

WORKSHOP MANUAL

**US VERSION
RIGHT HAND MODEL
EXP UBS**

ISUZU

PubNo. RV99_02-01.E

WORKSHOP MANUAL

1999

Frontera (UE)

2000

Frontera (UE)

2001

Frontera (UE)

WORKSHOP MANUAL

FRONTERA (UE)

FOREWORD

This manual includes special notes, important points, service data, precautions, etc. That are needed for the maintenance, adjustments, service, removal and installation of vehicle components.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication.

All rights are reserved to make changes at any time without notice.

Arrangement of the material is shown in the table of contents on the right-hand side of this page. A black spot on the first page of each section can be seen on the edge of the book below each section title. These point to a more detailed table of contents preceding each section.

This manual applies to 1999 models.

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GENERAL INFORMATION

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GENERAL INFORMATION

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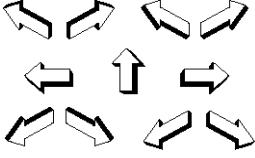






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General Repair Instruction

- If a floor jack is used, the following precautions are recommended.
Park vehicle on level ground, "block" front or rear wheels, set jack against the recommended lifting points (see "Lifting Instructions" in this section), raise vehicle and support with chassis stands and then perform the service operations.
- Before performing service operations, disconnect ground cable from the battery to reduce the chance of cable damage and burning due to short circuiting.
- Use a cover on body, seats and floor to protect them against damage and contamination.
- Brake fluid and anti-freeze solution must be handled with reasonable care, as they can cause paint damage.
- The use of proper tools and recommended essential and available tools, where specified, is important for efficient and reliable performance of service repairs.
- Use genuine Isuzu parts.
- Used cotter pins, plastic clips, gaskets, O-rings, oil seals, lock washers and self-locking nuts should be discarded and new ones should be installed, as normal function of the parts cannot be maintained if these parts are reused.
- To facilitate proper and smooth reassembly operation, keep disassembled parts neatly in groups. Keeping fixing bolts and nuts separate is very important, as they vary in hardness and design depending on position of installation.
- Clean the parts before inspection or reassembly. Also clean oil ports, etc. using compressed air, and make certain they are free from restrictions.
- Lubricate rotating and sliding faces of the parts with oil or grease before installation.
- When necessary, use a sealer on gaskets to prevent leakage.
- Carefully observe all specifications for bolt and nut torques.
- When removing or replacing parts that require refrigerant to be discharged from the air conditioning system, be sure to use the Vehicle Refrigerant Recovery and Recycling Equipment (VRRRE) to recover and recycle Refrigerant-134a.
- When a service operation is completed, make a final check to be sure the service has been done properly and the problem has been corrected.
- SUPPLEMENTAL RESTRAINT SYSTEM**
The vehicle is equipped with a Supplemental Restraint System (SRS) – Air Bags. This system is not to be serviced without consulting the appropriate service information. Consult Section 9J "SRS System" if work is to be done on the front of the vehicle such as bumper, sheet metal, seats, wiring, steering wheel or column. Also review SRS system information if any arc welding is to be done on the vehicle. The SRS system equipped vehicle can be identified by:
 - "AIR BAG" warning light on the instrument cluster.
 - A Code "J" for fifth digit of Vehicle Identification Number.

Illustration Arrows

Arrows are designed for specific purposes to aid your understanding of technical illustrations.

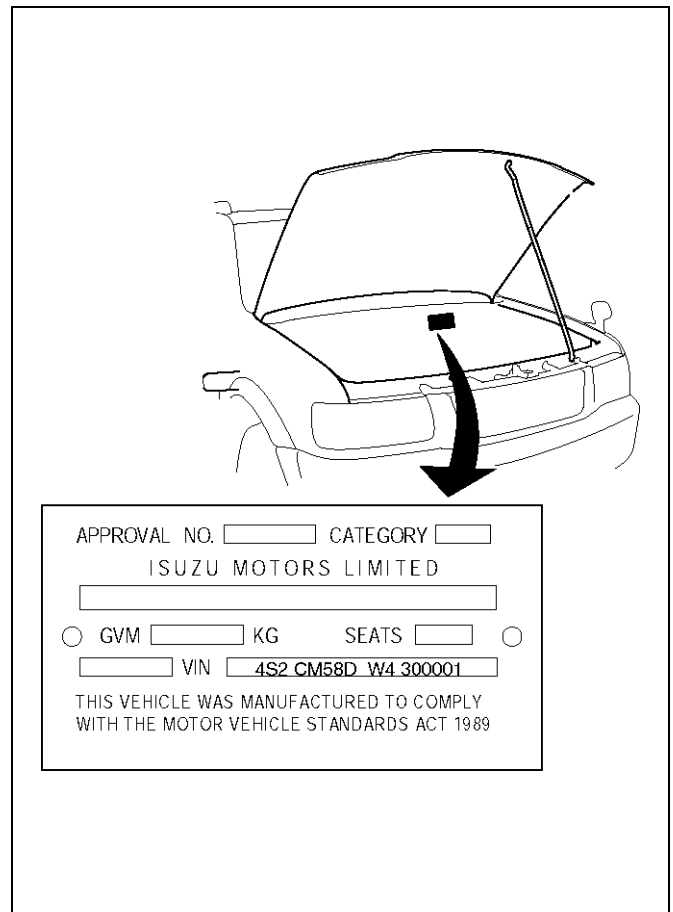
Arrow Type	Application
	Front of vehicle
	Up Side
	Task Related
	View Detail
	View Angle
	Dimension (1:2)
	Sectioning (1:3)

Arrow Type	Application
	<ul style="list-style-type: none"> Ambient/Clean air flow Cool air flow
	<ul style="list-style-type: none"> Gas other than ambient air Hot air flow
	<ul style="list-style-type: none"> Ambient air mixed with another gas Can indicate temperature change
	Motion or direction
	Lubrication point oil or fluid
	Lubrication point grease
	Lubrication point jelly

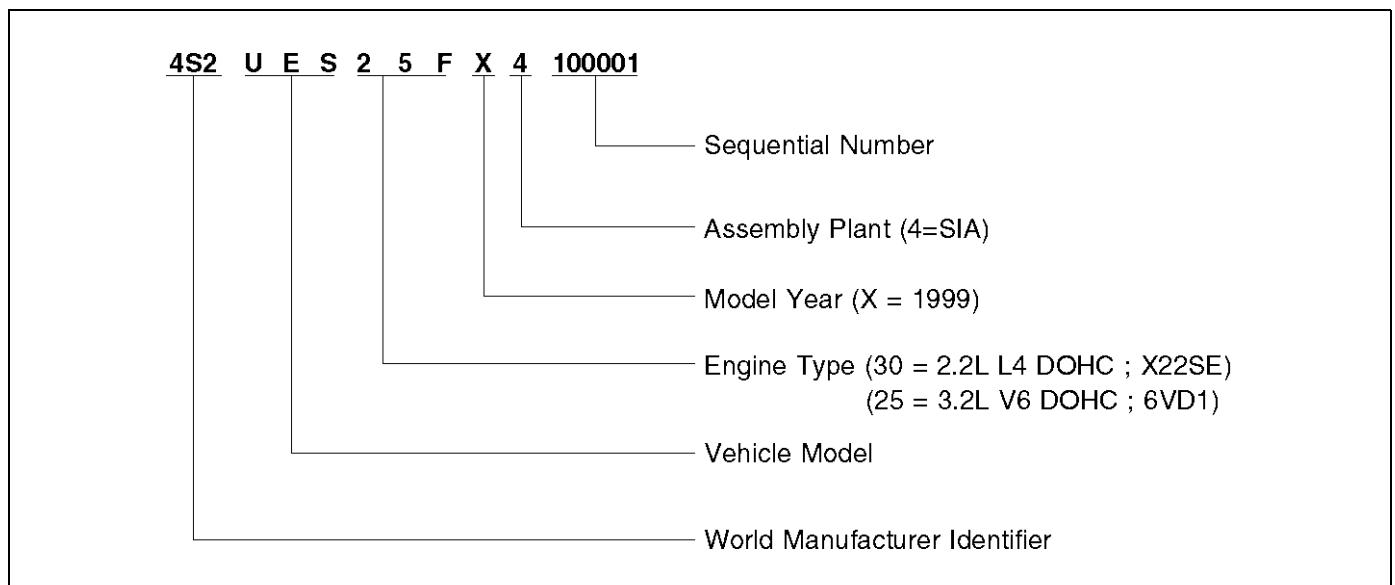
Identification

Vehicle Identification Number (VIN)

This is the legal identification of the vehicle. It is located on the left bottom of the windshield. It can be easily seen through the windshield from outside the vehicle.



F00RX016



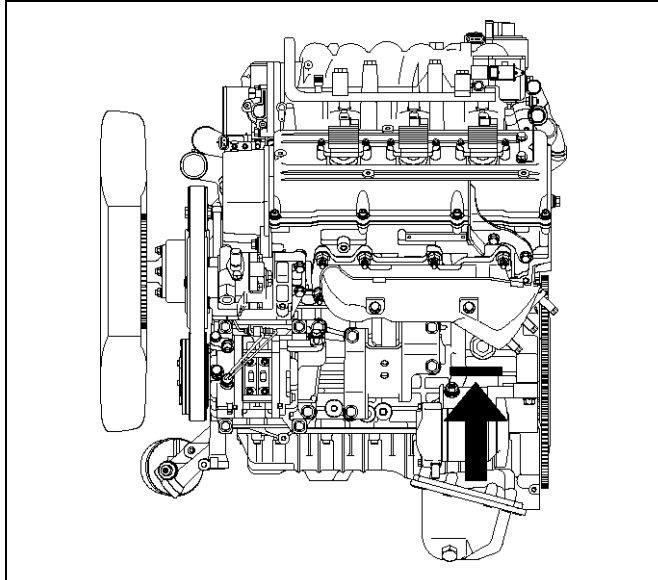
F00RX017

0A-4 GENERAL INFORMATION

Engine Serial Number

- 6VD1 Engine

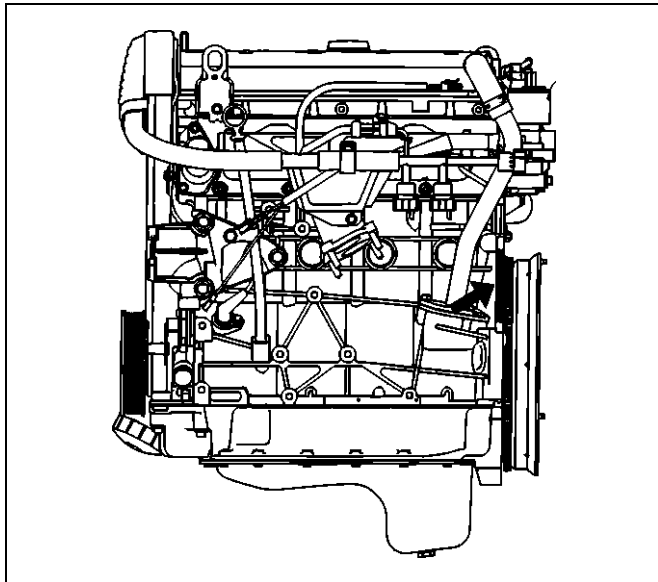
The gasoline engine serial number is stamped on the left rear lower area of the cylinder block above the starter.



F06RW001

- X22SE Engine

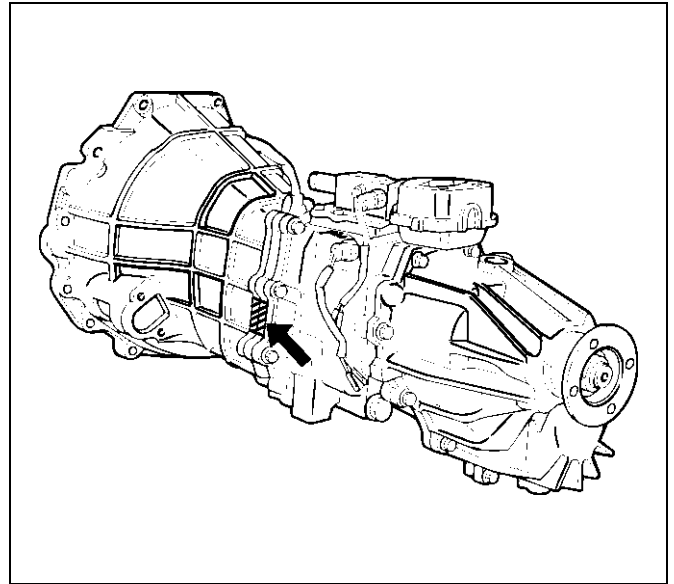
The gasoline engine serial number is stamped on the rear end raised area of the cylinder block left side.



035RW022

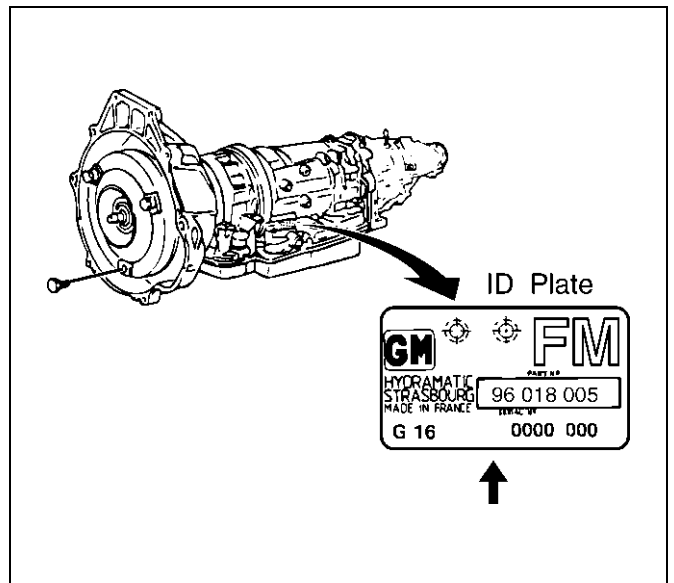
Transmission Serial Number

Manual : Stamped on the left side of the transmission intermediate plate.



220RS025

Automatic : Stamped on the identification plate, located on the left side of the transmission above the mode switch.

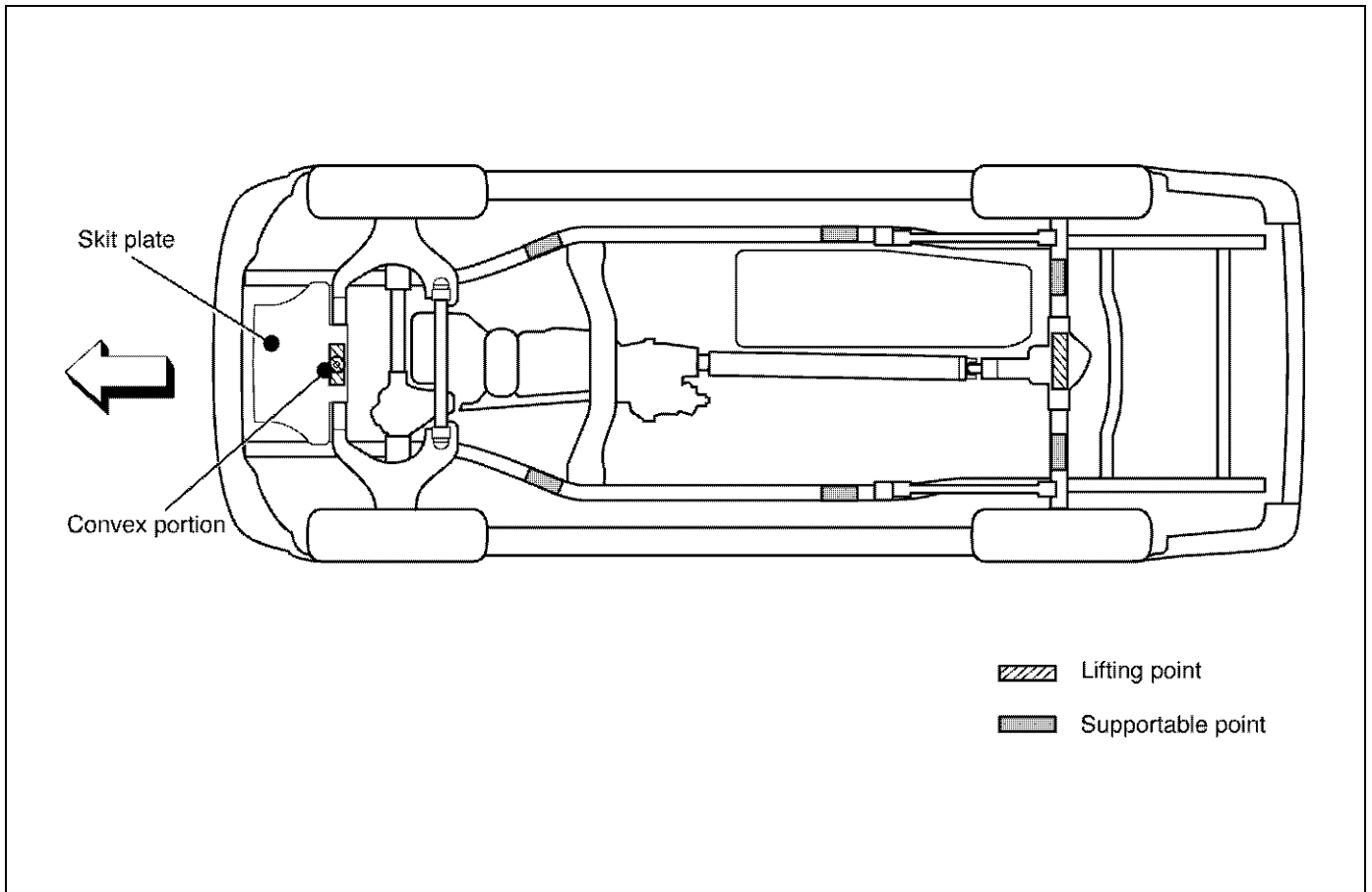


240RW019

Lifting Instructions

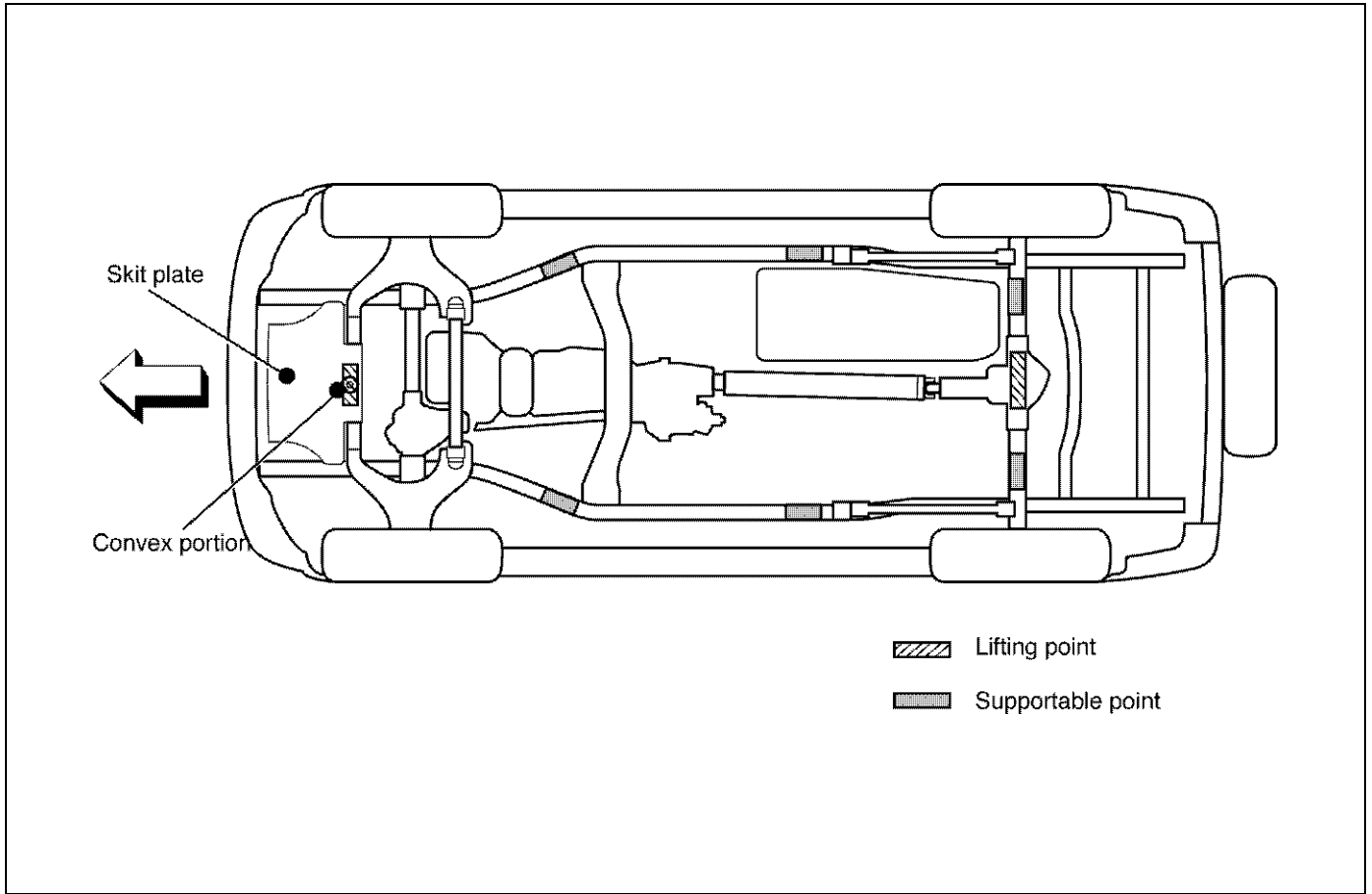
Lifting Points and Supportable Point Locations

4 Door Model



0A-6 GENERAL INFORMATION

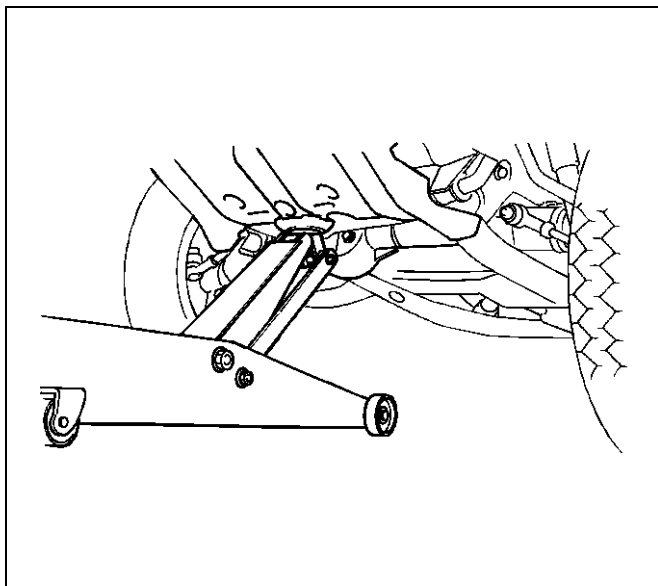
2 Door Model



C00RX001

Lifting Point: Front

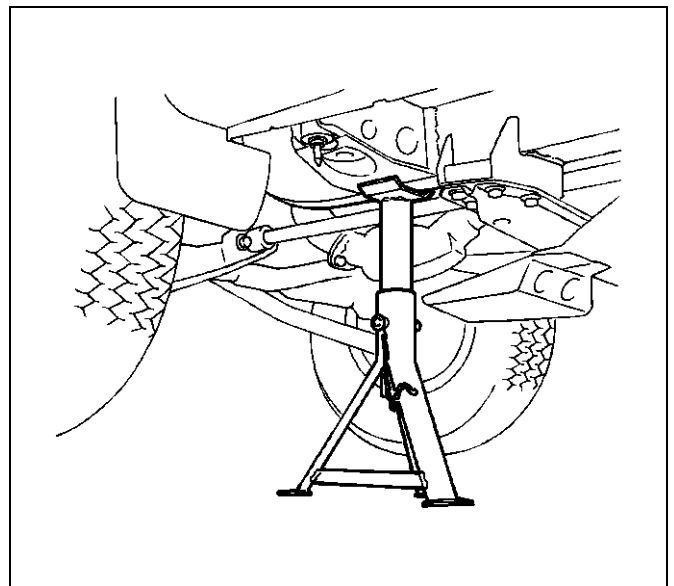
- When using a floor jack, lift on the Convex portion of the skid plate.



545RS001

Supportable Point: Front

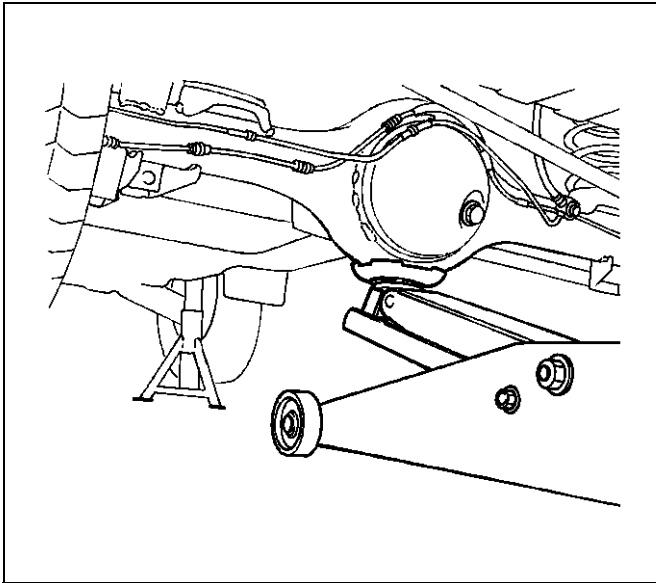
- Position the chassis stands at the bottom of the frame sidemember, behind the front wheel.



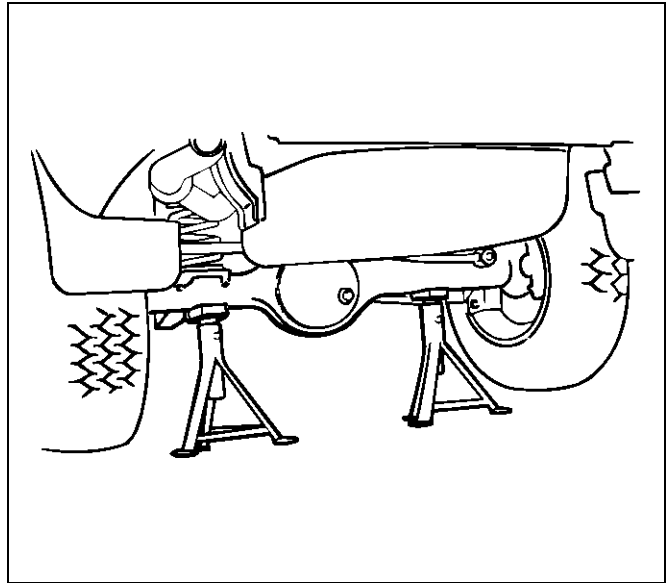
501RS003

Lifting Point: Rear

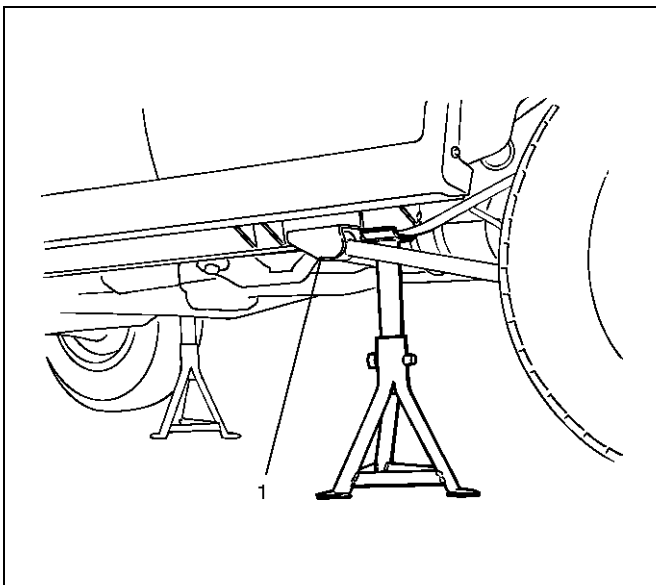
- Position the floor jack at the center of the rear axle case when lifting the vehicle.

**Supportable Point: Rear**

- Position the chassis stands at the bottom of the rear axle case.

**Supportable Point: Rear**

- Position the chassis stands at the bottom of the frame sidemember, just behind the trailing link bracket.





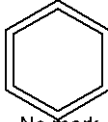


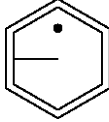
**Legend**

- (1) Trailing Link Bracket

0A-8 GENERAL INFORMATION

Standard Bolts Torque Specifications

The torque values given in the following table should be applied where a particular torque is not specified.

Strength Class	4.8	8.8		9.8
		Refined	Non-Refined	
Bolt Identification				
	 No Mark			
Bolt Diameter × Pitch (mm)				
M 6X1.0	4 – 8 N·m (3 – 6 lb ft)	5 – 10 N·m (4 – 7 lb ft)		–
M 8X1.25	8 – 18 N·m (6 – 13 lb ft)	12 – 23 N·m (9 – 17 lb ft)		17 – 30 N·m (12 – 22 lb ft)
M 10X1.25	21 – 34 N·m (15 – 25 lb ft)	28 – 46 N·m (20 – 34 lb ft)		37 – 63 N·m (27 – 46 lb ft)
* M10X1.5	20 – 33 N·m (14 – 25 lb ft)	28 – 45 N·m (20 – 33 lb ft)		36 – 60 N·m (27 – 44 lb ft)
M12X1.25	49 – 74 N·m (36 – 54 lb ft)	61 – 91 N·m (45 – 67 lb ft)		76 – 114 N·m (56 – 84 lb ft)
* M12X1.75	45 – 69 N·m (33 – 51 lb ft)	57 – 84 N·m (42 – 62 lb ft)		72 – 107 N·m (53 – 79 lb ft)
M14X1.5	77 – 115 N·m (56 – 85 lb ft)	93 – 139 N·m (69 – 103 lb ft)		114 – 171 N·m (84 – 126 lb ft)
* M14X2.0	72 – 107 N·m (53 – 79 lb ft)	88 – 131 N·m (65 – 97 lb ft)		107 – 160 N·m (79 – 118 lb ft)
M16X1.5	104 – 157 N·m (77 – 116 lb ft)	135 – 204 N·m (100 – 150 lb ft)		160 – 240 N·m (118 – 177 lb ft)
* M16X2.0	100 – 149 N·m (74 – 110 lb ft)	130 – 194 N·m (95 – 143 lb ft)		153 – 230 N·m (113 – 169 lb ft)
M18X1.5	151 – 226 N·m (111 – 166 lb ft)	195 – 293 N·m (144 – 216 lb ft)		230 – 345 N·m (169 – 255 lb ft)
M20X1.5	206 – 310 N·m (152 – 229 lb ft)	270 – 405 N·m (199 – 299 lb ft)		317 – 476 N·m (234 – 351 lb ft)
M22X1.5	251 – 414 N·m (185 – 305 lb ft)	363 – 544 N·m (268 – 401 lb ft)		425 – 637 N·m (313 – 469 lb ft)
M24X2.0	359 – 539 N·m (265 – 398 lb ft)	431 – 711 N·m (318 – 524 lb ft)		554 – 831 N·m (409 – 613 lb ft)

The asterisk * indicates that the bolts are used for female-threaded parts that are made of soft materials such as casting, etc.

Abbreviations Charts

List of automotive abbreviations which may be used in this manual

A — Ampere(s)	EEPROM — Electronically Erasable Programmable Read Only Memory
ABS — Antilock Brake System	EGR — Exhaust Gas Recirculation
AC — Alternating Current	EI — Electronic Ignition
A/C — Air Conditioning	ETR — Electronically Tuned Receiver
ACCEL — Accelerator	EVAP — Evaporation Emission
ACC — Accessory	Exh — Exhaust
ACL — Air Cleaner	° F — Degrees Fahrenheit
Adj — Adjust	Fed — Federal (All States Except Calif.)
A/F — Air Fuel Ratio	FF — Front Drive Front Engine
AIR — Secondary Air Injection System	FL — Fusible Link
Alt — Altitude	FLW — Fusible Link Wire
AMP — Ampere(s)	FP — Fuel Pump
ANT — Antenna	FRT — Front
ASM — Assembly	ft — Foot
A/T — Automatic Transmission/Transaxle	FWD — Front Wheel Drive
ATDC — After Top Dead Center	4WD — Four Wheel Drive
ATF — Automatic Transmission Fluid	4 x 4 — Four Wheel Drive
Auth — Authority	4 A/T — Four Speed Automatic Transmission/Transaxle
Auto — Automatic	Gal — Gallon
BARO — Barometric Pressure	GEN — Generator
Bat — Battery	GND — Ground
B+ — Battery Positive Voltage	Gov — Governor
Bbl — Barrel	g — Gram
BHP — Brake Horsepower	Harn — Harness
BPT — Backpressure Transducer	HC — Hydrocarbons
BTDC — Before Top Dead Center	HD — Heavy Duty
° C — Degrees Celsius	Hg — Hydrargyrum (Mercury)
CAC — Charge Air Cooler	HiAlt — High Altitude
Calif — California	HO2S — Heated Oxygen Sensor
cc — Cubic Centimeter	HVAC — Heater-Vent-Air-Conditioning
CID — Cubic Inch Displacement	IAC — Idle Air Control
CKP — Crankshaft Position	IAT — Intake Air Temperature
CL — Closed Loop	IC — Integrated Circuit / Ignition Control
CLCC — Closed Loop Carburetor Control	ID — Identification / Inside Diameter
CMP — Camshaft Position	IGN — Ignition
CO — Carbon Monoxide	INJ — Injection
Coax — Coaxial	IP — Instrument Panel
Conn — Connector	IPC — Instrument Panel Cluster
Conv — Converter	Int — Intake
Crank — Crankshaft	ISC — Idle Speed Control
Cu. In. — Cubic Inch	J/B — Junction Block
CV — Constant Velocity	kg — Kilograms
Cyl — Cylinder(s)	km — Kilometers
DI — Distributor Ignition	km/h — Kilometer per Hour
Diff — Differential	kpa — Kilopascals
Dist — Distributor	kV — Kilovolts (thousands of volts)
DLC — Data Link Connector	kW — Kilowatts
DOHC — Double Overhead Camshaft	KS — Knock Sensor
DTC — Diagnostic Trouble Code	L — Liter
DTM — Diagnostic Test Mode	lb ft — Foot Pounds
DTT — Diagnostic Test Terminal	lb in — Inch Pounds
DVM — Digital Voltmeter (10 meg.)	LF — Left Front
DVOM — Digital Volt Ohmmeter	LH — Left Hand
EBCM — Electronic Brake Control Module	LR — Left Rear
ECM — Engine Control Module	LS — Left Side
ECT — Engine Coolant Temperature	LWB — Long Wheel Base
	L-4 — In-Line Four Cylinder Engine
	MAF — Mass Air Flow
	MAN — Manual

0A-10 GENERAL INFORMATION

MAP — Manifold Absolute Pressure	ST — Start / Scan Tool
Max — Maximum	Sw — Switch
MC — Mixture Control	SWB — Short Wheel Base
MFI — Multiport Fuel Injection	SYN — Synchronize
MIL — Malfunction Indicator Lamp	Tach — Tachometer
Min — Minimum	TB — Throttle Body
mm — Millimeter	TBI — Throttle Body Fuel Injection
MPG — Miles Per Gallon	TCC — Torque Converter Clutch
MPH — Miles Per Hour	TCM — Transmission Control Module
M/T — Manual Transmission/Transaxle	TDC — Top Dead Center
MV — Millivolt	Term — Terminal
N — Newtons	TEMP — Temperature
NA — Natural Aspirated	TOD — Torque On Demand
NC — Normally Closed	TP — Throttle Position
N-M — Newton Meters	TRANS — Transmission/Transaxle
NO — Normally Open	TURBO — Turbocharger
NOX — Nitrogen, Oxides of	TVRS — Television & Radio Suppression
OBD — On-Board Diagnostic	TVV — Thermal Vacuum Valve
OD — Outside Diameter	TWC — Three Way Catalytic Converter
O/D — Over Drive	3 A/T — Three Speed Automatic Transmission/ Transaxle
OHC — Overhead Camshaft	2WD — Two Wheel Drive
OL — Open Loop	4 x 2 — Two Wheel Drive
O ₂ — Oxygen	U-joint — Universal Joint
O ₂ S — Oxygen Sensor	V — Volt(s)
PAIR — Pulsed Secondary Air Injection System	VAC — Vacuum
P/B — Power Brakes	VIN — Vehicle Identification Number
PCM — Powertrain Control Module	VRRRE — Vehicle Refrigerant Recovery and Recycling Equipment
PCV — Positive Crankcase Ventilation	V-ref — ECM Reference Voltage
PRESS — Pressure	VSS — Vehicle Speed Sensor
PROM — Programmable Read Only Memory	VSV — Vacuum Switch Valve
PNP — Park/Neutral Position	V-6 — Six Cylinder "V" Engine
P/S — Power Steering	V-8 — Eight Cylinder "V" Engine
PSI — Pounds per Square Inch	W — Watt(s)
PSP — Power Steering Pressure	w/ — With
Pt. — Pint	w/b — Wheel Base
Pri — Primary	w/o — Without
PWM — Pulse Width Modulate	WOT — Wide Open Throttle
Qt. — Quart	
REF — Reference	
RF — Right Front	
RFI — Radio Frequency Interference	
RH — Right Hand	
RPM — Revolutions Per Minute	
RPM Sensor — Engine Speed Sensor	
RPO — Regular Production Option	
RR — Right Rear	
RS — Right Side	
RTV — Room Temperature Vulcanizing	
RWAL — Rear Wheel Antilock Brake	
RWD — Rear Wheel Drive	
SAE — Society of Automotive Engineers	
Sec — Secondary	
SFI — Sequential Multiport Fuel Injection	
SI — System International	
SIR — Supplemental Inflatable Restraint System	
SOHC — Single Overhead Camshaft	
Sol — Solenoid	
SPEC — Specification	
Speedo — Speedometer	
SRS — Supplemental Restraint System	

GENERAL INFORMATION

MAINTENANCE AND LUBRICATION

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Lubricant Viscosity Chart.....	0B - 10		

Maintenance Schedule List

Normal Vehicle Use

The maintenance instructions in this Maintenance Schedule are based on the assumption that the vehicle will be used as designed:

- to carry passengers and cargo within the limitations specified on the tire placard located on the inside of the glove compartment door;
- to be driven on reasonable road surfaces within legal operating limits;
- to be driven on a daily basis, as a general rule, for at least several miles/kilometers;
- to be driven on unleaded fuel

Unusual or severe operating conditions will require more frequent vehicle maintenance, as specified in the following sections.

Service and Maintenance

SERVICE AND MAINTENANCE

Maintenance schedule

I: Inspect and correct or replace as necessary A: Adjust
 R: Replace or change T: Tighten to specified torque L: Lubricate

SERVICE INTERVAL: (Use odometer reading or months whichever comes first)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
GASOLINE ENGINE																				
* Engine oil				R																
* G4 Engine oil filter				R				R												
* G6 Engine oil filter																				
Oil leakage and contamination																				
G4 Timing belt																				
G6 Timing belt																				
G4 Engine/Accessory drive belt																				
G6 Fan belt tension and damage																				
G4 Spark plugs																				
G6 Spark plugs																				
G4 Spark plug wire																				
Exhaust system																				
G4 Engine coolant concentration																				
G6 Engine coolant concentration																				
Cooling system for water leakage																				
All hoses and pipes in engine compartment for clog or damage																				
G4 Fuel filter																				
G6 Fuel filter																				

*Marks: Under severe driving conditions, additional maintenance is required. Refer to "Maintenance schedule under severe driving conditions".

SERVICE AND MAINTENANCE

Maintenance schedule

I: Inspect and correct or replace as necessary A: Adjust
 R: Replace or change T: Tighten to specified torque L: Lubricate

	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
SERVICE INTERVAL: (Use odometer reading or months whichever comes first)	x 1,000 km or months																			
Fuel leakage	I	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I
Fuel tank	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
*Air cleaner element	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-
<input type="checkbox"/> V Pre air cleaner	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Idling speed and acceleration	I	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I
<input type="checkbox"/> G6 O ₂ sensor																				
<input type="checkbox"/> G6 Valve clearance																				
CLUTCH																				
Clutch fluid	-	-	-	-	-	-	-	I	-	-	-	-	-	-	-	-	-	-	-	-
Clutch pedal travel and play	I	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I
TRANSMISSION OR TRANSMISSION WITH TRANSFER CASE																				
*Manual transmission with transfer case oil	-	R	-	I	-	I	-	R	-	I	-	I	-	I	-	R	-	I	-	I
Oil leakage	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Gear control mechanism for looseness	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
* <input type="checkbox"/> AT Automatic transmission fluid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
* <input type="checkbox"/> AT Transfer case oil	-	R	-	I	-	I	-	R	-	I	-	I	-	I	-	R	-	I	-	I
PROPELLER SHAFT																				
Loose connections	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I
*Universal joints and splines for wear	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I	-	I
Universal joints and sliding sleeve	-	L	-	L	-	L	-	L	-	L	-	L	-	L	-	L	-	L	-	L

*Marks: Under severe driving conditions, additional maintenance is required.
 Refer to "Maintenance schedule under severe driving conditions".

SERVICE AND MAINTENANCE

Maintenance schedule

I: Inspect and correct or replace as necessary A: Adjust
 R: Replace or change T: Tighten to specified torque L: Lubricate

SERVICE INTERVAL: (Use odometer reading or months whichever comes first) or months	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
FRONT AND REAR AXLE																					
*Differential gear oil (Front and rear)		R						R													
Oil leakage		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Shift on the fly system																					
Gear oil																					
Front axle shaft rubber boot for damage																					
Axle case for distortion or damage																					
Axle shafts for distortion or damage																					
STEERING																					
Steering gear oil																					
Power steering fluid																					
Oil leakage																					
*Steering system for looseness or damage																					
Power steering hose																					
Steering wheel play																					
Steering function																					
Right and left turning radius																					
Wheel alignment																					
Joint ball for oil leakage or damage																					
Joint ball rubber boot for damage																					

*Marks: Under severe driving conditions, additional maintenance is required.
 Refer to "Maintenance schedule under severe driving conditions".

SERVICE AND MAINTENANCE

Maintenance schedule

I: Inspect and correct or replace as necessary A: Adjust
 R: Replace or change T: Tighten to specified torque L: Lubricate

	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
SERVICE INTERVAL: (Use odometer reading or months whichever comes first)	x 1,000 km or months																			
SERVICE BRAKES																				
Brake fluid	-	-	-	-	-	-	-	R	-	-	-	-	-	-	-	-	-	-	-	-
Brake system for fluid leakage	I	I	-	-	-	-	-	I	-	-	-	-	-	-	-	-	-	-	-	-
Brake function	I	I	-	-	-	-	-	I	-	-	-	-	-	-	-	-	-	-	-	-
*Front Disc brake pads and discs wear	-	I	-	-	-	-	-	I	-	-	-	-	-	-	-	-	-	-	-	-
Brake pedal travel and play	I	I	-	-	-	-	-	I	-	-	-	-	-	-	-	-	-	-	-	-
Pipes and hoses for loose connections or damage	I	I	-	-	-	-	-	I	-	-	-	-	-	-	-	-	-	-	-	-
PARKING BRAKE																				
Parking brake function	I	-	-	-	-	-	-	I	-	-	-	-	-	-	-	-	-	-	-	-
Parking brake lever travel	I	-	-	-	-	-	-	I	-	-	-	-	-	-	-	-	-	-	-	-
Cables for looseness or damage and guide for damage	I	-	-	-	-	-	-	I	-	-	-	-	-	-	-	-	-	-	-	-
Ratchet for wear or damage	-	-	-	-	-	-	-	I	-	-	-	-	-	-	-	-	-	-	-	-

*Marks: Under severe driving conditions, additional maintenance is required.
 Refer to "Maintenance schedule under severe driving conditions".

