

CIVIC



2002-2003
Service Manual
Hatchback

INTRODUCTION

How to Use This Manual

This manual is divided into 23 sections. The first page of each section is marked with a black tab that lines up with its corresponding thumb index tab on this page and the back cover. You can quickly find the first page of each section without looking through a full table of contents. The symbols printed at the top corner of each page can also be used as a quick reference system.


Each section includes:

1. A table of contents, or an exploded view index showing:
 - Parts disassembly sequence.
 - Bolt torques and thread sizes.
 - Page references to descriptions in text.
2. Disassembly/assembly procedures and tools.
3. Inspection.
4. Testing/troubleshooting.
5. Repair.
6. Adjustments.

Safety Messages

Your safety, and the safety of others, is very important. To help you make informed decisions, we have provided safety messages, and other safety information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing this vehicle. You must use your own good judgment.

You will find important safety information in a variety of forms including:

- **Safety Labels** – on the vehicle.
- **Safety Messages** – preceded by a safety alert symbol  and one of three signal words, DANGER, WARNING, or CAUTION. These signal words mean:

DANGER You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

WARNING You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

CAUTION You CAN be HURT if you don't follow instructions.

- **Instructions** – how to service this vehicle correctly and safely.

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As you read this manual, you will find information that is preceded by a **NOTICE** symbol. The purpose of this message is to help prevent damage to your vehicle, other property, or the environment.

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Specifications apply to U.S.A. and Canada

HONDA MOTOR CO., LTD.

Service Publication Office

As sections with *include SRS components;
special precautions are required when servicing.

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Maintenance	
Engine Electrical	
Engine	
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Fuel and Emissions	
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*Steering	
Suspension	
*Brakes (Including ABS)	
*Body	
*Heating, Ventilation and Air Conditioning	
*Body Electrical	
*Restraints	



General Information

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General Information

Chassis and Paint Codes - 2002 Model

Vehicle Identification Number

SHH EP3 3 5 * 2 U 300001

a b c d e f g h

a. Manufacturer, Make and Type of Vehicle
SHH: HONDA OF THE U.K. MFG., LTD. U.K.
HONDA Passenger vehicle

b. Line, Body and Engine Type
EP3: CIVIC/K20A3

c. Body Type and Transmission Type
3: 2-door Hatchback/5-speed Manual

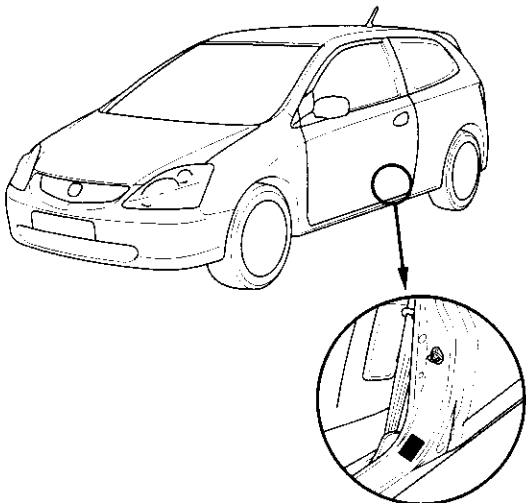
d. Vehicle Grade (Series)
5: Si (U.S.)
5: SiR (Canada)
6: Si with side airbag system (U.S.)
6: SiR with side airbag system (Canada)

e. Check Digit

f. Model Year
2: 2002

g. Factory Code
U: Honda of U.K. Manufacturing in Swindon, England

h. Serial Number
U.S.: 300001—
Canada: 600001—



Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification/Color Label.

Engine Number

K20A3 - 1700001

a b

a. Engine Type
K20A3: 2.0 l DOHC VTEC Sequential Multiport Fuel-injected engine

b. Serial Number

Transmission Number

NRH3 - 1000001

a b

a. Transmission Type
NRH3: 5-speed Manual

b. Serial Number

Paint Code

Code	Color	U.S.	Canada
B-92P	Nighthawk Black Pearl	○	○
NH-578	Taffeta White	○	○
NH-623M	Satin Silver Metallic	○	○
R-81	Milano Red	○	○
Y-62P	Euro Yellow Pearl	○	○



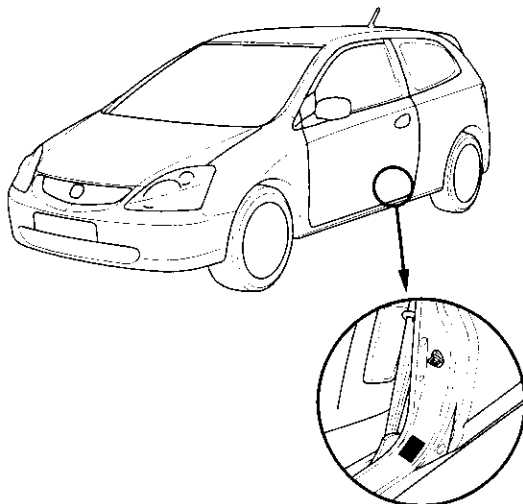
Chassis and Paint Codes - 2003 Model

Vehicle Identification Number

SHH EP3 3 5 * 3 U 400001

a b c d e f g h

- a. Manufacturer, Make and Type of Vehicle**
SHH: HONDA OF THE U.K. MFG., LTD. U.K.
HONDA Passenger vehicle
- b. Line, Body and Engine Type**
EP3: CIVIC/K20A3
- c. Body Type and Transmission Type**
3: 2-door Hatchback/5-speed Manual
- d. Vehicle Grade (Series)**
5: Si (U.S.)
5: SiR (Canada)
6: Si with side airbag system (U.S.)
6: SiR with side airbag system (Canada)
- e. Check Digit**
- f. Model Year**
3: 2003
- g. Factory Code**
U: Honda of U.K. Manufacturing in Swindon, England
- h. Serial Number**
U.S.: 400001—
Canada: 700001—



Vehicle Identification Number and Federal Motor Vehicle Safety Standard Certification/Color Label.

Engine Number

K20A3 - 2700001

a b

- a. Engine Type**
K20A3: 2.0 l DOHC VTEC Sequential Multiport Fuel-injected engine
- b. Serial Number**

Transmission Number

NRH3 - 2000001

a b

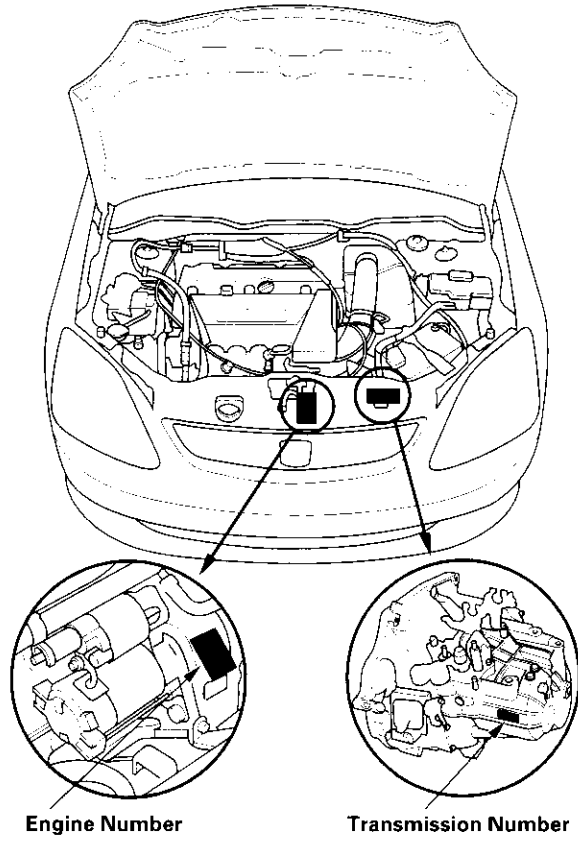
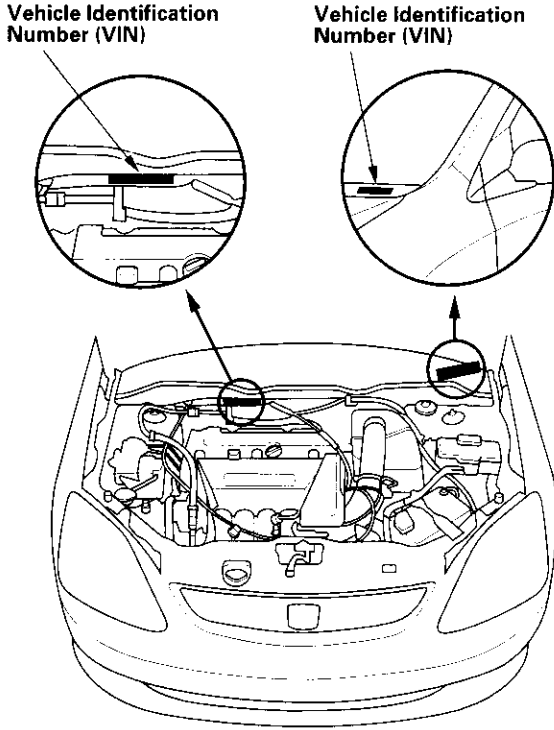
- a. Transmission Type**
NRH3: 5-speed Manual
- b. Serial Number**

Paint Code

Code	Color	U.S.	Canada
B-92P	Nighthawk Black Pearl	○	○
B-520P	Vivid Blue Pearl	○	○
NH-578	Taffeta White	○	○
NH-623M	Satin Silver Metallic	○	○
R-81	Milano Red		○
Y-62P	Euro Yellow Pearl		○

General Information

Identification Number Locations

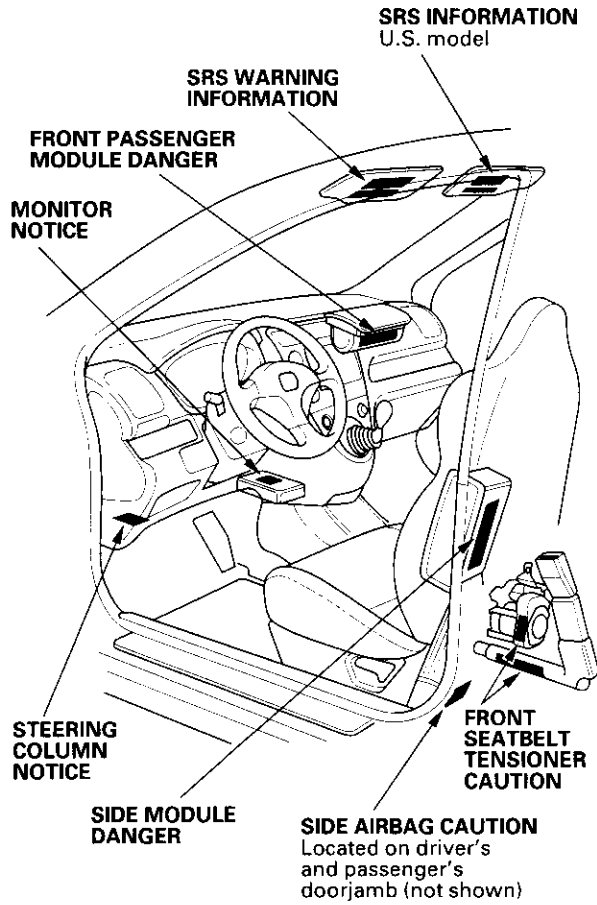




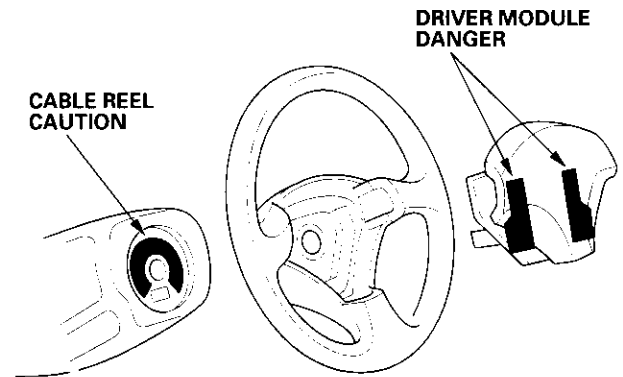
Warning/Caution Label Locations

NOTE: FRONT PASSENGER AIRBAG WARNING TAG (CHILD SEAT) is installed on the glove box on the U.S. model.

Passenger's Compartment:



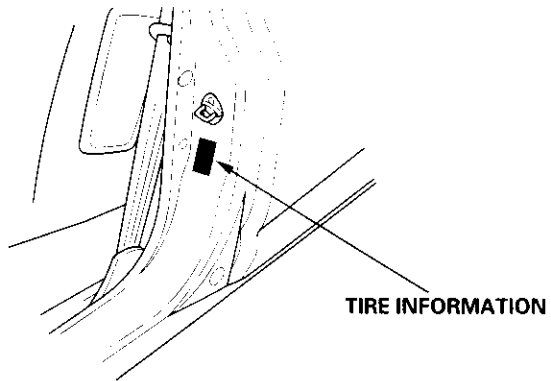
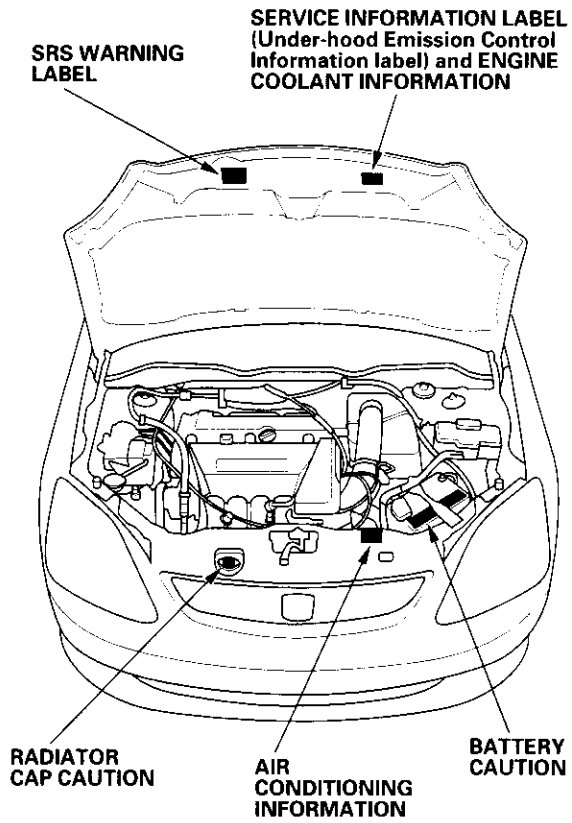
Steering Wheel:



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General Information

Warning/Caution Label Locations (cont'd)

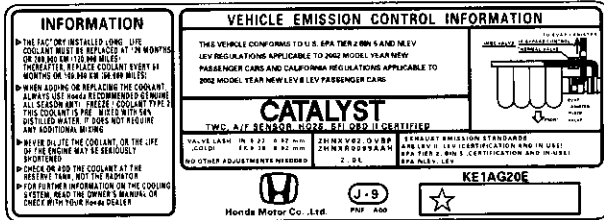




Under-hood Emission Control Label

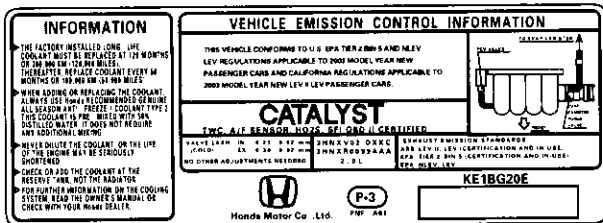
Emission Group Identification

Example: 2002 model



THIS VEHICLE CONFORMS TO U.S. EPA TIER 2 BIN 5 AND NLEV LEV REGULATIONS APPLICABLE TO 2002 MODEL YEAR NEW PASSENGER CARS AND CALIFORNIA REGULATIONS APPLICABLE TO 2002 MODEL YEAR NEW LEV II LEV PASSENGER CARS.

Example: 2003 model



THIS VEHICLE CONFORMS TO U.S. EPA TIER 2 BIN 5 AND NLEV LEV REGULATIONS APPLICABLE TO 2003 MODEL YEAR NEW PASSENGER CARS AND CALIFORNIA REGULATIONS APPLICABLE TO 2003 MODEL YEAR NEW LEV II LEV PASSENGER CARS.

Engine and Evaporative Families:

Engine Family:

2 HNX V 02.0 VBP
a b c d e

- a. Model Year
2: 2002
3: 2003
- b. Manufacturer Subcode
HNX: HONDA
- c. Family Type
V: LDV
- d. Displacement
- e. Sequence Characters
VBP: 2002
XKC: 2003

Evaporative Family:

2 HNX R 0099 AAH
a b c d e

- a. Model Year
2: 2002
3: 2003
- b. Manufacturer Subcode
HNX: HONDA
- c. Family Type
R: EVAP/ORVR
- d. Canister Work Capacity
- e. Sequence Characters
AAH: 2002
AAA: 2003

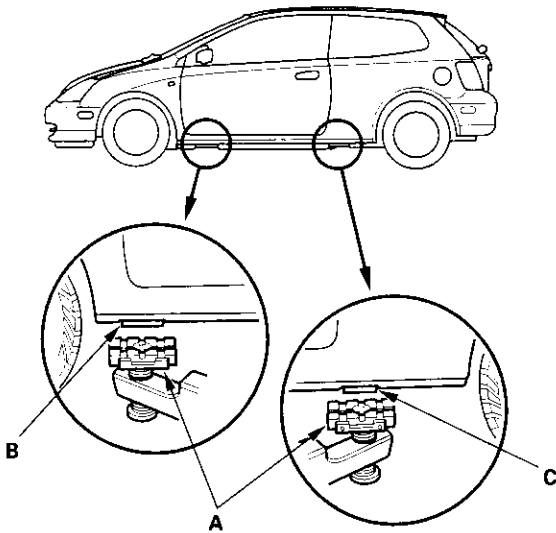
General Information

Lift and Support Points

NOTE: If you are going to remove heavy components such as suspension or the fuel tank from the rear of the vehicle, first support the front of the vehicle with tall safety stands. When substantial weight is removed from the rear of the vehicle, the center of gravity can change and cause the vehicle to tip forward on the hoist.

Frame Hoist

1. Position the hoist lift blocks (A), or safety stands, under the vehicle's front support points (B) and rear support points (C).



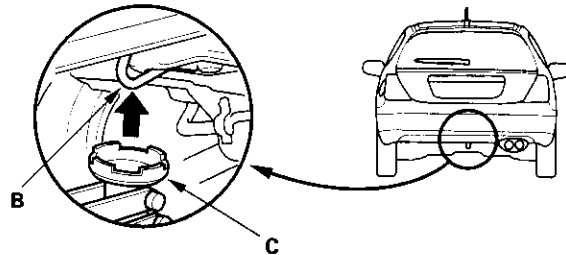
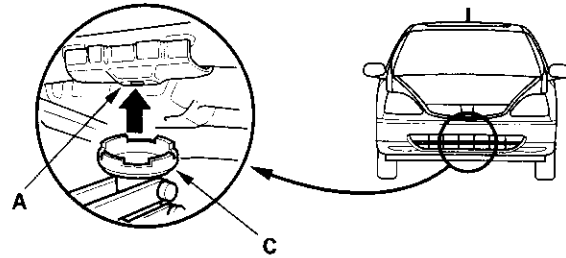
2. Raise the hoist a few inches, and rock the vehicle gently to be sure it is firmly supported.
3. Raise the hoist to full height, and inspect the lift points for solid contact with the lift blocks.

Safety Stands

To support the vehicle on safety stands, use the same support points (B and C) as for a frame hoist. Always use safety stands when working on or under any vehicle that is supported only by a jack.

Floor Jack

1. Set the parking brake.
2. Block the wheels that are not being lifted.
3. When lifting the rear of the vehicle, put the gearshift lever in reverse.
4. Position the floor jack under the front jacking bracket (A) or rear jacking bracket (B), center the jacking bracket in the jack lift platform (C), and jack up the vehicle high enough to fit the safety stands under it.



5. Position the safety stands under the support points and adjust them so the vehicle will level.
6. Lower the vehicle onto the stands.



Towing

If the vehicle needs to be towed, call a professional towing service. Never tow the vehicle behind another vehicle with just a rope or chain. It is very dangerous.

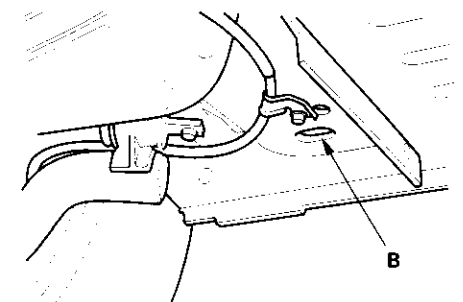
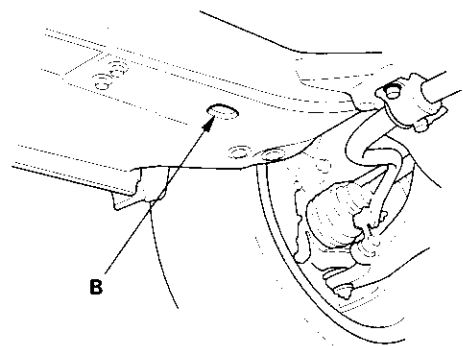
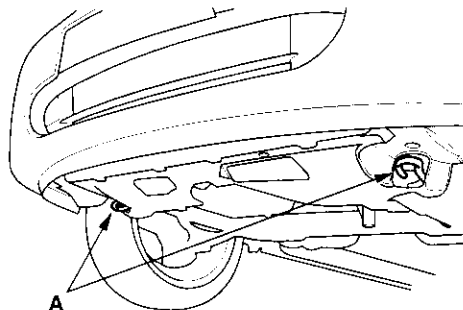
Emergency Towing

There are three popular methods of towing a vehicle.

Flat-bed Equipment — The operator loads the vehicle on the back of a truck. This is the best way of transporting the vehicle.

To accommodate flat-bed equipment, the vehicle is equipped with towing hooks (A) and tie down hooks (B).

The towing hook can be used with a winch to pull the vehicle onto the truck, and the tie down hooks slots can be used to secure the vehicle to truck.



Wheel Lift Equipment — The tow truck uses two pivoting arms that go under the tires (front or rear) and lifts them off the ground. The other two wheels remain on the ground. This is an acceptable way of towing the vehicle.

Sling-type Equipment — The tow truck uses metal cables with hooks on the ends. These hooks go around parts of the frame or suspension and the cables lift that end of the vehicle off the ground. The vehicle's suspension and body can be seriously damaged if this method of towing is attempted.

If the vehicle cannot be transported by flat-bed, it should be towed with the front wheels off the ground. If due to damage, the vehicle must be towed with the front wheels on the ground, do the following:

- Release the parking brake.
- Shift the transmission in Neutral.

It is best to tow the vehicle no farther than 50 miles (80 km), and keep the speed below 35 mph (55 km/h).

NOTICE

- Improper towing preparation will damage the transmission. Follow the above procedure exactly. If you cannot shift the transmission, the vehicle must be transported on a flat-bed.
- Trying to lift or tow the vehicle by the bumpers will cause serious damage. The bumpers are not designed to support the vehicle's weight.

General Information

Parts Marking

To deter vehicle theft, certain major components are marked with the vehicle identification number (VIN). Original parts have self-adhesive labels. Replacement body parts have generic self-adhesive labels. The original engine or transmission VIN plate is transferred to a replacement engine or transmission and attached with break-off bolts.

NOTE: Be careful not to damage the parts marking labels during body repair. Mask the labels before repairing the part.

Specifications

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Standards and Service Limits

Engine Electrical

Item	Measurement	Qualification	Standard or New	Service Limit
Ignition coil	Rated voltage		12 V	
	Firing order		1-3-4-2	
Spark plug	Type		NGK: IZFR6K11 DENSO: SKJ20DR-M11	
	Gap		1.0-1.1 mm (0.039-0.043 in.)	1.3 mm (0.051 in.)
Ignition timing		At idle (check the red mark)	in neutral: $8 \pm 2^\circ$ BTDC at 650 ± 50 rpm	
Alternator	Output	At 13.5 V and normal engine temperature	80 A	
	Coil (rotor) resistance	At 68°F (20°C)	2.2-3.0 Ω	
	Slip ring O.D.		14.4 mm (0.57 in.)	14.0 mm (0.55 in.)
	Brush length		10.5 mm (0.41 in.)	1.5 mm (0.06 in.)
	Brush spring tension		2.9-3.5 N (0.30-0.36 kgf, 0.7-0.8 lbs)	
Starter	Output		1.1 kW	
	Commutator mica depth		0.50-0.80 mm (0.020-0.031 in.)	0.20 mm (0.008 in.)
	Commutator runout		0.02 mm (0.001 in.) max.	0.05 mm (0.002 in.)
	Commutator O.D.		28.0 mm (1.10 in.)	27.0 mm (1.06 in.)
	Brush length		14.0-14.5 mm (0.55-0.57 in.)	9.0 mm (0.35 in.)

Engine Assembly

Item	Measurement	Qualification	Standard or New	Service Limit
Compression	Pressure check at 250 rpm with wide open throttle. (See Design Specs for ratio)	Minimum	930 kPa (9.5 kgf/cm ² , 135 psi)	
		Maximum variation	200 kPa (2.0 kgf/cm ² , 28 psi)	

Cylinder Head

Item	Measurement	Qualification	Standard or New	Service Limit	
Head	Warpage			0.05 mm (0.002 in.)	
	Height		103.95 – 104.05 mm (4.093 – 4.096 in.)		
Camshaft	End play		0.05 – 0.20 mm (0.002 – 0.008 in.)	0.4 mm (0.02 in.)	
	Camshaft-to-holder oil clearance	No. 1 journal	0.030 – 0.069 mm (0.001 – 0.003 in.)	0.15 mm (0.006 in.)	
		No. 2, 3, 4, 5 journals	0.060 – 0.099 mm (0.002 – 0.004 in.)	0.15 mm (0.006 in.)	
	Total runout		0.03 mm (0.001 in.) max.	0.04 mm (0.002 in.)	
	Cam lobe height	Intake, primary		33.925 mm (1.3356 in.)	
		Intake, secondary		29.638 mm (1.1668 in.)	
Exhaust			34.092 mm (1.3422 in.)		
Valves	Clearance (cold)	Intake	0.21 – 0.25 mm (0.008 – 0.010 in.)		
		Exhaust	0.28 – 0.32 mm (0.011 – 0.013 in.)		
	Stem O.D.	Intake	5.475 – 5.485 mm (0.2156 – 0.2159 in.)	5.445 mm (0.214 in.)	
		Exhaust	5.450 – 5.460 mm (0.2146 – 0.2150 in.)	5.42 mm (0.213 in.)	
	Stem-to-guide clearance	Intake	0.030 – 0.055 mm (0.0012 – 0.0022 in.)	0.08 mm (0.003 in.)	
		Exhaust	0.055 – 0.080 mm (0.0022 – 0.0031 in.)	0.11 mm (0.004 in.)	
Valve seats	Width	Intake	1.25 – 1.55 mm (0.049 – 0.061 in.)	2.00 mm (0.079 in.)	
		Exhaust	1.25 – 1.55 mm (0.049 – 0.061 in.)	2.00 mm (0.079 in.)	
	Stem installed height	Intake	40.8 – 41.0 mm (1.606 – 1.614 in.)		
		Exhaust	54.6 – 54.8 mm (2.150 – 2.157 in.)		
Valve springs	Free length	Intake	47.61 mm (1.874 in.)		
		Exhaust	49.64 mm (1.954 in.)		
Valve guides	I.D.	Intake	5.515 – 5.530 mm (0.2171 – 0.2177 in.)	5.55 mm (0.219 in.)	
		Exhaust	5.515 – 5.530 mm (0.2171 – 0.2177 in.)	5.55 mm (0.219 in.)	
	Installed height	Intake	15.2 – 16.2 mm (0.598 – 0.638 in.)		
		Exhaust	15.5 – 16.5 mm (0.610 – 0.650 in.)		
Rocker arms	Arm-to-shaft clearance	Intake	0.025 – 0.052 mm (0.0010 – 0.0020 in.)	0.08 mm (0.003 in.)	
		Exhaust	0.018 – 0.056 mm (0.0007 – 0.0022 in.)	0.08 mm (0.003 in.)	

Standards and Service Limits

Engine Block

Item	Measurement	Qualification	Standard or New	Service Limit
Block	Warpage of deck		0.07 mm (0.003 in.) max.	0.10 mm (0.004 in.)
	Bore diameter	A or I	86.010 – 86.020 mm (3.3862 – 3.3866 in.)	86.070 mm (3.3886 in.)
		B or II	86.000 – 86.010 mm (3.3858 – 3.3862 in.)	86.070 mm (3.3886 in.)
	Bore taper			0.05 mm (0.002 in.)
	Reboring limit			0.25 mm (0.01 in.)
Piston	Skirt O.D. at 11 mm (0.4 in.) from bottom of skirt	No letter or A	85.980 – 85.990 mm (3.3850 – 3.3854 in.)	85.930 mm (3.3831 in.)
		Letter B	85.970 – 85.980 mm (3.3846 – 3.3850 in.)	85.920 mm (3.3827 in.)
	Clearance in cylinder		0.020 – 0.040 mm (0.0008 – 0.0016 in.)	0.05 mm (0.002 in.)
	Ring groove width	Top	1.220 – 1.230 mm (0.0481 – 0.0484 in.)	1.25 mm (0.049 in.)
		Second	1.220 – 1.230 mm (0.0481 – 0.0484 in.)	1.25 mm (0.049 in.)
Oil		2.005 – 2.025 mm (0.0789 – 0.0797 in.)	2.05 mm (0.081 in.)	
Piston ring	Ring-to-groove clearance	Top	0.035 – 0.060 mm (0.0014 – 0.0024 in.)	0.13 mm (0.005 in.)
		Second (REKEN)	0.030 – 0.055 mm (0.0012 – 0.0022 in.)	0.13 mm (0.005 in.)
		Second (FEDERAL MOGUL)	0.025 – 0.060 mm (0.0010 – 0.0024 in.)	0.13 mm (0.005 in.)
	Ring end gap	Top	0.20 – 0.35 mm (0.008 – 0.014 in.)	0.60 mm (0.024 in.)
		Second	0.40 – 0.55 mm (0.016 – 0.022 in.)	0.70 mm (0.028 in.)
		Oil (REKEN)	0.25 – 0.65 mm (0.010 – 0.026 in.)	0.75 mm (0.030 in.)
		Oil (FEDERAL MOGUL)	0.20 – 0.70 mm (0.008 – 0.028 in.)	0.80 mm (0.031 in.)
Piston pin	O.D.		21.961 – 21.965 mm (0.8646 – 0.8648 in.)	21.953 mm (0.8643 in.)
	Pin-to-piston clearance		– 0.005 – + 0.002 mm (– 0.00020 – + 0.00008 in.)	0.005 mm (0.0002 in.)
Connecting rod	Pin-to-rod clearance		0.005 – 0.015 mm (0.0002 – 0.0006 in.)	0.02 mm (0.0008 in.)
	Small-end bore diameter		21.970 – 21.976 mm (0.8650 – 0.8652 in.)	
	Large-end bore diameter (Normal)		48.0 mm (1.89 in.)	
	End play installed on crankshaft		0.15 – 0.30 mm (0.006 – 0.012 in.)	0.40 mm (0.016 in.)
Crankshaft	Main journal diameter	No. 1 journal	54.984 – 55.008 mm (2.1648 – 2.1657 in.)	
		No. 2 journal		
		No. 4 journal		
		No. 5 journal		
		No. 3 journal		
	Rod journal diameter		44.976 – 45.000 mm (1.7707 – 1.7717 in.)	
	Rod/main journal taper		0.005 mm (0.0002 in.) max.	0.010 mm (0.0004 in.)
Rod/main journal out-of-round		0.005 mm (0.0002 in.) max.	0.010 mm (0.0004 in.)	
End play		0.10 – 0.35 mm (0.004 – 0.014 in.)	0.45 mm (0.018 in.)	
Runout		0.03 mm (0.0012 in.) max.	0.04 mm (0.0016 in.)	
Crankshaft bearings	Main bearing-to-journal oil clearance	No. 1 journal	0.017 – 0.041 mm (0.0007 – 0.0016 in.)	0.050 mm (0.0020 in.)
		No. 2 journal		
		No. 4 journal		
No. 5 journal				
	No. 3 journal	0.025 – 0.049 mm (0.0010 – 0.0019 in.)	0.055 mm (0.0022 in.)	
	Rod bearing clearance		0.021 – 0.049 mm (0.0008 – 0.0019 in.)	0.060 mm (0.0024 in.)

Engine Lubrication

Item	Measurement	Qualification	Standard or New	Service Limit	
Engine oil	Capacity		5.3 ℓ (5.6 US qt) for engine overhaul 4.2 ℓ (4.4 US qt) for oil change, including filter 4.0 ℓ (4.2 US qt) for oil change, without filter		
Oil pump	Inner-to-outer rotor clearance		0.02–0.16 mm (0.001–0.006 in.)	0.20 mm (0.008 in.)	
	Pump housing-to-outer rotor clearance		0.15–0.21 mm (0.006–0.008 in.)	0.23 mm (0.009 in.)	
	Pump housing-to-rotor axial clearance		0.02–0.07 mm (0.001–0.003 in.)	0.12 mm (0.005 in.)	
	Balancer shafts, journal diameter		No. 1 journal, front shaft	19.938–19.950 mm (0.7850–0.7854 in.)	19.92 mm (0.784 in.)
			No. 1 journal, rear shaft	23.938–23.950 mm (0.9424–0.9429 in.)	23.92 mm (0.942 in.)
			No. 2 journal, front and rear shaft	32.949–32.961 mm (1.2972–1.2977 in.)	32.93 mm (1.296 in.)
	Balancer shafts, journal taper		0.005 mm (0.0002 in.) max.		
	Balancer shafts, end play		Front	0.070–0.135 mm (0.0028–0.0053 in.)	0.15 mm (0.006 in.)
			Rear	0.070–0.135 mm (0.0028–0.0053 in.)	0.15 mm (0.006 in.)
	Balancer shafts, shaft-to-bearing clearance		No. 1 journal, front shaft	0.050–0.082 mm (0.0020–0.0032 in.)	0.10 mm (0.004 in.)
			No. 1 journal, rear shaft	0.050–0.082 mm (0.0020–0.0032 in.)	0.10 mm (0.004 in.)
			No. 2 journal, front and rear shaft	0.060–0.120 mm (0.0024–0.0047 in.)	0.15 mm (0.006 in.)
	Balancer shaft bearings, I.D.		No. 1 journal, front shaft	20.000–20.020 mm (0.7874–0.7882 in.)	20.03 mm (0.789 in.)
			No. 1 journal, rear shaft	24.000–24.020 mm (0.9449–0.9457 in.)	24.03 mm (0.946 in.)
No. 2 journal, front and rear shaft			33.021–33.069 mm (1.3000–1.3019 in.)	33.09 mm (1.303 in.)	
Relief valve, oil pressure with oil temperature at 176°F (80°C)		At idle	70 kPa (0.7 kgf/cm ² , 10 psi) min.		
		At 3,000 rpm	300 kPa (3.1 kgf/cm ² , 44 psi) min.		

Cooling

Item	Measurement	Qualification	Standard or New	Service Limit
Radiator	Coolant capacity (includes engine, heater, hoses, and reservoir)	Engine overhaul	6.7 L (7.1 US qt)	
		Coolant change	5.0 L (5.3 US qt)	
Reservoir	Coolant capacity		0.53 L (0.56 US qt)	
Radiator cap	Opening pressure		93–123 kPa (0.95–1.25 kgf/cm ² , 14–18 psi)	
Thermostat	Opening temperature	Begins to open	169–176°F (76–80°C)	
		Fully open	194°F (90°C)	
	Valve lift at fully open		8.0 mm (0.31 in.) min.	
Radiator fan switch	Switching temperature	Turns ON	196–203°F (91–95°C)	
		Turns OFF	Subtract 5–15°F (3–8°C) from actual ON temperature	

Standards and Service Limits

Fuel and Emissions

Item	Measurement	Qualification	Standard or New	Service Limit
Fuel pressure regulator	Pressure with fuel pressure gauge connected		320–370 kPa (3.3–3.8 kgf/cm ² , 47–52 psi)	
Fuel tank	Capacity		50 l (13.2 US gal)	
Engine idle	Idle speed with headlights and radiator fan off	Neutral	750 ± 50 rpm	
	Fast idle	Neutral	1,600 ± 50 rpm	

Clutch

Item	Measurement	Qualification	Standard or New	Service Limit
Clutch pedal	Height from the floor		193 mm (7.60 in.)	
	Stroke		130–140 mm (5.1–5.5 in.)	
	Play		10–16 mm (0.39–0.63 in.)	
	Disengagement height from the floor		115 mm (4.53 in.) min.	
Flywheel	Runout on clutch mating surface		0.05 mm (0.002 in.) max.	0.15 mm (0.006 in.)
Clutch disc	Rivet head depth		1.65–2.25 mm (0.065–0.089 in.)	0.7 mm (0.03 in.)
	Thickness		8.3–8.9 mm (0.33–0.35 in.)	6.0 mm (0.24 in.)
Pressure plate	Warpage		0.03 mm (0.001 in.) max.	0.15 mm (0.001 in.)
	Height of diaphragm spring fingers	Measured with special tool and feeler gauge	0.6 mm (0.02 in.) max.	0.8 mm (0.03 in.)

Manual Transmission and M/T Differential

Item	Measurement	Qualification	Standard or New	Service Limit
Transmission fluid	Capacity		For fluid change: 1.5 ℓ (1.6 US qt)	
			For overhaul: 1.7 ℓ (1.8 US qt)	
Mainshaft	End play		0.11–0.17 mm (0.004–0.007 in.)	Adjust
	Diameter of bushing surface		20.80–20.85 mm (0.819–0.821 in.)	20.75 mm (0.817 in.)
	Diameter of distance collar		31.984–32.000 mm (1.2594–1.2598 in.)	31.93 mm (1.257 in.)
	Diameter of ball bearing contact area (clutch housing side)		27.977–27.990 mm (1.1015–1.1020 in.)	27.92 mm (1.099 in.)
	Diameter of needle bearing contact area		38.984–39.000 mm (1.5348–1.5354 in.)	38.93 mm (1.533 in.)
	Diameter of ball bearing contact area (transmission housing side)		27.987–28.000 mm (1.1019–1.1024 in.)	27.93 mm (1.100 in.)
	Runout		0.02 mm (0.001 in.) max.	0.05 mm (0.002 in.)
Mainshaft 3rd, 4th and 5th gears	I.D.		44.009–44.025 mm (1.7326–1.7333 in.)	44.08 mm (1.735 in.)
	End play		0.06–0.16 mm (0.002–0.006 in.)	0.25 mm (0.010 in.)
	Thickness		23.92–23.97 mm (0.941–0.944 in.)	23.80 mm (0.937 in.)
Countershaft	Diameter of needle bearing contact area (clutch housing side)		35.000–35.015 mm (1.3780–1.3785 in.)	34.95 mm (1.376 in.)
	Diameter of distance collar contact area		39.937–39.950 mm (1.5723–1.5728 in.)	39.88 mm (1.570 in.)
	Diameter of ball bearing contact area (transmission housing side)		30.020–30.033 mm (1.1819–1.1824 in.)	29.97 mm (1.180 in.)
	Runout		0.02 mm (0.001 in.) max.	0.05 mm (0.002 in.)
	35 mm shim-to-bearing inner race clearance		0.04–0.10 mm (0.0016–0.0039 in.)	Adjust
Countershaft 1st gear	I.D.		52.010–52.029 mm (2.0476–2.0484 in.)	52.08 mm (2.050 in.)
	End play		0.06–0.16 mm (0.002–0.006 in.)	0.25 mm (0.010 in.)
	Thickness		22.92–22.97 mm (0.902–0.904 in.)	22.87 mm (0.900 in.)
Countershaft 2nd gear	I.D.		52.010–52.029 mm (2.0476–2.0484 in.)	52.08 mm (2.050 in.)
	End play		0.06–0.16 mm (0.002–0.006 in.)	0.25 mm (0.010 in.)
	Thickness		27.92–27.97 mm (1.099–1.101 in.)	27.87 mm (1.097 in.)
Countershaft 1st gear distance collar	I.D.		39.95–39.96 mm (1.5728–1.5732 in.)	39.97 mm (1.574 in.)
	O.D.		46.989–47.000 mm (1.8499–1.8504 in.)	46.94 mm (1.848 in.)
	Length		23.03–23.08 mm (0.907–0.909 in.)	
Countershaft 2nd gear distance collar	I.D.		39.95–39.96 mm (1.5728–1.5732 in.)	39.97 mm (1.574 in.)
	O.D.		46.989–47.000 mm (1.8499–1.8504 in.)	46.94 mm (1.848 in.)
	Length		28.03–28.08 mm (1.104–1.106 in.)	

Standards and Service Limits

Manual Transmission and Differential (cont'd)

Item	Measurement	Qualification	Standard or New	Service Limit
Mainshaft 4th and 5th gears distance collar	I.D.		32.00–32.01 mm (1.2598–1.2602 in.)	32.02 mm (1.261 in.)
	O.D.		38.989–39.000 mm (1.5350–1.5354 in.)	38.94 mm (1.533 in.)
	Length	A	51.95–52.05 mm (2.045–2.049 in.)	
B		24.03–24.08 mm (0.946–0.947 in.)		
MBS distance collar	I.D.		28.00–28.01 mm (1.102–1.103 in.)	28.02 mm (1.103 in.)
	Length		23.95–24.05 mm (0.943–0.947 in.)	
Reverse idler gear	I.D.		20.016–20.043 mm (0.7880–0.7891 in.)	20.90 mm (0.832 in.)
	Gear-to-reverse gear shaft clearance		0.036–0.084 mm (0.0014–0.0033 in.)	0.16 mm (0.006 in.)
Synchro ring	Ring-to-gear clearance	Ring pushed against gear	0.70–1.49 mm (0.028–0.059 in.)	0.4 mm (0.016 in.)
Triple cone synchro	Outer synchro ring-to-synchro cone clearance	Ring pushed against gear	0.70–1.19 mm (0.028–0.047 in.)	0.3 mm (0.012 in.)
	Synchro cone-to-gear clearance	Ring pushed against gear	0.50–1.04 mm (0.020–0.041 in.)	0.3 mm (0.012 in.)
	Outer synchro ring-to-gear cone clearance	Ring pushed against gear	0.95–1.68 mm (0.037–0.066 in.)	0.6 mm (0.024 in.)
Shift fork	Finger thickness		7.4–7.6 mm (0.29–0.30 in.)	
	Fork-to-synchro sleeve clearance		0.35–0.65 mm (0.014–0.026 in.)	1.0 mm (0.039 in.)
Reverse shift fork	Finger thickness		13.4–13.7 mm (0.527–0.539 in.)	
	Fork-to-reverse idler gear clearance		0.20–0.59 mm (0.007–0.024 in.)	1.3 mm (0.051 in.)
Shift arm	I.D.		13.973–14.000 mm (0.5501–0.5512 in.)	
	Shift fork diameter at contact area		16.9–17.0 mm (0.665–0.669 in.)	
	Shift arm-to-shift lever clearance		0.2–0.5 mm (0.008–0.020 in.)	0.62 mm (0.024 in.)
Select lever	Finger width		14.85–14.95 mm (0.585–0.589 in.)	
Shift lever	Shaft-to-select lever clearance		0.05–0.25 mm (0.002–0.010 in.)	0.50 mm (0.020 in.)
	Groove (to select lever)		15.00–15.10 mm (0.591–0.594 in.)	
	Shaft-to-shift arm clearance		0.013–0.07 mm (0.0005–0.003 in.)	0.1 mm (0.004 in.)
M/T differential carrier	Pinion shaft contact area I.D.		18.010–18.028 mm (0.7091–0.7098 in.)	
	Carrier-to-pinion shaft clearance		0.027–0.057 mm (0.0011–0.0022 in.)	0.1 mm (0.004 in.)
	Driveshaft contact area I.D.		28.025–28.045 mm (1.1033–1.1041 in.)	
M/T differential pinion gear	Backlash		0.05–0.15 mm (0.002–0.006 in.)	
	I.D.		18.042–18.066 mm (0.7103–0.7113 in.)	
	Pinion gear-to-pinion shaft clearance		0.059–0.095 mm (0.0023–0.0037 in.)	0.15 mm (0.006 in.)
80 mm shim	80 mm shim-to-bearing outer race clearance in transmission housing		0–0.10 mm (0–0.0039 in.)	Adjust