Recommended, But Not Required

① Change engine coolant at 12,500 miles or 12-1/2 months, whichever comes first, then at the start of each winter season. Maintain a 50/50 mixture of coolant and water (−34°F/−36°C freezing point) for corrosion protection during summer.

② Replace air cleaner element once in between each normally scheduled change when driving under predominantly dusty conditions.

③ On 4- and 6-cylinder models, clean PCV filter in air cleaner assembly. On 8-cylinder models, clean PCV filter in oil filler cap.

1981 JEEP CHASSIS MAINTENANCE SCHEDULE

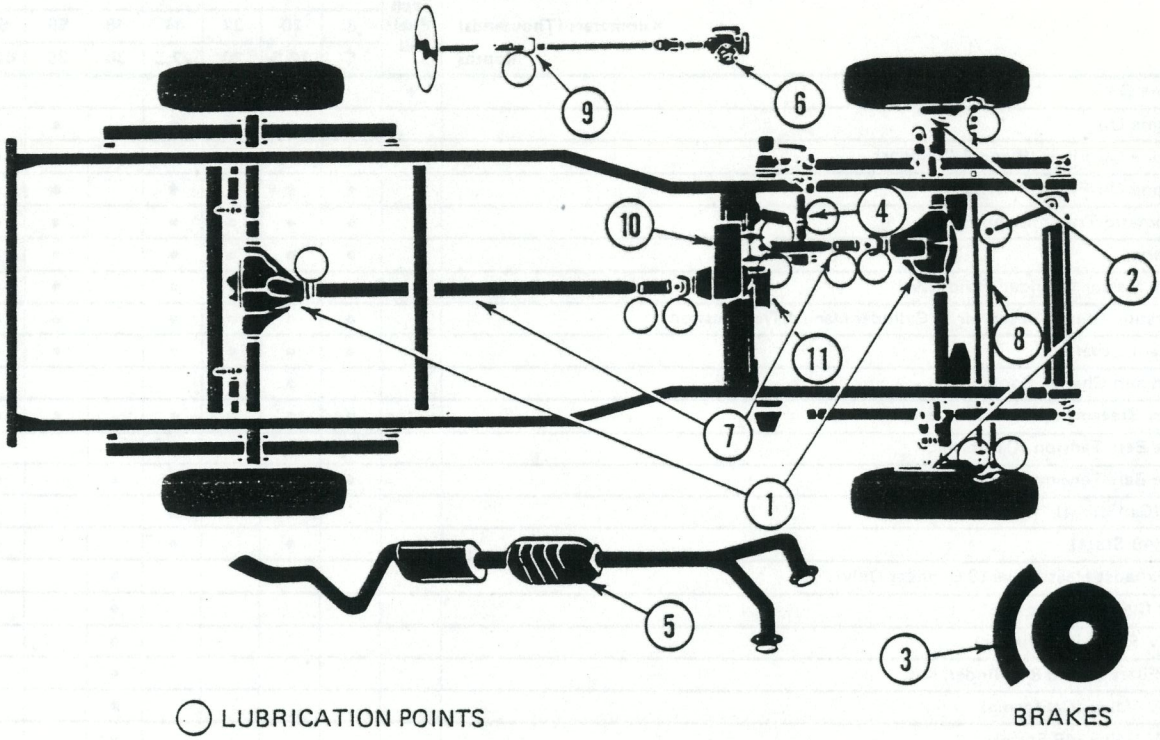


Fig. B-4 Chassis Illustration

Perform the maintenance services at the intervals shown. The symbol tells you what service is required, followed by the time and/or distance interval. For example: Front Wheel Bearings (Number 2) should be lubricated every 30,000 miles (48 000 km) under normal use, and every 15,000 miles (24 000 km) under heavy-duty operation. (The footnotes provide additional information about certain components and services.)

1981 JEEP CHASSIS MAINTENANCE SCHEDULE

Miles (Thousands)	Each Fuel Fill	3	5	6	7.5	9	10	12	15	18	20	21	22.5	24	25	27	30	33	35	36	37.5	39	40	42	45	48	50	51
Kilometers (Thousands)		5	8	10	12	14	16	19	24	29	32	34	36	38	40	43	48	53	56	58	60	62	64	67	72	77	80	82
Months		3	5	6	7.5	9	10	12	15	18	20	21	22.5	24	25	27	30	33	35	36	37.5	39	40	42	45	48	50	51
1) Check Axle Differentials (Front & Rear)		HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO
1) Replace Axle Differential Fluid (Front & Rear)															•												•	
2) Lubricate Front Wheel Bearings④									HO								HO								HO			
2) Lubricate Manual Locking Hubs									HO								HO								HO			
3) Check Brakes & Chassis⑤			HO				HO		HO		HO				HO		HO		HO				HO		HO		HO	
3) Lubricate Body Components⑥			HO				HO		HO		HO				HO		HO		HO				HO		HO		HO	
4) Lubricate Clutch Lever & Linkage (CJ)		HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO
4) Lubricate Clutch Lever & Linkage (Cherokee, Wagoneer, Truck)			HO				HO		HO		HO				HO		HO		HO				HO		HO		HO	
5) Inspect Exhaust System⑦			HO				HO		HO		HO				HO		HO		HO				HO		HO		HO	
6) Check Manual Steering Gear		HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO
7) Lubricate Propeller Shafts (Front & Rear)(CJ)⑧		HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO
7) Lubricate Propeller Shafts (Front & Rear) (Cherokee, Wagoneer, Truck)⑧			HO				HO		HO		HO				HO		HO		HO				HO		HO		HO	

1981 JEEP CHASSIS MAINTENANCE SCHEDULE (Continued)

8) Check and Lubricate Steering Linkage (CJ)[e]		HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO
8) Check and Lubricate Steering Linkage (Cherokee, Wagoneer, Truck)[e]			HO				HO		HO		HO				HO		HO		HO				HO		HO		HO	
9) Lubricate Steering Shaft U-Joint			HO				HO		HO		HO				HO		HO		HO				HO		HO		HO	
10) Check Transfer Case Fluid		HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO
10) Replace Transfer Case Fluid (Model 208 & Model 300)																	HO											
10) Replace Transfer Case Fluid (Quadra-Trac)[d]																	HO											
11) Check Manual Transmission Fluid		HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO		HO	•	HO	HO	HO	•	HO
11) Replace Manual Transmission Fluid																	HO											
11) Replace Automatic Transmission Fluid & Filter							HO				HO				•		HO						HO				HO	
12) Check Windshield Washer Fluid			•				•		•		•				•		•		•				•		•		•	

[d] Replace spindle oil and bearing seals on front wheel bearings (rear wheel bearings do not require periodic or scheduled lubrication).

[b] Check the following items as indicated. Correct to specifications as necessary: BRAKES—Front and rear brake linings for wear; rear brake self-adjusting mechanism for proper operation; master cylinder, calipers, wheel cylinders and differential warning valves for leaks; brake lines, fittings and hoses for condition and leaks; parking brake for proper operation; overall brake condition and action. STEERING/SUSPENSION—Manual or power steering gear and linkage for leaks, looseness or wear; springs, shock absorbers, steering damper and bushings for leaks, looseness or wear; tire condition; overall steering/suspension condition and action. BODY LUBRICATION—Lubricate the following items with the recommended lubricants: ashtray slides; courtesy light buttons; door, hood, liftgate, tailgate latches and hinges; front seat tracks; glove box door latch and hinge; locks; windshield hinges and holddown knobs (CJ only). ALSO—Adjust parking brake and manual transmission clutch free play, if necessary; adjust tire pressures to specifications; lubricate Model 300 transfer case linkage.

[c] Check exhaust system for leaks, damage, misalignment or grounding against body sheet metal or frame. Check catalytic converter for bulging or heat damage.

[d] Lubricate sleeve yokes (splines) and single and double cardan U-joints.

[e] Inspect and replace torn or ruptured grease seals, replace damaged steering components, and lubricate ball joints.

DESCRIPTION OF SERVICES—ENGINE COMPONENTS

1. Oil Check

Check engine oil level at each fuel fill. Add oil as necessary.

2. Oil Change

Change engine oil after the first 5,000 miles (8 000 km) and every 5,000 miles (8 000 km) thereafter. As periods for oil changes are affected by a variety of conditions, no single mileage figure applies for all types of driving.

Five-thousand miles (8 000 km) is the maximum amount of miles that should elapse between changes; more frequent changes are beneficial, and for this reason, oil should be changed every five months even though 5,000 miles (8 000 km) may not have elapsed on the vehicle odometer.

Drain crankcase only after engine has reached normal operating temperature to ensure complete drainage of used oil.

For maximum engine protection under all driving conditions, fill crankcase only with engine oil meeting API Engine Oil Service Classification "SE." These letters must appear on the oil container singly or in combination with other letters. SE engine oils protect against oil oxidation, high-temperature engine deposits, rust and corrosion.

Single viscosity or multi-viscosity oils are equally acceptable. Oil viscosity number, however, should be determined by the lowest anticipated temperature before the next oil change.

Engine Oil Viscosity

Lowest Temperature Anticipated	Recommended Single Viscosity	Recommended Multi-Viscosity
Above +40°F (+5°C)	SAE 30 or 40	SAE 10W-30, 20W-40, or 10W-40
Above 0°F (-18°C)	SAE 20W-20	SAE 10W-30 or 10W-40
Below 0°F (-18°C)	SAE 10W*	SAE 5W-20 or 5W-30

***Sustained high speeds (above 55 mph, 88 km/h) should be avoided when using SAE 10W engine oil since oil consumption may be greater under this condition.** 60542

Crankcase capacity is 3.0 quarts (2.84 liters) for four-cylinder engines, 4 quarts (3.8 liters) for six-cylinder engines, 4 quarts (3.8 liters) for eight-cylinder engines. Add one additional quart (1 liter) when the filter is changed. Do not add any additional oil when the filter is changed on four-cylinder engines.

3. Oil Filter

Change the oil filter every 5,000 miles (8 000 km) or every five months, whichever comes first, under normal conditions.

A full-flow oil filter is mounted on the lower center right side of six-cylinder engines, lower right side on four-cylinder engines and lower right side on eight-cylinder engines.

Remove the throwaway filter unit from the adapter with Oil Filter Removal Tool J-22700, or equivalent. To install, turn the replacement unit by hand until the gasket contacts the seat and then tighten an additional one-half turn.

CAUTION: *Use only a short-type, full-flow oil filter (AMC/Jeep Part No. 8993146, or equivalent) for replacement. Filters exceeding 4-1/4 inches (108 mm) in length could be punctured by the engine support or frame rail resulting in loss of oil and possible engine damage.*

4. Automatic Transmission (Fluid Check)

Inspect fluid level at scheduled interval. Check while the transmission is at normal operating temperature. This occurs after at least 15 miles (25 km) of expressway driving or equivalent city driving. At normal operating temperature, the gauge end of the dipstick will be too hot to make an accurate fluid level check perform the following steps:

(1) Bring transmission up to normal operating temperature as indicated above.

(2) Place vehicle on level surface.

(3) Have engine running at idle speed.

(4) Apply parking brake.

(5) Move gearshift lever through all positions, leaving it in Neutral.

(6) Remove dipstick, located in fill tube at right rear of engine near dash panel, and wipe clean.

(7) Insert dipstick until cap seats.

(8) Remove dipstick and note reading. The fluid level should be between the ADD and FULL marks. If at or below the ADD mark, add sufficient fluid to raise level to FULL mark.

Use AMC/Jeep Automatic Transmission Fluid, or equivalent, labeled Dexron® or Dexron II®.

CAUTION: *Do not overfill. Overfilling can cause foaming which can lead to overheating, fluid oxidation, or varnish formation. These conditions can cause interference with normal valve, clutch, and servo operation. Foaming can also cause fluid to escape from the transmission vent where it may be mistaken for a leak.*

When checking fluid level, also check fluid condition. If fluid smells burned or is full of metal or friction material particles, a complete transmission overhaul may be needed. Examine the fluid closely. If doubtful about its condition, drain out a sample for a double check.

Refer to Chassis Components for procedures on changing automatic transmission fluid and linkage adjustment.

5. Battery

WARNING: *Wear safety glasses, rubber gloves and protective clothing when servicing the battery. Battery fluid contains sulfuric acid and must be kept away from skin, eyes, clothing and the vehicle painted surfaces. If acid contacts any of these,* **flush immediately with large amounts of water. If acid contacts skin or eyes get medical attention.** *Do not smoke while checking or servicing the battery and keep open flames or sparks away from battery filler caps since explosive gas is always present.*

Check electrolyte level at scheduled interval. Lift the battery cell caps (fig. B-5) and look into each filler well. Maintain the fluid level above the battery plates to the bottom of the filler well ring. Add distilled water or drinking water free of high mineral content. In freezing weather, add water before driving to assure mixing with acid and to prevent freezing.

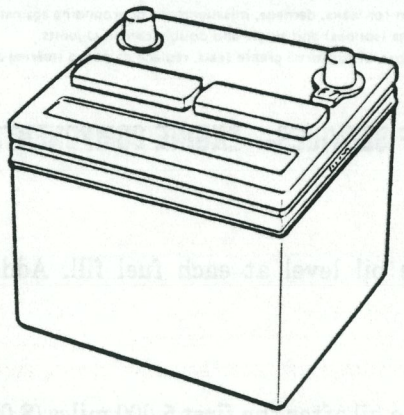


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Fig. B-5 Battery

In addition to regular fluid checks, inspect overall battery condition before every winter season according to the following procedure:

(1) Disconnect battery negative cable and then positive cable.

(2) Clean cables and terminal posts with a wire-brush terminal cleaner.

(3) Check battery fluid level and replenish if necessary (fig. B-4).

(4) Remove battery holddown and clean battery case and battery tray, if necessary, with a solution of baking soda and water; then rinse thoroughly.

(5) Position battery in tray and fasten holddown. Do not overtighten.

(6) Attach positive cable and then the negative cable.

(7) Apply a small amount of grease or protective coating to cable ends to minimize corrosion.

6. Brake Master Cylinder

Check fluid level at scheduled interval.

Clean the top of the cover and surrounding housing area. Unsnap the bail and remove the cover. The fluid should be 1/4 inch (6 mm) below the rim of each well in the reservoir. If not, add brake fluid as required and install cover. Use only Jeep Heavy-Duty Brake Fluid, or equivalent, meeting SAE Standard J1703, and Federal Standard No. 116, DOT 3 Fluid.

Refer to Chassis Components for procedures on brake and chassis inspection.

7. Coolant

Check coolant level at scheduled interval when the engine is cold. If coolant should be needed, fill radiator to approximately 1-1/2 to 2 inches (38 to 51 mm) below the filler neck when cold, or 1/2 to 1 inch (13 to 25 mm) at normal operating temperature. Add a 50/50 mixture of ethylene glycol antifreeze and pure water. In an emergency, water alone may be used. Check the freeze protection at the earliest opportunity, as the addition of water will reduce the antifreeze and corrosion protection afforded by the coolant mixture. Do not overfill, as loss of coolant—due to expansion—will result.

Year-round coolant is installed at the factory to last through two years of normal operation, if the coolant is maintained at the original concentration.

In normal operation, flush and refill the cooling system at the **Maintenance Schedule** interval.

When replacing coolant use a 50/50 mixture of high-quality, ethylene glycol antifreeze and water. Use this mixture year-round for protection against corrosion, boiling and engine damage.

8. Power Steering Pump

Check fluid level at scheduled interval.

Lubricant level can be checked with fluid either hot or cold. If below the FULL HOT or FULL COLD marking on the dipstick attached to the reservoir cap (fig. B-6), add AMC/Jeep Power Steering Fluid, or equivalent.

9. Drive Belts

Check belts driving fan, air pump, alternator, power steering pump and air conditioning compressor for cracks, fraying, wear, and general condition at scheduled interval. Use Tension Gauge J-23600 to check drive belt tension. Compare reading obtained against the tension specified for used belts in the following chart. If installing a new belt, use the new belt setting shown in the chart. Refer to Chapter 1C—Cooling for replacement or adjustment procedures.

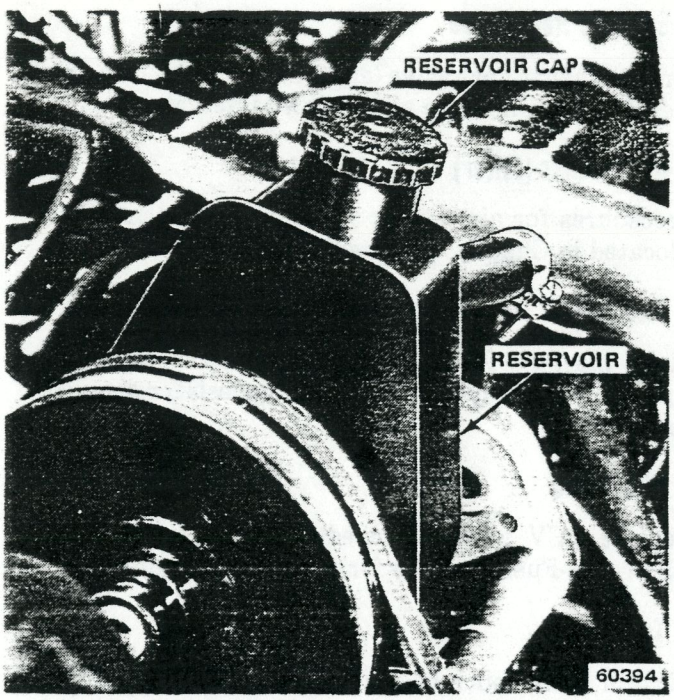

Fig. B-6 Power Steering Pump Dipstick Location

Drive Belt Tension

	Initial Newtons New Belt	Reset Newtons Used Belt	Initial Pounds New Belt	Reset Pounds Used Belt
Air Conditioner				
Six-Cylinder	556-689	400-512	125-155	90-115
Eight-Cylinder	556-689	400-512	125-155	90-115
Air Pump				
Six-Cylinder w/PS	289-334	267-311	65-75	60-70
Other Six-Cylinder and all Eight-Cylinder	556-689	400-512	125-155	90-115
Fan – All Engines	556-689	400-512	125-155	90-115
Power Steering – All Engines	556-689	400-512	125-155	90-115
Serpentine				
Six-Cylinder Calif.	800-890	623-712	180-200	140-160

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10. Fuel Filter

Replace the fuel filter at scheduled interval. Be sure to position the fuel return line at the top of the filter (fig. B-7).

For more detailed procedures on fuel filter replacement, refer to Chapter 1J—Fuel Systems.

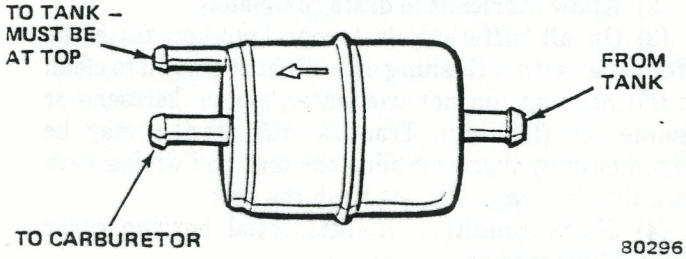


Fig. B-7 Correct Fuel Filter Installation

11. Exhaust Heat Valve

Check exhaust heat valve (eight-cylinder only) for free movement and lubricate at scheduled interval.

12. Air Cleaner (Filter)

Procedures for air cleaner servicing and replacement are located in Chapter 1J—Fuel Systems.

13. PCV Filter

Clean the PCV Filter at scheduled interval. Refer to Chapter 1A—General Service and Diagnosis for detailed procedure.

14. PCV Valve

Replace PCV valve at scheduled interval. Refer to Chapter 1J—Fuel Systems for detailed procedures.

15. Tune-Up

Certain items (such as the choke system and ignition timing) must be checked and serviced between regularly scheduled complete tune-ups on some models. Refer to the Engine Maintenance Schedule for details.

Perform a complete precision tune-up at the scheduled interval. Perform a precision electronic diagnosis whenever questionable engine performance occurs between scheduled tune-ups.

Refer to Chapter 1A—General Service and Diagnosis for detailed procedures and specifications.

DESCRIPTION OF SERVICES—CHASSIS COMPONENTS

1. Axle Differentials (Front and Rear)

Check fluid levels at scheduled interval.

The lubricant level of all differentials should be at the level of the fill hole (fig. B-8). If not, bring to level by adding the recommended lubricant.

Change fluid as recommended in the Chassis Maintenance Schedule. Fluid type and quantity required are listed in the Recommended Fluids and Lubricants chart and the Fluid Capacities chart at the end of this chapter by axle model. To change fluid:

(1) Remove axle differential housing cover.

(2) Allow lubricant to drain completely.

(3) On all differentials except Trac-Loc, flush the differential with a flushing oil or light engine oil to clean out the housing (do not use water, steam, kerosene or gasoline for flushing). Trac-Loc differentials may be cleaned only by disassembling the unit and wiping with clean, lint-free rags. Do not flush the unit.

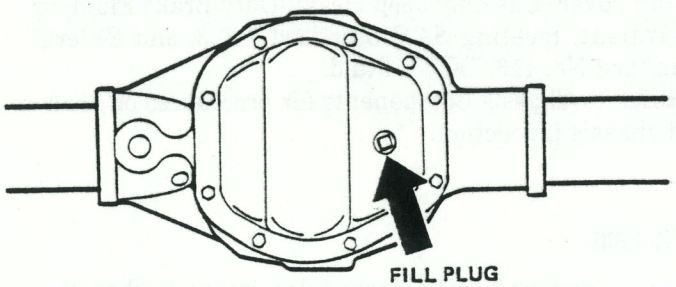
(4) Check condition of differential housing cover gasket. Replace if necessary.

(5) Install gasket and differential housing cover.

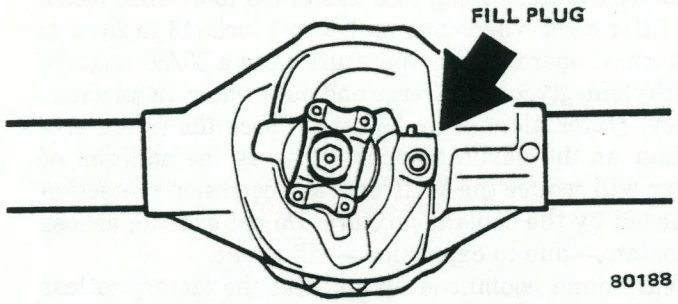
(6) Tighten cover bolts to 15 to 25 foot-pounds (20 to 34 N•m) torque.

(7) Remove fill plug and add new lubricant to fill hole level (fig. B-8).

(8) Install fill plug.



ALL FRONT AXLES AND J-20 TRUCK REAR AXLE



ALL REAR AXLES EXCEPT J-20 TRUCK

Fig. B-8 Axle Fill Plug Locations

2. Bearings—Front Wheel

Lubricate front wheel bearings as scheduled using a high quality wheel bearing lubricant (see Recommended Fluids and Lubricants chart). Be sure to force grease between rollers. Check the bearing races for signs of pitting, brinelling or overheating. Wipe the spindle clean and apply a small amount of grease to prevent rust. Wipe the wheel hub clean and apply a small amount of grease inside the hub.

CAUTION: *Do not overfill the wheel hub. Too much grease can cause overheating and bearing damage, or it can leak and contaminate brakelinings.*

Install the inner bearing and a new grease seal. Assemble the hub assembly and adjust bearings as described in Chapter 2F—Axles.

Inspect bearings, and clean and repack if necessary, when they are removed for other services.

Manual Locking Hubs

Inspect and lubricate manual locking hubs as scheduled using chassis lubricant. For a more detailed procedure, refer to Chapter 2F—Axles.

Brake and Chassis Inspection

Brakes

Inspect linings for wear, cracks, charred surfaces or broken rivets, and for contamination by brake fluid, axle lubricant or other contaminants. Refer to the following inspection procedures.

Front Brakelinings—CJ Models

Check both ends of the outboard lining by looking in at each end of the caliper (fig. B-9). These are the points at which the highest rate of wear normally occurs. At the same time, check the lining thickness of the inboard shoe to make sure that it has not worn prematurely. Look through the inspection port to view the inboard shoe and lining. Whenever the thickness of any lining is worn to the approximate thickness of the metal shoe, all shoe and lining assemblies on both brakes should be replaced.

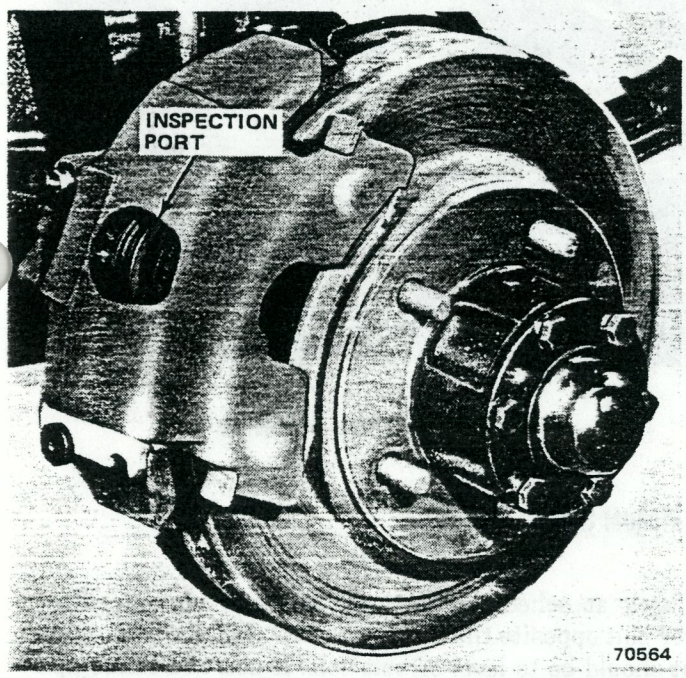


Fig. B-9 Disc Brake Assembly—CJ Models

Front Brakelinings—Cherokee-Wagoneer-Truck Models

Check brakelining thickness through caliper inspection port (fig. B-10).

A wear sensor is attached to the brakeshoes. When brakelining wears to the point that replacement is necessary, the sensor contacts the disc, making a screeching or scraping noise to warn the driver that brakeshoes need replacement.

Rear Brakelinings—All Models

Replace linings worn to within 1/32 inch (.78 mm) of rivet head.

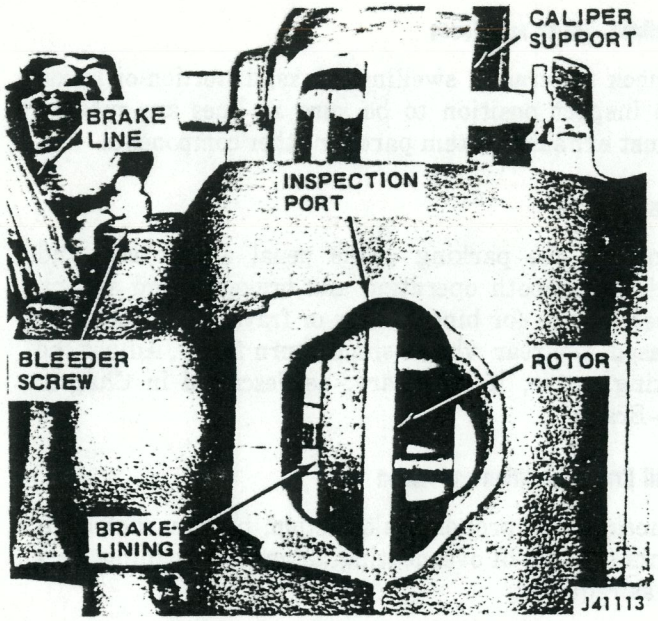


Fig. B-10 Caliper Inspection Port—Cherokee-Wagoneer-Truck Models

Rear Self-Adjusting Mechanism

Operate the adjuster cable (CJ) or adjuster lever and pivot (Cherokee, Wagoneer and Truck). Check for ease of operation of the adjuster screw assembly. Check condition of the adjuster components for bending, frayed cables, loose or overheated springs, or binding.

Master Cylinder

Inspect the cap bail for proper tension and fit. The cap should maintain a tight seal. Check the rubber diaphragm seal for cracks, cuts or distortion. Check fittings and housing for signs of leakage. If internal leaks are suspected or if fluid loss occurs but a leak is not evident, check for leaks at the rear of the master cylinder. Correct as required.

Disc Brake Calipers

Check dust boot for correct installation, tears or signs of leakage. Check slide surfaces (CJ) or bushings and pins (Cherokee, Wagoneer and Truck) for binding, corrosion or tears.

Rear Wheel Cylinders

Pull the dust boot back and inspect for leaks. Check the condition of the pistons and cylinder bores.

Differential Warning Valve

Check the valve and housing for signs of leaks, kinked lines or loose fittings.

Brakelines, Fitting and Hoses

Check for cracks, swelling, kinks, distortion or leaks. Also inspect position to be sure no lines are rubbing against exhaust system parts or other components.

Parking Brake

Operate the parking brake pedal and release and check for smooth operation and brake holding ability. Inspect cables for binds, kinks or frays. With the brake released, the rear wheels should turn freely. Adjust the parking brake, if necessary, as described in Chapter 2G—Brakes.

Overall Brake Condition and Action

Check for improper brake action, performance complaints or signs of overheating, dragging or pulling. Correct as required.

Chassis

Inspect spring bushings and mountings for looseness or wear. Check shock absorbers and bushings for loose mountings, wear or leaks. Correct as required.

Check for improper steering action or suspension noises, performance complaints or signs of shimmy, pulling, rubbing or undue tire wear.

Check tires for visible signs of wear which may indicate underinflation or need for front-end alignment, tire rotation or wheel balancing. Also check for bulging, cracks or other road hazard damage. Check and adjust inflation pressures according to the specifications listed in the tire pressure sticker on the glove box door.

3. Body Lubrication

Lubricate the items listed at scheduled interval using lubricant specified in the Recommended Fluids and Lubricants chart at the end of this section. Refer to figures B-11 through B-18 for application of lubricant. When lubricating weatherstrips and seals, apply the lubricant to a rag and wipe it on the seal to avoid dust-collecting overspray which can soil passenger clothing.

4. Clutch Lever and Linkage

Lubricate at scheduled interval. Apply AMC/Jeep All-Purpose Lubricant, or equivalent, or multi-purpose chassis lubricant (lithium base) to the one lube fitting on the clutch bell crank.

5. Exhaust System Inspection

Inspect the exhaust system at scheduled interval for the following conditions. Correct as required.

- Exhaust system leaks, damage, misalignment
- Grounding against body sheet metal or frame
- Catalytic converter "bulging" or heat damage

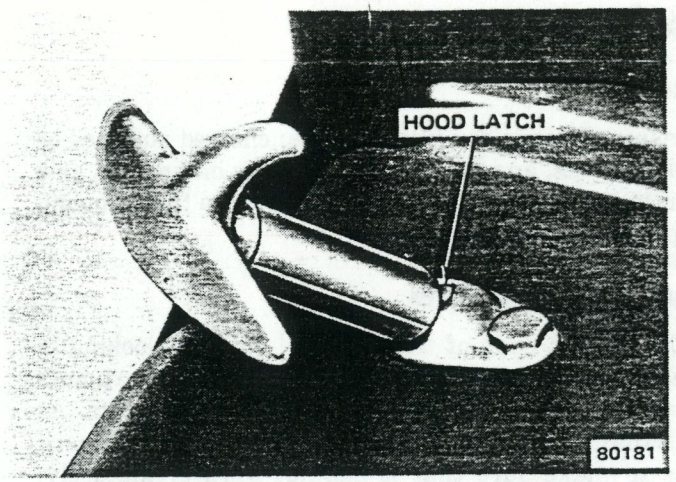


Fig. B-11 Hood Latch—CJ Models

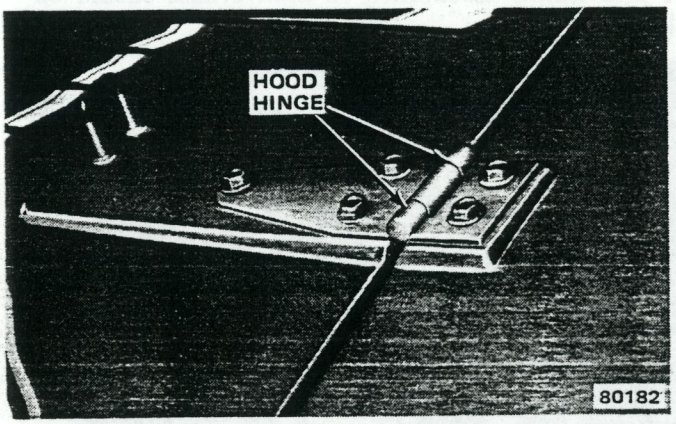


Fig. B-12 Hood Hinge—CJ Models

6. Manual Steering Gear

Check at scheduled interval by removing the side cover bolt opposite the adjuster screw (fig. B-19). Lubricant should be to level of bolt hole. If not, add make-up fluid such as AMC/Jeep All-Purpose Lubricant or multi-purpose lithium base chassis lubricant.

7. Propeller Shafts (Front and Rear)

Lubricate propeller shafts, single and double cardan U-joints, during the scheduled chassis lubrication with AMC/Jeep All-Purpose Lubricant or multi-purpose lithium base chassis lubricant grease.

NOTE: *Undercoating or rustproofing compounds could unbalance the propeller shafts and cause drivetrain vibrations. Remove any such compounds using the appropriate solvent.*

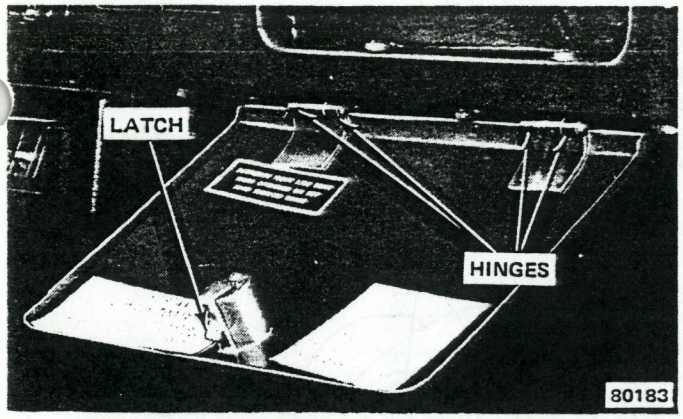


Fig. B-13 Glove Box Latch and Hinge—CJ Models

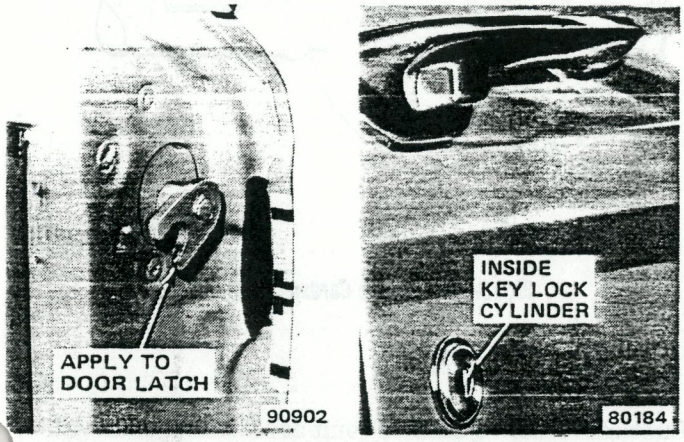


Fig. B-14 Door Latch and Lock—Cherokee-Wagoneer-Truck Models

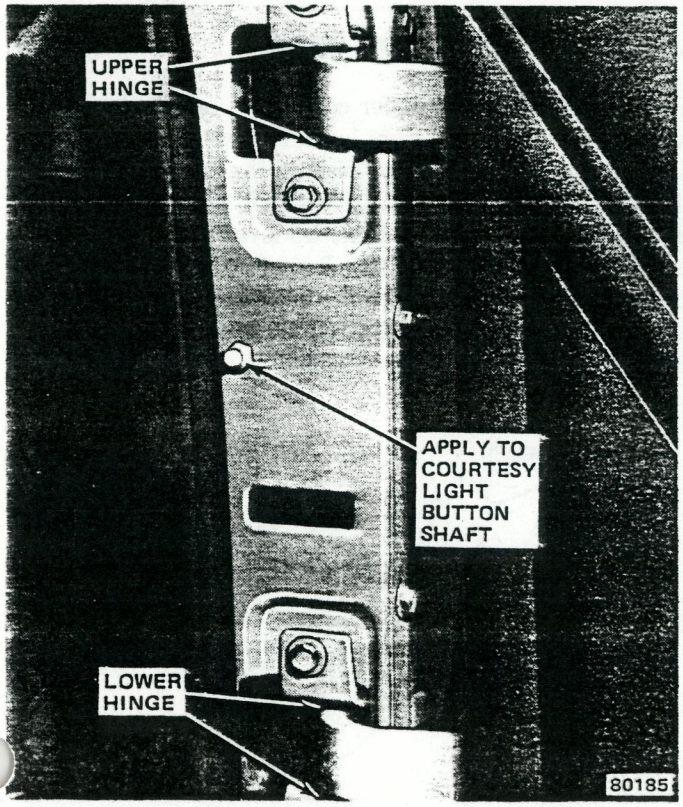


Fig. B-15 Door Hinges and Courtesy Light Button—
Cherokee-Wagoneer-Truck Models

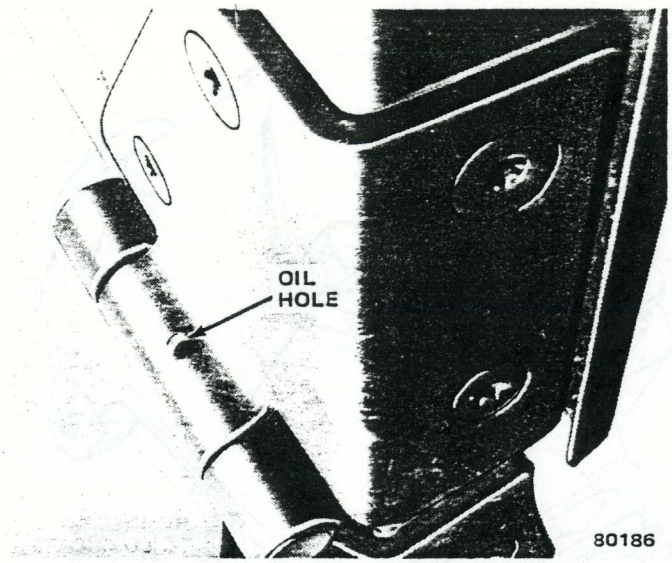


Fig. B-16 Windshield Hinge Lubrication Hole—CJ Models

Fig. B-17 Tailgate Lubrication Points—Cherokee-Wagoneer Models

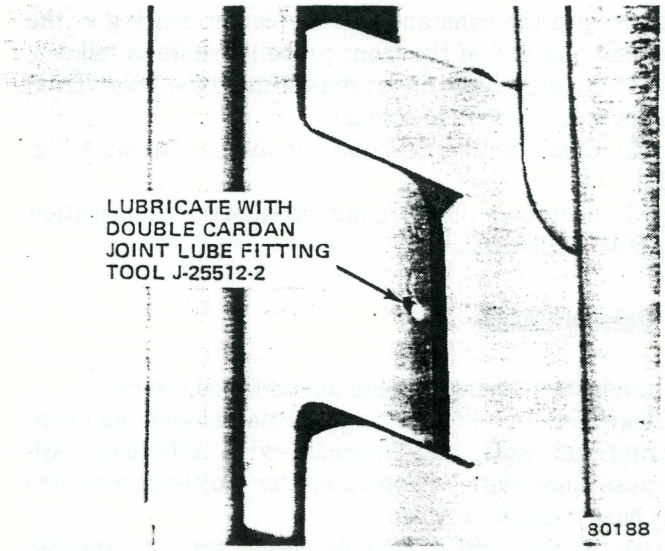


Fig. B-18 Tailgate Hinge Lubrication Hole—
Cherokee-Wagoneer Models

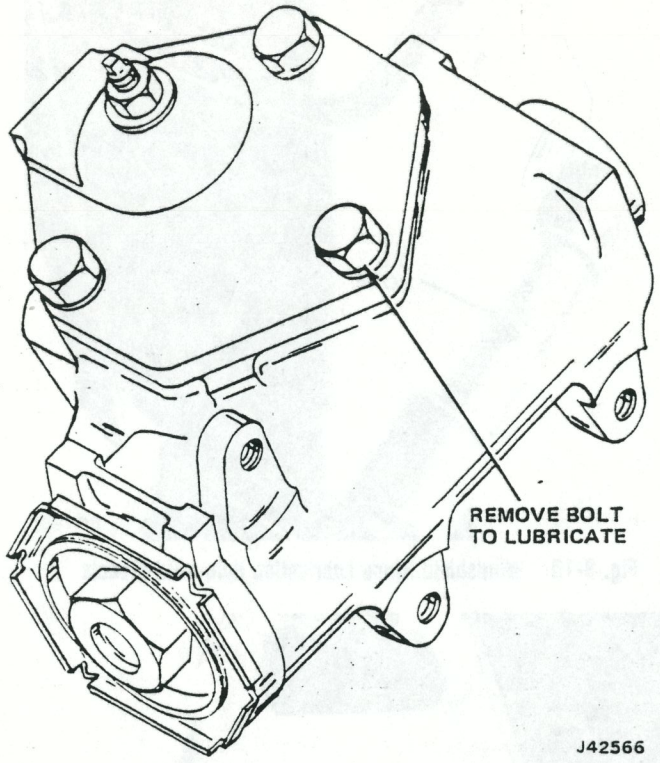


Fig. B-19 Manual Steering Gear Fill Hole Location

Sleeve Yokes (Splines)

Apply grease gun pressure to sleeve yoke grease fitting until lubricant appears at pressure relief hole in expansion plug at sleeve yoke end of spline. At this point, cover pressure relief hole with finger and continue to apply pressure until grease appears at sleeve yoke seal. This will ensure complete lubrication of spline.

Double Cardan Joint

Lubricate the constant velocity center bearing at the transfer case end of the front propeller shaft as follows:

(1) Raise vehicle on frame-contact type hoist (front wheels must be free to rotate).

(2) Clean dirt from around double cardan joint (fig. B-20).

(3) Lubricate joint using needle-type Lubrication Adapter J-225512-2.

8. Steering Linkage

Lubricate steering linkage at scheduled interval.

Clean the four lube fittings on tie-rod ends and connecting rod ends, and lubricate with AMC/Jeep All-Purpose Lubricant, or equivalent, or multi-purpose lithium base chassis lubricant.

Also, inspect and replace as needed torn or ruptured grease seals, replace damaged steering components and lubricate ball joints.

Check manual or power steering gear assembly for leaks, housing cracks or loose frame mounting. Inspect steering damper for leaks or loose mounting. Also, check steering tie rods and connecting rod for bending, looseness or wear.

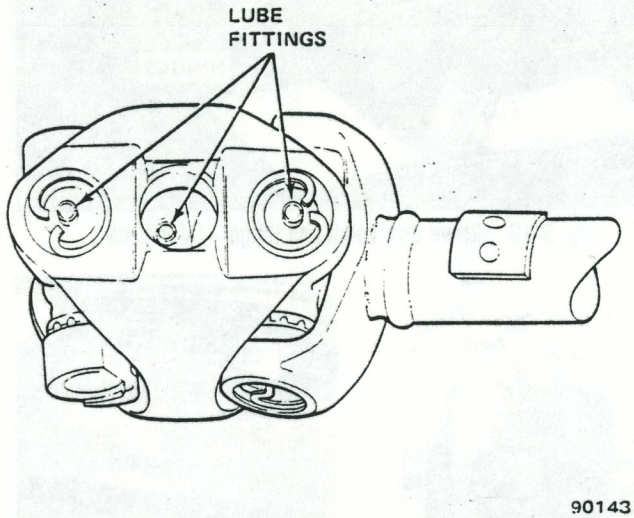


Fig. B-20 Double Cardan Joint

9. Steering Shaft U-Joint

Lubricate steering shaft U-joint at scheduled interval. (On Cherokee, Wagoneer and Truck models only.)

10. Transfer Case—Fluid Level Check

Fluid levels in the transfer case must be checked as scheduled. To check lubricant level, remove the transfer case fill plug located on the rear of the transfer case. Lubricant should be level with the fill plug hole (figs. B-21 through B-23). If not, bring up level with specified lubricant and install fill plug. Refer to Recommended Fluids and Lubricants chart located at the end of this chapter for lubricant specification and to Fluid Capacities chart for transfer case capacity.

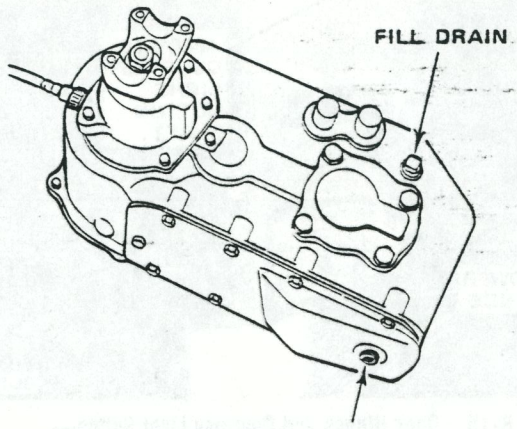


Fig. B-21 Transfer Case Drain and Fill Plugs—Model 300

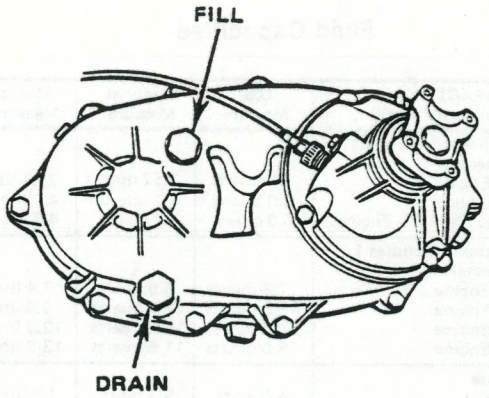


Fig. B-22 Transfer Case Drain and Fill Plugs—Model 208

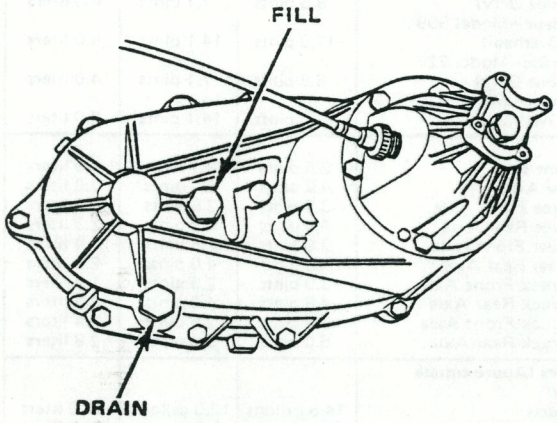


Fig. B-23 Transfer Case Drain and Fill Plugs—Quadra-Trac

Transfer Case—Fluid Change

Drain and change transfer case at scheduled interval. To change fluid:

(1) Remove fill plugs then drain plugs.
(2) Allow transfer case to drain completely.
(3) Install drain plugs.
(4) Fill with specified lubricant to level of fill hole.
(5) Install fill plugs.

CAUTION: *Do not overtighten fill and drain plugs. Tighten plugs to 15 to 25 foot-pounds (20.3 to 33.9 N•m) torque. Overtightening can strip threads or break the aluminum case.*

11. Transmission

Refer to Engine Components for procedure on checking fluid level for automatic transmission.

Fluid levels in the transfer case and manual transmission must be checked at the same time, as scheduled. Fill plugs for all manual transmissions are located on the right side of the assembly.

To check lubricant level, remove the transmission fill plug. Lubricant should be level with each fill plug hole. If not, bring up to level with specified lubricant and install fill plug. Refer to Recommended Fluids and Lubricants chart and Fluid Capacities chart at the end of this chapter.

Automatic Transmission Fluid Changes

Drain and refill the automatic transmission every 25,000 miles (40 000 km) for vehicles in normal service and every 10,000 miles (16 000 km) for vehicles in heavy-duty service. Change fluid immediately after vehicle operation, before it cools.

(1) Remove transmission pan screws, pan, and gasket.
(2) Remove and discard oil filter (fig. B-24).
(3) Remove and discard O-ring seal from pick-up pipe.
(4) Install new O-ring seal on pick-up pipe and install strainer and pipe assembly.
(5) Clean pan thoroughly and position new gasket on pan. Use petroleum jelly, or equivalent, to position gasket.
(6) Install pan. Secure with attaching screws and tighten to 10 to 13 foot-pounds (14 to 18 N•m) torque.
(7) Pour approximately 5 quarts (4.71 liters) of Dexron® or Dexron II® automatic transmission fluid into filler pipe. Be sure container spout, funnel, or other items in contact with fluid are clean.
(8) Start engine and allow it to idle a few minutes.
(9) Apply brake pedal and parking brake. Shift transmission into all positions then place the selector lever in N (Neutral).
(10) With transmission at operating temperature, check fluid level. Add fluid, if necessary, to bring level to FULL mark.

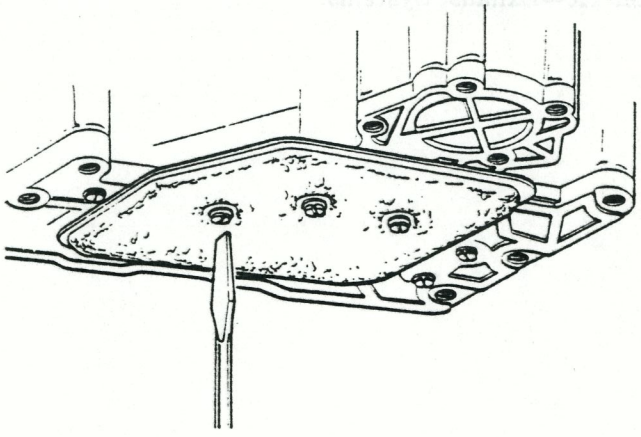


Fig. B-24 Removing Automatic Transmission Filter

Manual Transmission Fluid Change

Manual transmission and transfer case lubricating fluid should be changed at the same time, as scheduled. See Recommended Fluids and Lubricants at the end of this chapter for fluid specification, and the Fluid Capacities Chart for quantity. To change fluid:

(1) Remove fill plugs then drain plugs.
(2) Allow units to drain completely.
(3) Install drain plugs.
(4) Fill to level of fill holes.
(5) Install fill plugs.

UNSCHEDULED MAINTENANCE

General

Services detailed in this subsection are not listed in the Maintenance Schedule for performance at a specified interval. They are to be performed as required to restore vehicle to original specifications. Unscheduled maintenance services include such items as fuel system cleaning; engine carbon deposit removal; retightening loose parts and connections; replacement of manual transmission clutch components, brakelinings, shock absorbers, light bulbs, wiper blades, belts or hoses; replacement of interior trim, bright metal trim, painted parts and other appearance items or rubber-like parts. Need for these unscheduled services is usually indicated by a change in performance, handling, or the appearance of the vehicle or a particular component. Owners, users and service mechanics should be alert for indications that service or replacement is needed.

Catalytic Converter

The catalytic converter(s) used on 1981 Jeep models will become contaminated if leaded gas is used, or if the engine or emission controls are not maintained as scheduled. If this occurs, the catalyst—the alumina-coated beads in the converter—or the entire converter must be replaced. Refer to the catalyst replacement procedure in Chapter 1K—Exhaust Systems.

Fluid Capacities

CAPACITIES Approximate Refill	U.S. Measure	Imperial Measure	Metric Measure
Engine Oil (includes 1 quart for filter change)			
151 CID Engine	3.0 quarts	2.52 quarts	2.84 liters
258 CID Engine	5.0 quarts	4.2 quarts	4.7 liters
304 CID & 360 CID Engines	5.0 quarts	4.2 quarts	4.7 liters
Cooling System (includes 1 quart for heater)			
151 CID Engine	7.8 quarts	6.5 quarts	7.4 liters
258 CID Engine	10.5 quarts	8.7 quarts	9.9 liters
304 CID Engine	13.0 quarts	10.8 quarts	12.3 liters
360 CID Engine	14.0 quarts	11.6 quarts	13.2 liters
Transfer Case			
Model 300	4.0 pints	3.3 pints	1.9 liters
Model 208	6.0 pints	5.0 pints	2.8 liters
Quadra-Trac	4.0 pints	3.3 pints	1.9 liters
Transmission			
Manual 4-Speed—SR-4	3.0 pints	2.5 pints	1.4 liters
Manual 4-Speed—T-176	3.5 pints	2.9 pints	1.7 liters
Manual 4-Speed—T-18	6.5 pints	5.5 pints	3.1 liters
Automatic—Model 999 (Change Only)	8.5 pints	7.1 pints	4.0 liters
Automatic—Model 999 (At Overhaul)	17.0 pints	14.1 pints	8.0 liters
Automatic—Model 727 (Change Only)	8.5 pints	7.1 pints	4.0 liters
Automatic—Model 727 (At Overhaul)	17.0 pints	14.1 pints	8.0 liters
Axles			
CJ Front Axle	2.5 pints	2.1 pints	1.9 liters
CJ Rear Axle	4.8 pints	4.0 pints	2.3 liters
Cherokee Front Axle	3.0 pints	2.5 pints	1.4 liters
Cherokee Rear Axle	4.8 pints	4.0 pints	2.3 liters
Wagoneer Front Axle	3.0 pints	2.5 pints	1.4 liters
Wagoneer Rear Axle	4.8 pints	4.0 pints	2.3 liters
J-10 Truck Front Axle	3.0 pints	2.5 pints	1.4 liters
J-10 Truck Rear Axle	4.8 pints	4.0 pints	2.3 liters
J-20 Truck Front Axle	3.0 pints	2.5 pints	1.4 liters
J-20 Truck Rear Axle	6.0 pints	5.0 pints	2.8 liters
Gas Tanks (Approximate Capacity)			
CJ Models	14.8 gallons	12.3 gallons	56.0 liters
Cherokee Models	20.3 gallons	16.9 gallons	76.8 liters
Wagoneer Models	20.3 gallons	16.9 gallons	76.8 liters
Truck Models	19.0 gallons	15.8 gallons	71.9 liters

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Recommended Fluids and Lubricants

ENGINE	
COMPONENT	**SPECIFICATION**
Distributor rotor tip*	AMC/Jeep Silicone Dielectic Compound or equivalent.
Engine coolant	High quality ethylene glycol (permanent antifreeze) and clean water mixture.
Engine oil	API classification "SE" or "SF", if available. Refer to oil viscosity chart for correct SAE grade.
Exhaust manifold heat valve	AMC/Jeep Heat Valve Lubricant or equivalent.
CHASSIS	
COMPONENT	**SPECIFICATION**
Automatic transmission	AMC/Jeep Automatic Transmission Fluid or equivalent labeled Dexron® or Dexron II®.
Brake master cylinder*	AMC/Jeep Brake Fluid or equivalent marked FMVSS No. 116, DOT-3 and SAE J-1703. CAUTION: Use only recommended brake fluids.
Caliper Slide Rails (CJ only)	AMC/Jeep Brake Support Plate Lubricant or equivalent molydisulfide lubricant.
Clutch lever and linkage	AMC/Jeep All-Purpose Lubricant or equivalent lithium base chassis lubricant.
Conventional axle differentials	AMC/Jeep Rear Axle Lubricant or gear lubricant of SAE 85W-90 (API-GL5) quality.
Drum brake support plate ledges*	AMC/Jeep Brake Support Plate Lubricant or equivalent molydisulfide lubricant.
Front suspension ball joints, steering linkage, propeller shafts, single and double cardan joints and yokes	AMC/Jeep All-Purpose Lubricant or equivalent lithium base chassis lubricant.
Front wheel bearings	AMC/Jeep All-Purpose Lubricant or equivalent lithium base chassis lubricant.
Gearshift linkage-transmission and transfer case	AMC/Jeep All-Purpose Lubricant or equivalent lithium base chassis lubricant.
Manual locking hubs	AMC/Jeep All-Purpose Lubricant or equivalent lithium base chassis lubricant.

CHASSIS (Continued)	
COMPONENT	**SPECIFICATION**
Manual steering gear*	AMC/Jeep All-Purpose Lubricant or equivalent lithium base chassis lubricant.
Manual transmission	SAE 85W-90 gear lubricant (API-GL5).
Model 208 transfer case	10W-30 motor oil.
Model 300 transfer case	SAE 85W-90 gear lubricant (API-GL5).
Parking brake pedal mechanism*	3-M Spray Lube 8902 or equivalent.
Power steering pump and gear*	AMC/Jeep Power Steering Fluid or equivalent.
Quadra-Trac transfer case	10W-30 motor oil.
Steering shaft U-joint	AMC/Jeep All-Purpose Lubricant or equivalent lithium base chassis lubricant.
Trac-Lok axle differential	AMC/Jeep Rear Axle Lubricant or limited-slip gear lubricant of SAE 85W-90 (API-GL5) quality.
BODY	
COMPONENT	**SPECIFICATION**
Ashtray slides	3-M Spray Lube 8902 or equivalent.
Front seat tracks	3-M Spray Lube 8902 or equivalent.
Hinges: door, hood, liftgate, tailgate, glove box	3-M Spray Lube 8902 or equivalent.
Hinges: tailgate (Cherokee, Wagoneer)	AMC/Jeep All-Purpose Lubricant or equivalent lithium base chassis lubricant.
Key lock cylinders	Powdered graphite, AMC/Jeep Silicone Lubricant Spray or light oil.
Latches: door, hood, liftgate, tailgate, glove box	3-M Spray Lube 8902 or equivalent.
Moon roof	Petroleum Jelly
Weatherstrips: door, window, liftgate, tailgate	AMC/Jeep Silicone Lubricant Spray or equivalent.
Windshield hinges and holddown knobs (CJ)	3-M Spray Lube 8902 or equivalent.

***No routine drain and refill or application of lubricant is required. Specification is for maintaining fluid levels or reassembling components. Refer to the Maintenance Schedules for intervals.**

NOTES

PART 1
POWER PLANT

CHAPTER INDEX

GENERAL SERVICE AND DIAGNOSIS 1A

SECTION INDEX

GENERAL INFORMATION

GENERAL

This chapter contains **general** information that applies to all Jeep engines: 151 CID four-cylinder, 258 CID six-cylinder, 304 CID eight-cylinder, and 360 CID eight-cylinder engines. Refer to Chapter 1B—Engines for **specific** procedures involving engine replacement, engine disassembly, internal component repair and replacement and mechanical specifications.

The Engine Diagnosis section of this chapter presents information and procedures useful for locating problems not normally encountered during routine maintenance and tune-ups.

The Engine Tune-Up section of this chapter presents a systematic approach to the performance of a complete, precision tune-up required at the interval specified in the Engine Maintenance Schedule.

EMISSION COMPONENTS

It is frequently helpful to know at a glance the emission control-related components that are installed on a particular vehicle. This information is contained in three emission component charts. Vehicles designated 49-state are certified for sale in all states (and Canada) except California. Vehicles designated California are the only vehicles certified for sale in the state of California. Hilly terrain components are applicable to vehicles that are normally driven in areas where the driveability is affected by the environmental conditions (e.g., altitude).

Emission Components—Hilly Terrain Light Duty Vehicles

Engine and Carb.	Vehicle and Series	Cooling System Type	Transmission	Air Injection	Air Switch Valve	Diverter Valve	Catalytic Converter	Pre-Cat Converter	EGR	EGR DELAY VALVE (F)	EGR TVS	EGR CTO Valve Temp.	TAC Type	TAC TVS	TAC Delay Valve (R) and Check Valve	Spark CTO Valve Temp.	Non-Linear Valve	HD Spark CTO Valve Temp.	Spark Delay Valve	Carb. Vent to Canister	Electric Choke	Sol-Vac Idle Control	Throttle Solenoid	Decel Valve	Microprocessor	Vacuum Switch Assembly	Trap Door (Air Cleaner)	PCV
304 CID 2V	CJ-5 7 (85) (87)	STD	M4	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	—	R •	•	•	—	—	—	—	—	•	•
		HD	M4	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	220°F (101°C)	R •	•	•	—	—	—	—	—	•	•

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Emission Components—49-State Light Duty Vehicles

Engine and Carb.	Vehicle and Series	Cooling System Type	Transmission	Air Injection	Air Switch Valve	Diverter Valve	Catalytic Converter	Pre-Cat Converter	EGR	EGR Delay Valve (F)	EGR TVS	EGR CTO Valve Temp.	TAC Type	TAC TVS	TAC Delay Valve (R) and Check Valve	Spark CTO Valve Temp.	Non-Linear Valve	HD Spark CTO Valve Temp.	Spark Delay Valve	Carb. Vent to Canister	Electric Choke	Sol-Vac Idle Control	Throttle Solenoid	Decel Valve	Microprocessor	Vacuum Switch Assembly	Trap Door (Air Cleaner)	PCV
151 CID 2V	CJ-5 (85) 7 (87) 8 (88)	STD	M4	—	—	—	•	—	•	—	•	100°F (38°C)	V	•	•	120°F (49°C)	—	—	DR •	•	•	—	•	—	—	—	—	•
		HD	M4	—	—	—	•	—	•	—	•	100°F (38°C)	V	•	•	120°F (49°C)	—	220°F (101°C)	DR •	•	•	—	•	—	—	—	—	•
		STD	A	—	—	—	•	—	•	—	•	100°F (38°C)	V	•	•	120°F (49°C)	—	—	DR •	•	•	—	•	—	—	—	—	•
		HD	A	—	—	—	•	—	•	—	•	100°F (38°C)	V	•	•	120°F (49°C)	—	220°F (101°C)	DR •	•	•	—	•	—	—	—	—	•
258 CID 2V	CJ-5 (85) 7 (87) 8 (88)	STD	M4	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	—	R •	•	•	•	—	—	—	—	•	•
		HD	M4	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	220°F (101°C)	R •	•	•	•	—	—	—	—	•	•
		STD	A	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	•	—	—	•	•	•	—	—	—	—	•	•
		HD	A	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	•	220°F (101°C)	—	•	•	•	—	—	—	—	•	•
	Cherokee 16, 17, 18 Wagoneer 15 J-10 Truck 25, 26	STD	M4	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	—	—	•	•	•	—	—	—	—	•	•
		HD	M4	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	220°F (101°C)	—	•	•	•	—	—	—	—	•	•
		STD	A	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	•	—	—	•	•	•	—	—	—	—	•	•
		HD	A	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	•	220°F (101°C)	—	•	•	•	—	—	—	—	•	•
304 CID 2V	CJ-5 (85) 7 (87)	STD	M4	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	—	R •	•	•	—	•	—	—	—	•	•
		HD	M4	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	220°F (101°C)	R •	•	•	—	•	—	—	—	•	•
		STD	A	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	•	—	R •	•	•	—	•	—	—	—	•	•
		HD	A	•	—	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	•	220°F (101°C)	R •	•	•	—	•	—	—	—	•	•
360 CID 2V	Cherokee 16, 17, 18 Wagoneer 15 Truck 25, 26, 27	STD	M4	•	—	•	•	—	•	•①	•	115°F (46°C)	V	•	•	155°F (68°C)	•①	—	R •②	•	•	—	•	—	—	—	•	•
		HD	M4	•	—	•	•	—	•	•①	•	115°F (46°C)	V	•	•	155°F (68°C)	•①	220°F (101°C)	R •②	•	•	—	•	—	—	—	•	•
		STD	A	•	—	•	•	—	•	•	•	115°F (46°C)	V	•	•	155°F (68°C)	•	—	R •	•	•	—	•	—	—	—	•	•
		HD	A	•	—	•	•	—	•	•	•	115°F (46°C)	V	•	•	155°F (68°C)	•	220°F (101°C)	R •	•	•	—	•	—	—	—	•	•

Trans. — Transmission Type: Manual (M4) or Automatic (A)
Cat. Conv. — Catalytic Converter
CTO — Coolant Temperature Override
EGR — Exhaust Gas Recirculation
TVS — Thermal Vacuum Switch
Delay Valve — R = Reverse Delay
— F = Forward Delay
— DR = Dual Reverse Delay

PCV — Positive Crankcase Ventilation
TAC — Thermostatically Controlled Air Cleaner (vacuum or mechanical)
• — On all models in vehicle specified
STD — Standard
HD — Heavy Duty
VSD — Vacuum Signal Dump
① J-20 Only
② Except J-20

NOTE: All vehicles have Fuel Tank Vapor Control, Vacuum Operated TAC Systems, and PCV Valves. All temperatures are nominal.

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Emission Components—California Light Duty Vehicles

Engine and Carb.	Vehicle and Series	Cooling System Type	Transmission	Air Injection	Air Switch Valve	Diverter Valve	Catalytic Converter	Pre-Cat Converter	EGR	EGR — Vacuum Signal Dump Valve (VSD)	EGR TVS	EGR CTO Valve Temp.	TAC Type	TAC TVS	TAC Delay Valve (R) and Check Valve	Spark CTO Valve Temp.	Non-Linear Valve	HD Spark CTO Valve Temp.	Spark Delay Valve	Carb. Vent to Canister	Electric Choke	Sol-Vac Idle Control	Throttle Solenoid	Decel Valve	Microprocessor	Vacuum Switch Assembly	Trap Door (Air Cleaner)	PCV
151 CID 2V	CJ-5 (85) 7 (87) 8 (88)	STD	M4	—	—	—	•	—	•	—	•	100°F (38°C)	V	•	•	120°F (49°C)	—	—	DR •	•	•	—	•	•	•	•	—	•
		HD	M4	—	—	—	•	—	•	—	•	100°F (38°C)	V	•	•	120°F (49°C)	—	—	DR •	•	•	—	•	•	•	•	—	•
		STD	A	—	—	—	•	—	•	—	•	100°F (38°C)	V	•	•	120°F (49°C)	—	—	DR •	•	•	—	•	•	•	•	—	•
		HD	A	—	—	—	•	—	•	—	•	100°F (38°C)	V	•	•	120°F (49°C)	—	—	DR •	•	•	—	•	•	•	•	—	•
258 CID 2V	CJ-5 (85) 7 (87) 8 (88)	STD	M4	•	•	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	—	R •	•	•	•	—	—	•	•	•	•
		HD	M4	•	•	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	220°F (105°C)	R •	•	•	•	—	—	•	•	•	•
		STD	A	•	•	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	•	—	R •	•	•	•	—	—	•	•	•	•
		HD	A	•	•	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	•	220°F (105°C)	R •	•	•	•	—	—	•	•	•	•
	Cherokee 16, 17, 18 Wagoneer 15 Truck 25, 26	STD	M4	•	•	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	—	R •	•	•	•	—	—	•	•	•	•
		HD	M4	•	•	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	—	220°F (105°C)	R •	•	•	•	—	—	•	•	•	•
		STD	A	•	•	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	•	—	R •	•	•	•	—	•	•	•	•	•
		HD	A	•	•	•	•	—	•	—	•	115°F (46°C)	V	•	•	155°F (68°C)	•	220°F (105°C)	R •	•	•	•	—	—	•	•	•	•

Trans. — Transmission Type: Manual (M4) or Automatic (A)
Cat. Conv. — Catalytic Converter
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TVS — Thermal Vacuum Switch
Delay Valve — R = Reverse Delay; F = Forward Delay; DR = Dual Reverse Delay
PCV — Positive Crankcase Ventilation
TAC — Thermostatically Controlled Air Cleaner (vacuum or mechanical)
• — On all models in vehicle specified
STD — Standard
HD — Heavy Duty
VSD — Vacuum Signal Dump

NOTE: All vehicles have Fuel Tank Vapor Control, Vacuum Operated TAC Systems and PCV Valves. All temperatures are nominal.

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ENGINE DIAGNOSIS

GENERAL

An engine diagnosis is helpful for identifying the causes of malfunctions not remedied by routine maintenance and tune-ups. These malfunctions are classified as either **mechanical** (e.g. a strange noise), or **performance** (e.g. engine idles rough and stalls). Refer to the Service Diagnosis—Mechanical chart and the Service Diagnosis—Performance chart.

Additional tests and diagnostic procedures may be necessary to pinpoint a particular problem. This information is provided within Diagnosis with Scope Analyzer, Cylinder Compression Pressure Test, Cylinder Leakage Test, Blown Cylinder Head Gasket Diagnosis and Intake Manifold Leakage Diagnosis.

Service Diagnosis—Mechanical

Condition	Possible Cause	Correction
EXTERNAL OIL LEAKS	(1) Fuel pump gasket broken or improperly seated.	(1) Replace gasket.
	(2) Cylinder head cover gasket broken or improperly seated.	(2) Replace gasket; check cylinder head cover gasket flange and cylinder head gasket surface for distortion.
	(3) Oil filter gasket broken or improperly seated.	(3) Replace oil filter.
	(4) Oil pan side gasket broken or improperly seated.	(4) Replace gasket; check oil pan gasket flange for distortion.
	(5) Oil pan front oil seal broken or improperly seated.	(5) Replace seal; check timing case cover and oil pan seal flange for distortion.
	(6) Oil pan rear oil seal broken or improperly seated.	(6) Replace seal; check oil pan rear oil seal flange; check rear main bearing cap for cracks, plugged oil return channels, or distortion in seal groove.
	(7) Timing case cover oil seal broken or improperly seated.	(7) Replace seal.
	(8) Oil pan drain plug loose or has stripped threads.	(8) Repair as necessary and tighten.
	(9) Rear oil gallery plug loose.	(9) Use appropriate sealant on gallery plug and tighten.
	(10) Rear camshaft plug loose or improperly seated.	(10) Seat camshaft plug or replace and seal, as necessary.
EXCESSIVE OIL CONSUMPTION	(1) Oil level too high.	(1) Lower oil level to specifications.
	(2) Oil too thin.	(2) Replace with specified oil.
	(3) Valve stem oil deflectors are damaged, missing, or incorrect type.	(3) Replace valve stem oil deflectors.
	(4) Valve stems or valve guides worn.	(4) Check stem-to-guide clearance and repair as necessary.
	(5) Piston rings broken, missing.	(5) Replace missing or broken rings.
	(6) Incorrect piston ring gap.	(6) Check ring gap, repair as necessary.
	(7) Piston rings sticking or excessively loose in grooves.	(7) Check ring side clearance, repair as necessary.
	(8) Compression rings installed upside down.	(8) Repair as necessary.
	(9) Cylinder walls worn, scored, or glazed.	(9) Repair as necessary.
	(10) Piston ring gaps not properly staggered.	(10) Repair as necessary.
	(11) Excessive main or connecting rod bearing clearance.	(11) Check bearing clearance, repair as necessary.

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Service Diagnosis—Mechanical (Continued)

Condition	Possible Cause	Correction
NO OIL PRESSURE	(1) Low oil level.	(1) Add oil to correct level.
	(2) Oil pressure gauge or sending unit inaccurate.	(2) Refer to Oil Pressure Gauge in Chapter 1L.
	(3) Oil pump malfunction.	(3) Refer to Oil Pump in Chapter 1B
	(4) Oil pressure relief valve sticking.	(4) Remove and inspect oil pressure relief valve assembly. Refer to Chapter 1B.
	(5) Oil passages on pressure side of pump obstructed.	(5) Inspect oil passages for obstructions.
	(6) Oil pickup screen or tube obstructed.	(6) Inspect oil pickup for obstructions.
	(7) Loose oil inlet tube.	(7) Replace inlet tube.
LOW OIL PRESSURE	(1) Low oil level.	(1) Add oil to correct level.
	(2) Oil excessively thin due to dilution, poor quality, or improper grade.	(2) Drain and refill crankcase with correct grade oil.
	(3) Oil pressure relief spring weak or sticking.	(3) Remove and inspect oil pressure relief valve assembly.
	(4) Oil pickup tube and screen assembly has restriction or air leak.	(4) Remove and inspect oil inlet tube and screen assembly. (Fill pickup with lacquer thinner to find leaks.) Replace if defective.
	(5) Excessive oil pump clearance.	(5) Check clearances; refer to Oil Pump in Chapter 1B.
	(6) Excessive main, rod, or camshaft bearing clearance.	(6) Measure bearing clearances, repair as necessary.
HIGH OIL PRESSURE	(1) Improper grade oil.	(1) Drain and refill crankcase with correct grade oil.
	(2) Oil pressure gauge or sending unit inacurrate.	(2) Refer to Oil Pressure Gauge in Chapter 1L.
	(3) Oil pressure relief valve sticking closed.	(3) Remove and inspect oil pressure relief valve assembly.
	(4) Oil pressure relief valve anti-lock port blocked (eight-cylinder only).	(4) Check for obstruction; repair as necessary.
MAIN BEARING NOISE	(1) Insufficient oil supply.	(1) Check for low oil level or low oil pressure.
	(2) Main bearing clearance excessive.	(2) Check main bearing clearance, repair as necessary.
	(3) Crankshaft end play excessive.	(3) Check end play, repair as necessary.
	(4) Loose flywheel or drive plate.	(4) Tighten flywheel or drive plate bolts.
	(5) Loose or damaged vibration damper.	(5) Repair as necessary.

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Service Diagnosis—Mechanical (Continued)

Condition	Possible Cause	Correction
CONNECTING ROD BEARING NOISE	(1) Insufficient oil supply.	(1) Check for low oil level or low oil pressure.
	(2) Bearing clearance excessive or bearing missing.	(2) Check clearance, repair as necessary.
	(3) Crankshaft connecting rod journal out-of-round.	(3) Check journal measurements, repair or replace as necessary.
	(4) Misaligned connecting rod or cap.	(4) Repair as necessary.
	(5) Connecting rod bolts tightened improperly.	(5) Tighten bolts to specified torque.
PISTON NOISE	(1) Piston-to-cylinder wall clearance excessive.	(1) Check clearance, repair as necessary.
	(2) Cylinder walls excessively tapered or out-of-round.	(2) Check cylinder wall measurements, rebore cylinder.
	(3) Piston ring broken.	(3) Replace all rings on that piston.
	(4) Loose or seized piston pin.	(4) Check piston-to-pin clearance, repair as necessary.
	(5) Connecting rods misaligned.	(5) Check rod alignment, straighten or replace.
	(6) Piston ring side clearance excessively loose or tight.	(6) Check ring side clearance, repair as necessary.
	(7) Carbon build-up on piston is excessive.	(7) Clean carbon from piston.
VALVE TRAIN NOISE	(1) Insufficient oil supply.	(1) Check for: (a) Low oil level. (b) Low oil pressure. (c) Plugged pushrods. (d) Wrong hydraulic tappets. (e) Plugged oil gallery in block. (f) Excessive tappet to bore clearance
	(2) Push rods worn or bent.	(2) Replace worn or bent push rods.
	(3) Rocker arms or pivots worn.	(3) Replace worn rocker arms or pivots.
	(4) Dirt or chips in hydraulic tappets.	(4) Clean tappets.
	(5) Excessive tappet leak-down.	(5) Replace valve tappet.
	(6) Tappet face worn.	(6) Replace tappet; check corresponding cam lobe for wear.
	(7) Broken or cocked valve springs.	(7) Properly seat cocked springs; replace broken springs.
	(8) Stem-to-guide clearance excessive.	(8) Check stem-to-guide clearance, ream guide, install oversize valve.
	(9) Valve bent.	(9) Replace valve.
	(10) Loose rocker arms.	(10) Tighten bolts to specified torque.
	(11) Valve seat runout excessive.	(11) Regrind valve seat/valves.
	(12) Missing valve lock.	(12) Install valve lock.
	(13) Push rod rubbing or contacting cylinder head.	(13) Remove cylinder head and remove obstruction in head.

Service Diagnosis—Performance

Condition	Possible Cause	Correction
HARD STARTING (ENGINE CRANKS NORMALLY)	(1) Binding linkage, choke valve or choke piston.	(1) Repair as necessary.
	(2) Restricted choke vacuum and hot air passages.	(2) Clean passages.
	(3) Improper fuel level.	(3) Adjust float level.
	(4) Dirty, worn or faulty needle valve and seat.	(4) Repair as necessary.
	(5) Float sticking.	(5) Repair as necessary.
	(6) Exhaust manifold heat valve stuck (eight-cylinder engine only).	(6) Lubricate or replace.
	(7) Faulty fuel pump.	(7) Replace fuel pump.
	(8) Incorrect choke cover adjustment.	(8) Adjust choke cover.
	(9) Inadequate unloader adjustment.	(9) Adjust unloader.
	(10) Faulty ignition coil.	(10) Test and replace as necessary.
	(11) Improper spark plug gap.	(11) Adjust gap.
	(12) Incorrect initial timing.	(12) Adjust timing.
	(13) Incorrect valve timing.	(13) Check valve timing; repair as necessary.
ROUGH IDLE OR STALLING	(1) Incorrect curb or fast idle speed.	(1) Adjust curb or fast idle speed.
	(2) Incorrect initial timing.	(2) Adjust timing to specifications.
	(3) Improper idle mixture adjustment.	(3) Adjust idle mixture.
	(4) Damaged tip on idle mixture screw(s).	(4) Replace mixture screw(s).
	(5) Improper fast idle cam adjustment.	(5) Adjust fast idle speed.
	(6) Faulty EGR valve operation.	(6) Test EGR system and replace as necessary.
	(7) Faulty PCV valve air flow.	(7) Test PCV valve and replace as necessary.
	(8) Exhaust manifold heat valve inoperative (eight-cylinder engine only).	(8) Lubricate or replace heat valve as necessary.
	(9) Choke binding.	(9) Locate and eliminate binding condition.
	(10) Improper choke setting.	(10) Adjust choke.
	(11) Faulty TAC unit.	(11) Repair as necessary.

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Service Diagnosis—Performance (Continued)

Condition	Possible Cause	Correction
ROUGH IDLE OR STALLING (Continued)	(12) Air leak into manifold vacuum.	(12) Check manifold vacuum and repair as necessary.
	(13) Improper fuel level.	(13) Adjust fuel level.
	(14) Faulty distributor rotor or cap.	(14) Replace rotor or cap.
	(15) Leaking engine valves.	(15) Perform cylinder combustion or compression test, repair as necessary.
	(16) Incorrect ignition wiring.	(16) Check wiring and correct as necessary.
	(17) Faulty coil.	(17) Test coil and replace as necessary.
	(18) Clogged air bleed or idle passages.	(18) Clean passages.
	(19) Restricted air cleaner.	(19) Clean or replace air cleaner.
FAULTY LOW-SPEED OPERATION	(1) Clogged idle transfer slots.	(1) Clean transfer slots.
	(2) Restricted idle air bleeds and passages.	(2) Clean air bleeds and passages.
	(3) Restricted air cleaner.	(3) Clean or replace air cleaner.
	(4) Improper fuel level.	(4) Adjust fuel level.
	(5) Faulty spark plugs.	(5) Clean or replace spark plugs.
	(6) Dirty, corroded, or loose secondary circuit connections.	(6) Clean or tighten secondary circuit connections.
	(7) Faulty coil wire (six- and eight-cylinder engines only).	(7) Replace coil wire.
	(8) Faulty distributor cap.	(8) Replace cap.
FAULTY ACCELERATION	(1) Improper pump stroke.	(1) Adjust pump stroke.
	(2) Incorrect ignition timing.	(2) Adjust timing.
	(3) Inoperative pump discharge check ball or needle.	(3) Clean or replace as necessary.
	(4) Faulty elastomer valve. (Eight-cylinder engine only.)	(4) Replace valve.
	(5) Worn or damaged pump diaphragm or piston.	(5) Replace diaphragm or piston.
	(6) Leaking main body cover gasket.	(6) Replace gasket.
	(7) Engine cold and choke too lean.	(7) Adjust choke.
	(8) Improper metering rod adjustment (BBD Model carburetor)	(8) Adjust metering rod.

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Service Diagnosis—Performance (Continued)

Condition	Possible Cause	Correction
FAULTY ACCELERATION (Continued)	(9) Faulty spark plug(s).	(9) Clean or replace spark plug(s).
	(10) Leaking engine valves.	(10) Check cylinder leakdown rate or compression, repair as necessary.
	(11) Faulty coil.	(11) Test coil and replace as necessary.
FAULTY HIGH SPEED OPERATION	(1) Incorrect ignition timing.	(1) Adjust timing.
	(2) Faulty distributor centrifugal advance.	(2) Check centrifugal advance and repair as necessary.
	(3) Faulty distributor vacuum advance.	(3) Check vacuum advance and repair as necessary.
	(4) Low fuel pump volume.	(4) Replace fuel pump.
	(5) Wrong spark plug gap; wrong plug.	(5) Adjust gap; install correct plug.
	(6) Faulty choke operation.	(6) Adjust choke.
	(7) Partially restricted exhaust manifold, exhaust pipe, muffler or tailpipe.	(7) Eliminate restriction.
	(8) Clogged vacuum passages.	(8) Clean passages.
	(9) Improper size or obstructed main jet.	(9) Clean or replace as necessary.
	(10) Restricted air cleaner.	(10) Clean or replace as necessary.
	(11) Faulty distributor rotor or cap.	(11) Replace rotor or cap.
	(12) Faulty coil.	(12) Test coil and replace as necessary.
	(13) Leaking engine valve(s).	(13) Perform cylinder combustion or compression test, repair as necessary.
	(14) Faulty valve spring(s).	(14) Inspect and test valve spring tension and replace as necessary.
	(15) Incorrect valve timing.	(15) Check valve timing and repair as necessary.
	(16) Intake manifold restricted.	(16) Remove restriction or replace manifold.
	(17) Worn distributor shaft.	(17) Replace shaft.

Service Diagnosis—Performance (Continued)

Condition	Possible Cause	Correction
MISFIRE AT ALL SPEEDS	(1) Faulty spark plug(s).	(1) Clean or replace spark plug(s).
	(2) Faulty spark plug wire(s).	(2) Replace as necessary.
	(3) Faulty distributor cap or rotor.	(3) Replace cap or rotor.
	(4) Faulty coil.	(4) Test coil and replace as necessary.
	(5) Trigger wheel too high.	(5) Set to specifications.
	(6) Primary circuit shorted or open intermittently.	(6) Trace primary circuit and repair as necessary.
	(7) Leaking engine valve(s).	(7) Perform cylinder combustion or compression test, repair as necessary.
	(8) Faulty hydraulic tappet(s).	(8) Clean or replace tappet(s).
	(9) Faulty valve spring(s).	(9) Inspect and test valve spring tension, repair as necessary.
	(10) Worn lobes on camshaft.	(10) Replace camshaft.
	(11) Air leak into manifold vacuum.	(11) Check manifold vacuum and repair as necessary.
	(12) Improper carburetor settings.	(12) Adjust carburetor.
	(13) Fuel pump volume or pressure low.	(13) Replace fuel pump.
	(14) Blown cylinder head gasket.	(14) Replace gasket.
	(15) Intake or exhaust manifold passage(s) restricted.	(15) Pass chain through passages.
	(16) Wrong trigger wheel.	(16) Install correct wheel.
POWER NOT UP TO NORMAL	(1) Incorrect ignition timing.	(1) Adjust timing.
	(2) Faulty distributor rotor.	(2) Replace rotor.
	(3) Trigger wheel positioned too high or loose on shaft.	(3) Reposition or replace trigger wheel.
	(4) Incorrect spark plug gap.	(4) Adjust gap.
	(5) Faulty fuel pump.	(5) Replace fuel pump.
	(6) Incorrect valve timing.	(6) Check valve timing and repair as necessary.
	(7) Faulty coil.	(7) Test coil and replace as necessary.
	(8) Faulty ignition.	(8) Test wires and replace as necessary.
	(9) Leaking engine valves.	(9) Perform cylinder combustion or compression test, and repair as necessary.
	(10) Blown cylinder head gasket.	(10) Replace gasket.

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Service Diagnosis—Performance (Continued)

Condition	Possible Cause	Correction
POWER NOT UP TO NORMAL (Continued)	(11) Leaking piston rings.	(11) Check compression and repair as necessary.
	(12) Worn distributor shaft.	(12) Replace shaft.
INTAKE BACKFIRE	(1) Improper ignition timing.	(1) Adjust timing.
	(2) Faulty accelerator pump discharge.	(2) Repair as necessary.
	(3) Improper choke operation.	(3) Repair as necessary.
	(4) Defective EGR CTO valve.	(4) Replace EGR CTO valve.
	(5) Defective TAC unit.	(5) Repair as necessary.
	(6) Lean fuel mixture.	(6) Check float level or manifold vacuum for air leak. Remove sediment from bowl.
EXHAUST BACKFIRE	(1) Air leak into manifold vacuum.	(1) Check manifold vacuum and repair as necessary.
	(2) Faulty diverter valve.	(2) Test diverter valve and replace as necessary.
	(3) Faulty choke operation.	(3) Repair as necessary.
	(4) Exhaust leak.	(4) Locate and eliminate leak.
PING OR SPARK KNOCK	(1) Incorrect ignition timing.	(1) Adjust timing.
	(2) Distributor centrifugal or vacuum advance malfunction.	(2) Check advance and repair as necessary.
	(3) Excessive combustion chamber deposits.	(3) Use combustion chamber cleaner.
	(4) Carburetor set too lean.	(4) Adjust carburetor.
	(5) Air leak into manifold vacuum.	(5) Check manifold vacuum and repair as necessary.
	(6) Excessively high compression.	(6) Check compression and repair as necessary.
	(7) Fuel octane rating excessively low.	(7) Try alternate fuel source.
	(8) Heat riser stuck in heat ON position (eight-cylinder engine only).	(8) Free-up or replace heat riser.
	(9) Sharp edges in combustion chamber.	(9) Grind smooth.
SURGING (CRUISING SPEEDS TO TOP SPEEDS)	(1) Low fuel level.	(1) Adjust fuel level.
	(2) Low fuel pump pressure or volume.	(2) Replace fuel pump.
	(3) Metering rod(s) not adjusted properly (BBD Model Carburetor).	(3) Adjust metering rod.

Service Diagnosis—Performance (Continued)

Condition	Possible Cause	Correction
SURGING (CRUISING SPEEDS TO TOP SPEEDS) (Continued)	(4) Improper PCV valve air flow.	(4) Test PCV valve and replace as necessary.
	(5) Air leak into manifold vacuum.	(5) Check manifold vacuum and repair as necessary.
	(6) Clogged main jet(s).	(6) Clean main jet(s).
	(7) Undersize main jet(s).	(7) Replace main jet(s).
	(8) Blocked air bleeds.	(8) Clean air bleeds.
	(9) Clogged fuel filter screen.	(9) Replace fuel filter.
	(10) Restricted air cleaner.	(10) Clean or replace air cleaner.

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DIAGNOSIS WITH SCOPE ANALYZER

The scope analyzer is an ignition system tester that provides a quick and accurate means for diagnosis of ignition system performance problems. All phases of the ignition cycle are displayed graphically on an oscilloscope (cathode ray tube) as they occur during engine operation.

The manufacturers of scope analyzer equipment provide descriptions of the test procedures possible with their equipment. This section is not intended to describe all uses of scope analyzer equipment, but to indicate differences in scope pattern between the HEI (High Energy Ignition) and SSI (Solid State Ignition) systems used on Jeep engines (fig. 1A-1).

The upper display illustrates a typical scope pattern for the HEI system from firing line to firing line and areas of the pattern significant for diagnosis. The scope pattern displays the time duration horizontally and voltage amplitude vertically.

Compare the scope pattern of the HEI system with the typical pattern of the SSI system.

The SSI waveform pattern is below the zero voltage line (i.e., negative) during oscilation dampening but otherwise is similar to that of the HEI system in this area.

Other than the differences noted, scope analyzer ignition system diagnosis for HEI and SSI systems is essentially the same.

CYLINDER COMPRESSION PRESSURE TEST

A cylinder compression pressure test is useful for identifying the cylinder(s) with an abnormal compression pressure. With this information available, additional testing/inspection will provide the exact cause of the pressure loss.

(1) Clean spark plug recesses with compressed air.

(2) Remove spark plugs.

(3) Remove coil wire from distributor caps and connect to ground (six- and eight-cylinder engines). Disconnect distributor wire harness connector for four-cylinder engines.

(4) Secure throttle in wide open position.

NOTE: *Ensure battery and starter motor are in good operating condition before starting test.*

(5) Insert compression pressure gauge, engage starter motor and turn engine for three revolutions. Record compression pressure on third revolution.

(6) Test remaining cylinders and record compression pressures.

(7) Refer to Compression Pressure chart.

Compression Pressure

Engine	Pressure—PSI (kPa)	Max. Cyl. Deviation—PSI (kPa)
Four-Cylinder	140 (965)	30 (207)
Six-Cylinder	120-140 (827-965)	30 (207)
Eight-Cylinder	120-140 (827-965)	30 (207)

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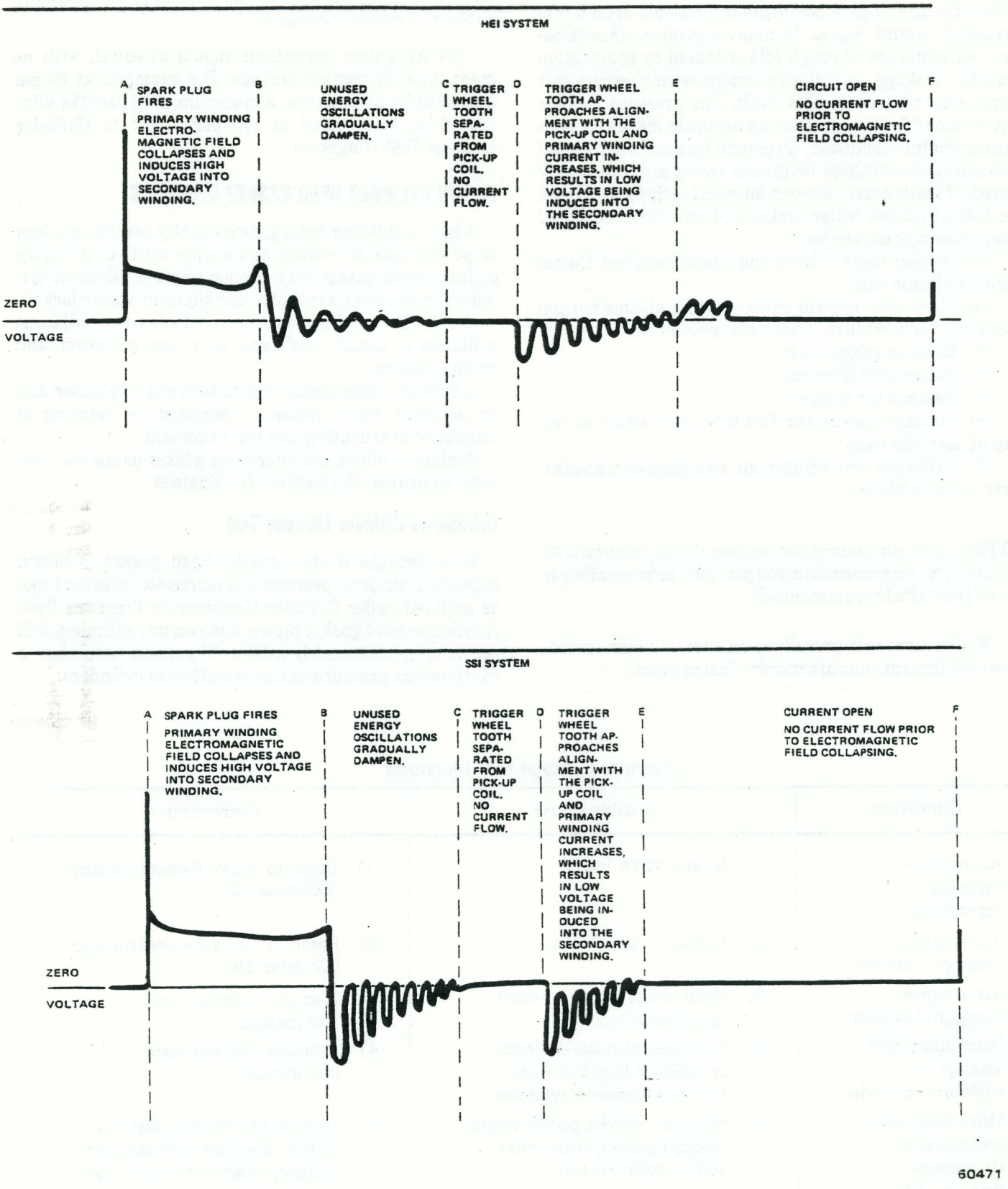

Fig. 1A-1 Scope Diagnosis Patterns

CYLINDER (COMBUSTION CHAMBER) LEAKAGE TEST

Satisfactory engine performance depends upon a mechanically sound engine. In many instances, unsatisfactory performance or rough idle is caused by combustion chamber leakage. A cylinder compression pressure test alone may not reveal this fault. The pressure leakage test outlined below provides an accurate means of evaluating engine condition. Pressure leakage testing will indicate if the exhaust or intake valves are improperly seated, if leaks exist between adjacent cylinders, if there are leaks into the water jacket and any other causes of compression pressure loss.

(1) Inspect coolant level and add as required. Do not install radiator cap.

(2) Start and operate engine until it attains normal operating temperature, then turn ignition Off.

(3) Remove spark plugs.

(4) Remove oil filler cap.

(5) Remove air cleaner.

(6) Position carburetor fast idle speed screw on top step of fast idle cam.

(7) Calibrate test equipment according to manufacturer's instructions.

NOTE: *Shop air source for testing should maintain 70 psi (483 kPa) minimum and 200 psi (1380 kPa) maximum (80 psi* [552 kPa] recommended).

(8) Perform test procedure on each cylinder according to equipment manufacturer's instructions.

NOTE: *While testing, listen for air escaping through carburetor, tailpipe and oil filler opening, and look for bubbles in radiator coolant.*

(9) All gauge indications should be equal, with no more than 25 percent leakage. For example, at 80 psi (552 kPa) input pressure, a minimum of 60 psi (414 kPa) should be maintained in cylinder. Refer to Cylinder Leakage Test Diagnosis.

BLOWN CYLINDER HEAD GASKET DIAGNOSIS

A blown cylinder head gasket usually results in a loss of power, loss of coolant and engine misfire. A blown cylinder head gasket may develop between adjacent cylinders or between a cylinder and adjacent water jacket.

A cylinder head gasket blown between two adjacent cylinders is usually indicated by a loss of power and engine misfire.

A cylinder head gasket blown between a cylinder and an adjacent water jacket is indicated by foaming of coolant or overheating and loss of coolant.

Replace a blown cylinder head gasket using the procedure outlined in Chapter 1B—Engines.

Cylinder-to-Cylinder Leakage Test

To determine if the cylinder head gasket is blown between cylinders, perform a compression pressure test as outlined under Cylinder Compression Pressure Test. A cylinder head gasket blown between two cylinders will result in approximately a 50 to 70 percent reduction in compression pressure in the two affected cylinders.

Cylinder Leakage Test Diagnosis

Condition	Possible Cause	Correction
(1) Air escapes through carburetor.	(1) Intake valve leaks.	(1) Refer to Valve Reconditioning (Chapter 1B).
(2) Air escapes through tailpipe.	(2) Exhaust valve leaks.	(2) Refer to Valve Reconditioning (Chapter 1B).
(3) Air escapes through radiator.	(3) Head gasket leaks or crack in cylinder block.	(3) Remove cylinder head and inspect.
(4) More than 25% leakage on adjacent cylinder.	(4) Head gasket leaks or crack in cylinder block or head between adjacent cylinders.	(4) Remove cylinder head and inspect.
(5) More than 25% leakage and air escapes through oil filler cap opening only.	(5) Stuck or broken piston ring(s); cracked piston; worn rings and/or cylinder wall.	(5) Inspect for broken ring(s) or piston. Measure ring gap and cylinder diameter, taper, and out-of-round.

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Cylinder-to-Water Jacket Leakage Test

WARNING: *Use extreme caution when engine is operating. Do not stand in direct line with fan. Do not put hands near pulleys, belts or fan. Do not wear loose clothing.*

(1) Remove radiator cap and start engine. Allow engine to warm up until thermostat opens.

(2) If large compression/combustion pressure leak exists, bubbles will be visible in coolant.

(3) If bubbles are not visible, install radiator pressure tester and pressurize system. If cylinder compression and combustion pressure is leaking into water jacket, pointer will pulsate with every combustion stroke of piston.

INTAKE MANIFOLD LEAKAGE DIAGNOSIS

An intake manifold air leak is characterized by lower than normal manifold vacuum. One or more cylinders may be "dead."

Exterior Leak

Two tests are possible, one with engine oil and one with acetylene.

WARNING: *Use extreme caution when engine is operating. Do not stand in direct line with fan. Do not put hands near pulleys, belts or fan. Do not wear loose clothing.*

(1) Start engine.

(2) Apply oil to gasket edge areas between intake manifold and cylinder head. If oil is forced into manifold, or if smoke is evident in exhaust, manifold has air leak.

(3) Open acetylene valve of oxyacetylene torch. **Do not ignite.** Pass torch tip over gasket edge areas. If engine speed increases, manifold has leak.

Interior Leak—Eight-Cylinder Engine Only

WARNING: *Use extreme caution when engine is operating. Do not stand in direct line with fan. Do not put hands near pulleys, belts or fan. Do not wear loose clothing.*

(1) Start engine. Remove PCV valve hose from intake manifold.

(2) Plug PCV valve hose fitting in manifold. Allow PCV valve to hang free.

(3) Remove oil filler cap. Cover filler tube with palm of hand. If vacuum is felt, crankcase is exposed to intake manifold or cylinder head vacuum.

(4) Remove intake manifold. Inspect for casting flaws.

(5) Inspect cylinder head for casting flaws. Thoroughly inspect area around intake valves and intake valve ports.

(6) With valve closed, fill port with gasoline and inspect for leaks. Alternate method: wrap shop cloth around air nozzle and apply air pressure to port. Listen for leaks.

ENGINE TUNE-UP

GENERAL

A complete, precision tune-up is required at the interval outlined in the Engine Maintenance Schedule. A tune-up will accomplish several things. First, it will assure that the engine is operating as efficiently and as economically as it was designed to operate. Second, it will assure that the undesirable exhaust and fuel vapor emissions are within the limits defined by Federal regulations.

A complete, precision tune-up includes all of the tasks listed in the Engine Maintenance Schedule. Some tasks involve highly-precision emission control devices. These devices are explained within the applicable systems in their respective chapters of this manual. They are included in this chapter for reference only.

For convenience, when performing a precision tune-up, the necessary services are grouped together by systems.

ENGINE ASSEMBLIES

Oil Filler Cap

On eight-cylinder engines, a polyurethane foam filter in the oil filler cap filters air coming into the PCV system. To clean the filter, apply light air pressure in the direction opposite normal air flow (through the filler tube opening). If the filter is deteriorated, replace the filler cap.

Drive Belts

Inspect belts for defects such as fraying or cracking. Test belt tension. Belt adjustment, arrangement and tension specifications are described in Chapter 1C—Cooling Systems.

Vacuum Fittings and Hoses

Inspect vacuum fittings for looseness and corrosion. Inspect rubber hoses for brittleness and cracking. Thoroughly inspect the hose ends that are slipped onto nipples. Engine performance may be adversely affected by air leaks in such unlikely places as the heater and air conditioner control hoses, Cruise Command hoses or the power brake booster hose.

IGNITION SYSTEMS

Spark Plugs

Remove and examine spark plugs for burned electrodes and fouled, cracked or broken porcelain insulators. Keep plugs arranged in the order removed from the engine. An isolated plug displaying an abnormal condition indicates that a problem exists in the cylinder from where it was removed. Replace plugs at the mileage interval recommended in the Engine Maintenance Schedule. Plugs that have less engine mileage may be cleaned and reused if not otherwise defective. Refer to Spark Plug Condition. After cleaning, file the center electrode flat with a point file. Adjust the gap clearance 0.033-0.038 inch (0.84-0.97 mm) for six- and eight-cylinder engines, and 0.060 inch (1.52 mm) for four-cylinder engines (fig. 1A-2).

Always use a torque wrench when installing spark plugs. Distortion from overtightening will change the gap clearance of the plug. For four- and six-cylinder engines, tighten plugs with 7 to 15 foot-pounds (9.5 to 23 N•m) torque. For eight-cylinder engines, tighten plugs with 25 to 30 foot-pounds (34 to 41 N•m) torque.

Spark Plug Condition

Refer to figure 1A-3. Compare the spark plugs with the illustrations and the following descriptions.

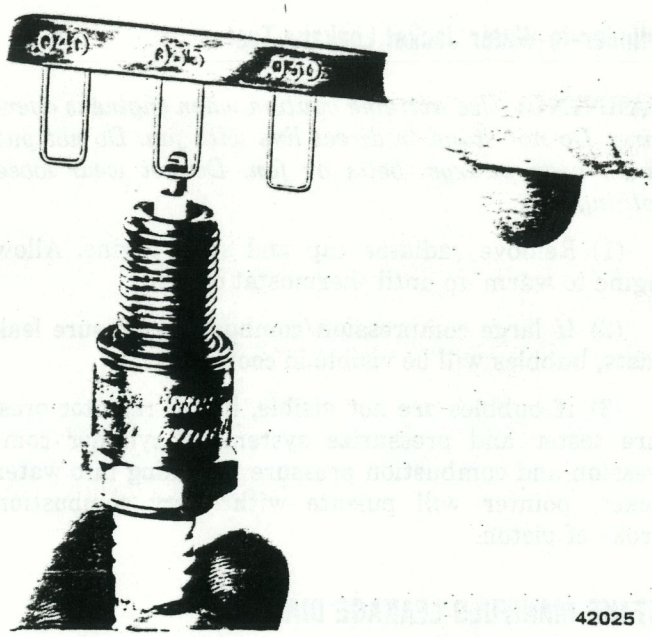


Fig. 1A-2 Spark Plug Gap Adjustment

A—Gap Bridging

Gap bridging may be traced to loose deposits in the combustion chamber. These deposits accumulate on the plugs during continuous stop-and-go driving. When the engine is suddenly subjected to a heavy load, the deposits partially liquefy and bridge the gap.

B—Scavenger Deposits

Fuel scavenger deposits may be either white or yellow. They may appear to be harmful but this is a normal condition caused by additives in certain fuels. Such additives are designed to change the chemical nature of deposits and lessen misfire tendencies. Notice that accumulation on the ground electrode and shell areas may be heavy, but the deposits are easily removed. Plugs with scavenger deposits can be considered as being in normal condition and can be cleaned using standard procedures.

C—Chipped Insulator

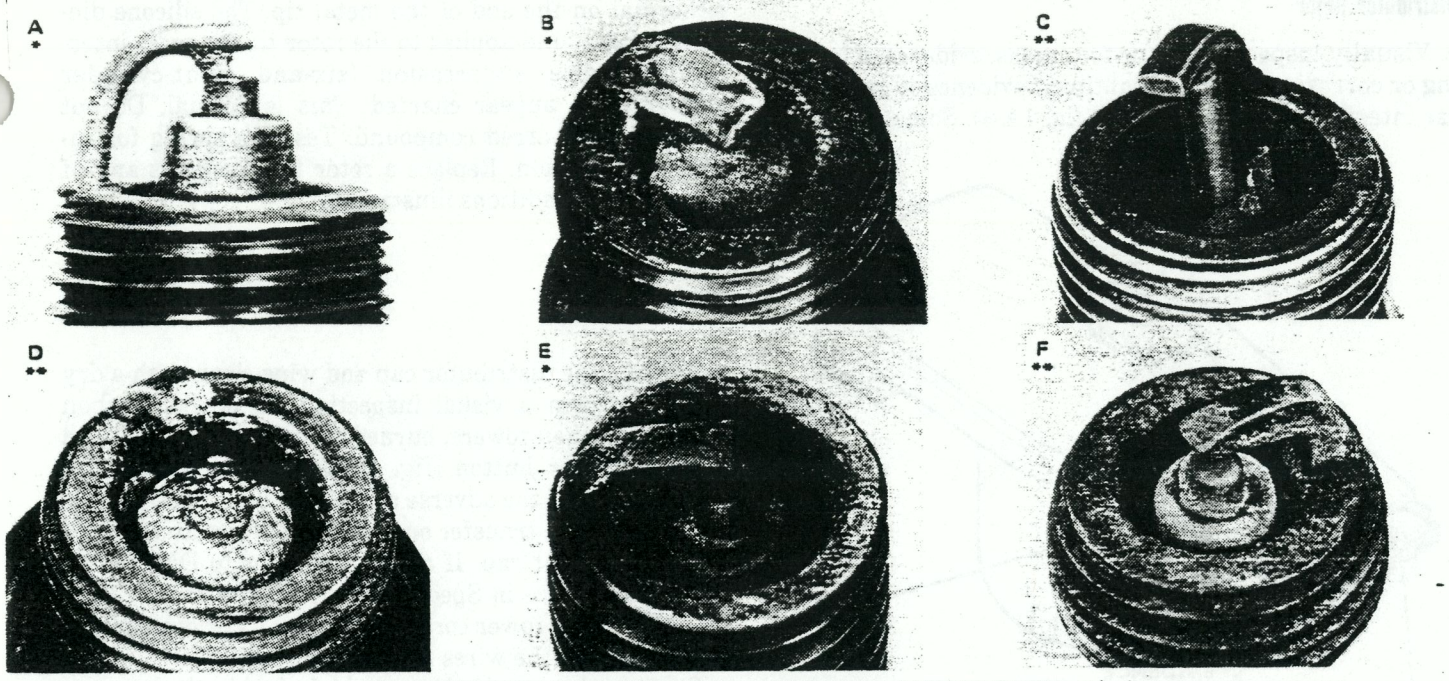
Chipped insulators usually result from bending the center electrode while adjusting the plug gap. Under certain conditions, severe detonation can also split insulators.

D—Pre-ignition Damage

Pre-ignition damage is caused by excessive combustion chamber temperature. First, the center electrode dissolves and, somewhat later, the ground electrode. Insulators appear relatively deposit free. Determine if plug has correct heat range and if ignition timing is overadvanced or if other similar conditions exist for overheating.

E—Cold Fouling (or Carbon Fouling)

Cold fouling is basically a carbon deposit. A dry, black deposit on one or two plugs in a set may be caused by sticking valves or defective spark plug wires. Fouling of the entire set may be caused by a clogged air cleaner, a sticking exhaust manifold heat valve (eight-cylinder engine only) or a faulty choke.



* LOW MILEAGE PLUGS WITH THIS CONDITION MAY BE CLEANED
** PLUGS WITH THIS CONDITION MUST BE REPLACED

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Fig. 1A-3 Spark Plug Conditions

F—Overheating

Overheating is indicated by a drab white or gray insulator that appears blistered. Electrode gap wear rate will be considerably in excess of 0.001 inch (0.025 mm) per 1000 miles. This may suggest that a cooler heat range plug should be used. Overadvanced ignition timing, detonation and cooling system malfunctions can also cause plug overheating.

NOTE: *Some fuel refiners are using a manganese additive (MMT) in unleaded fuel. During combustion, MMT fuel covers the entire tip of the spark plug with a rust-colored deposit. This rust color may be misdiagnosed as being caused by coolant in the combustion chamber. Spark plug performance is not affected by MMT deposits.*

Spark Plug Wires

To remove wires from spark plugs, twist the rubber protector boot approximately 1/2-turn to break the seal. Grasp the boot and pull it from the plug with steady, even force. Do not pull on the wire itself because this will damage the wire.

To remove wires from the distributor cap or coil tower, loosen the boot first, then grasp the upper part of the boot and the wire and gently pull straight up.

Wire Test

Do not puncture spark plug wires with a probe to perform any test. This may cause a separation in the conductor. Remove the suspected wire and use an ohmmeter to test for correct resistance according to the length of the particular wire.

Wire Resistance Values

Inches	Ohms
0 to 15	3,000 to 10,000
15 to 25	4,000 to 15,000
25 to 35	6,000 to 20,000
Over 35	8,000 to 25,000

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When installing spark plug wires and the coil high voltage wire, ensure there is a good, tight connection at the spark plug, distributor cap tower and coil tower (six- and eight-cylinder engines only). The protector boots on the spark plugs and distributor cap must fit tightly. A partially seated wire creates an additional gap (resistance) in the circuit and the resulting arc will cause terminal corrosion, wire damage and decrease the voltage at the spark plugs.

Ignition Coil

Always test a suspected defective ignition coil on the engine. Because a coil may break down after the engine has heated it to operating temperature, it is important that the coil be at operating temperature when tests are performed. Perform the tests following the instructions furnished by the test equipment manufacturer.

Distributor

The distributor used on all engines is a solid state, electronically controlled type (i.e., no contact points). Other than the cap and rotor inspection listed in the Engine Maintenance Schedule, there is no scheduled maintenance for distributors. Refer to Chapter 1G—Ignition Systems for distributor service procedures.

Distributor Rotor

Visually inspect the rotor for cracks, evidence of burning or corrosion on the metal tip, or evidence of mechanical interference with the cap (fig. 1A-4). Some charring is normal on the end of the metal tip. The silicone dielectric compound applied to the rotor tip for radio interference noise suppression (six-and eight-cylinder engines) will appear charred. This is normal. Do not remove the charred compound. Test the spring for insufficient tension. Replace a rotor that displays any of the adverse conditions illustrated.

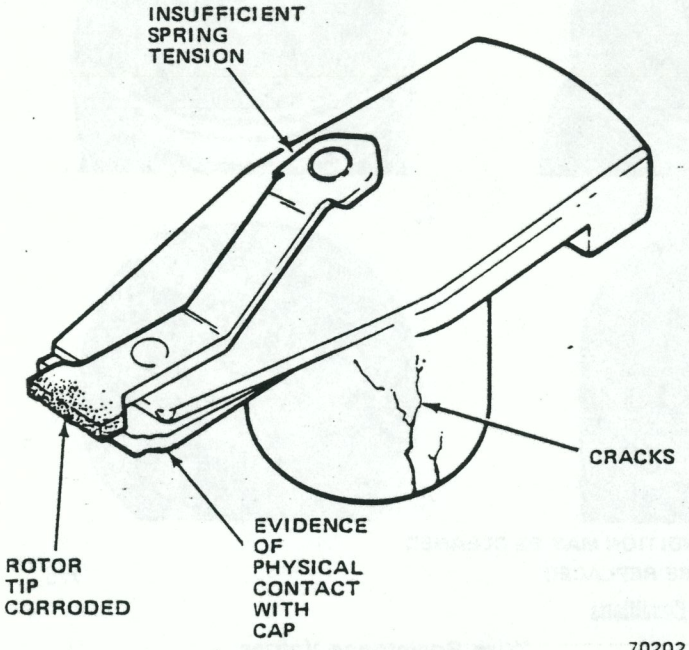

Fig. 1A-4 Rotor Inspection

Distributor Cap

Remove the distributor cap and wipe clean with a dry cloth. Perform a visual inspection for cracks, carbon runners, broken towers, burned or eroded terminals and damaged rotor button (fig. 1A-5). Replace a cap that displays any of the adverse conditions illustrated. When replacing a cap, transfer one spark plug wire at a time to the replacement cap. If necessary, refer to Distributor Wiring Sequence in Specifications. Ensure each wire is installed in the tower corresponding to its original tower position. Push the wires firmly into place.

Replace the cap if the terminals inside the cap are excessively burned. The vertical face of a terminal will indicate some evidence of burning through normal operation. Examine the terminals for evidence of mechanical interference with the rotor tip.

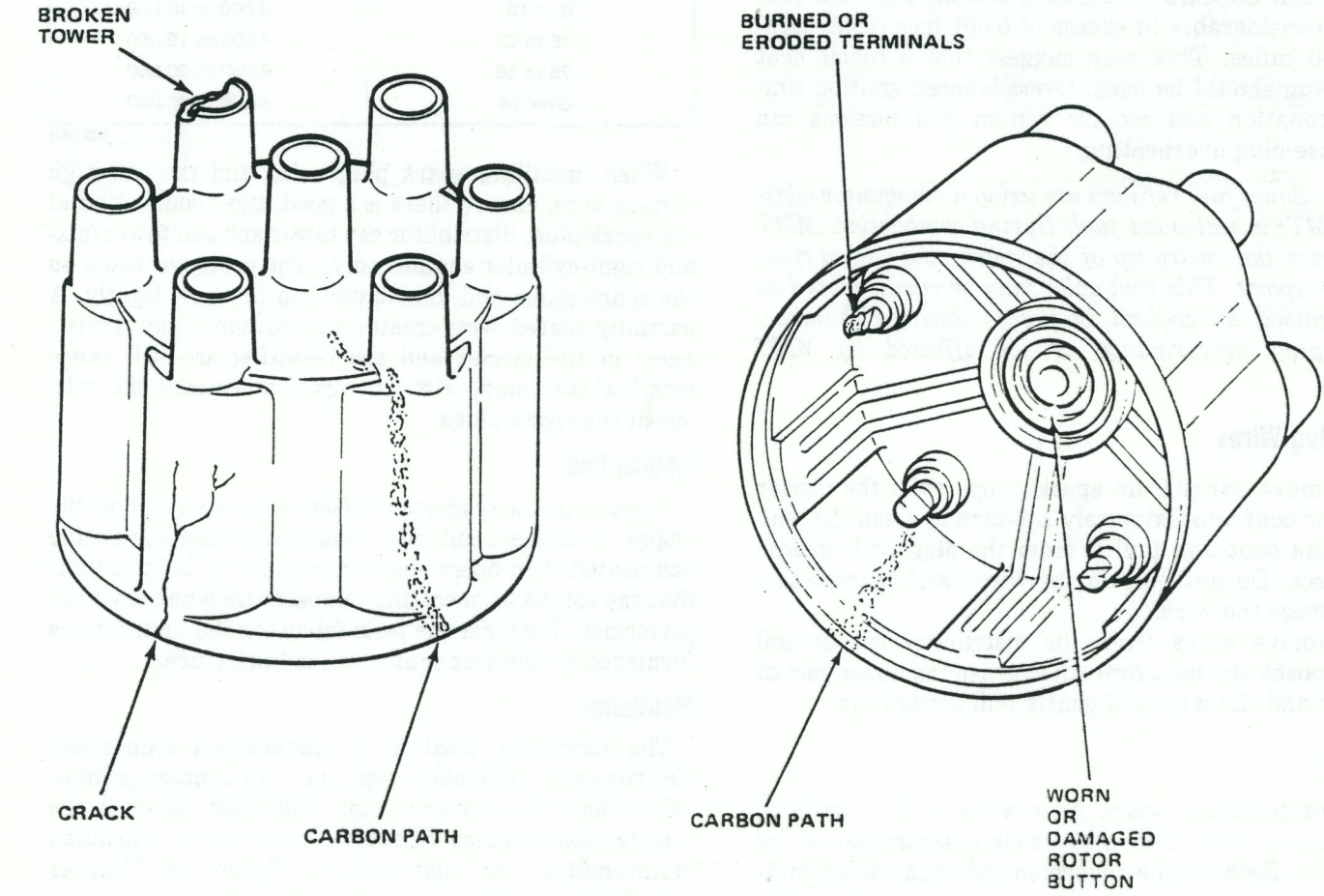

Fig. 1A-5 Distributor Cap Inspection—Typical

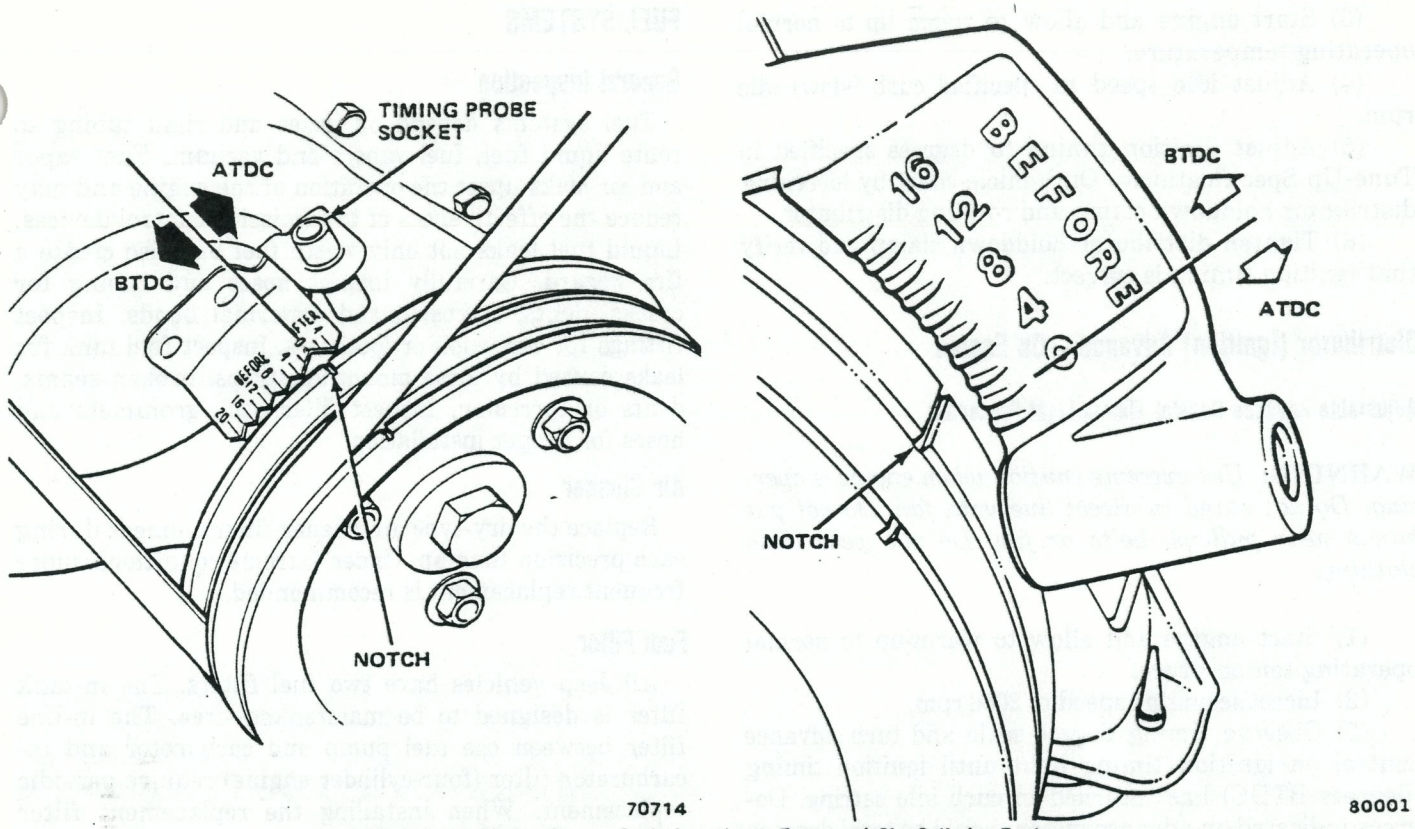

Fig. 1A-6 Timing Degree Scale Location—Four- and Six-Cylinder Engines

Ignition Timing

A graduated timing degree scale located on the timing case cover is used for timing each ignition system. A notch milled into the vibration damper is used to reference the No. 1 cylinder crankshaft firing position with the correct timing mark on the scale (figs. 1A-6 and 1A-7).

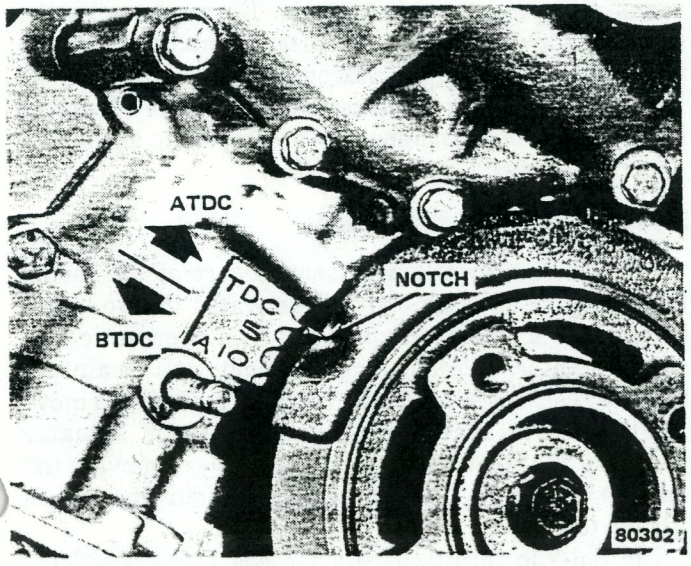

Fig. 1A-7 Timing Degree Scale Location—Eight-Cylinder Engine

Magnetic Timing Probe

A socket integral with the timing degree scale on the timing case cover is provided for use with a special magnetic timing probe that detects the milled notch in the vibration damper. The probe is inserted through the socket until it touches the vibration damper and is automatically spaced away from the damper by damper eccentricity. Ignition timing is indicated on a meter or computer printout, depending on the manufacturer's equipment.

The socket is located at 9.5° ATDC, and the equipment is calibrated to compensate for the degree difference. **Do not use the socket location when timing an ignition system with a conventional timing light.**

Timing Procedure

(1) Disconnect and plug distributor vacuum advance hose.

(2) Connect ignition timing light and properly calibrated tachometer.

NOTE: *If the timing light has an adjustable advance control feature, turn the control to the OFF position.*

WARNING: *Use extreme caution when engine is operting. Do not stand in direct line with fan. Do not put hands near pulleys, belts or fan. Do not wear loose clothing.*

(3) Start engine and allow to warm up to normal operating temperature.

(4) Adjust idle speed to specified curb (slow) idle rpm.

(5) Adjust ignition timing to degrees specified in Tune-Up Specifications—On Vehicle chart by loosening distributor holddown clamp and rotating distributor.

(6) Tighten distributor holddown clamp and verify that ignition timing is correct.

Distributor (Ignition) Advance—On Engine

Adjustable Advance Control Timing Light Procedure

WARNING: *Use extreme caution when engine is operting. Do not stand in direct line with fan. Do not put hands near pulleys, belts or fan. Do not wear loose clothing.*

(1) Start engine and allow to warm-up to normal operating temperature.

(2) Increase engine speed to 2000 rpm.

(3) Observe timing degree scale and turn advance control on ignition timing light until ignition timing (degrees BTDC) has returned to curb idle setting. Degrees indicated on advance meter should be total degrees advance as specified in Tune-Up Specifications—On Vehicle chart.

(4) If total degrees advance at 2000 rpm is less than specified, disconnect and plug vacuum advance hose at distributor.

(5) Repeat steps (2) and (3) above to determine maximum centrifugal advance degrees at 2000 rpm. Refer to Distributor Curves in Specifications.

If the centrifugal advance degrees are as specified, replace the vacuum advance mechanism.

Distributor (Ignition) Advance—On Tester

Total distributor advance degrees also may be determined with the distributor removed from the engine. Follow the distributor test equipment manufacturer's instructions.

Information provided in the Distributor Curves is for on-engine testing. If the distributor advance mechanisms are tested with a distributor tester, convert the information in the Distributor Curves from engine rpm to distributor rpm and from engine degrees advance to distributor degrees advance. Divide engine rpm by 2 to obtain distributor rpm. Divide engine degrees advance by 2 to obtain distributor degrees advance. For instance, if the Distributor Curve indicates 8 to 12 degrees advance at 2000 rpm, the corresponding on-tester specifications would be 4 to 6 degrees advance at 1000 rpm.

NOTE: *The vacuum inches of mercury (or kPa) is the same, regardless if test is on-engine or off-engine.*

FUEL SYSTEMS

General Inspection

Fuel systems depend on hoses and rigid tubing to route liquid fuel, fuel vapors and vacuum. Fuel vapor and air leaks upset the operation of the engine and may reduce the effectiveness of the emission control devices. Liquid fuel leaks not only waste fuel but also create a fire hazard. Carefully inspect hoses and tubing for cracks, dents, corrosion and abnormal bends. Inspect fittings for corrosion or looseness. Inspect fuel tank for leaks caused by loose mounting straps, broken seams, dents or corrosion. Inspect filler neck grommets and hoses for proper installation.

Air Cleaner

Replace the dry-type air cleaner filter element during each precision tune-up. Under extreme conditions, more frequent replacement is recommended.

Fuel Filter

All Jeep vehicles have two fuel filters. The in-tank filter is designed to be maintenance-free. The in-line filter between the fuel pump and carburetor and in-carburetor filter (four-cylinder engine) require periodic replacement. When installing the replacement filter (six- and eight-cylinder engines), ensure the fuel return nipple is positioned at the top of the filter.

Engine Idle Speed Adjustment

General

The engine and related systems must be operating properly before performing idle speed adjustments.

The idle mixture should not require adjustment as part of a precision tune-up. The idle mixture adjustment screws are sealed on all carburetors (fig. 1J-8, 1J-9 and 1J-10). The plugs or dowel pins must be removed before the idle mixture can be adjusted. This effectively prevents indiscriminate adjustments. Do not remove the plug(s) or dowel pins and readjust the mixture screw(s) unless involved in a major carburetor overhaul, throttle body replacement or the emission of excessive CO at idle speed has been determined by a competent authority. Refer to Chapter 1J—Fuel Systems.

Idle Speed Control (Six-Cylinder Engines)

The Sol-Vac throttle positioner is part of the model BBD carburetor assembly. It is activated in two ways: by an electric holding solenoid and by a pneumatic vacuum actuator. The holding solenoid will maintain throttle position, but it does not have the ability to move the throttle to a new position. The vacuum actuator portion of the Sol-Vac, however, is capable of moving the throttle to a new position when manifold vacuum is applied to it.

The Sol-Vac throttle positioner has three positions. One is the off, or deactivated, position (curb idle); the

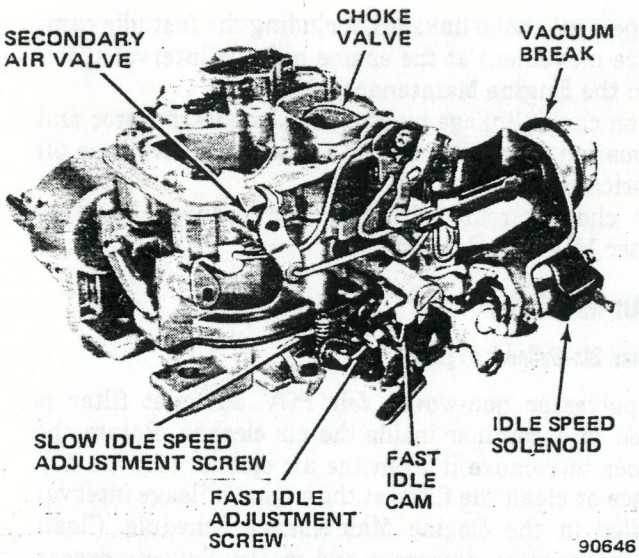

Fig. 1A-8 Rochester Model 2SE and E2SE Carburetors

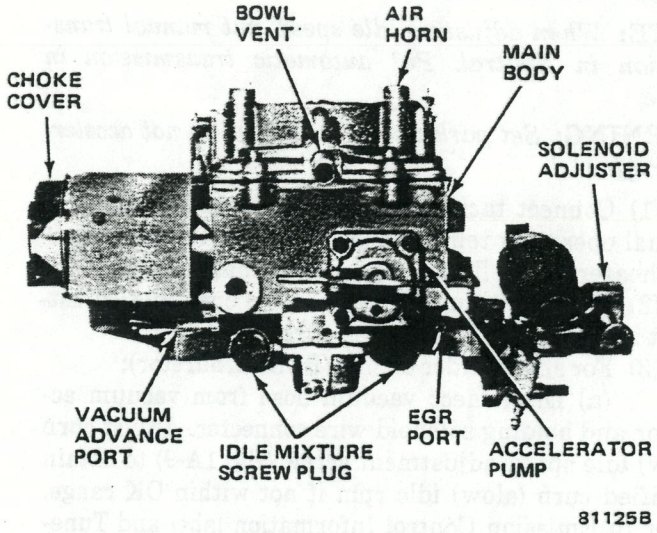

Fig. 1A-10 Motorcraft Model 2150 Carburetor

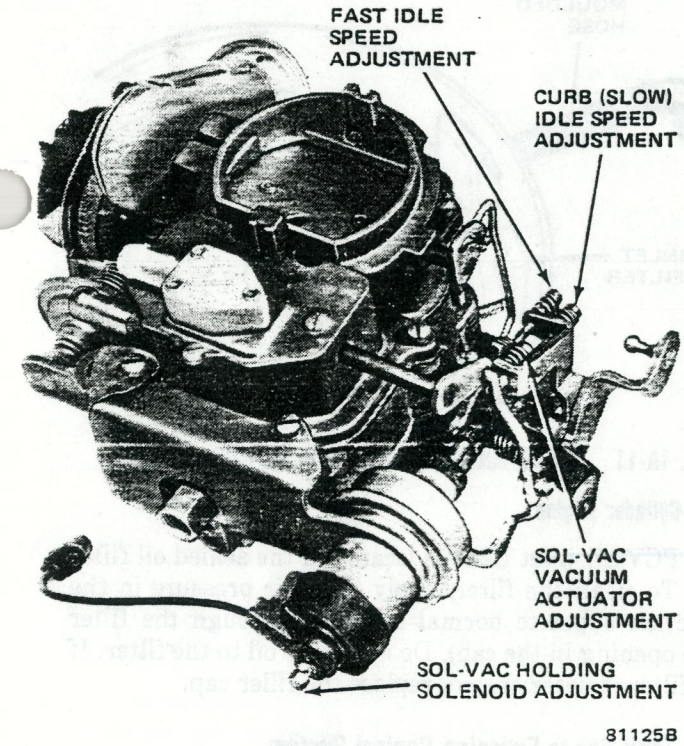

Fig. 1A-9 Carter Model BBD Carburetor

second is the holding solenoid position; and the third is the vacuum actuator position. An electric vacuum switching solenoid allows manifold vacuum stored in a reservoir to reach the vacuum actuator and engage it. The electric vacuum switching solenoid is energized by the idle speed controller.

The idle speed controller energizes the holding solenoid if either the intake manifold heater, air conditioner or rear window defroster are in use. The vacuum actuator is engaged via the thermal electric switch (TES) if the air cleaner air temperature is below 60°F or 16°C (approximately). When the air cleaner air temperature is above the switching temperature, the idle speed controller energizes the vacuum switching solenoid to engage the vacuum actuator every time the idle speed decreases to the calibrated minimum rpm. When engine rpm increases to the calibrated maximum, the vacuum actuator is disengaged by the idle speed controller and the throttle returns to either the holding solenoid position (if energized) or to the curb idle speed position.

NOTE: *The calibrated minimum and maximum rpm's for vehicles equipped with automatic transmissions are 435 ± 10 rpm and 1050 ± 100 rpm. For vehicles equipped with manual transmissions, the calibrated minimum and maximum rpm's are 463 ± 10 rpm and 1175 ± 150 rpm.*

Adjustment Precautions and General Information

- Because vehicles with automatic transmissions are adjusted in Drive, set the parking brake firmly and do not accelerate the engine.
- Bring the engine up to normal operating temperature before adjusting the idle speed.
- Perform the adjustment with the air cleaner installed.
- Do not idle the engine more than three minutes at a time.
- Use extreme caution when engine is operating. Do not stand in direct line with fan. Do not put hands near pulleys, belts or fan. Do not wear loose clothing.

Idle Speed Adjustment Procedure

NOTE: *When adjusting idle speed, put manual transmission in Neutral. Put automatic transmission in Drive.*

WARNING: *Set parking brake firmly. Do not accelerate engine.*

(1) Connect tachometer, start engine and warm to normal operating temperature. Choke and intake manifold heater (six-cylinder engine only) must be off.

(2) If not within OK range, turn curb idle adjustment screw to obtain specified curb idle rpm.

(3) For six-cylinder engine (BBD carburetor):

(a) Disconnect vacuum hose from vacuum actuator and holding solenoid wire connector. Adjust curb (slow) idle speed adjustment screw (fig. 1A-9) to obtain specified curb (slow) idle rpm if not within OK range. Refer to Emission Control Information label and Tune-Up Specifications.

(b) Apply direct source of vacuum to vacuum actuator.

(c) Turn vacuum actuator adjustment screw on throttle lever until specified rpm is obtained (900 rpm for manual transmissions, and 800 rpm for automatic transmissions).

(d) Disconnect manifold vacuum source from vacuum actuator.

(e) With jumper wire apply battery voltage (12V) to energize holding solenoid. Turn A/C on, if equipped.

NOTE: *Throttle must be opened manually to allow Sol-Vac throttle positioner to be extended.*

(f) With Sol-Vac throttle positioner extended, idle speed should be 650 ± 70 rpm for automatic transmission equipped vehicles and 750 ± 70 rpm for manual transmission equipped vehicles.

(g) If idle speed is not within tolerance, adjust Sol-Vac (hex-head adjustment screw) to obtain specified rpm.

(h) Remove jumper wire from Sol-Vac holding solenoid wire connector.

(i) Connect Sol-Vac holding solenoid wire connector.

(j) Connect original hose to vacuum actuator.

(4) For four- and eight-cylinder engines (2SE, E2SE or 2150 carburetor, turn nut on solenoid plunger or hex screw on solenoid carriage to obtain specified idle rpm.

(a) Tighten locknut, if equipped.

(b) Disconnect solenoid wire connector and adjust curb idle screw to obtain 500 rpm idle speed.

(c) Connect solenoid wire connector.

(d) If model 2150 carburetor (eight-cylinder engine, is equipped with dashpot. With throttle at curb idle position, fully depress dashpot stem and measure clearance between stem and throttle lever. Clearance should be 0.032 inch (0.813 mm). Adjust by loosening locknut and turning dashpot.

Choke Linkage

Inspect all choke linkages, including the fast idle cam, for free movement at the engine mileage interval specified in the Engine Maintenance Schedule.

Clean choke linkage by applying Jeep Carburetor and Combustion Area Cleaner, or equivalent. Never use oil to lubricate choke linkage.

For choke circuit adjustment procedures, refer to Chapter 1J—Fuel Systems.

PCV Air Inlet Filter

Four- and Six-Cylinder Engines

A polyester non-woven felt PCV air inlet filter is located in a retainer inside the air cleaner. Rotate the retainer to remove it from the air cleaner (fig. 1A-11). Replace or clean the filter at the engine mileage interval specified in the Engine Maintenance Schedule. Clean with kerosene or detergent and water. Squeeze excess liquid from filter. Do not wring or twist. After cleaning, lightly oil the filter with clean engine lube oil.

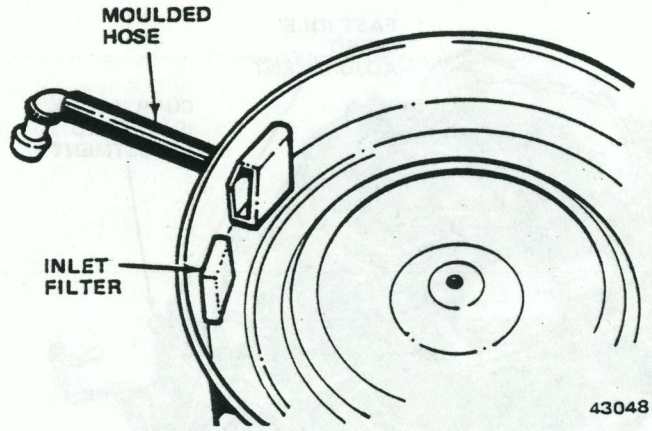

Fig. 1A-11 PCV Air Inlet Filter—Four- and Six-Cylinder Engines

Eight-Cylinder Engine

A PCV air inlet filter is located in the sealed oil filler cap. To clean the filter, apply light air pressure in the direction opposite normal air flow (through the filler tube opening in the cap). Do not apply oil to the filter. If the filter is deteriorated, replace the filler cap.

Fuel Tank Vapor Emission Control System

The fuel tank, filler cap, fuel lines and vent lines must be maintained in good condition to prevent raw fuel vapor (hydrocarbons) from entering the atmosphere.

Inspect the filler cap for evidence of fuel leakage stains at the filler neck opening. Remove the cap and examine the condition of the sealing gasket. Replace the filler cap if the gasket is damaged or deteriorated.

Inspect the fuel tank for evidence of fuel leakage stains. Trace stain to its origin and repair or replace the tank as required.

Inspect the fuel and vent lines for leakage or damage. Repair or replace as required. Ensure all connections are tight.

If liquid fuel is present in the fuel vapor storage canister, inspect the liquid check valve and replace if necessary.

Fuel Vapor Storage Canister Filter

The filter pad located at the bottom of the canister is the only serviceable part of the canister assembly. Replace at the interval specified in the Engine Maintenance Schedule.

Thermostatically Controlled Air Cleaner (TAC) System

Inspect the air valve in the air cleaner snorkel for proper operation. If necessary, refer to Chapter 1J—Fuel Systems for functional test procedure.

Inspect hoses for cracks and brittleness. Replace as necessary.

EXHAUST SYSTEMS

Air Injection Systems

Inspect hoses and hose connections for defects. Replace as necessary. Refer to Chapter 1K—Exhaust Systems for system functional test procedures.

Exhaust Manifold Heat Valve—Eight-Cylinder Engine

The exhaust manifold heat valve is an often overlooked, but highly important, emission control related device. This valve can affect the fuel economy, engine performance and driveability, and cause excessive emission of undesirable exhaust gases.

Inspect the valve (located in front exhaust pipe) for correct operation and lubricate with Jeep Heat Valve Lubricant, or equivalent. Refer to Chapter 1K—Exhaust Systems for additional service procedures.

SPECIFICATIONS

Tune-Up Specifications—On-Vehicle

CID and Venturi	Vehicle	Transmission	Slow Idle RPM		Initial Timing at Curb Idle		Distributor Model Number	Vacuum Mechanism Number	Tot. Degrees Advance at 2000 RPM	Centrifugal Advance	Spark Plug
			Set To	OK Range	Set To	OK Range					
151 2V	CJ	Manual (49-S)	900	800-1000	10°	±1°	1110560	8131940	33°-42°	Refer To Distributor	Type AC R44TSX 0.060 Inch (1.52 mm) Gap
		Automatic (49-S)	700	600-800	12°	±1°	1110561	8132515	30°-38°		
		Manual (Calif.)	900	800-1000	10°	±1°	1110560	8131940	33°-42°		
		Automatic (Calif.)	700	600-800	10°	±1°	1110560	8131940	33°-42°		
304 2V	CJ	Manual (49-S)	600	500-700	8°	±1°	3237198	8131969	34°-43°	Curves	N12Y (Alt. RN12Y) Gap 0.033 (0.84 mm) to 0.038 (0.97 mm)
		Manual (Hilly Terrain)	700	600-800	12°	±1°	3237198	8131969	38°-47°		
		Automatic (49-S)	600	550-650	10°	±1°	3237199	8131970	43°-52°		
360 2V	Cherokee Wagoneer Truck	Manual (49-S)	600	550-650	10°	±1°	3233174	8129470	36°-43°		
		Automatic (49-S)	600	550-650	10°	±1°	3233174	8129470	36°-43°		

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CID and Venturi	Vehicle	Trans.	Curb Idle Speed — RPM		Sol-Vac Speed RPM	Initial Timing BTDC at Curb Idle Speed With Vacuum Advance Hose Disconnected	Distributor Model Number	Vacuum Advance Mechanism	Total Degrees Advance At 2000 RPM	Centrifugal Advance	Spark Plug Type And Gap
			Set To	Holding Solenoid Energized	Vacuum Actuator Energized	Set To					
258 2V	CJ	Manual (49-S)	650 ±70	750 ±50	900 ±50	8° ±1°	3235141	8131971	35-43	Refer To Distributor Curves	Champion RFN14LY (Alternate FN14LY) 0.035 (0.033 to 0.038) Inch (0.84 to 0.97 mm) Gap
		Manual (Calif.)	650 ±70	750 ±50	900 ±50	4° ±1°	3235141	8131971	33-41		
		Automatic (49-S)	550 ±70	650 ±50	800 ±50	8° ±1°	3235141	8131971	37-45		
		Automatic (Calif.)	550 ±70	650 ±50	800 ±50	6° ±1°	3235141	8131971	35-43		
	Cherokee Wagoneer Truck	Manual (49-S)	650 ±70	750 ±50	900 ±50	8° ±1°	3235141	8131971	35-43		
		Manual (Calif.)	650 ±70	750 ±50	900 ±50	4° ±1°					
		Automatic (49-S)	550 ±70	650 ±50	800 ±50	8° ±1°					
		Automatic (Calif.)	550 ±70	650 ±50	800 ±50	6° ±1°					

NOTE: Automatic Adjusted in Drive; Manual in Neutral Sol-Vac de-energized.

NOTE: Automatic Adjusted in Drive; Manual Adjusted in Neutral. Idle Speed is 500 rpm with solenoid de-energized.

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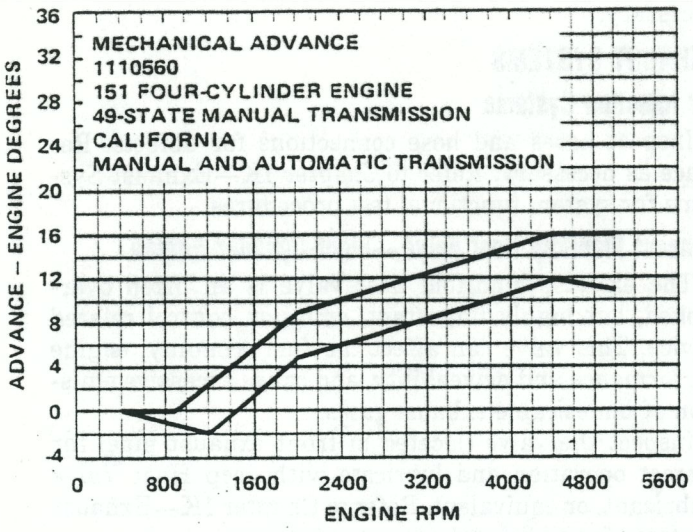
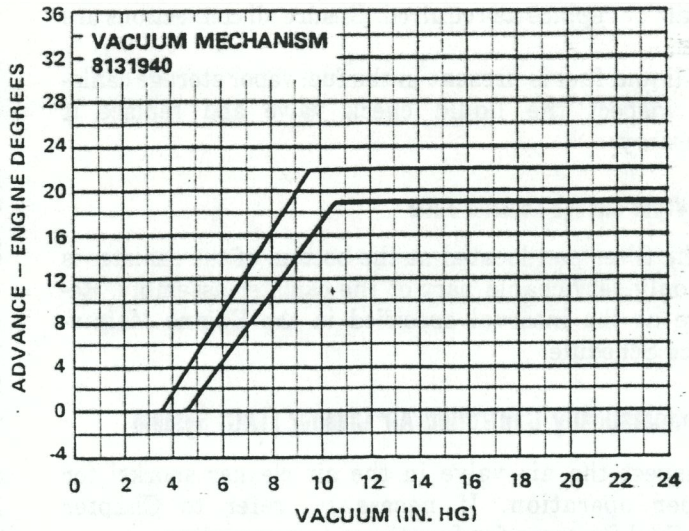
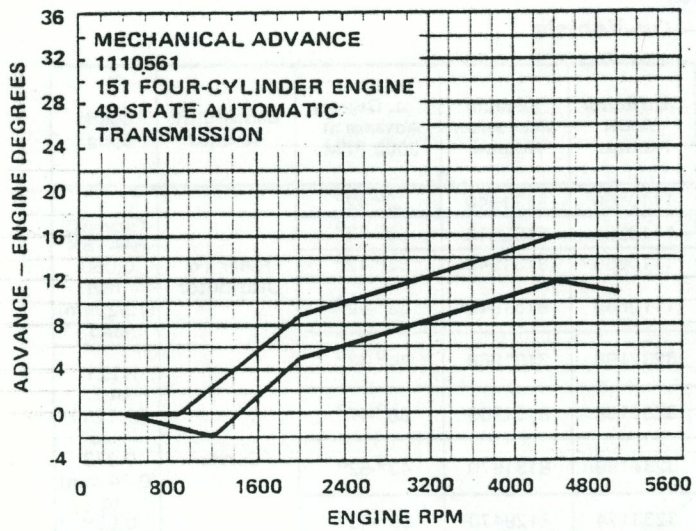
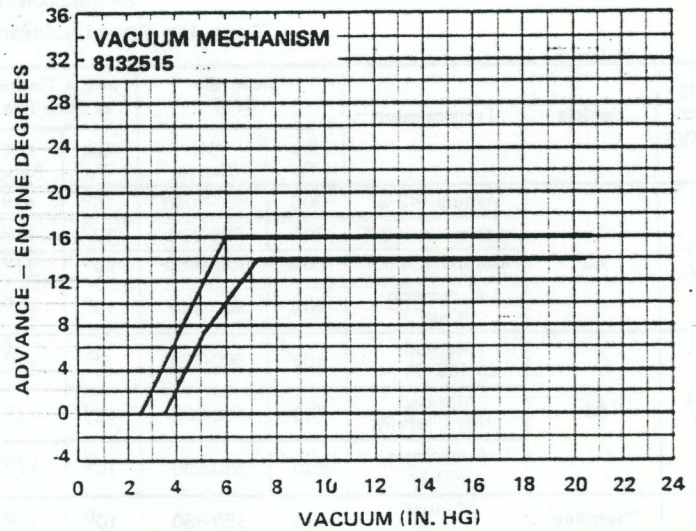
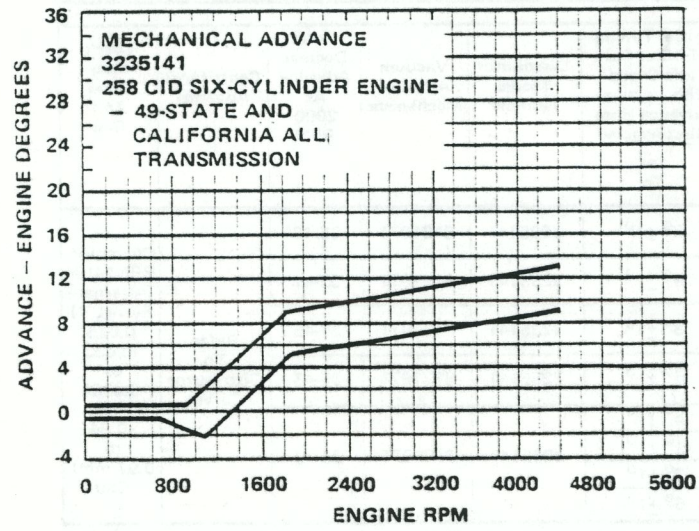
Distributor Curves—On-Vehicle

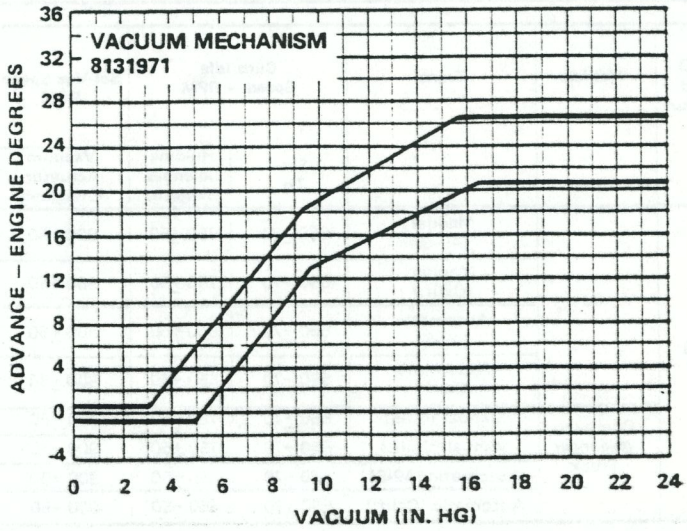












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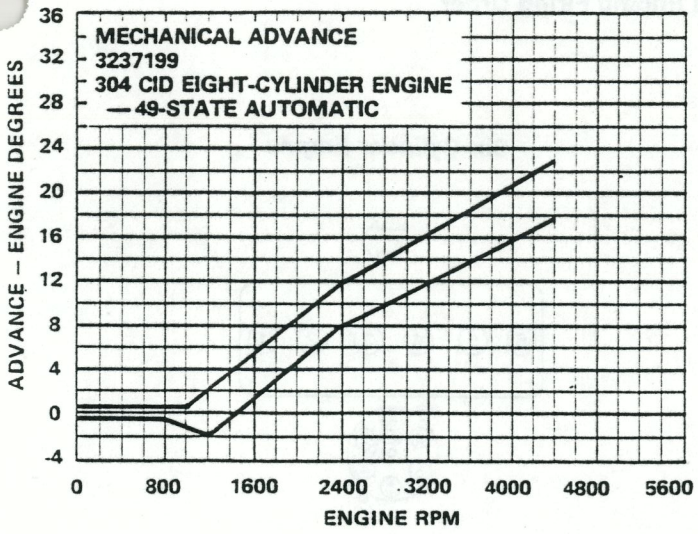
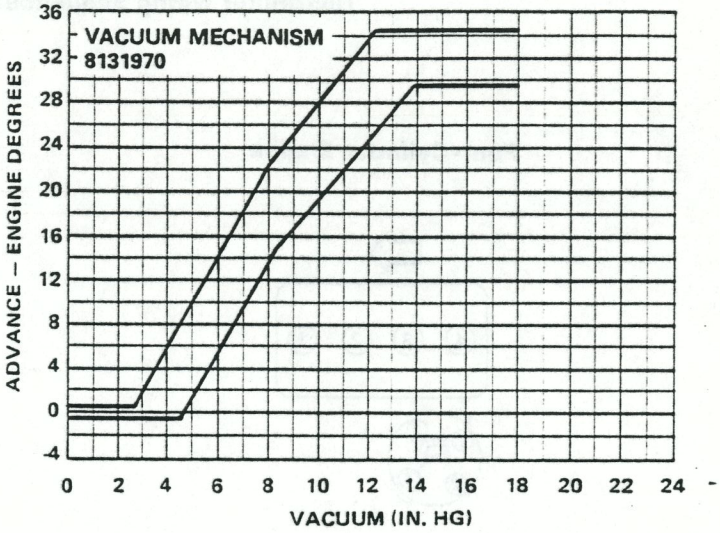
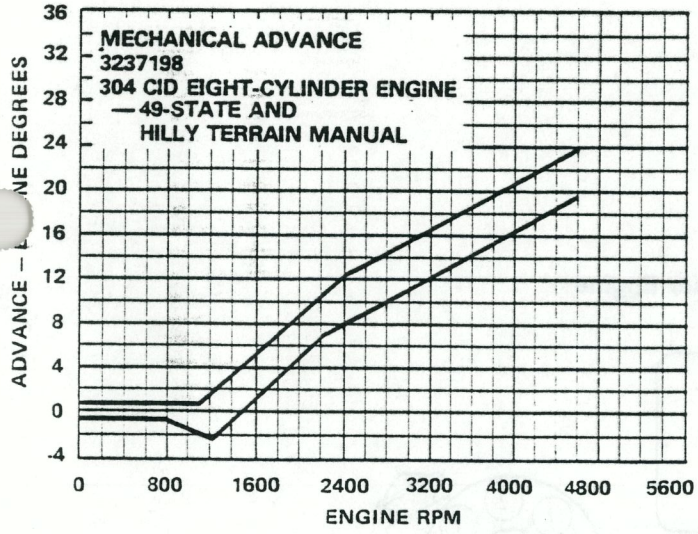
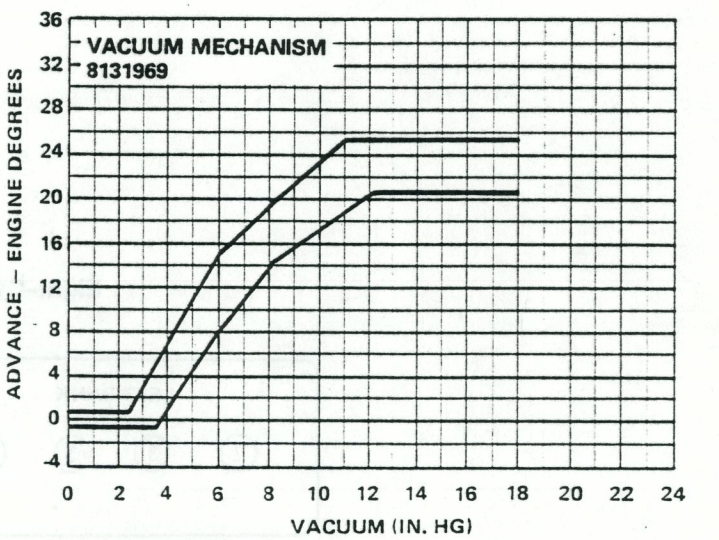
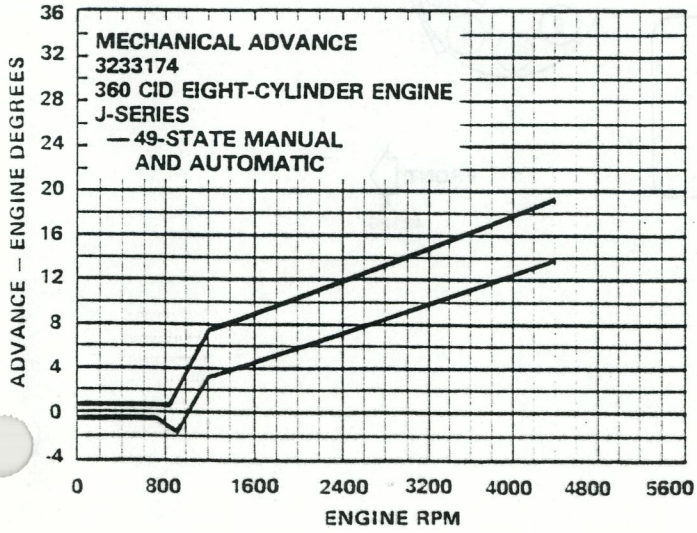
Distributor Curves—On-Vehicle

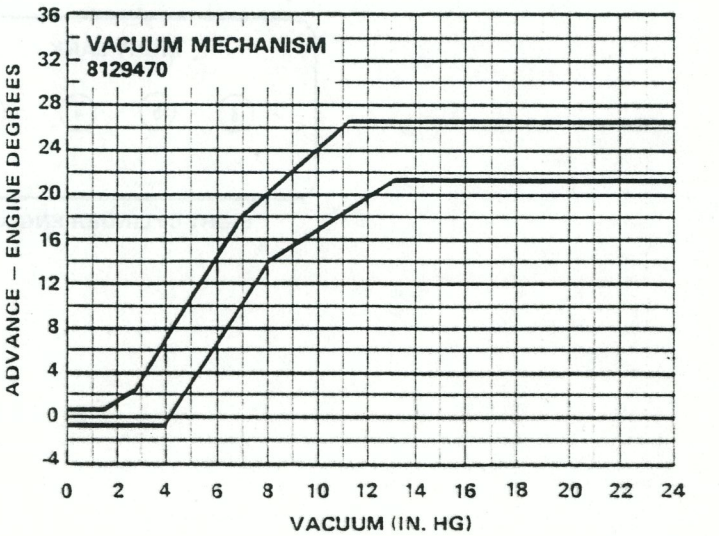












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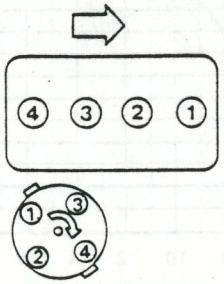
Distributor Wiring Sequence and Engine Firing Order

Four-Cylinder Engine



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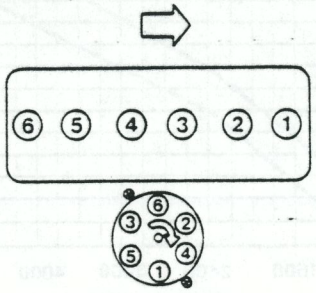
Six-Cylinder Engine



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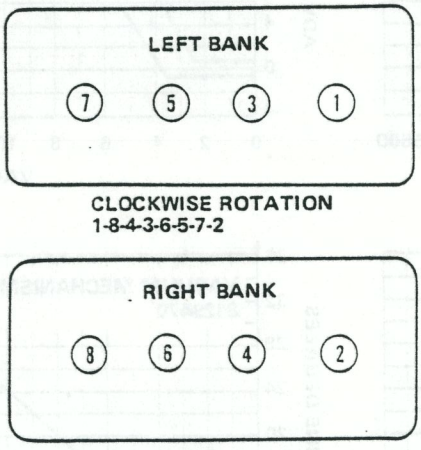
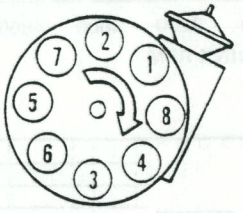
Eight-Cylinder Engine





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