SECTION A
GENERAL INFORMATION

SECTION INDEX

HOW TO USE THIS MANUAL

Organization

This manual is divided into twenty sections:

- General Information
- Maintenance
- Snow Plow—Snow Plow Power Packs
- Cabs and Cap
- Fabric Tops
- Mini-Spreader
- Winches
- Tire Carriers
- Front Drive Hubs
- Trailer Hitches, Tow Bar and Helper Springs
- Brush Guard, Roll Bars and Padding
- Fender and Bumper Extensions
- Off-Road Driving and Fog Lamps
- Seats
- Luggage and Ski Racks
- Sun Roof
- Strobe Warning Lamp and Backup Alarm
- Carpets
- Miscellaneous Kits—CJ Models
- Miscellaneous Kits—Cherokee-Wagoneer-Truck Models

Sections one through eighteen are comprised of special equipment installation procedures and, if required, repair procedures. The section index located at the beginning of this manual has a black locator tab for each section. The first page of each section has a corresponding tab that is visible from the outside edge. To locate a desired section, align applicable tabs and open the manual at the indicated page thickness. Each section has an alphabetical index of the included subjects. Also, for overall reference, an alphabetical index of the contents of this manual is located on its final pages.

Warnings and Cautions

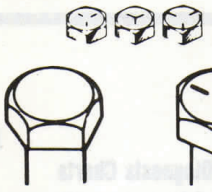
Detailed descriptions of standard safety procedures are not included within this manual. However, this manual does contain **WARNINGS** involving the installation and operation of certain equipment that could cause personal injury. **CAUTIONS** are included for certain procedures that could either damage the vehicle or the equipment. It is very important to understand that the **WARNINGS** and **CAUTIONS** do not encompass every conceivable situation that could potentially cause personal injury or vehicle damage. It is for this reason that everyone involved with the installations, maintenance, repairs and tools (whether or not recommended by Jeep Corporation) described in this manual must ensure that neither personal nor vehicle safety is being jeopardized.

Service Diagnosis Charts

Service Diagnosis Charts are included in this manual, as required. The charts list possible causes for specific malfunctions in descending order of probability. For example, the first listed cause will occur more frequently than the second, third, etc.

When an equipment malfunction is first detected, a visual inspection should be performed prior to diagnosis. This often leads directly to the cause of the problem and the repair process can be effected without delay.

Standard Torque Specifications and Capscrew Markings

CAPSCREW HEAD MARKINGS	CAPSCREW BODY SIZE Inches – Thread	SAE GRADE 1 or 2 (Used Infrequently) Torque		SAE GRADE 5 (Used Frequently) Torque		SAE GRADE 6 or 7 (Used at Times) Torque		SAE GRADE 8 (Used Frequently) Torque	
		Ft-Lb	N·m	Ft-Lb	N·m	Ft-Lb	N·m	Ft-Lb	N·m
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

70090

Torque Information

Tightening torque values are listed within the installation procedures, as applicable. Refer to the Standard Torque Specifications and Capscrew Markings Chart if additional specifications are required. All torque values are based on clean and dry threads. Reduce values by 10 percent when threads are oiled and by 20 percent for new, plated capscrews.

Torx-Head Fasteners

Various sized internal and external hex-lobular (Torx) head fasteners are used for the assembly and installation of some of the equipment described in this manual. They may not always be identified as such within a specific procedure but, when this type fastener is included in an equipment kit, they can be installed (or removed) with Tool Set J-25359-02.

Service Manual Improvements

A preaddressed, postage paid form is provided at the end of this section for user response. Please use this form to report errors, omissions and/or to submit recommendations for improving this manual. Your cooperation and effort will be greatly appreciated.

CONVERSION OF ENGLISH AND METRIC UNITS

Common Conversions:

- **Cubic Centimeters To Cubic Inches:** To convert cm^3 to in^3, multiply cm^3 by 0.061 (cm^3 x 0.061 = in^3).
- **Cubic Inches To Cubic Centimeters:** To convert in^3 to cm^3, multiply in^3 by 16.39 (in^3 x 16.39 = cm^3).
- **Liters To Cubic Inches:** To convert l to in^3, multiply l by 61.02 (l x 61.02 = in^3).
- **Cubic Inches To Liters:** To convert in^3 to l, multiply in^3 by 0.01639 (in^3 x 0.01639 = l).
- **Cubic Centimeters To Liters:** To convert cm^3 to l, divide cm^3 by 1000 (move decimal point three places left).
- **Liters To Cubic Centimeters:** To convert l to cm^3, multiply l by 1000 (move decimal point three places right).
- **Miles To Kilometers:** To convert miles to km, multiply miles by 1.609 (miles x 1.609 = km).
- **Kilometers To Miles:** To convert km to miles, multiply km by 0.6214 (km x 0.6214 = km miles).
- **Pounds To Kilograms:** To convert pounds to kg, multiply pounds by 2.2046 (pounds x 2.2046 = kg).
- **Kilograms To Pounds:** To convert kg to pounds, multiply kg by 0.4536 (kg x 0.4536 = pounds).

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

QUANTITY	EXAMPLES OF APPLICATIONS	METRIC UNIT	SYMBOL
Celsius Temperature	General use	degree Celsius	°C
Thermodynamic Temperature	General use	kelvin	k
Electric Current	General use	ampere	A
		milliampere	mA
		microampere	μA
Potential Difference (Electromotive Force)	General use	kilovolt	kV
		volt	V
		millivolt	mV
		microvolt	μV
Electric Resistance	General use	megohm	MΩ
		kilohm	kΩ
		ohm	Ω
Electric Capacitance	General use	farad	F
		microfarad	μF
		picofarad	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	kilopascal	kPa
	Coolant		
	Lubricating oil		
	Fuel pump delivery		
	Engine compression		
	Manifold		
	Brake line (hydraulic)		
	Car heating & ventilation		
	Barometric pressure		
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 °C

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	