SUZUKI CARRY & EVERY

ENGLISH SERVICE MANUAL

CARRY TRUCK

EVERY VAN

F6A ENGINES

ALL MODELS 2 & 4 VALVE

2WD-4WD
CARBURETED
FUEL INJECTED
TURBOCHARGED

1990~1998 MODELS

James Danko

Suzuki Carry & Every

English Version

Factory Service Manual

Full Mechanical Version

Carry Truck 660cc
2WD & 4WD

Every Van 660cc

Suzuki Kei Vehicles Series

James Danko

Yokohama, Japan

Third Edition 2010

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Artwork: James L. Danko© 2010

Layout By: James L. Danko

Computer Assistance: Yoshiro (www.yoshiro.com)

Printed in U.S.A

Publisher LuLu.com

ISBN-10: 1435717317

ISBN-13: 978-0-557-73540-2

Third Edition 2010

All translations from original Japanese test to English completed by James Danko.

Disclaimer: All translations from one language to another can involve technical errors. The author has found mistakes in the original Japanese text. The best suitable English vocabulary has been chosen by the author.

Credits: I would like to thank the Suzuki Motors Corporation (Japan) for their part in supplying required information.

Credits: I would like to thank Yoshiro for all his computer technology to make these books happen. His computer graphics and technology is simply the best. www.yoshiro.com

Introduction

Due to the high request for English version manuals on Japanese mini trucks & Vans, we are publishing wide variety information to provide the mini truck community with the ability to maintain their vehicles.

Japanese mini tucks & vans are produced only for the Japanese market. Therefore, all original manuals are only available in Japanese. This is the first of these books written in English.

This book or manual is for the professional mechanic. Simple items as how to change a spark plug, or an air-filter are not in this book. It is written in Factory Service Manual style. It is full of diagrams and schematics that are easily understood by a professional mechanic. How to do an engine overhaul using the correct parts sizes, measurements, torque, etc. Complete diagrams of all major parts, including body. You will have the same information as the Suzuki Factory techs have. This book is written by a mechanic, for mechanics.

We have manuals for all Japanese manufactures. It's a time consuming process, please check our web page frequently as we post more information.

For more information please visit our home page at www.yokohamamotors.com

Comments or information on this book please email to info@yokohamamotors.com

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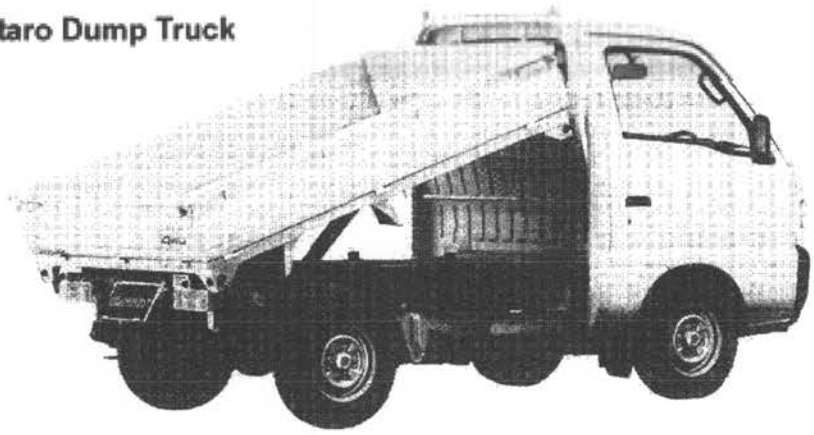
Chapter 1: General Information

- Vehicle Types (All including Specialty Vehicles)
- Jacking Positions
- Vehicle Identification & Engine Decoding
- Vehicle Data & Specifications
- Body Components & Frame Dimensions

Dump Trucks

Kintaro Dump Truck



Low Bed Flat Dump

Special Vehicles
Dump Series

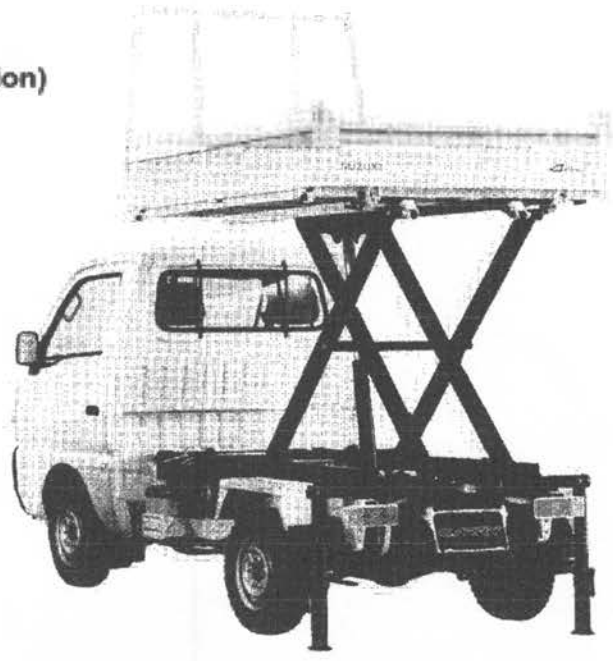
One Way Dump
Three Way Dump

Deep Box Dump

Specialty vehicles
Dump Series

3 Way Dump (Option)

Lift Up Dump (Option)



Tail Gate Lift Series

Crane Option

Vender Series Trucks

Freezer Truck

Portable Vendor Sales Truck (Refrigerated or Freezer)

Specialty Vehicles

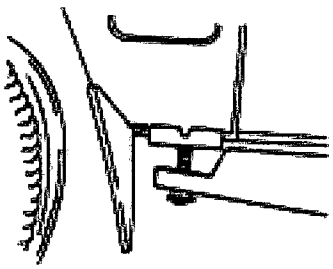
Deep Freezer (Fish-Meat) Option

Fuel Truck Option

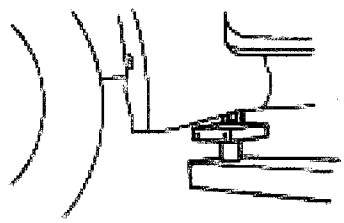
Yokohama Motors

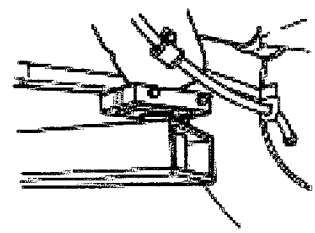
Jacking Locations

Front (Van)

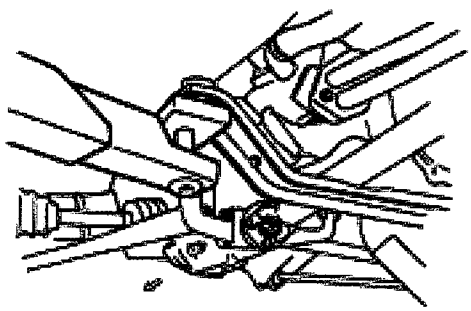


Rear

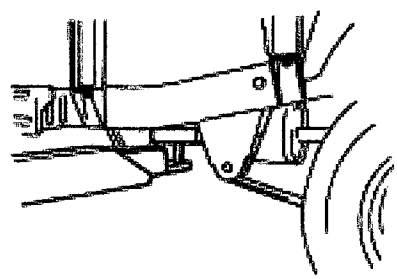




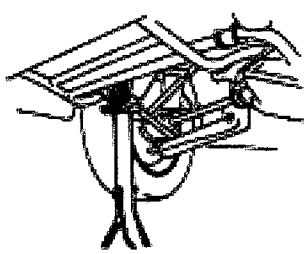
Truck
Front



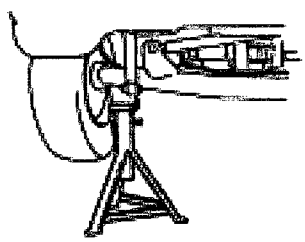
Rear



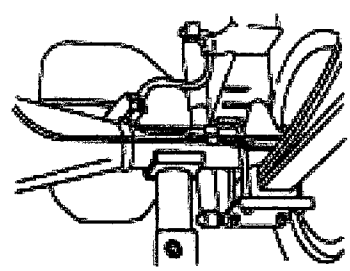
Front



Rear (Van)

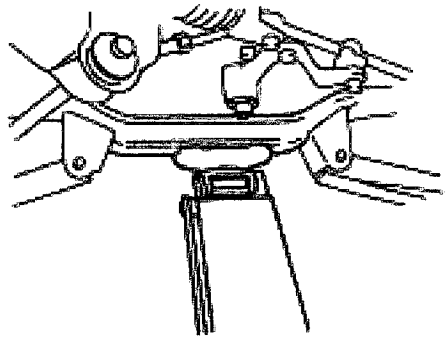


Truck

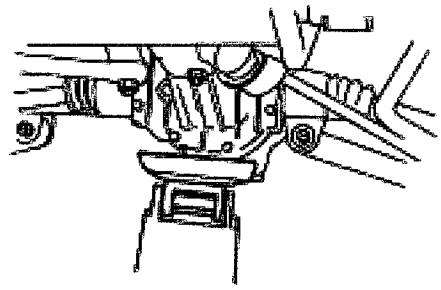


Floor Jack Locations

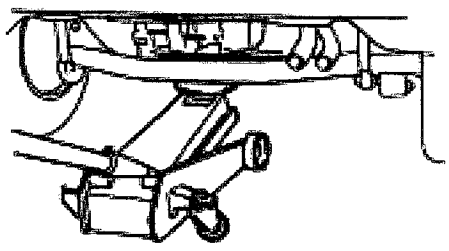
Front
2WD



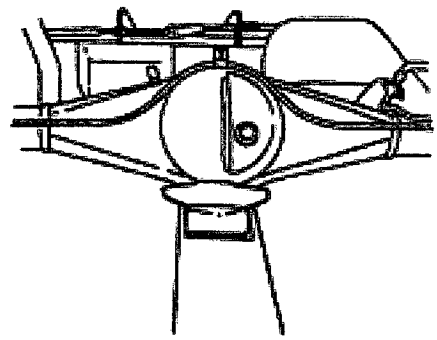
4WD



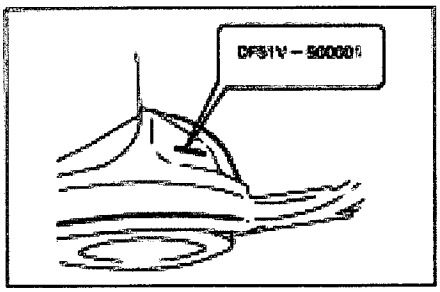
Rear
Van



Truck



Vehicle Identification
Suzuki Carry & Every Van

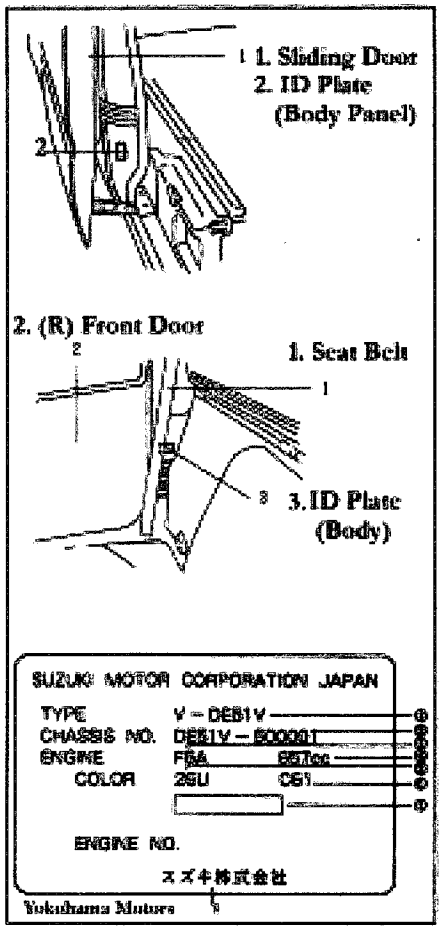


Drivers Side Inner Fender Under Seat

Example: DE51V=Vehicle Series
500001=Production number
In Sequence

Every Van
DE51V-500001
DF51V-500001
Carry Truck
DC51T-100001~
DD51T-100001~
DC51B-100001~

Other Locations of ID Plates



Note: Model Years do not exist in Japan, only Series.

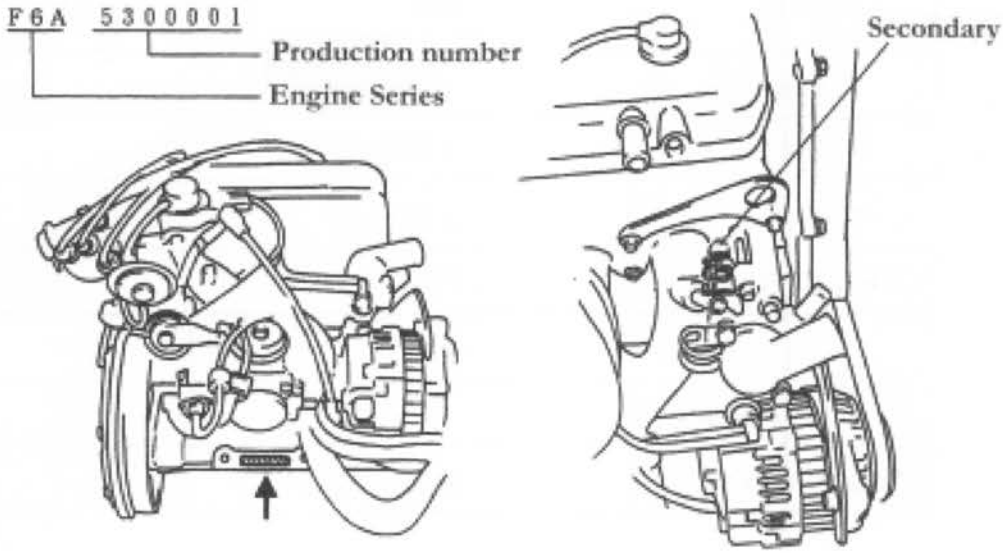
Example: Car Manufactured in 2000 but not sold until 2008=2008. Therefore, vehicles go by codes and manufactures date means nothing in Japan.

***Note: For manufactured year check the seat belt tag or any paperwork you have from your dealer.**

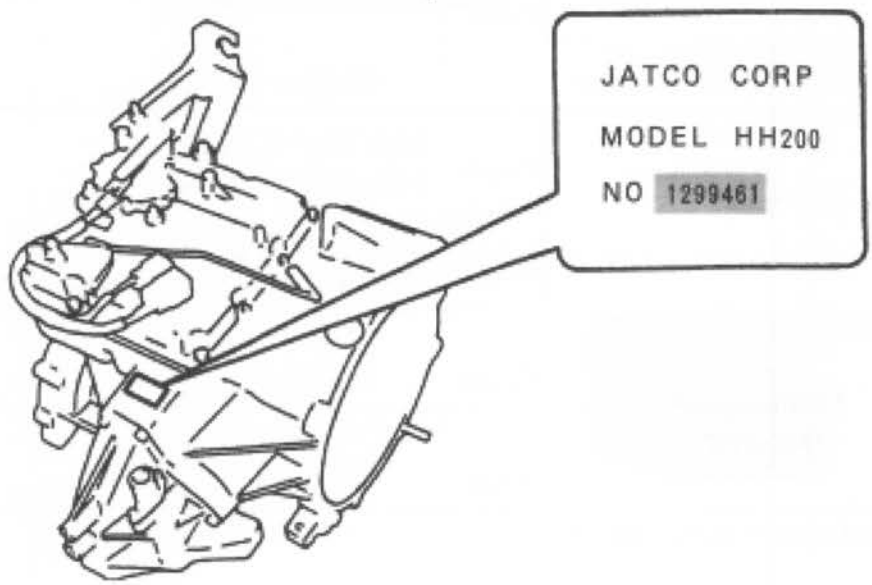
ID Plate Decoder

1. Vehicle Series
2. Vehicle VIN Number
3. Engine Series
4. Engine True Size(cc)
5. Body Color Code
6. Interior Color Code or Package Code
7. Makers Code (For Sales Dept. Information)
8. Suzuki Corporation(Japanese)

Engine & Transmission Identification Location



Automatic Transmision ID plate



Wheel Alighnment
Wheel & Tire

(*)=Degree

Vehicle		Van	Truck
Toe In (mm)		2-4	
Camber		1*00(+-)1*	
Caster		3*30(+-)1*	
King Pin Degree		11*30'	
Degree	Inside	40	37
	Outside	36	34
Side Slip (m/km)		in2.0-out1.0	

Vehicle			Van	Truck
Wheel	Wheel Bearing in-out	Front	0-0.4	
		Rear	0-0.4	
	Rim Circumference		Within(mm) 2.5	
Tire	Tire Size	Front	5.00-12-4PR ULT 5.00-12-6PR ULT	
		Rear	145R12-6PR LT 155/7013 75S	
	Air Pressure (kg.cm2)	Front	20.2-2.6	
		Rear	2.4-3.0	

Yokohama Motors, Japan

Service Data- Carry Truck and Every Van

<table>
<tr><td>Fuel Capacity (Liters)</td><td colspan="2">Carry Truck 36L
Every Van 37L</td><td colspan="4">Conversion 1.0 Liter= 0.264 Gallon</td></tr>
<tr><td>Engine Oil Requirements</td><td colspan="2">Maximum 5000Km
3125 Miles</td><td colspan="2">All Models 10W-30</td><td colspan="2">Capacity
2.9 Liters</td></tr>
<tr><td colspan="7">Oil Filter Change 10,000 Km (Harsh conditions 2500Km)</td></tr>
<tr><td rowspan="5">Transmission Oil</td><td rowspan="4">MT</td><td rowspan="4">2 Years or 20,000Km</td><td rowspan="4">Gear Oil #90 Suzuki (GL-4)</td><td rowspan="2">2WD</td><td>4 Speed 1.1Liter</td></tr>
<tr><td>5 Speed 1.2Liter</td></tr>
<tr><td rowspan="2">4WD</td><td>Part Time 2.6 Liter</td></tr>
<tr><td>Full Time 2.8 Liter</td></tr>
<tr><td>AT</td><td>2 Years or 40,000Km</td><td>Suzuki AT oil 5D06</td><td>Normal</td><td>Cp 2.6L</td></tr>
<tr><td rowspan="6">Differential</td><td rowspan="6">2 Years or 20,000Km</td><td rowspan="6">75W-80 (GL-5)</td><td rowspan="2">2WD</td><td>Normal</td><td>1.0L</td></tr>
<tr><td>Turbo</td><td>1.3L</td></tr>
<tr><td rowspan="2">4WD Part Time</td><td>Front</td><td>0.7L</td></tr>
<tr><td>Rear</td><td>1.0L</td></tr>
<tr><td rowspan="2">4WD Full Time</td><td>Front</td><td>0.7L</td></tr>
<tr><td>Rear</td><td>1.3L</td></tr>
</table>

Service Data- Carry Truck and Every Van

Spark Plug Gap	Turbo	ND	W16EXR-U	GAP (Millimeters)
		NGK	BPR5E	0.7 to 0.8mm
	Normal	ND	XU22EPR-U	0.8 to 0.9mm
		NGK	DCPR7E	

Battery	Normal	Part # 28B19R (Right positive connection)
	AC Equipped Also Refrigerated Trucks	Part # 38B20B

Note: For Vehicle Timing see (Fuel System & Tune-Up Section)

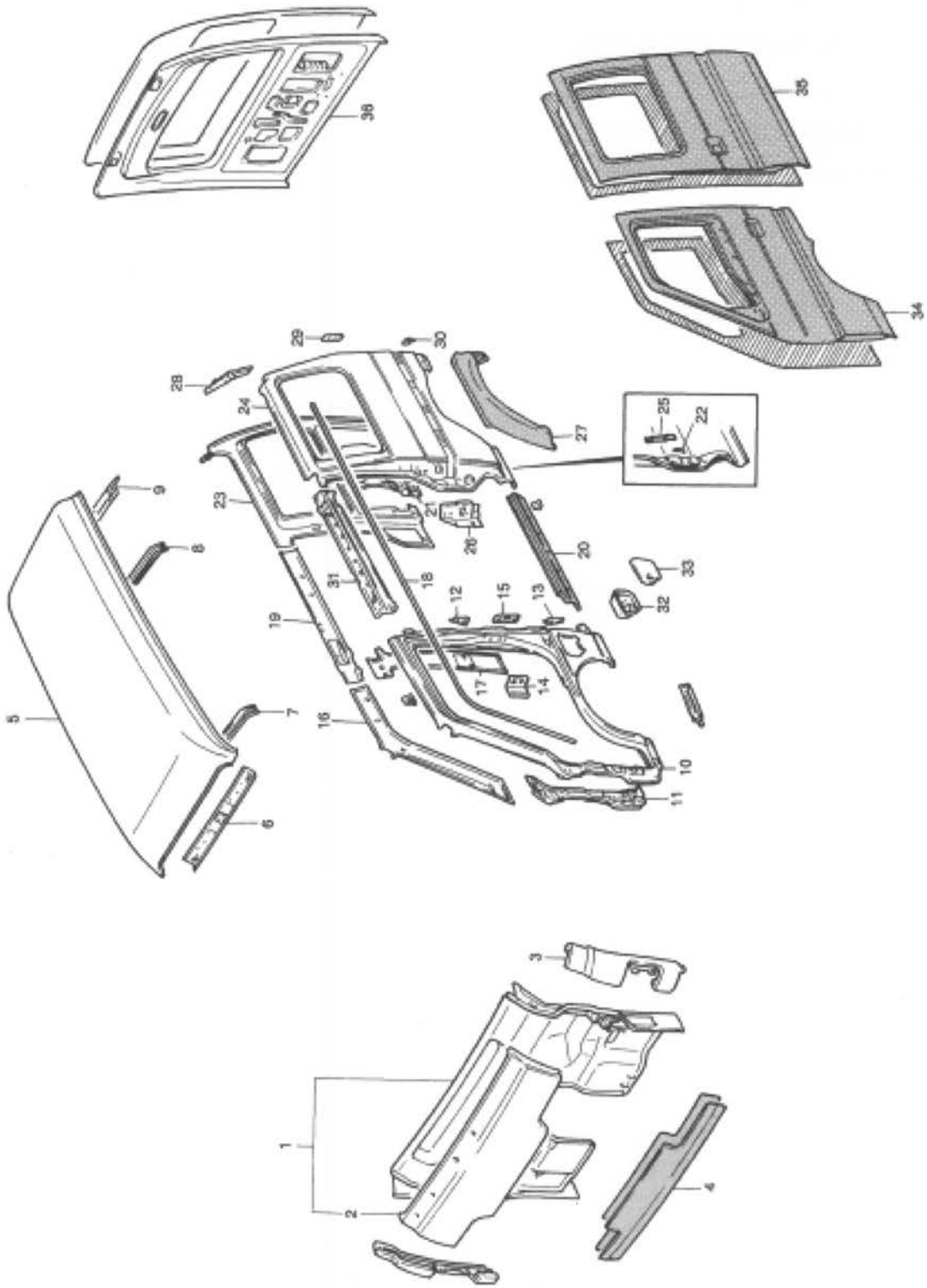
Note: Points & Dwell see (Ignition section)

Note: Others see respective section

Body & Chassis

- Van Body Full Assembly
- Van Chassis
- Truck Body Full Assembly
- Truck Chassis
- Van Frame Specifications
- Truck Frame Specifications

Van Exploded View

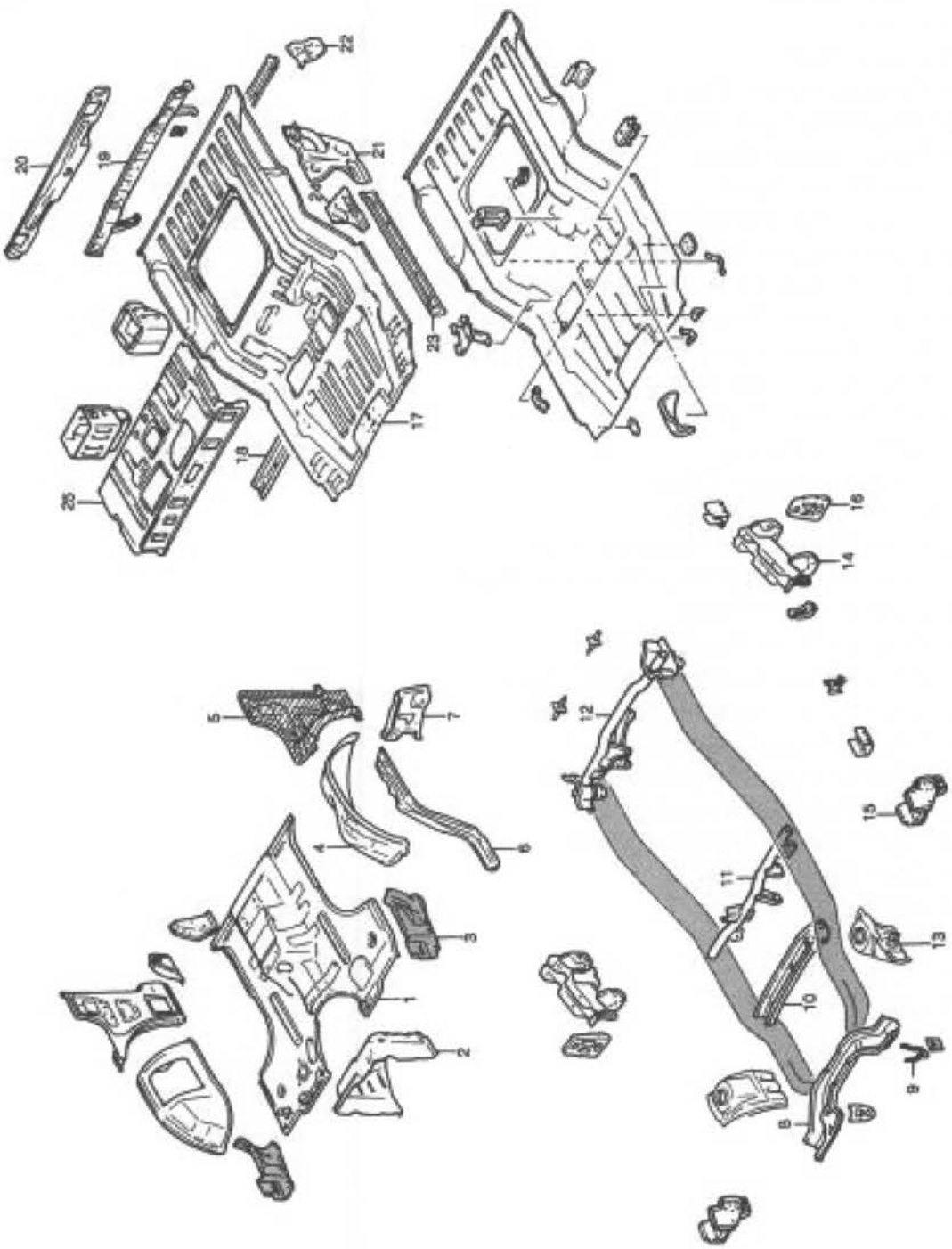


Body Panel: Van

1. Front Panel
2. Front Panel: Outer
3. Front Corner Panel
4. Front Panel: Lower
5. Roof Panel
6. Roof Panel: Inner
7. Roof Reinforcement: Front
8. Rood Reinforcement: Rear
9. Roof Panel: Upper Back
10. Cab Side Outer Panel
11. Front Door Hinge Reinforcement
12. Rear Door Stopper Reinforcement
13. Rear Door Stopper: Lower Reinforcement
14. Door Lock Striker Reinforcement
15. Cab Side: Junction Switch Reinforcement
16. Roof Side Inner Front Panel
17. Center Pillar Inner Panel
18. Roof Side Drip Railing
19. Roof Side Inner Rear Panel
20. Sill Side Door Outer Panel
21. Rear Door Center Rail Reinforcement
22. Rear Door Center Rail Front Bracket: Right
23. Rear Quarter Inner Panel
24. Rear Quarter Outer Panel
25. Rear Door Striker Reinforcement: Right
26. Rear Door Striker Reinforcement: Left
27. Rear Wheel Housing: Outer Panel
28. Rear Quarter Outer Extension Panel
29. Back Door Stay Reinforcement
30. Back Door Stopper Reinforcement
31. Rear Door Upper Railing
32. Fuel Inlet Panel
33. Fuel Door
34. Rear Door Panel
35. Back Door Panel

Body Pan Van

VAN

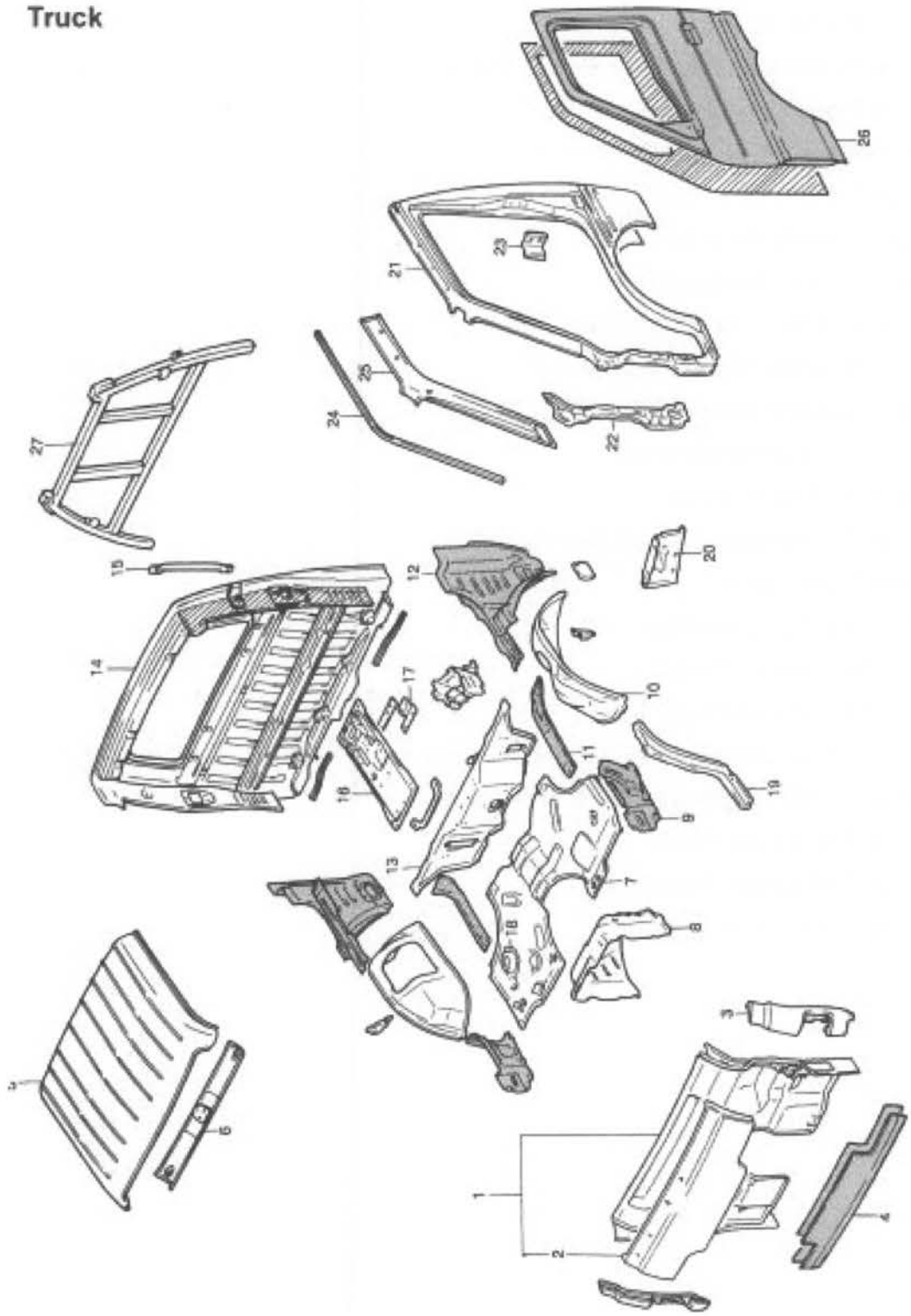


Lower Body Panels Van

1. Front Floor Panel
2. Front Floor Tunnel Panel
3. Front Wheel Housing Front Rocker Panel
4. Front Wheel Housing Panel
5. Front Wheel Housing Rear Rocker Panel
6. Front Floor Side Member
7. Front Floor Side Re-enforcement
8. Front Floor Cross Member
9. Front Towing Hock Left
10. Rear Cross Member Front
11. Engine Mount Cross Member Front
12. Rear Suspension Cross Member
13. Strut Support Bracket
14. Rear Suspension Bracket
15. Tension Rod Bracket
16. Rear Suspension Bracket Reinforcement
17. Rear Floor Panel
18. Rear Seat Leg Member
19. Tail Skirt Panel (Inner)
20. Tail Skirt Panel (Outer)
21. Rear Wheel Housing Front Rocker Panel
22. Rear Wheel Housing Rear Rocker Panel
23. Slide Rail Lower Panel
24. Slide Rail Upper Panel
25. Rear Floor Panel Upper

Truck Exploded View

Truck

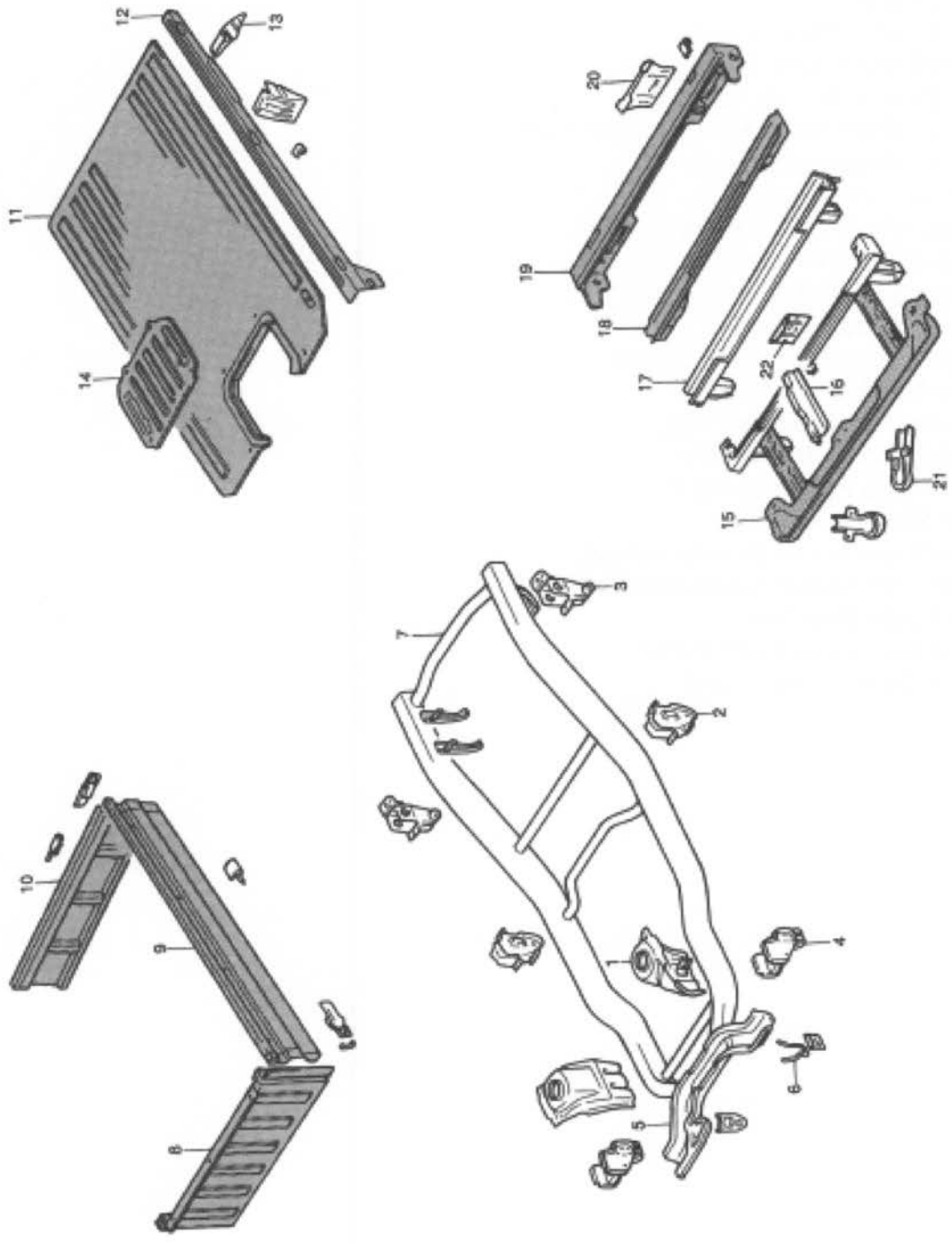


Truck

1. Front Panel Assembly
2. Front Panel: Outer
3. Front Corner Panel
4. Front Panel: Lower
5. Roof Panel
6. Roof: Front Panel
7. Front Floor Panel
8. Front Floor Tunnel Panel
9. Front Wheelhouse Front Rocker Panel
10. Front Wheelhouse Panel
11. Frame Front Cover
12. Front Wheel Lower Rocker Panel
13. Engine Room Panel: Front
14. Cabin Back Panel Assembly
15. Back Window Guard
16. Engine Room Member: Center
17. Seat Belt Bracket: Center
18. Steering Shift Cover Plate
19. Front Floor Side Member
20. Floor Side Reinforcement
21. Cab Side Outer Panel
22. Front Door Hinge Reinforcement
23. Door Lock Striker Reinforcement
24. Roof Side Drip Rail
25. Roof Side Inner Front Panel
26. Front Door Panel Guard

Body Panel Truck Lower

Truck

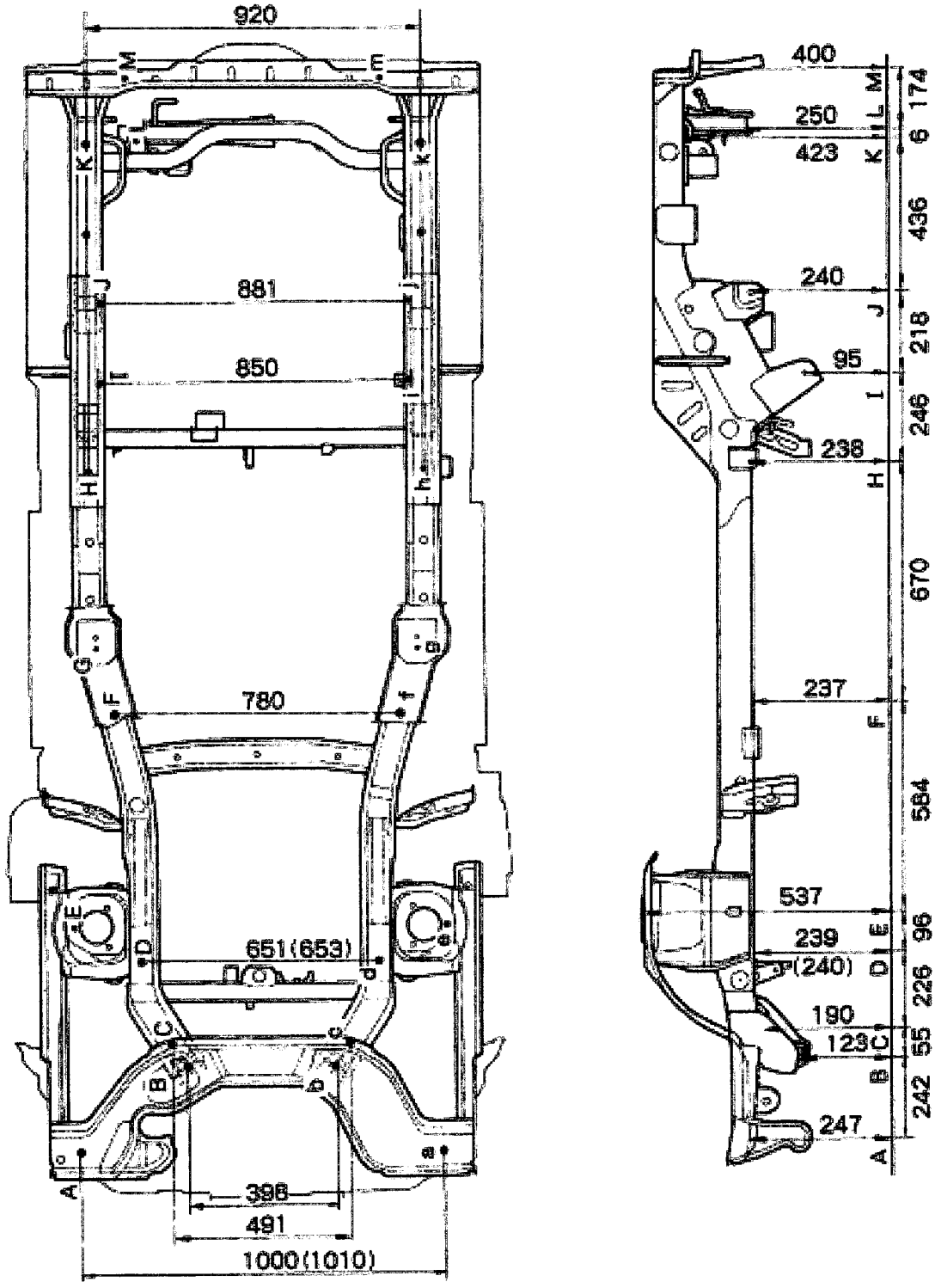


Truck Body Panels Lower

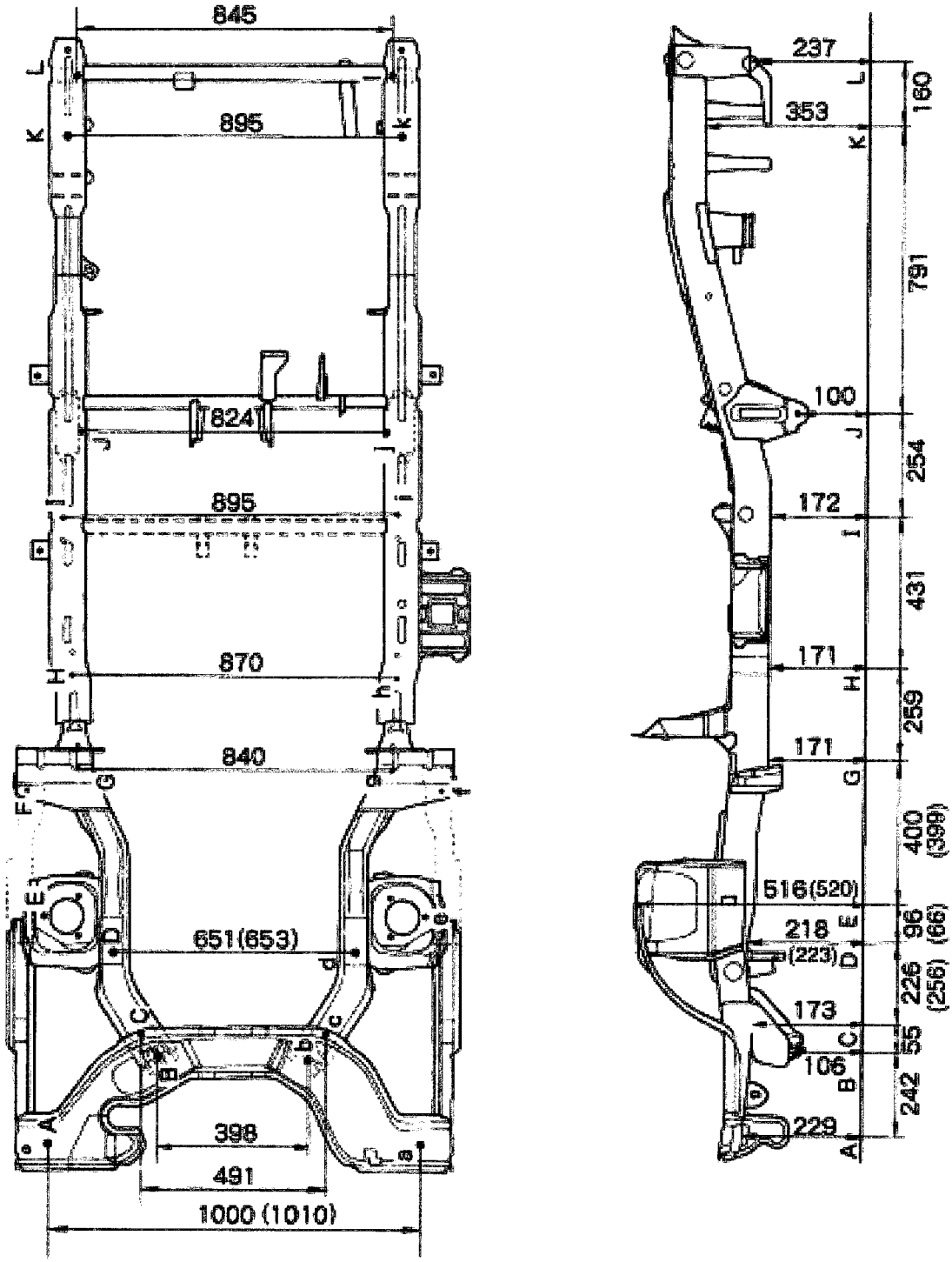
1. Strut Support Bracket
2. Rear Spring Front Rocker
3. Rear Spring Hanger Rear
4. Tension Rod Bracket
5. Front Floor Cross Member
6. Front Towing Hock Left
7. Frame Cross Member Rear
8. Deck Panel Assembly Front
9. Side Gate Panel Assembly
10. Rear Gate Panel Assembly
11. Deck Floor Panel
12. Deck Floor Side Member
13. Deck Fender
14. Engine Access Panel
15. Deck Floor Member Upper Assembly
16. Support
17. Deck Floor Cross member No. 3
18. Deck Floor Cross member No. 4
19. Deck Floor Tail Member
20. Rear License Bracket
21. Rear Body Bracket
22. Ignition Coil Bracket

Van Frame Dimensions

VAN



Truck Frame Dimensions

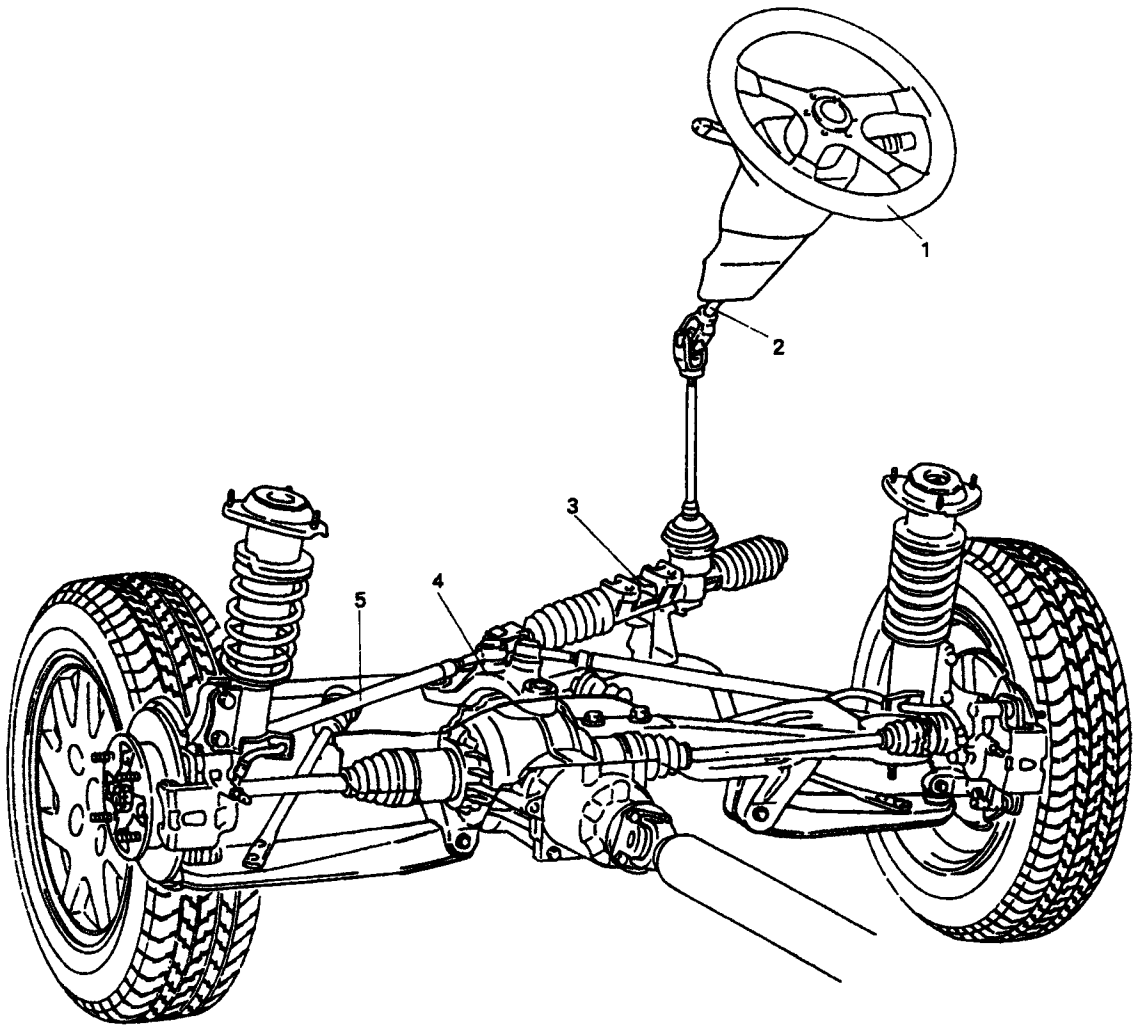


Chapter 2: Steering System

- Steering System
- Tools
- Steering Components
- Steering Linkage
- Steering Column
- Telescoping Column
- Steering Wheel
- Rack Components Truck-Van
- Rack & Pinion Assembly
- Rack and Pinion Overhaul
- Power Steering Components
- Power Steering Unit
- Power Steering Motor
- Power Steering Control Module Circuit

Steering System

Components



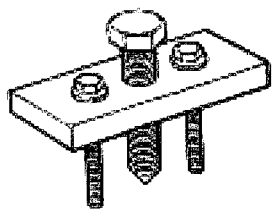
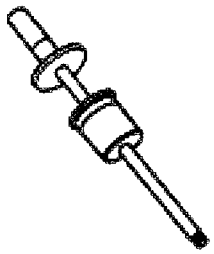
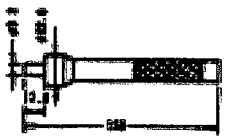
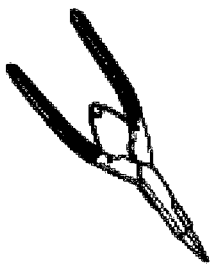
Main Component Sections

1. Steering Wheel
2. Steering Column
3. Rack & Pinion Gearbox
4. Intermeshing Arm
5. Tie Rod

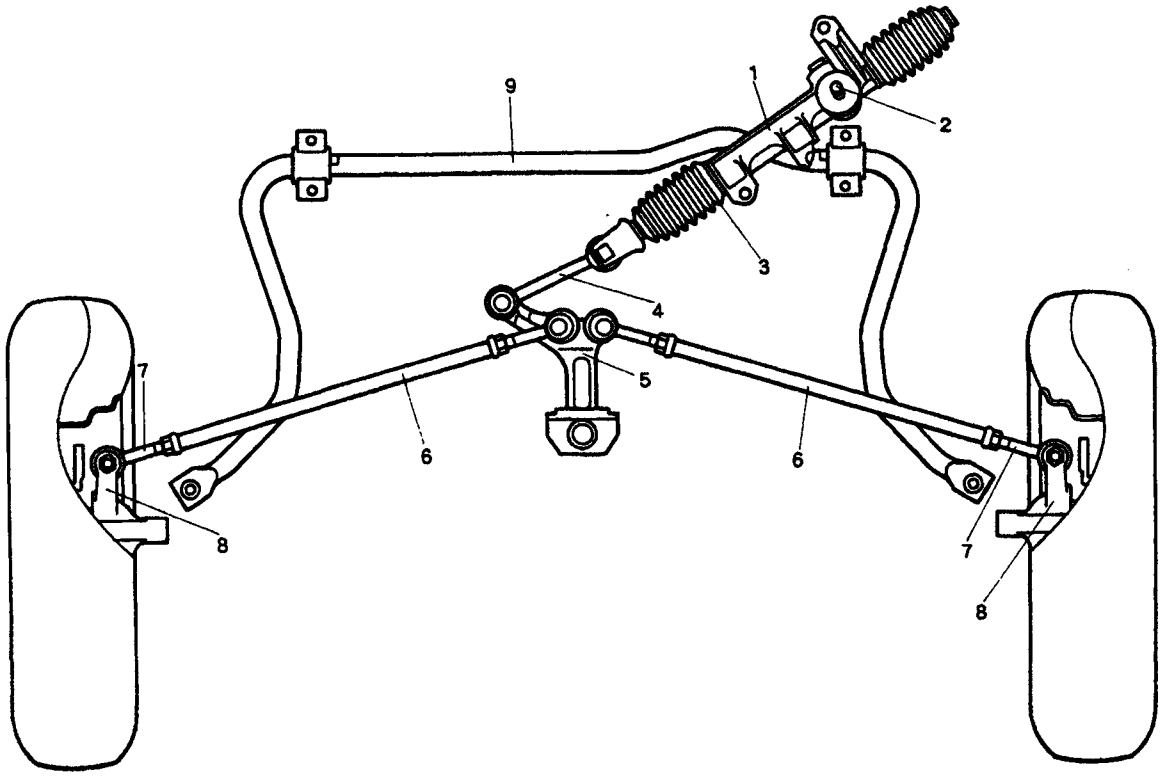
Suzuki Factory Tools & Part Numbers

Rack & Pinion

Tools

 09944-36010 **Steering Wheel Puller**	 09944-26210 **Pinion Bearing Socket**	 09944-18211 **Pinion Socket**	 09930-30102 **Slide Puller**
 09921-20200 **Bearing Remover**	 09943-88211 **Bearing Installer**	 09900-06107 **Snap Ring Pliers**	

Steering System
Linkage Routing

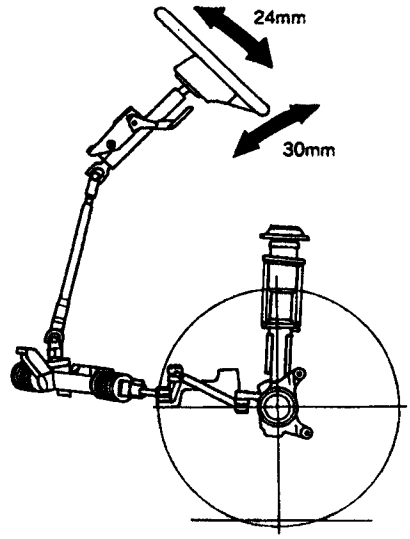


Steering Linkage Components

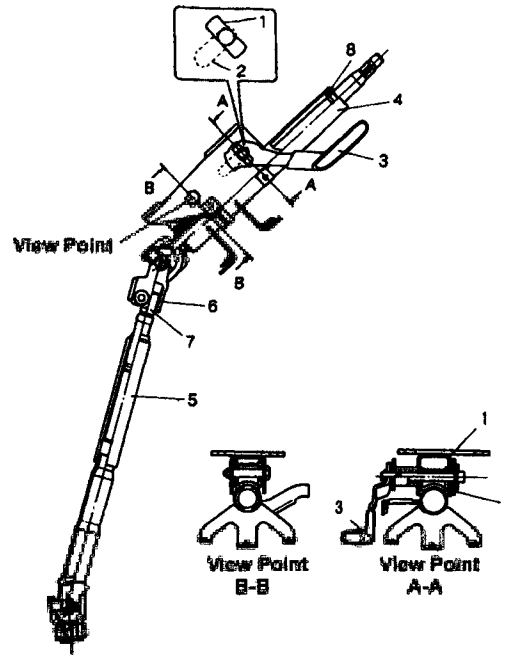
1. Rack & Pinion Steering Box
2. Pinion
3. Rack
4. Track Rod
5. Intermesh Arm
6. Tie Rod
7. Tie Rod End
8. Knuckle
9. Stabilizer Bar

Steering System

Tilt & Telescopic Column

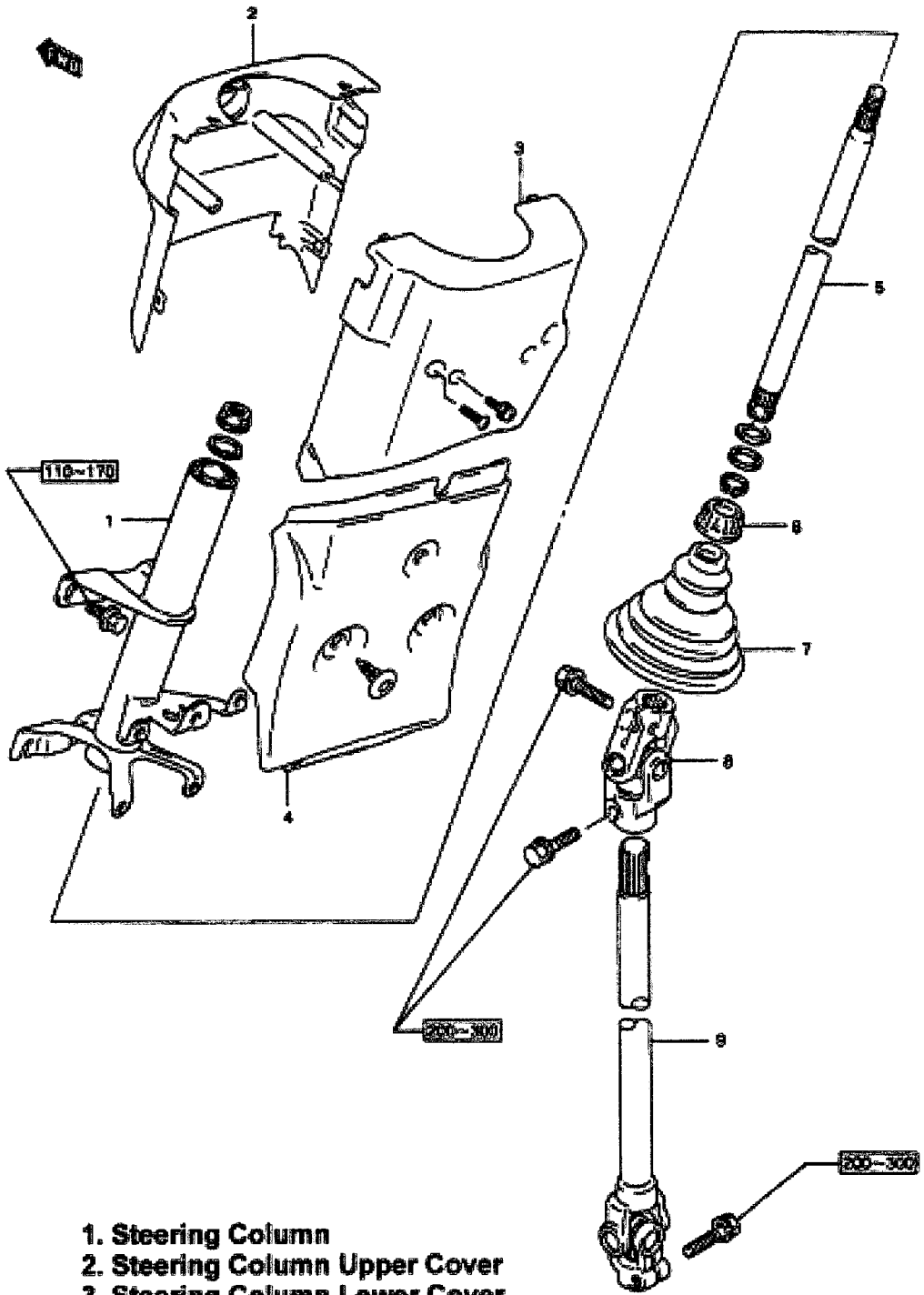


- Tilt Range: 24mm Travel
- Telescopic Function: 30mm Travel



1. Tilt Bracket	2. Distancing Bracket
3. Locking Lever	4. Steering Upper Shaft
5. Steering Lower Shaft	6. Tube Spline
7. Shaft Spline	8. Ball Bearing

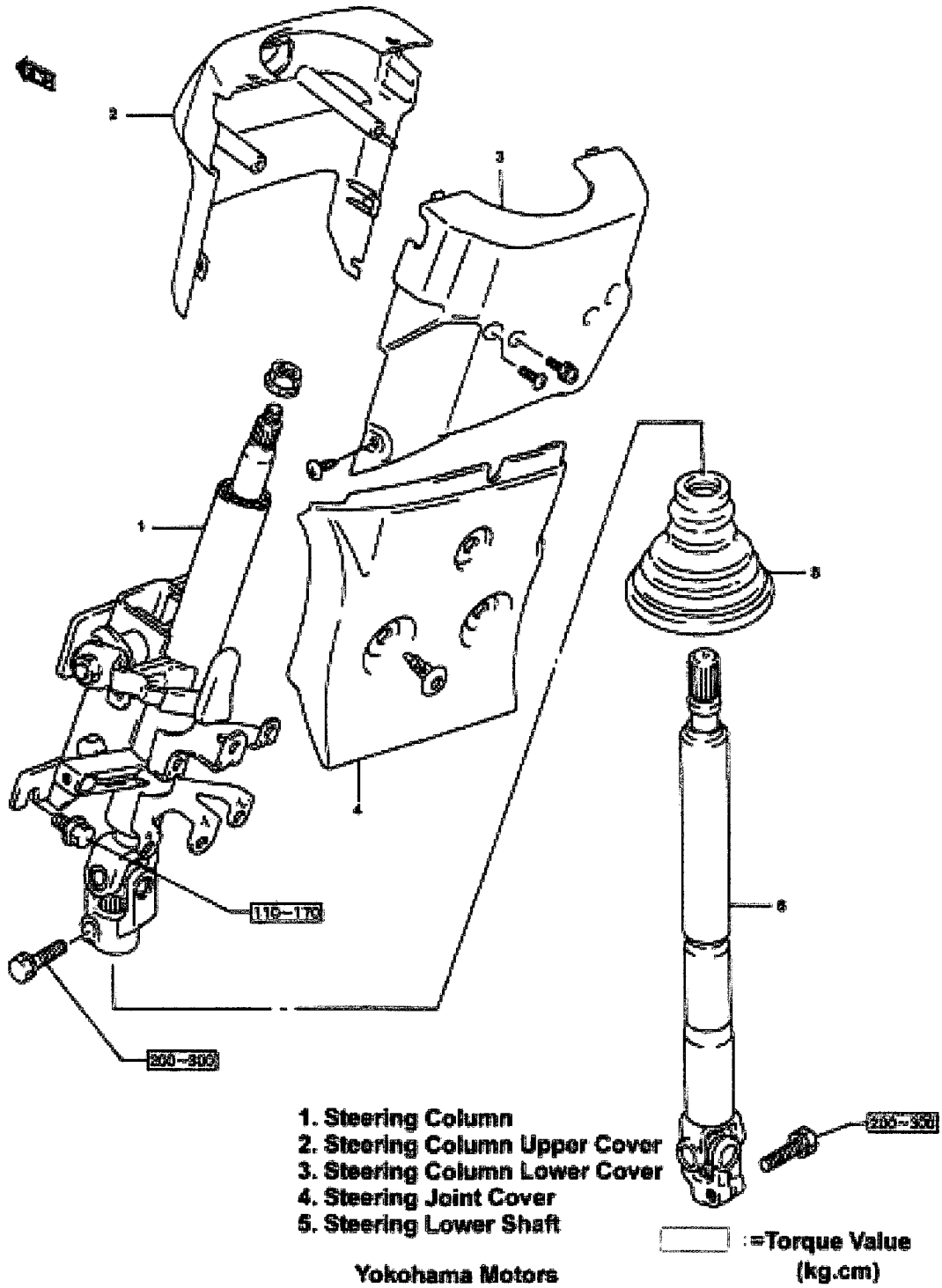
Number in boxes indicate torque in (kg.cm)



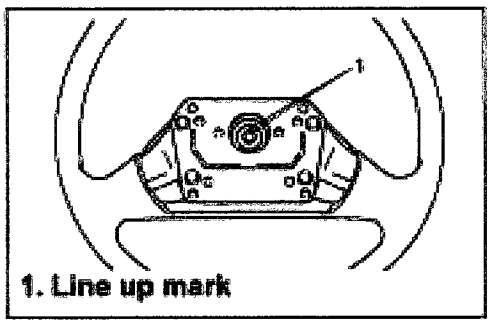
1. Steering Column
2. Steering Column Upper Cover
3. Steering Column Lower Cover
4. Steering Colum Joint Cover
5. Steering Upper Shaft
6. Lower Bushing
7. Shift Lever
8. Steering Upper Joint
9. Steering Lower Joint

Yokohama Motors

Telescopic Steering Handle



Steering Handle Removal

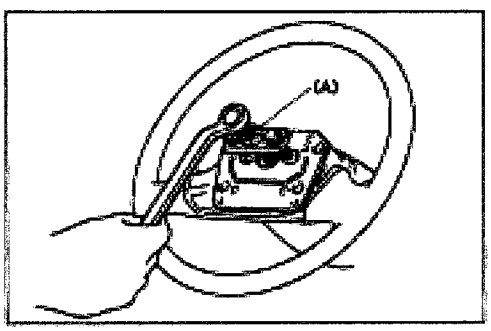


1. Line up mark

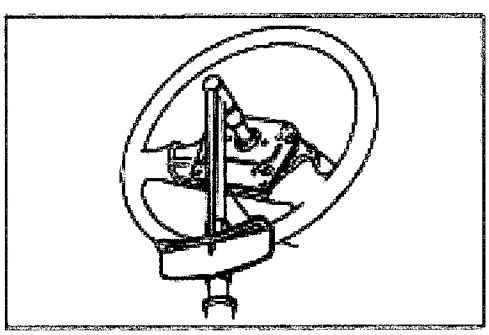
Removal

***Note: Have front wheels facing straight**

1. **Disconnect (-) Negative Battery connection**
2. **Remove Horn Button**
3. **Remove steering shaft nut**
4. **Make a line up mark as in the diagram on the left**
5. **Us a steering wheel puller to remove the wheel**



***Note: Use Suzuki Sterring Wheel Puller**
PN: # 09944-38210



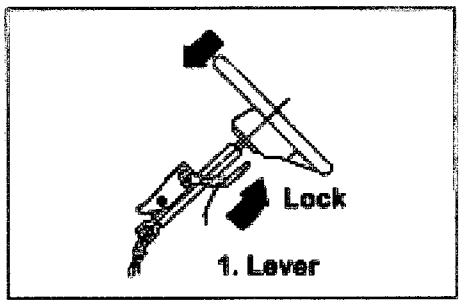
Installation

1. **Install wheel**
2. **Install Nut**

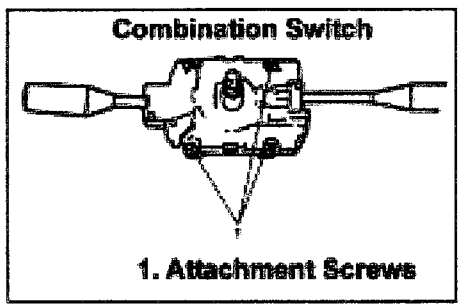
Torque: (kg.cm) 250-400

3. **Install Horn Button**
4. **Connect (-) Negative battery connection**

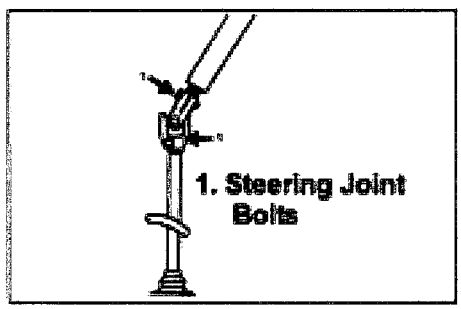
Steering Column Removal



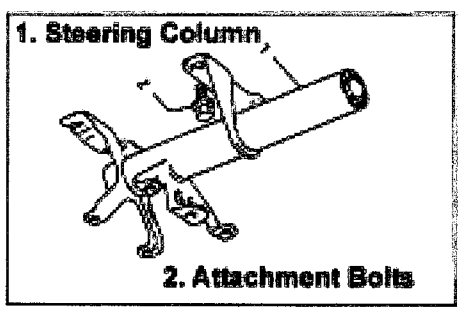
1. Disconnect (-) Negative battery connection
2. Remove Steering Wheel



3. Remove Combination Switch (Turn Signal)
4. Diconect Ignition switch connector



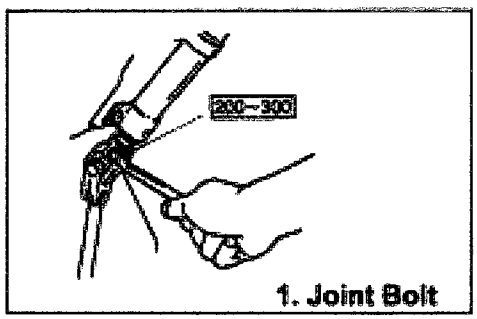
5. Diconnect steering joint bolts. First lower and then upper

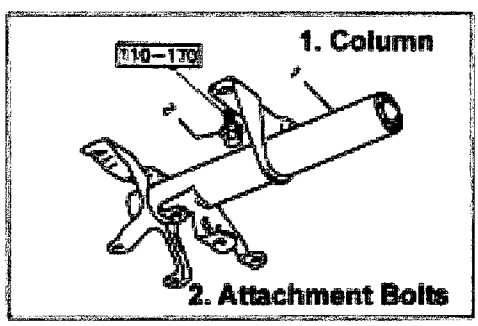


6. Remove steering column attachment bolts (4)

Steering Column Installation

Joint Attachment





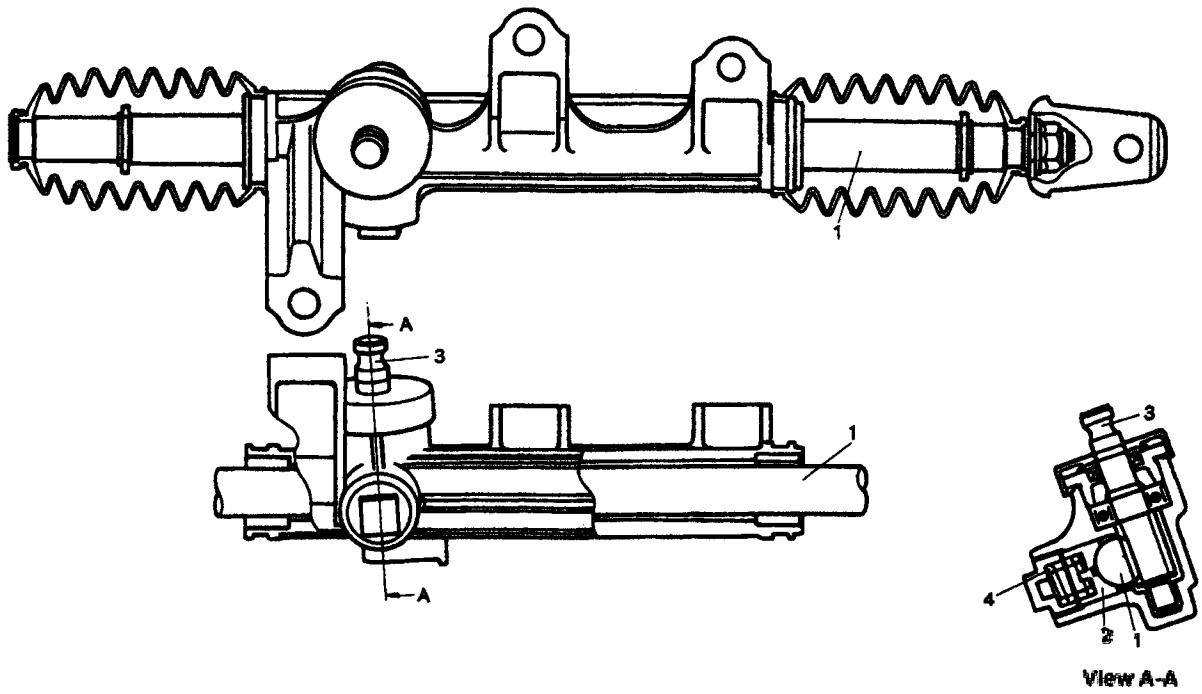
Installation: Reverse Procedure

Joint Bolt Torque (kg.cm) 200-300

***Note: Torque Lower Bolt First, Then Torque Upper Bolt**

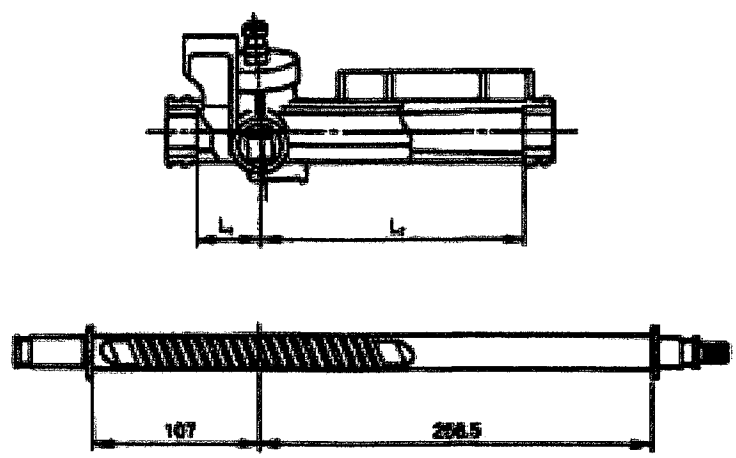
Column Attachment Bolt Torque (kg.cm) 110-170

Rack Components Truck-Van



1. Steering Rack	2. Plunger
3. Pinion	4. Plunger Spring

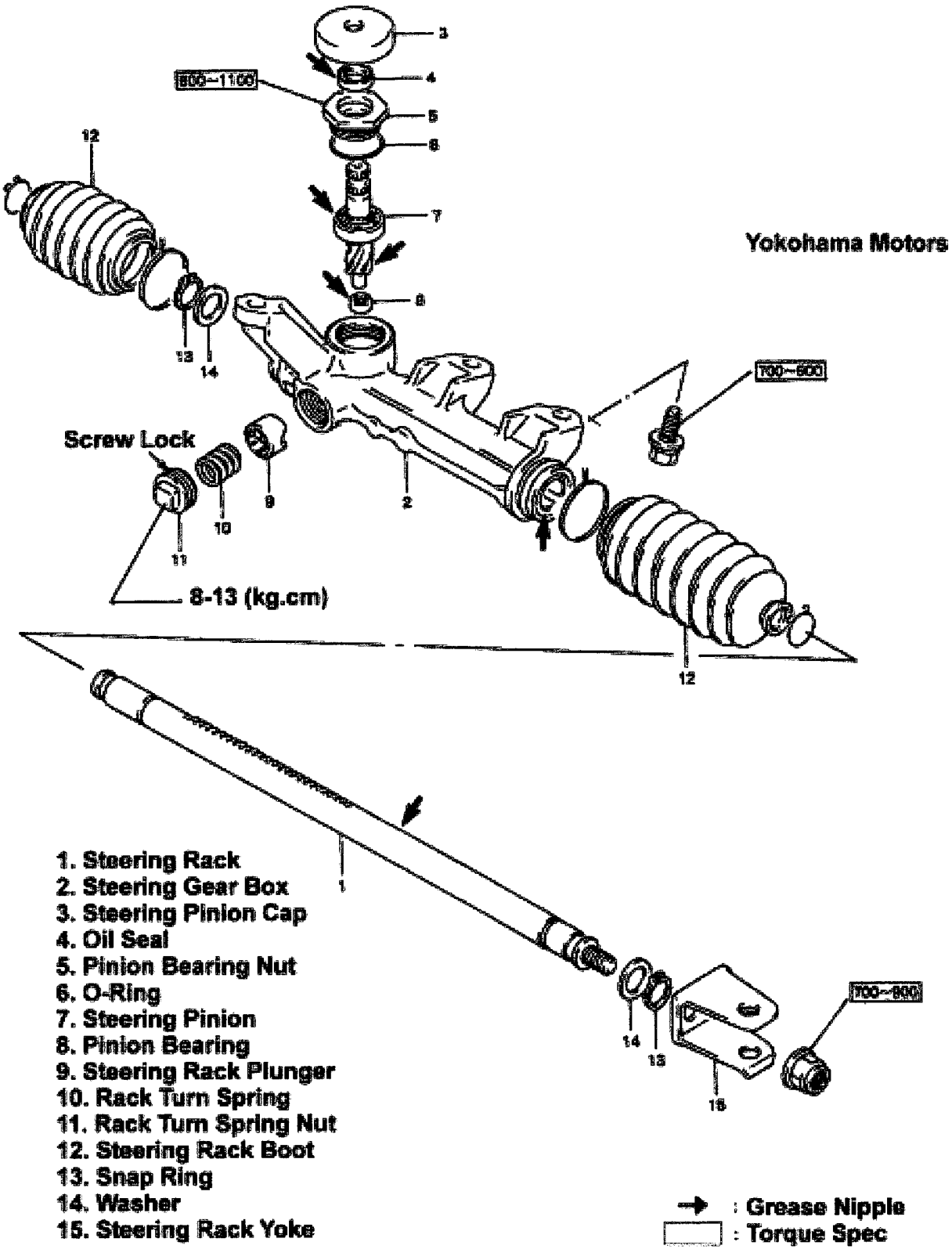
Truck & Van Length



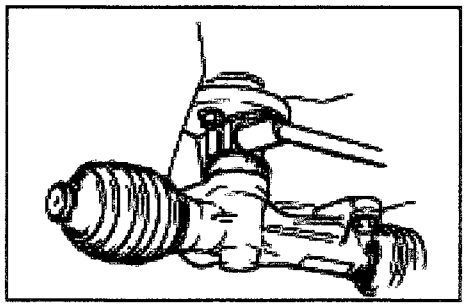
Truck: L1=40mm L2=169.5mm

Van: L1=35.5mm L2=165mm

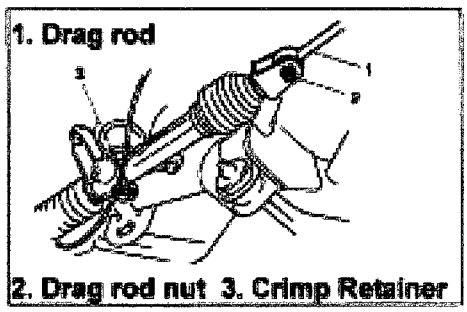
Rack & Pinion Diagram



Rack Removal & Disassembly Procedure

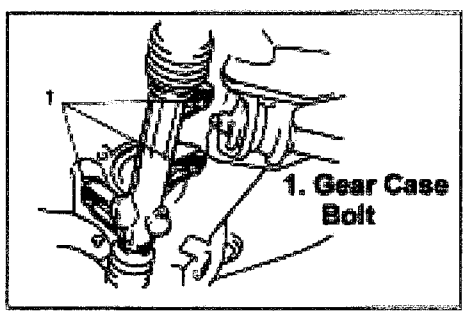


1. Remove Steering Joint Bolt



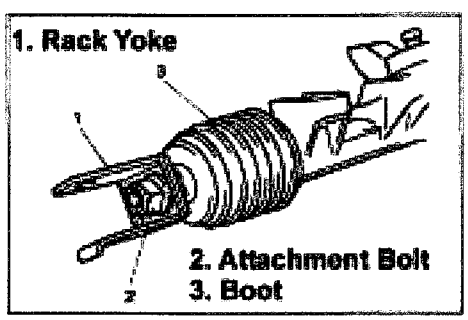
2. Remove Drage rod retainer bolt

3. Remove Crimp Retainer

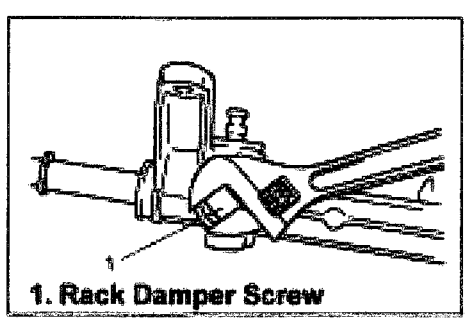


4. Remove case attachement bolts. Remove assembly

Disassembly

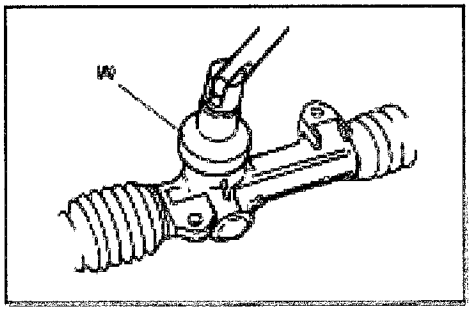


1. Remove Yoke
2. Remove Boot



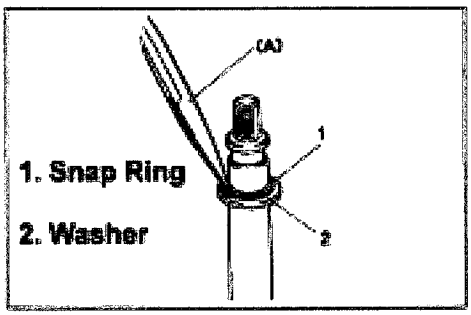
3. Remove Rack Dampner Screw
4. Remove Spring & Plunger

Rack & Pinion Disassembly



1. Remove Pinion Bearing Retainer

Suzuki Tool: # 09944-28210

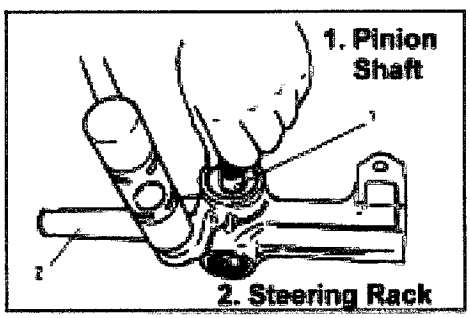


1. Snap Ring

2. Washer

6. Remove Snap Ring Retainer and Washer

Suzuki Tool: # 09900-06107

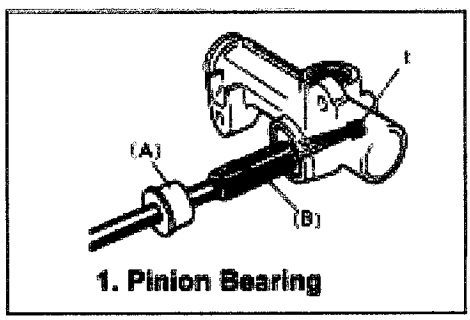


1. Pinion Shaft

2. Steering Rack

7. Remove Pinion Shaft

***Note: Take special care not to damage the Shaft or other parts. Use a plastic tip hammer for tapping. Do Not use a steel face hammer or damage will occur.**

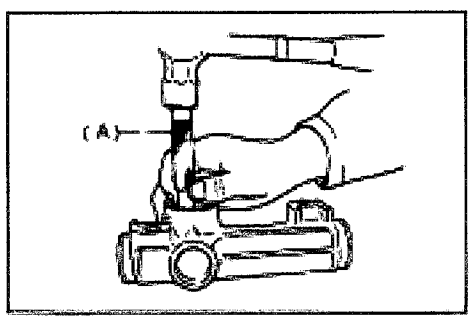


1. Pinion Bearing

Pinion Bearing Replacement

1. Remove Pinion bearing with the following tools or their equivalent

(A) Steering Hammer: 09930-30102
(B) Pinion Bearing Remover: 09921-20200

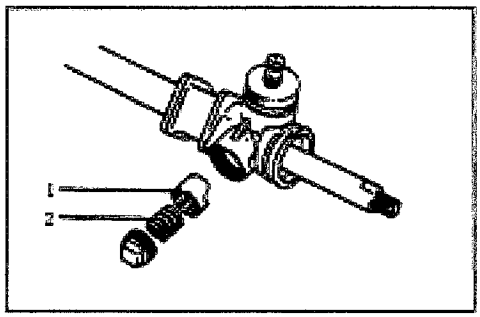


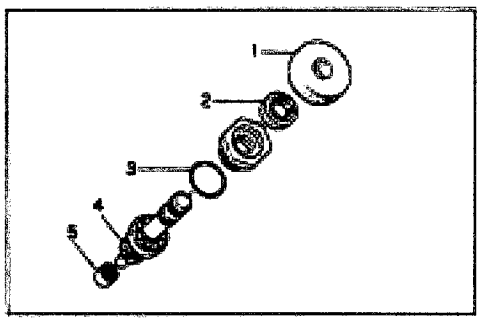
2. Pack the bearing with Molybdenum Grease (Moly B)

Suzuki Tool: Pinion Bearing Installer: 09943-88211

Steering Rack Assembly

1. Rack Plunger
2. Plunger Spring





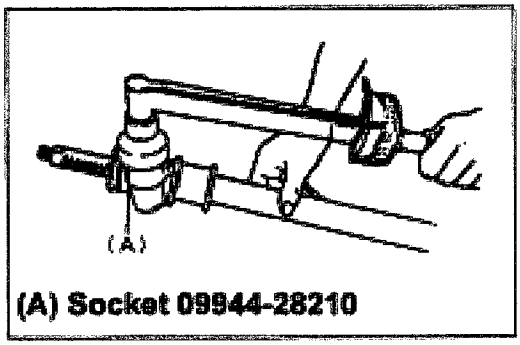
1. Cap
2. Oil Seal
3. O-Ring
4. Steering Pinion
5. Pinion Bearing

Assembly

Assemble parts in revearse order. Coat parts with a light coat of Moly B Grease.

Note: Do not force parts during assembly

Note: Do not re-use O-Ring



(A) Socket 09944-28210

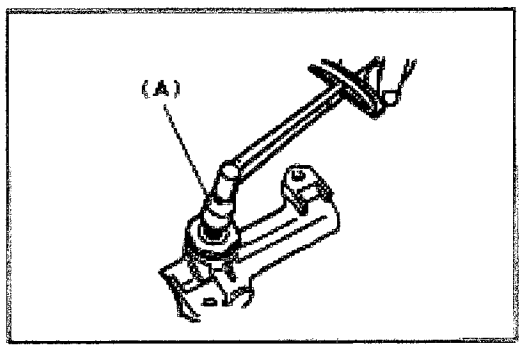
Set Torque

Pinion Bearing Lock Nut

Torque: (kg.cm) 800-1100

Suzuki Tool: 09944-28210

Note: Use Loctite Adheasive on threads

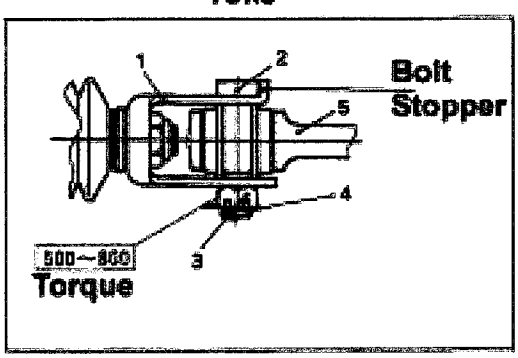


Yoke

Steering Rack Dampner Screw

(A) Pinion socket
Suzuki Tool: 09944-18211

Torque: (kg.cm) 8-13

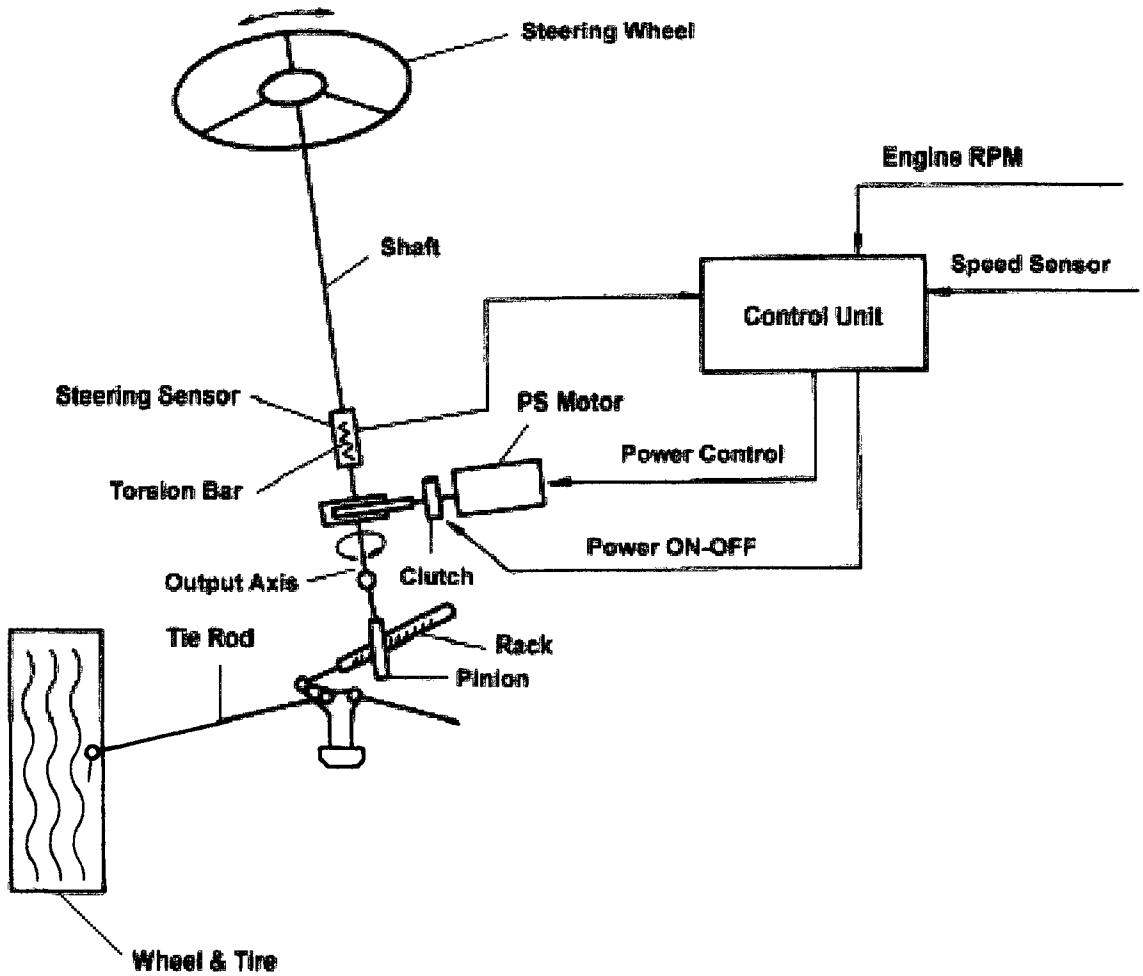


Steering Shaft Joint Bolt (kg.cm) 200-300

Steering Gear Case attachement Bolts (kg.cm) 700-900

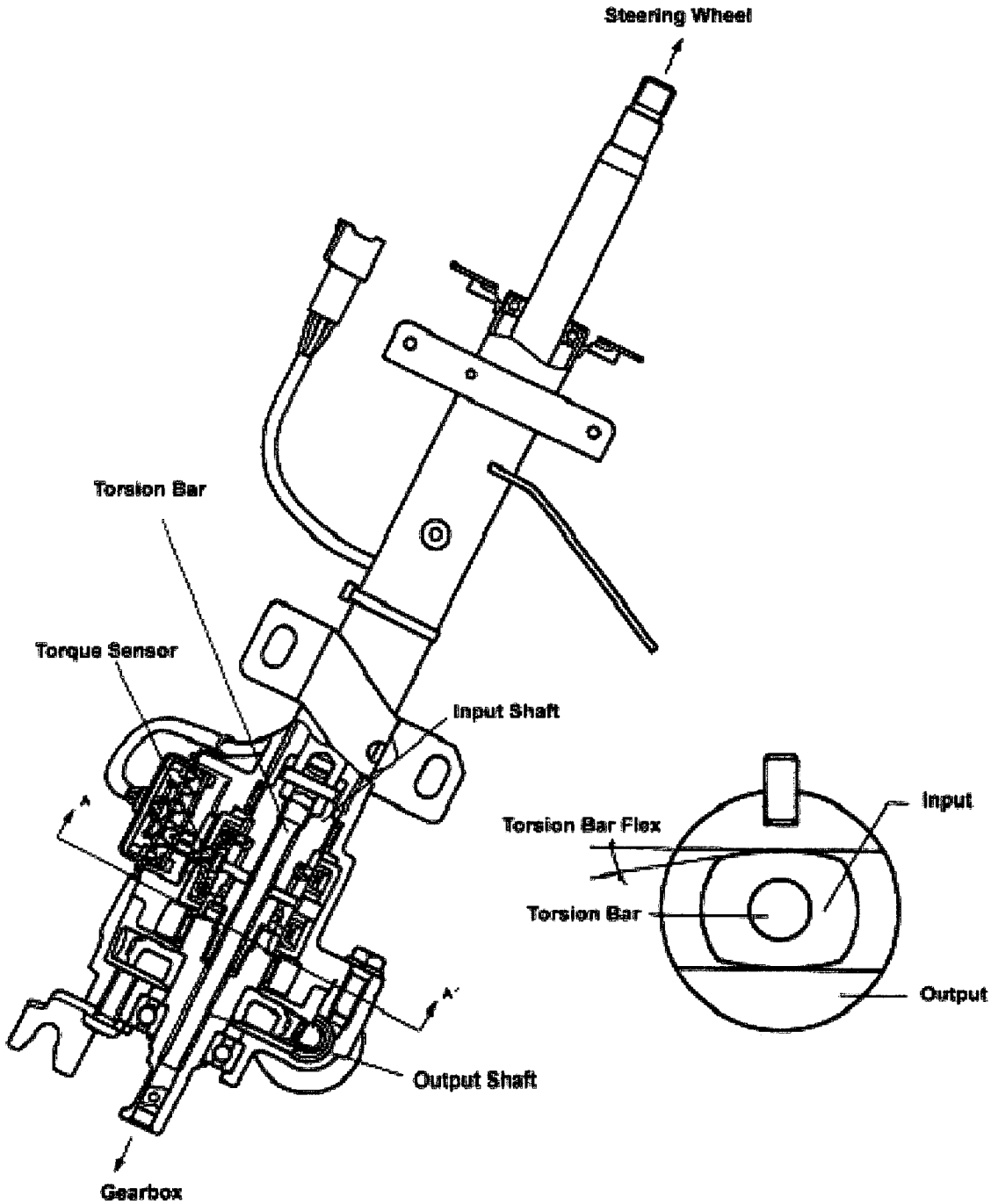
1. Steering Rack Yoke
2. Bolt
3. Nut
4. Cotter Pin
5. Drag Rod

Power Steering Components

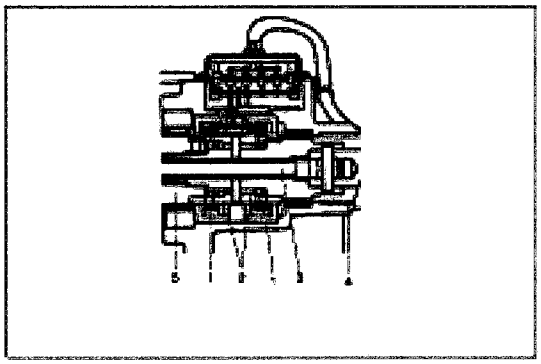


Note: The Power Steering Unit Automatically turns off at speeds over 45km/h

Power Steering Unit

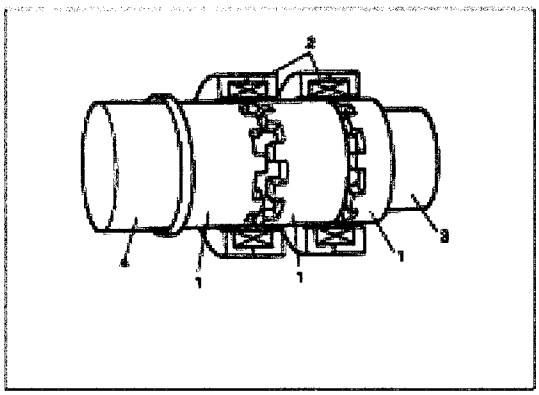


Power Steering Motor



Steering Sensor

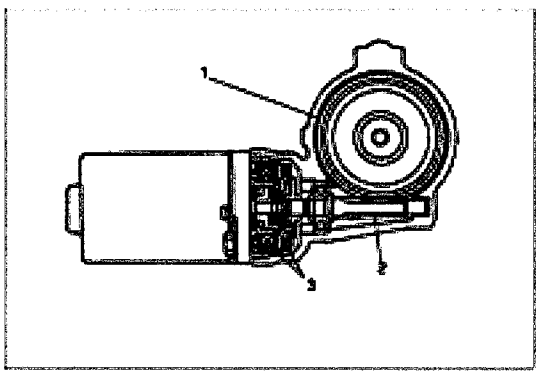
1. Coil
2. Output Ring
3. Torsion Bar
4. Input Shaft
5. Output Shaft



Engagement Coupling

1. Ring
2. Coil
3. Input Shaft
4. Output Shaft

Note: If the Coil Fails to engage or disengage connecting rings the unit must be replaced.



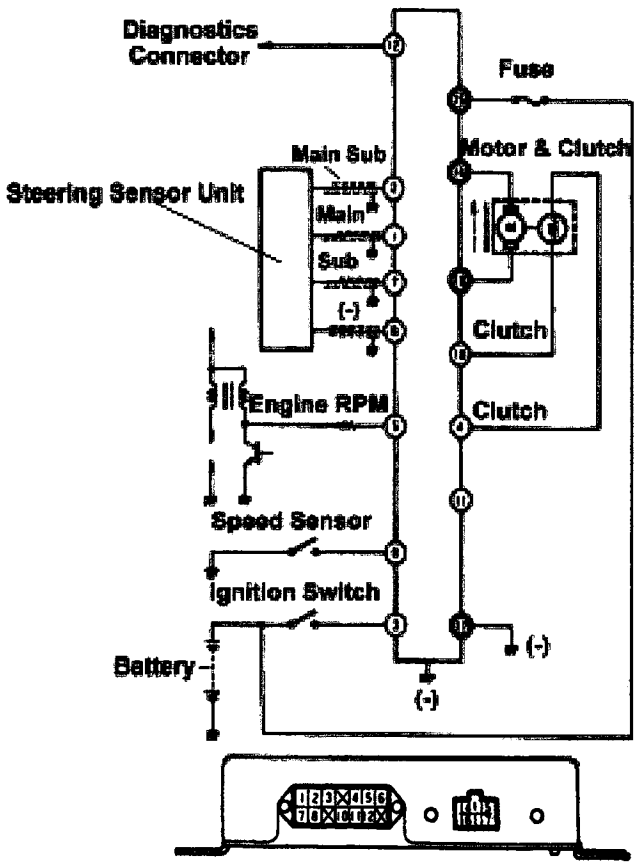
Power Steering Motor

1. Engagement Gear
2. Worm Gear
3. Clutch

Note: Remove Motor to test. Connect a 12 Volt connection direct to inspect clutch and worn gear engagement.

Note: Power Steering Motor must be changed as a Unit. The Motor can not be disassembled for further repair.

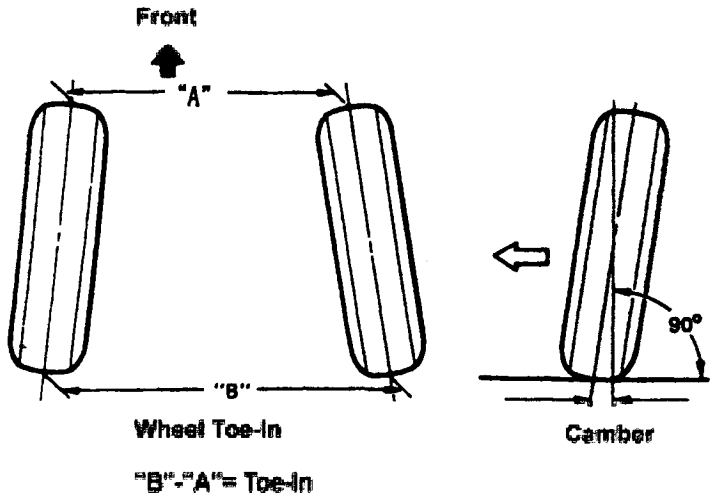
Power Steering Control Module Circuit



Chapter 3: Front & Rear Suspension

- Front Suspension Components 2WD
- Front Suspension Components 4WD
- Alignment Specifications
- Stabilizer Bar
- Strut Assembly
- Steering Knuckle
- Wheel Bearings
- Suspension Arms
- Stud Replacement
- Arm Bushings
- Ball Joint
- Tie Rod
- Tools: Front
- Rear Components: Van
- Rear Components: Truck
- Rear Suspension Axel Van
- Wheel Stud
- Bearings & Oil Seal
- Shock Absorber
- Rear Suspension Truck
- Tools: Rear

Alignment Specifications

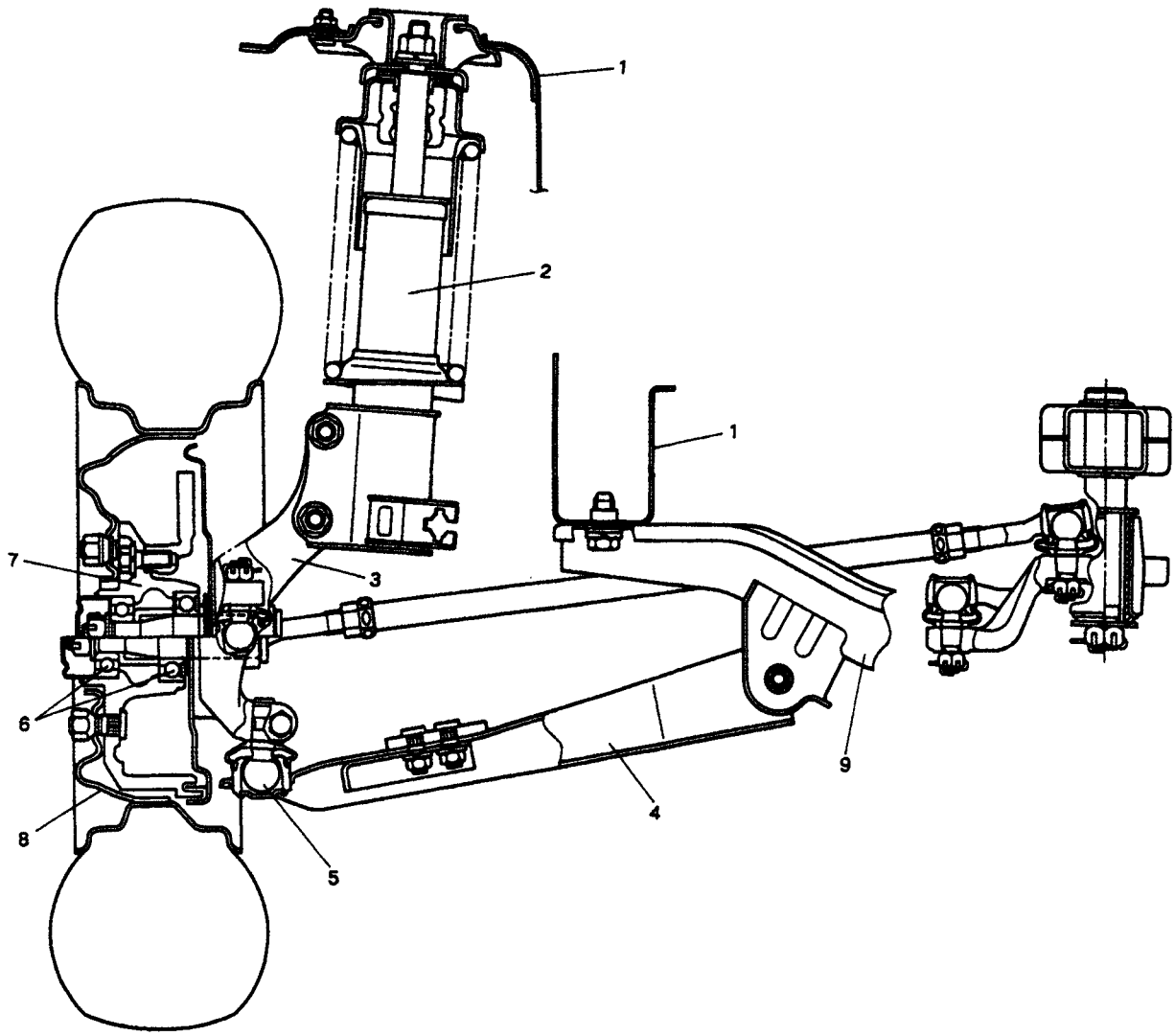


Suspension Type	McPherson Front Suspension
Toe-In	2~4mm
Camber	1°00'±1°
Caster	3°30'±1°

Steering Radius

Side	Van	Truck
Inside	40°	37°
Outside	36°	34°

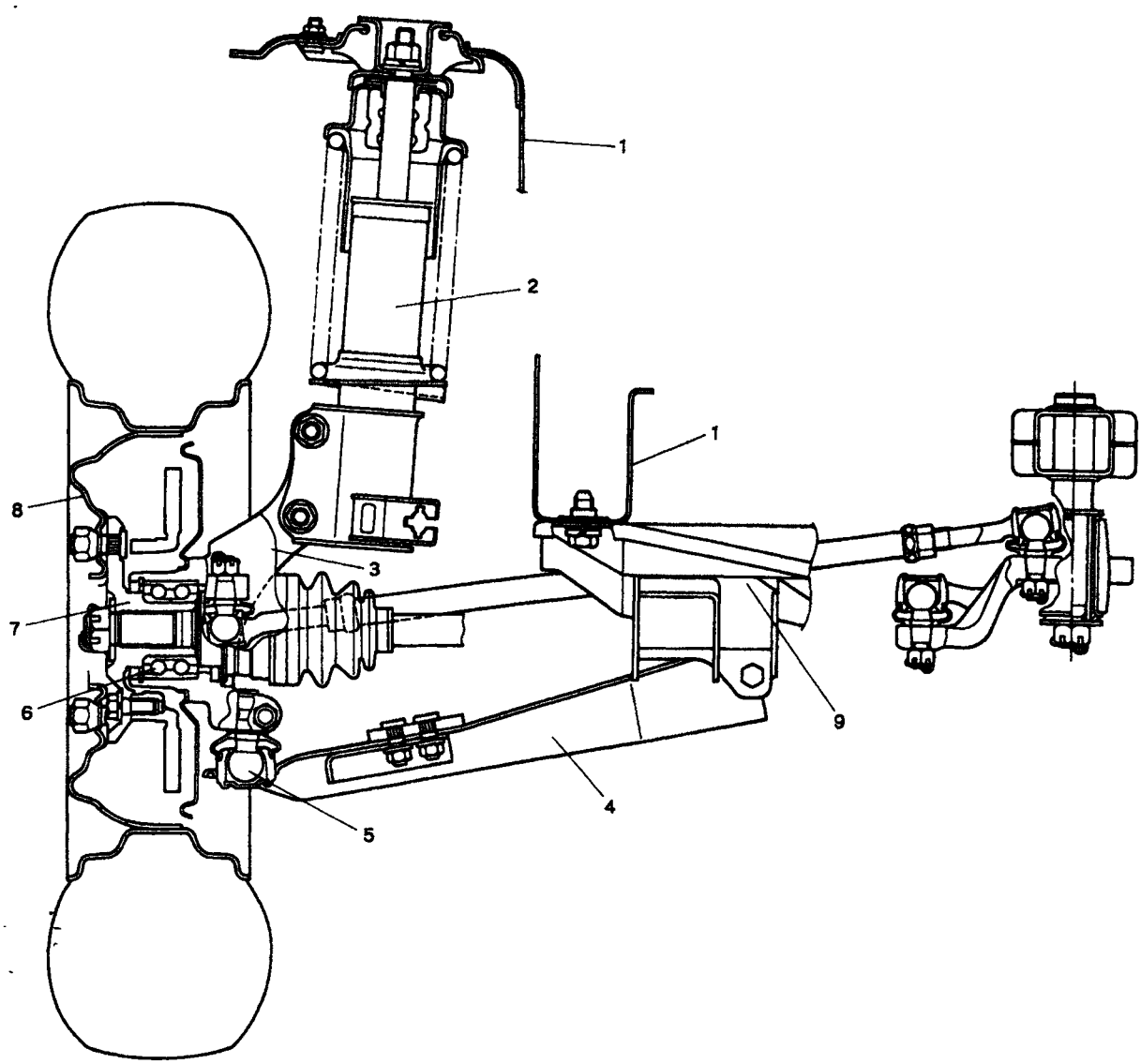
Front Suspension Components 2WD



Front Suspension Components 2WD

1. Vehicle Body Mount
2. Strut Assembly
3. Steering Knuckle
4. Lower Arm
5. Lower Ball Joint
6. Bearings
7. Hub
8. Wheel
9. Frame Connection

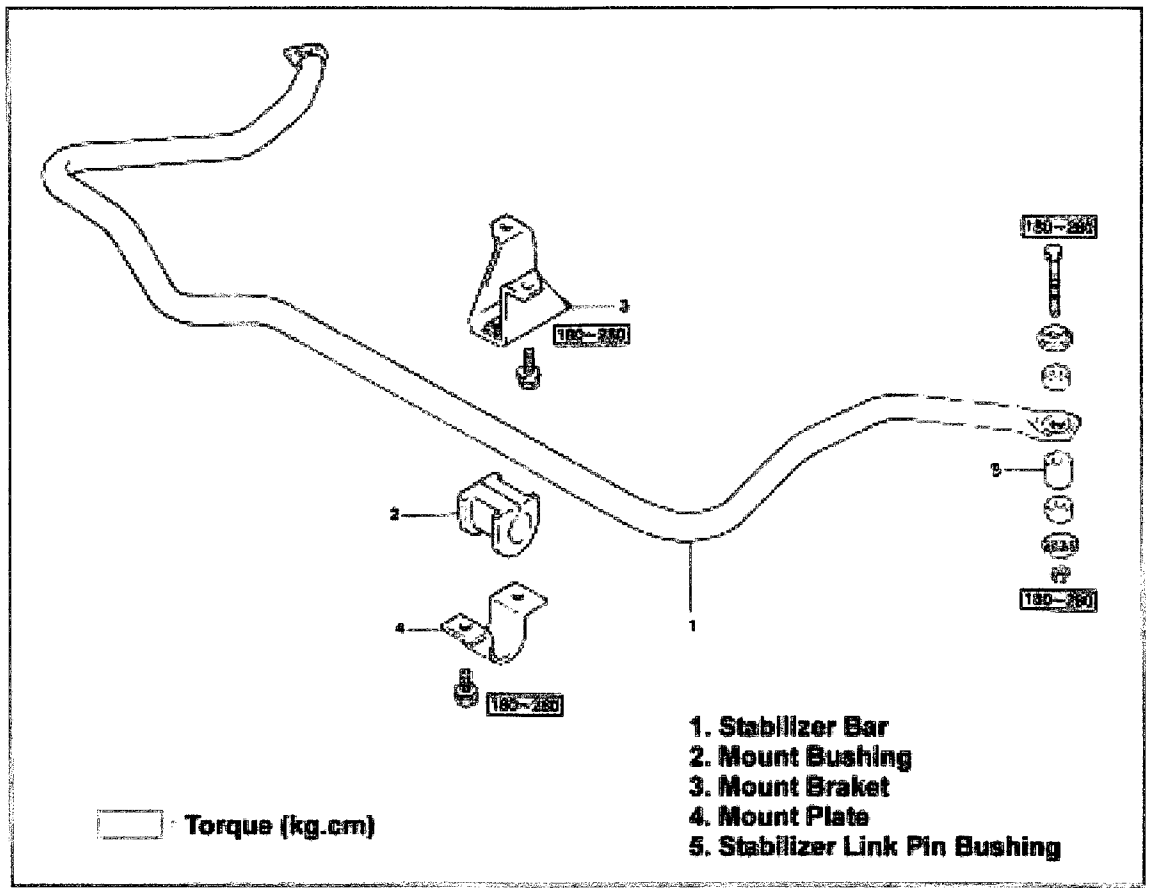
Front Suspension Components 4WD



Front Suspension Components 4WD

10. Vehicle Body Mount
11. Strut Assembly
12. Steering Knuckle
13. Lower Arm
14. Lower Ball Joint
15. Bearings
16. Hub
17. Wheel
18. Frame Connection

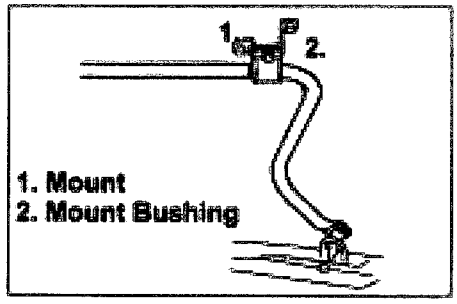
Front Stabilizer Bar Assembly



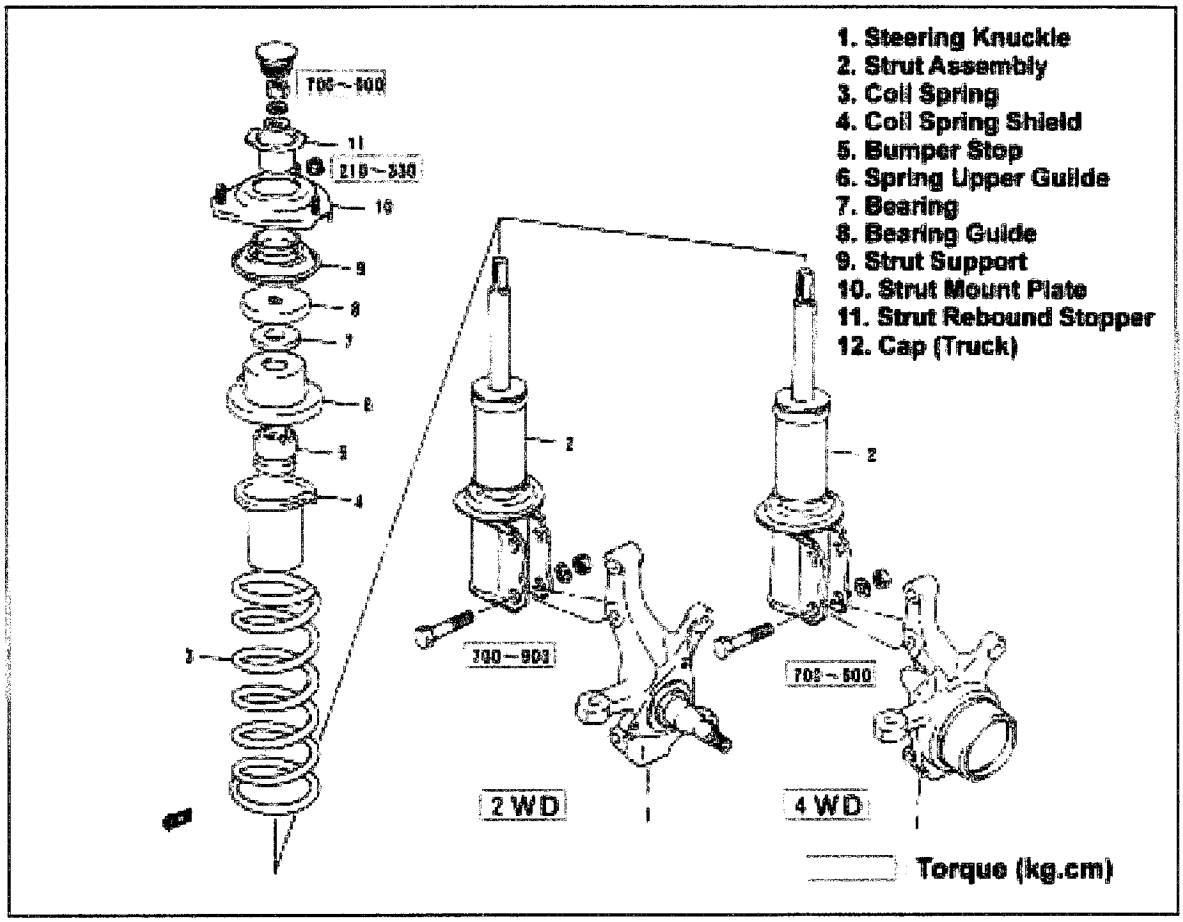
Removal or Bushing Replacement

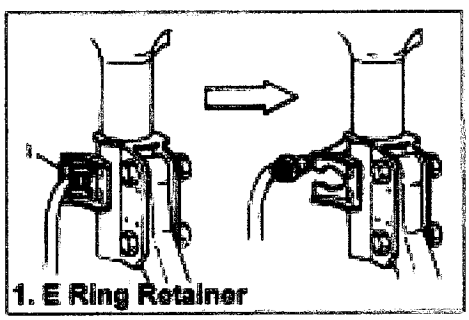
1. Remove Link Pin
2. Remove Mounts
3. Remove Bar
4. Replace Bushings

Sway Bar Mounts



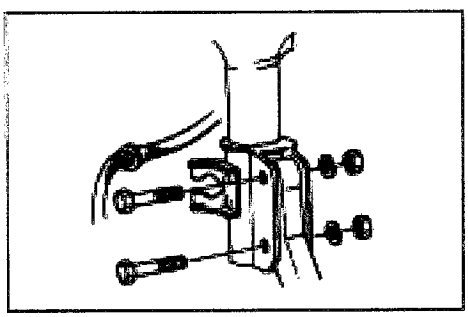
Strut Assembly



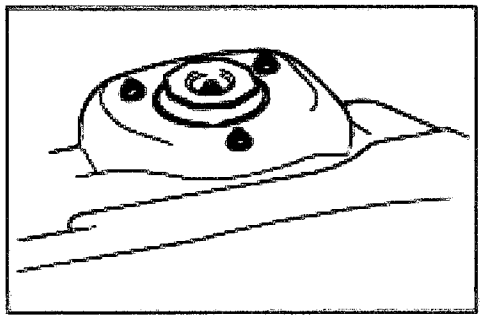


Replacement

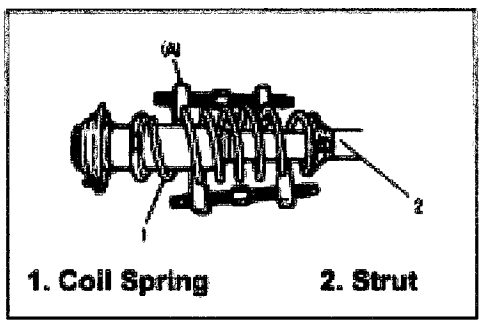
1. Jack Up Front of Vehicle
2. Remove Wheel
3. Disconnect E-Ring from Strut



4. Remove Bolts from Strut Bracket



5. Remove top attachement bolts and remove unit

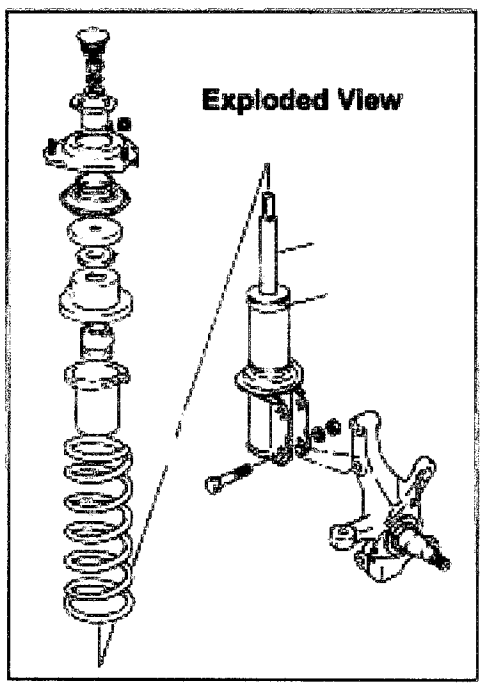


1. Coil Spring 2. Strut

Disassembly

*Note: Coil spring Is Under Extream Pressure
Use Only Proper tools and Saftey
Equipement when working with Springs

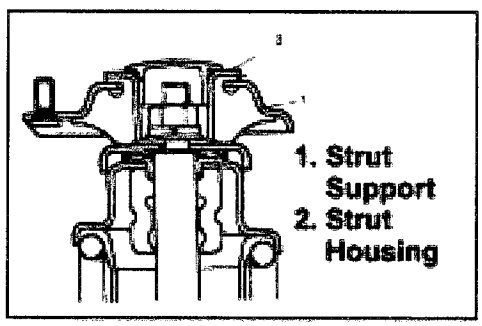
Use Tool (A) 09940-71430 Spring Compressor



Use the chart on the left for disassembly contents

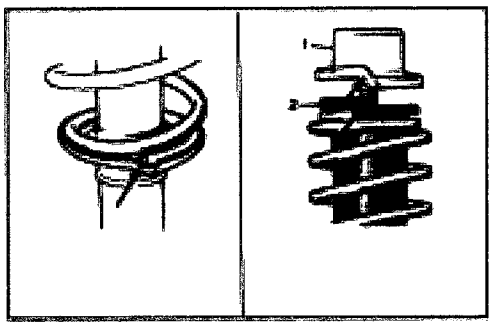
*Note: Make sure all parts surfaces are clean before re-assembly

*Note: Take care note to scratch shaft unit



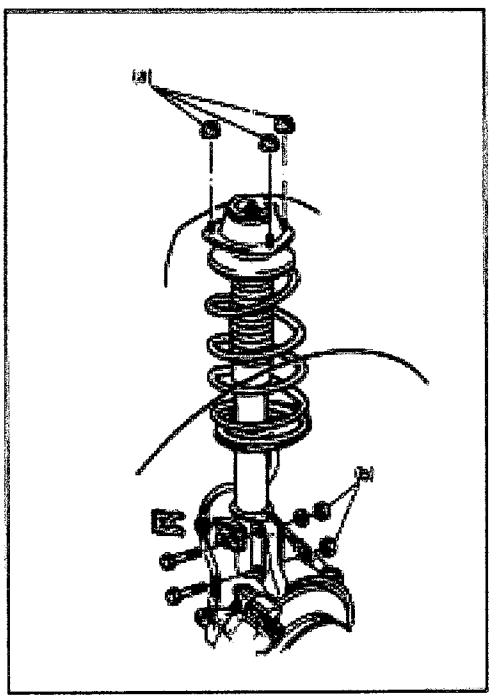
Close Up Diagram

Strut Assembly



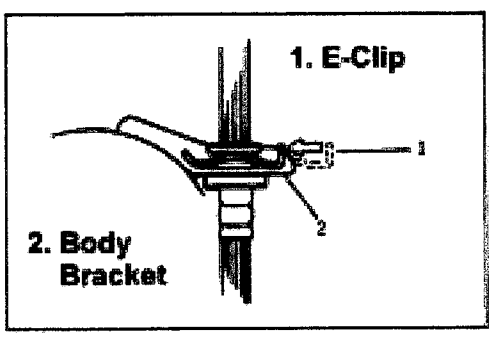
Use the diagram on the left for Spring Seating location

1. Spring Upper Seat
2. Spring Rubber Seat



Attach all bolts and nuts finger tight before setting torque value

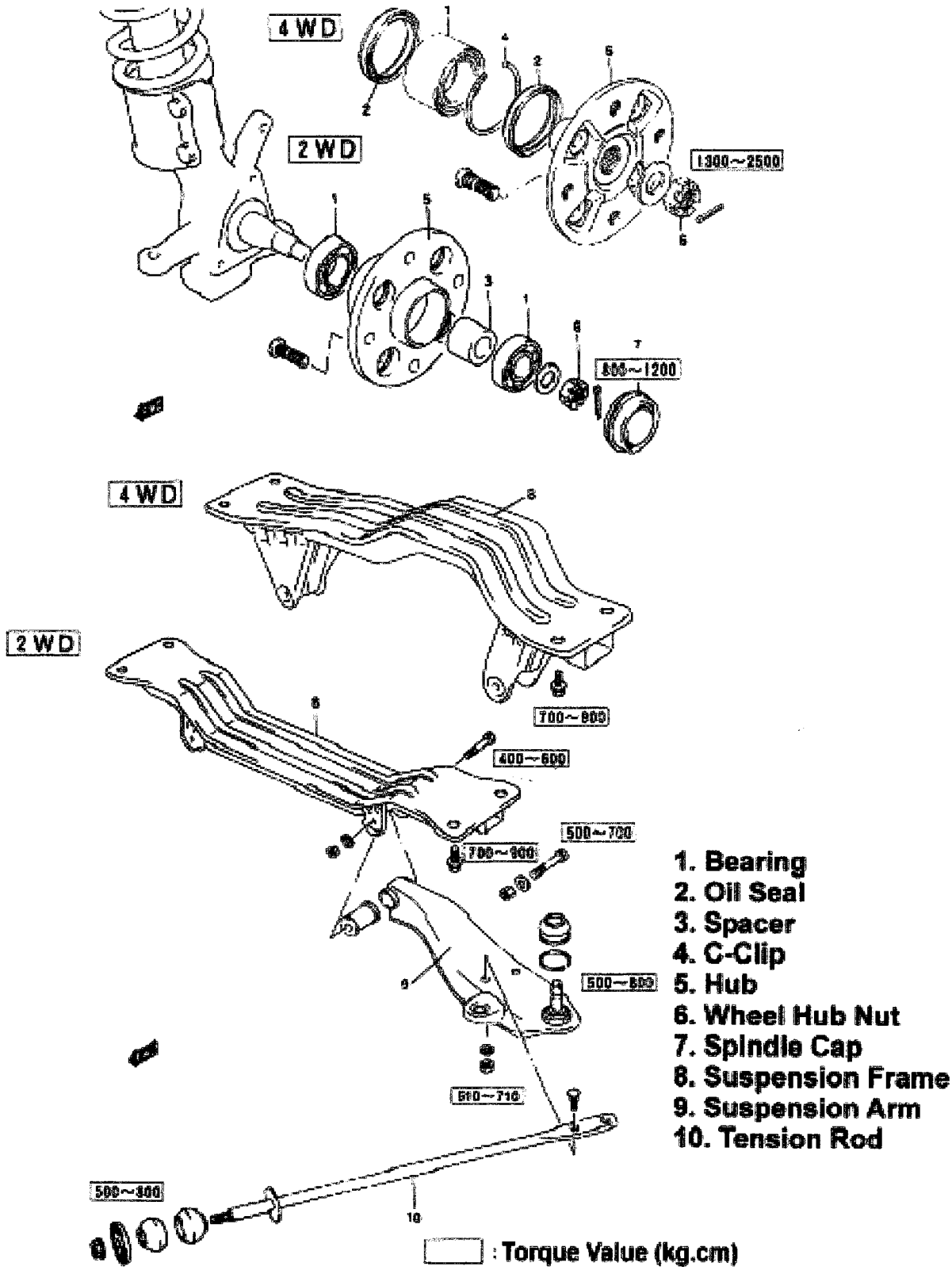
(a) Strut Support Nut 210-330 (kg.cm)
(b) Strut Braket Nut and bolt 700-900 (kg.cm)



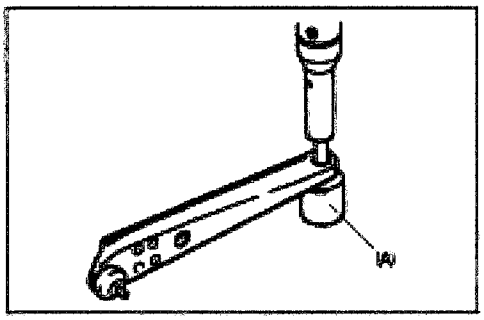
Re-attach Brake Hose

***Note: Use New E-Clip**

Brake Hose Attachment


4 WD
2 WD
1300~2500
800~1200
4 WD
2 WD
700~900
400~600
500~700
700~900
500~800
600~710
500~800
1. Bearing
2. Oil Seal
3. Spacer
4. C-Clip
5. Hub
6. Wheel Hub Nut
7. Spindle Cap
8. Suspension Frame
9. Suspension Arm
10. Tension Rod
: Torque Value (kg.cm)

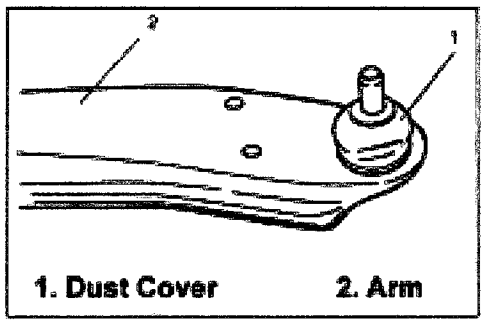
Suspension Arm & Wheel Bearing Torque



Suspension Arm Bushings

***Note: Inspect bushings for cracks or weather damage. Cold weather climate check every 6 months**

Remove Arm and using tool (A) 09943-77910 remove old bushing



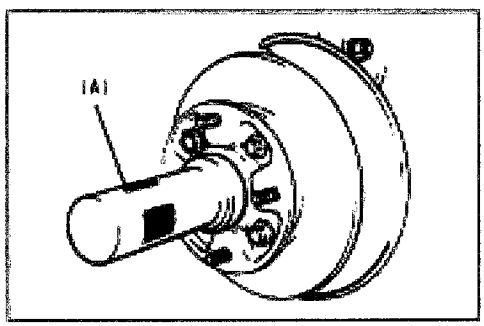
1. Dust Cover **2. Arm**

Ball Joint

Remove Ball Joint, Inspect Arm for Cracks or damage. If crack is detected replace arm

***Note: Damaged or Cracked Arms must be replaced**

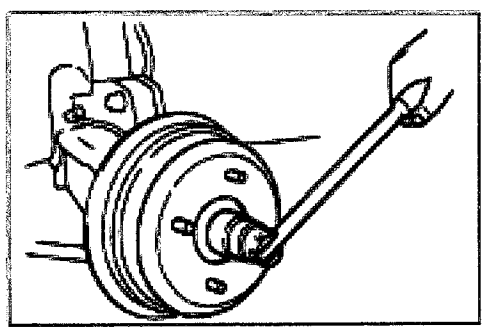
***Note: See diagram for torque settings**



Wheel Bearing Torque

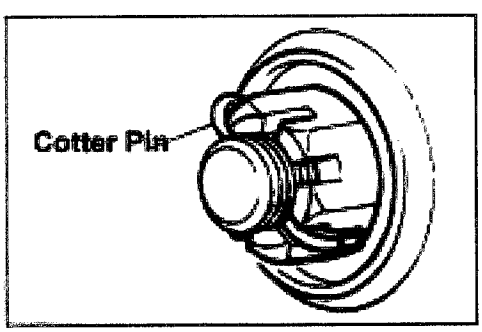
Remove Old Bearing and Install new

Use Too (A) Wheel Bearing Installer: 09913-85210



Front Wheel Bearing Torque

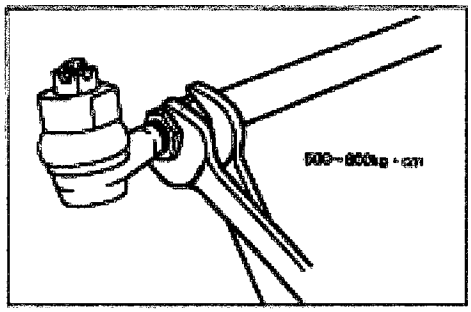
1300-2500(kg.cm) 4WD
800-1200 (kg.cm) 2WD



Install Catter Pin

***Note: Do not re-use cotter pins use only new replacements**

Tie Rod End & Specialty Tools

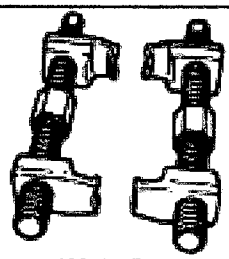


Tie Rod End Torque

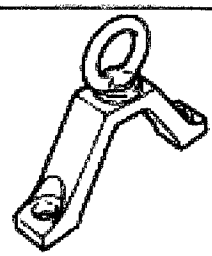
(kg.cm) 500-800

Tools

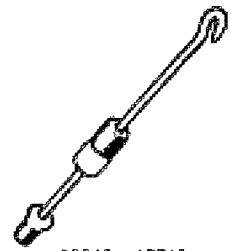
Product Name	Product Number	Product Use
Lithium Grease	Suzuki Super Grease (99000-25010)	Wheel Bearings, Oil Seal Wheel Hub Bearings



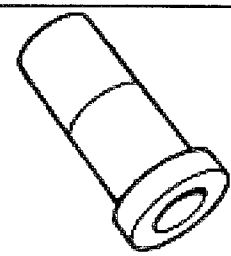
09940-71430
Compressor



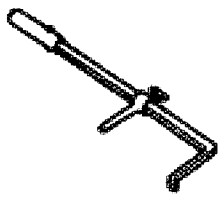
09943-17911
Hub Remover



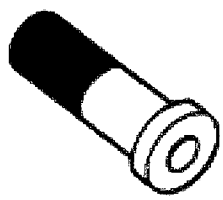
09942-15510
Slide Hammer



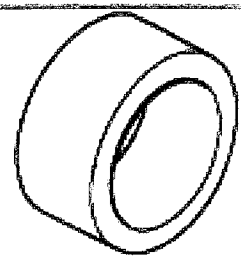
09913-85210
Bearing Installer



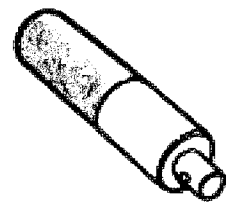
09913-50121
Oil Seal Remover



09951-16060
Bearing Installer

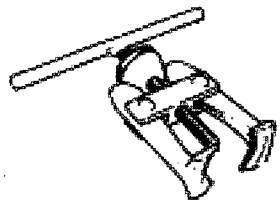


09944-78220
Bearing Inst:Support

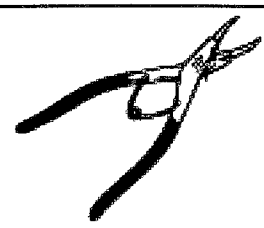


09924-74510
Installer Handle

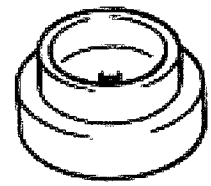
09925-68210
Puller Attachment



09913-61110
Bearing Puller



09900-06108
Snap Ring Pliers

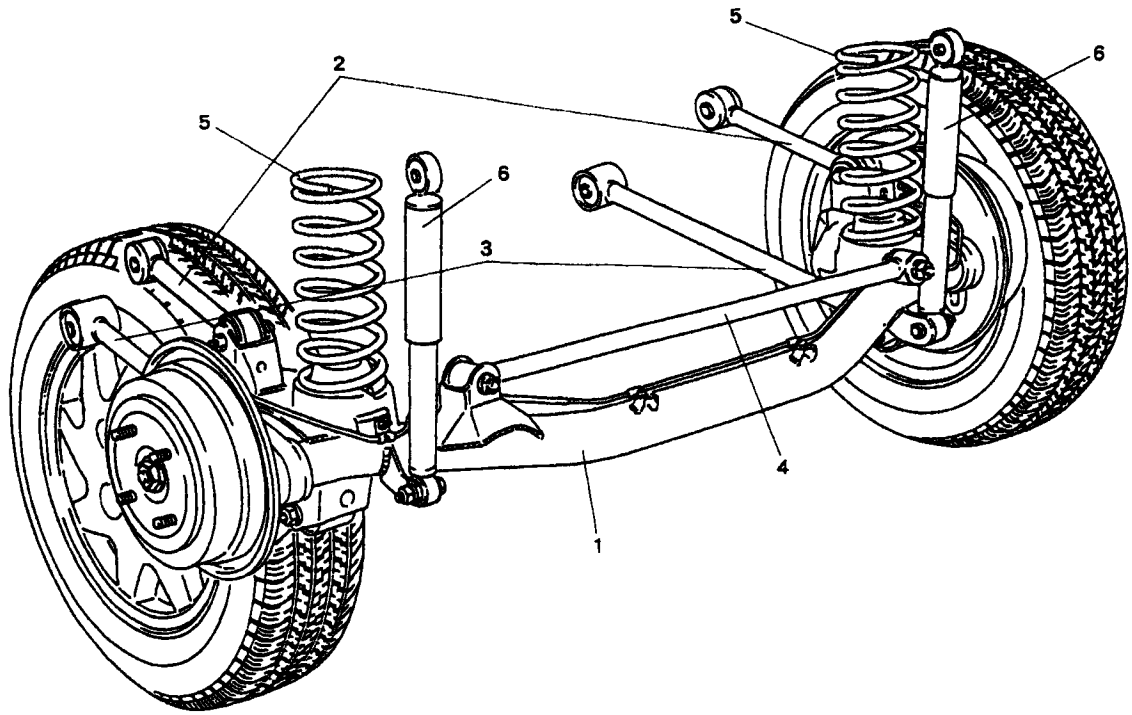


09944-66010
Oil Seal Installer

Rear Suspension

- Rear Components: Van
- Rear Components: Truck
- Rear Suspension Axel Van
- Wheel Stud
- Bearings & Oil Seal
- Shock Absorber
- Rear Suspension Truck
- Tools

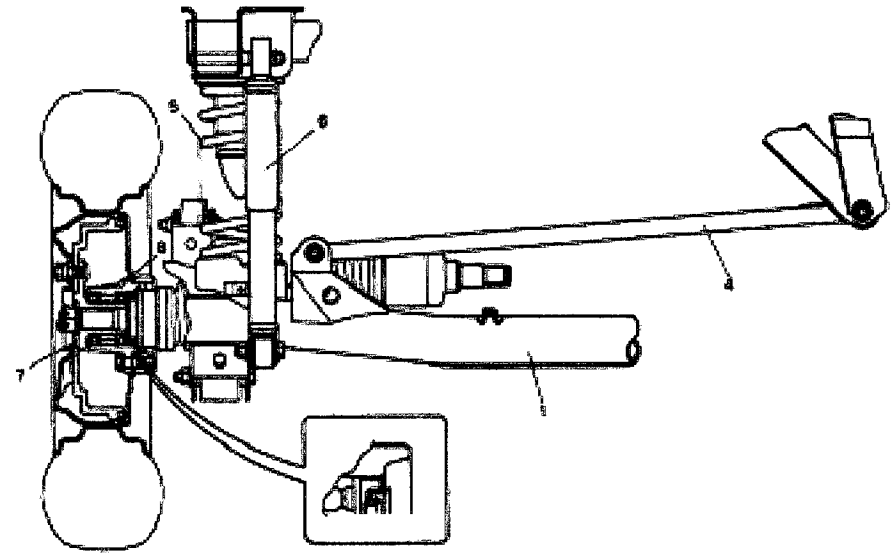
Rear Suspension Exploded View (Van)

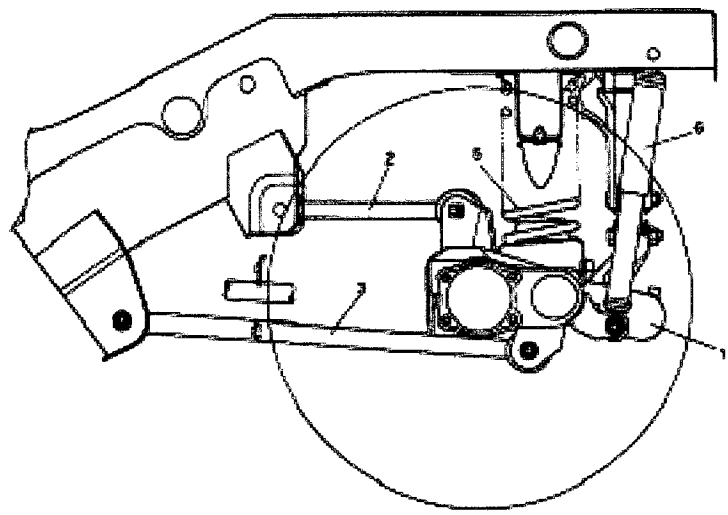


1. Rear Axle
2. Upper Rod
3. Lower Rod
4. Lateral Rod
5. Coil Spring
6. Shock Absorber

Rear Suspension Exploded View (Van)

C

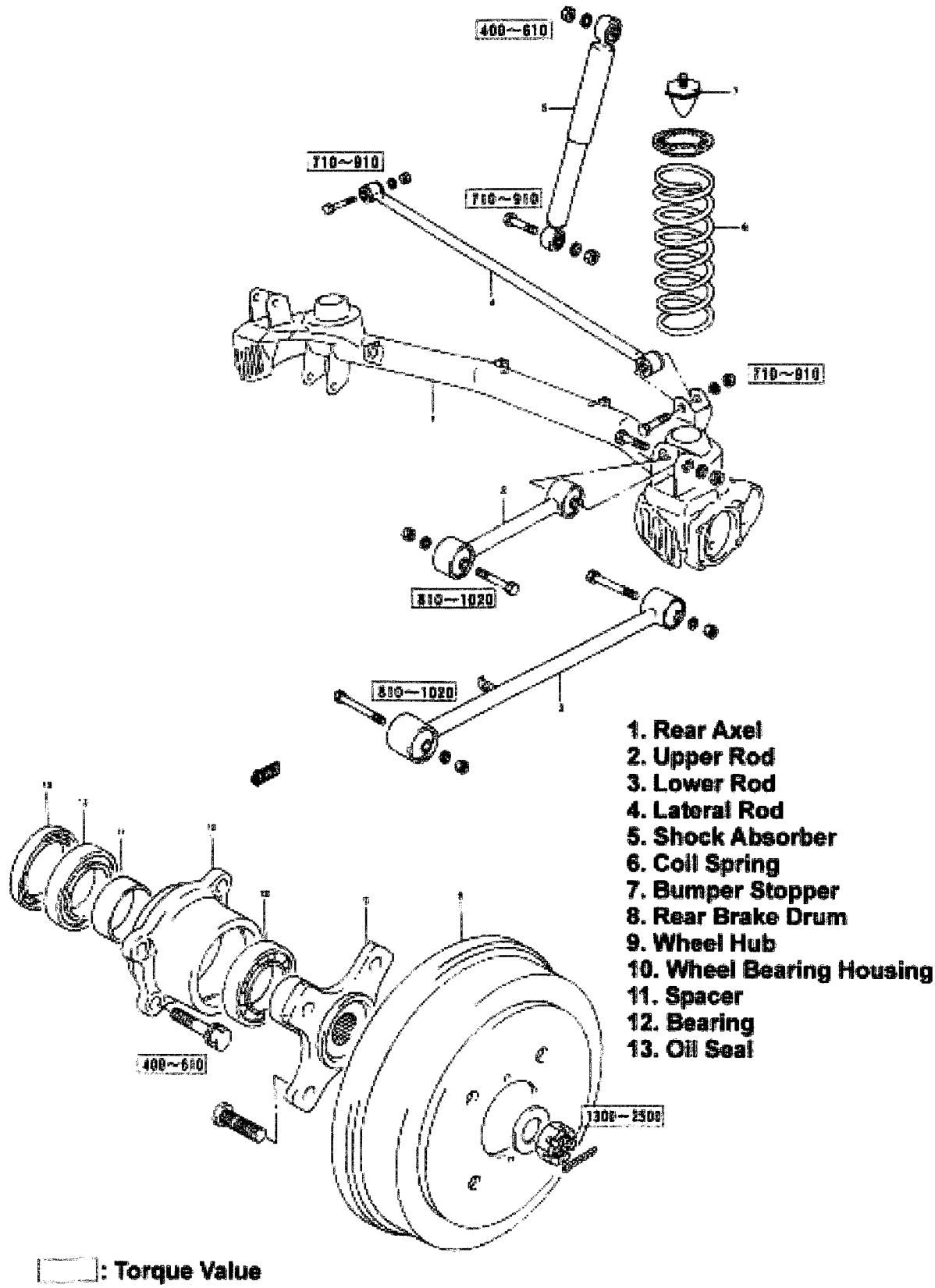




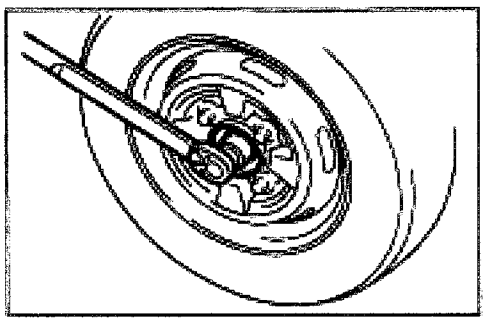
Components

1. Axle
2. Upper Rod
3. Lower Rod
4. Lateral Rod
5. Coil Spring
6. Shock Absorber
7. Wheel Hub
8. Bearing Housing

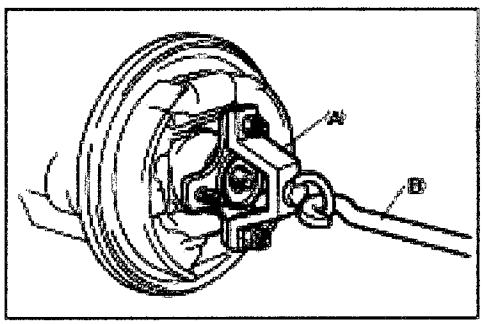
Rear Suspension Exploded View (Van)



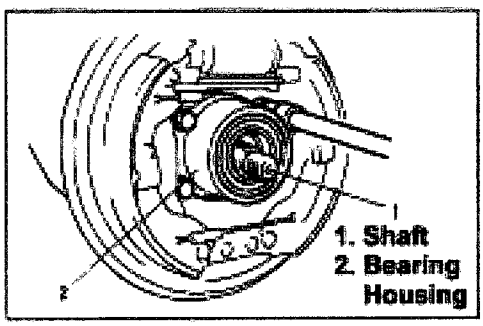
Rear Hub & Axel Removal



1. Loosen Lug Nuts & Hub Bearing Retainer Nut
2. Jack Rear of Vehicle Using Proper Positioning
3. Remove Wheel Bearing Nut (30mm)

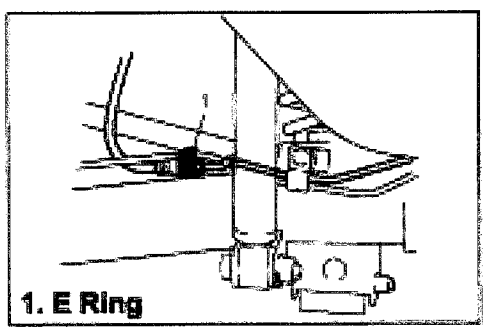


Remove Hub
Use Tools
(A) 09943-17911
(B) 09942-15510

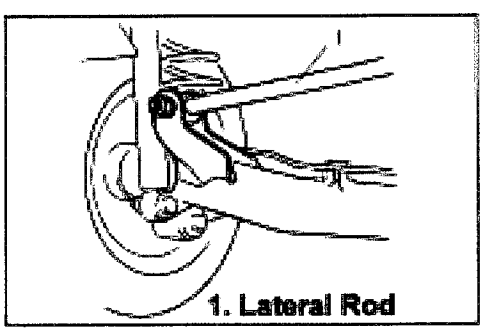


5. Remove Bearing Housing Bolts (17mm)

6. Remove Driveshaft

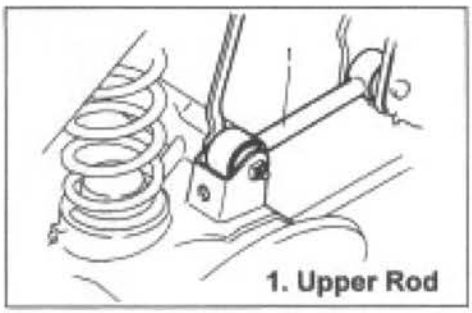


7. Remove E Ring as in the diagram
(Aways replace E Ring with a new ring)
Disconnect Brake Lines

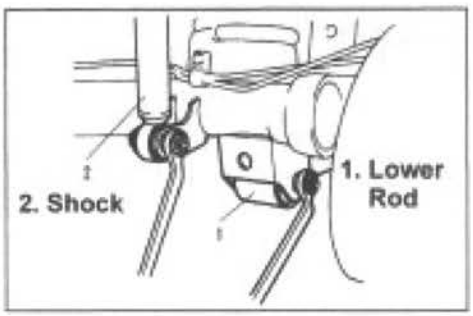


8. Place a jack at the center point of the rear axel

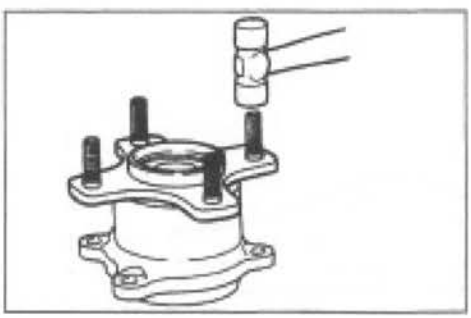
9. Disconnect Lateral Rod (17mm)



10. Disconnect Upper Rod from Axel (17mm)

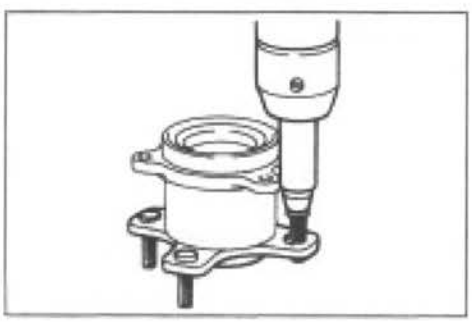


11. Disconnect Lower Rod (17mm)
12. Disconnect Shock (17mm)
13. Slowly lower Jack & Remove Differential



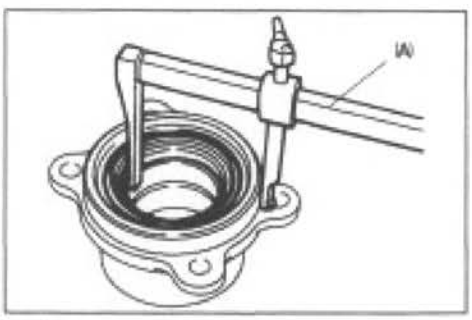
Wheel Stud

Knock Out Old Stud Using a Hammer



Use a Hydraulic Press to Install New Studs

Do Not Use a Hammer to Install New Studs



Oil Bearing Oil Seal

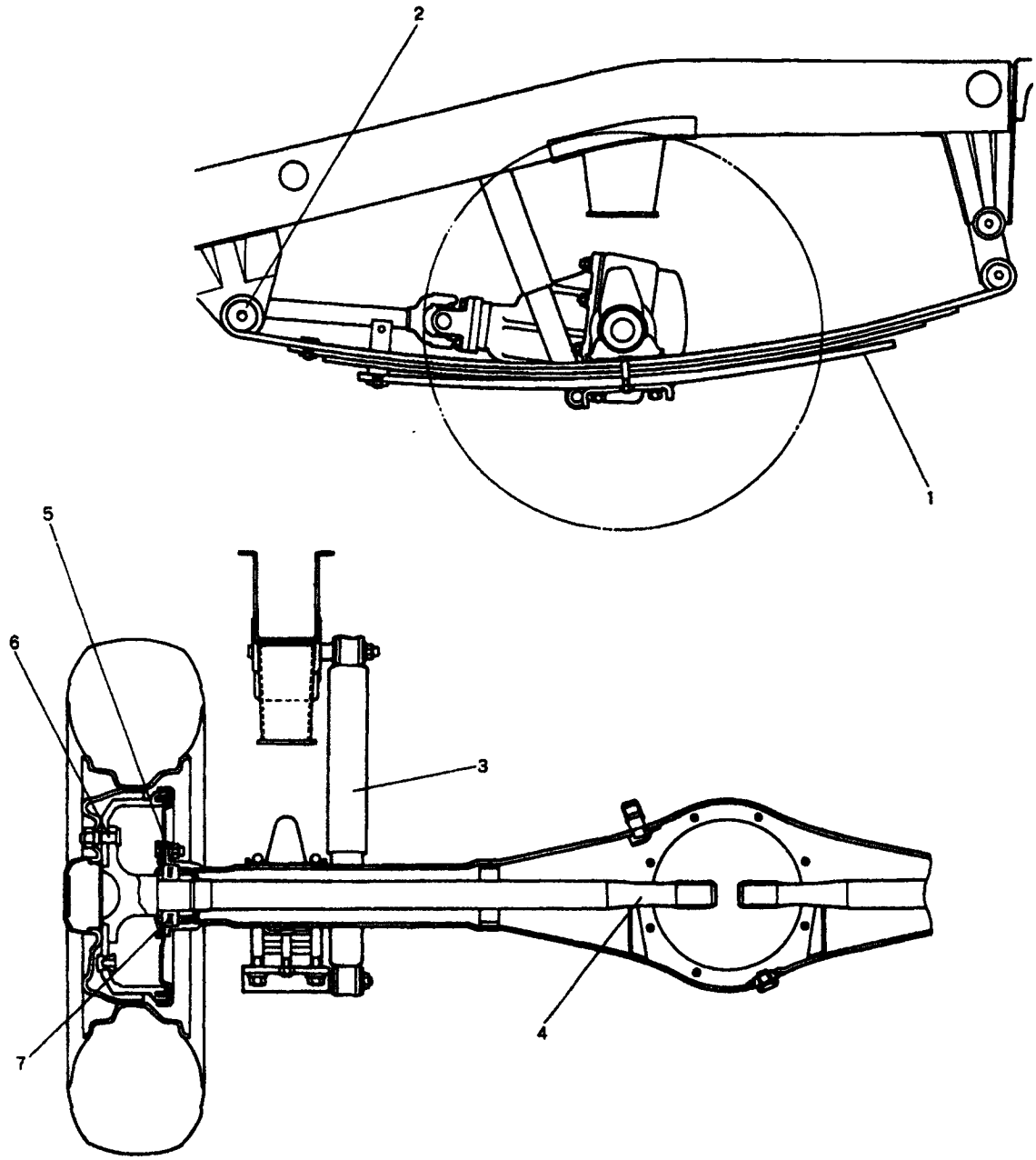
Use Tool
(A) 09913-50121

Remove Old Oil Seal

Install New Seal

***Note: Never Re-Use Oil Seals**

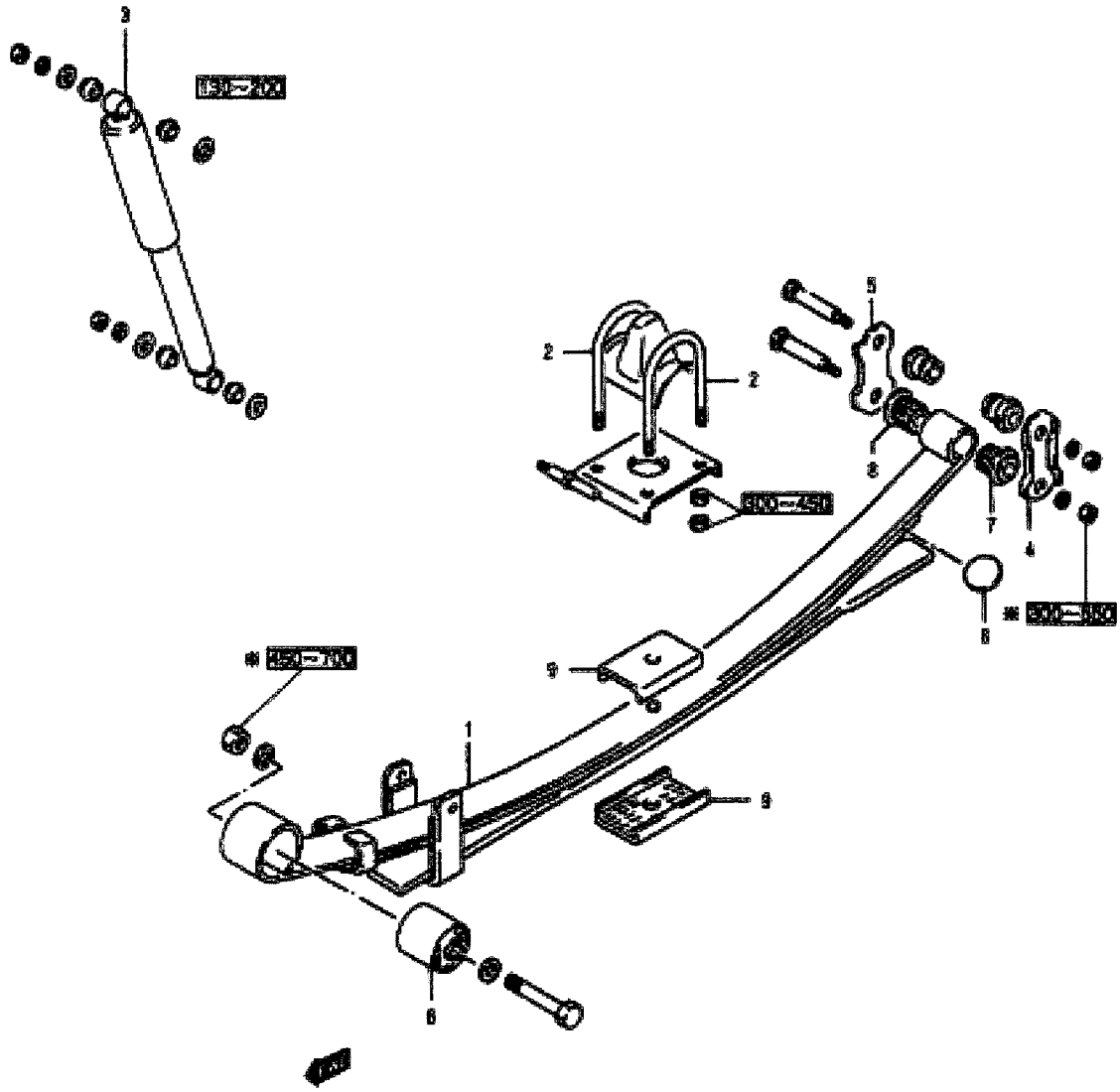
Rear Suspension: Truck



Components

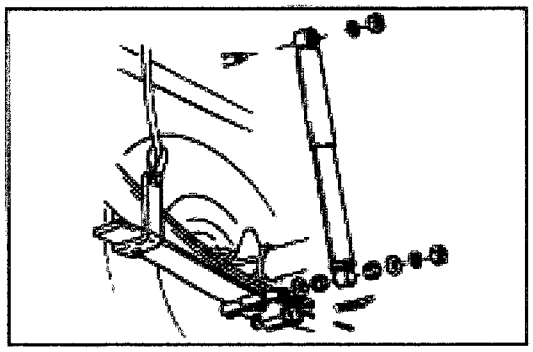
1. Leaf Spring Assembly
2. Bushings
3. Rear Shock Absorbers
4. Rear Support Shaft
5. Rear Axle Housing Hub
6. Rear Stud Bolts
7. Rear Wheel Bearing

Rear Suspension (Truck) Exploded View



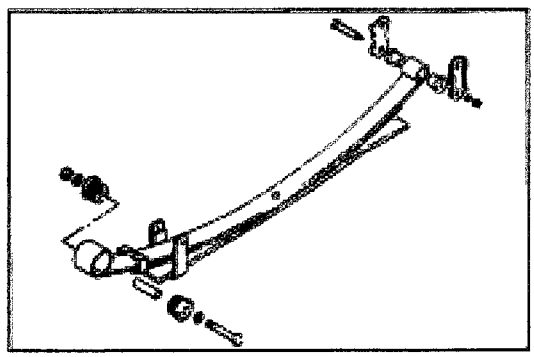
: Torque Value

*Torque with no load on Vehicle



Shock Removal

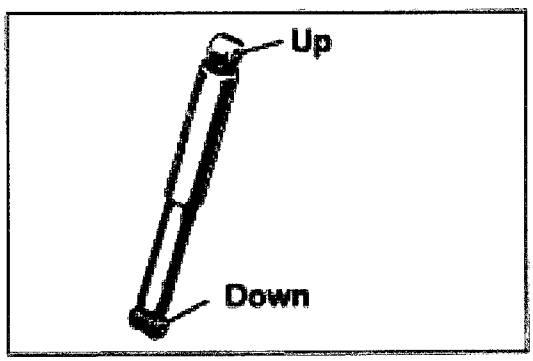
1. Unbolt Lower Support Bolt
2. Unbolt Upper Support Bolt
3. Remove Shock



Leaf Spring

1. Remove Shock
2. Unbolt U-Bolts
3. Unbolt front and rear connections
4. Remove Leaf Spring

Shock



Shock Absorber

During inspection, inspect for oil leaks

If leak is detected replace shock

Rear Suspension Specialty Tools

 09943－17911 **Brake Drum Remover**	 09942－15510 **Sliding Hammer**	 09913－85210 **Bearing Installer**
 09913－50121 **Oil Seal Remover**	 09944－66030 **Oil Seal Installer**	 09924－74510 **Bearing Installer Handle**

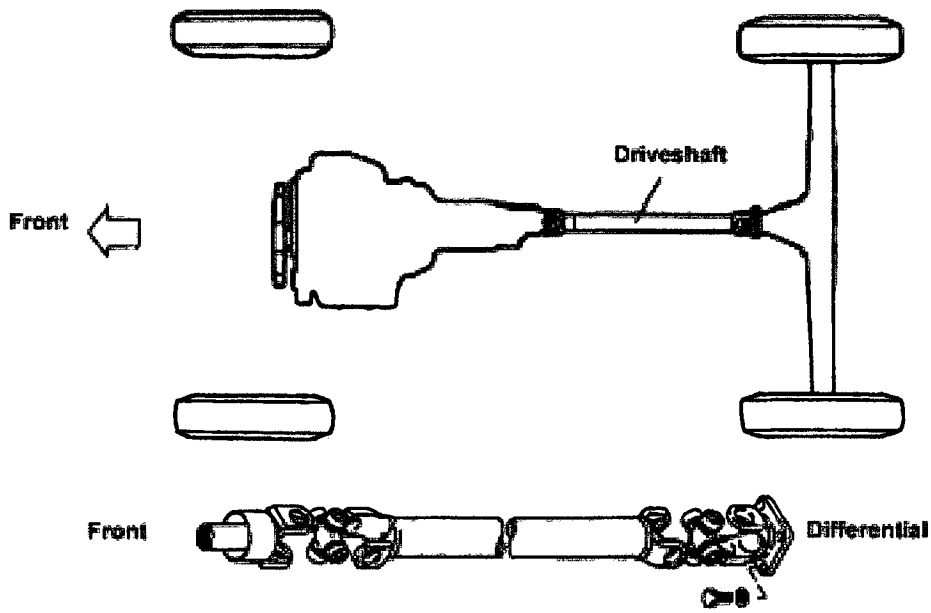
Chapter 4: Drivetrain Components

- Driveshaft System Truck 2WD-4WD
- Driveshaft System Van: All
- Front Drive Axel: 4WD
- Rear Axel: Truck
- Rear Axel: Van
- Axel Rebuilding
- Front Differential: Part Time 4WD-Van
- Front Differential: Full Time 4WD
- Rear Differential: 2WD
- Rear Differential: 4WD-Non-Diff Lock
- Front Differential: 4WD-Diff Lock Option (Truck)
- Rear Differential: Standard
- Rear Differential Overhaul

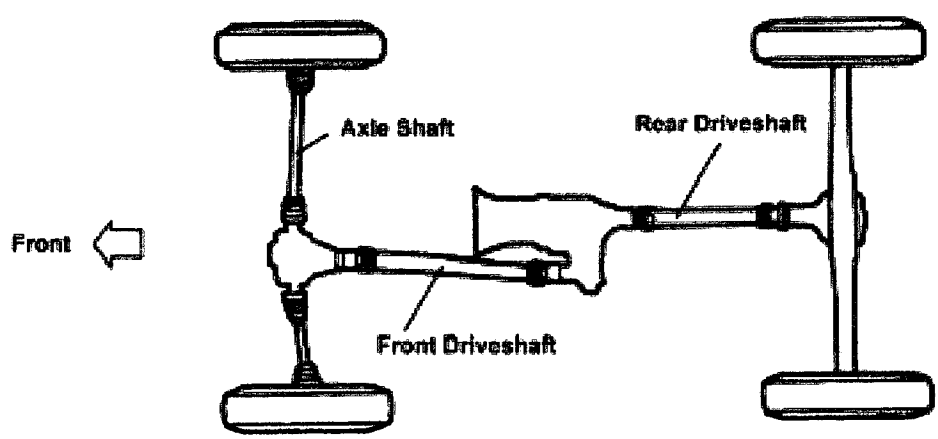
Driveshaft System: Truck 2WD-4WD

Truck

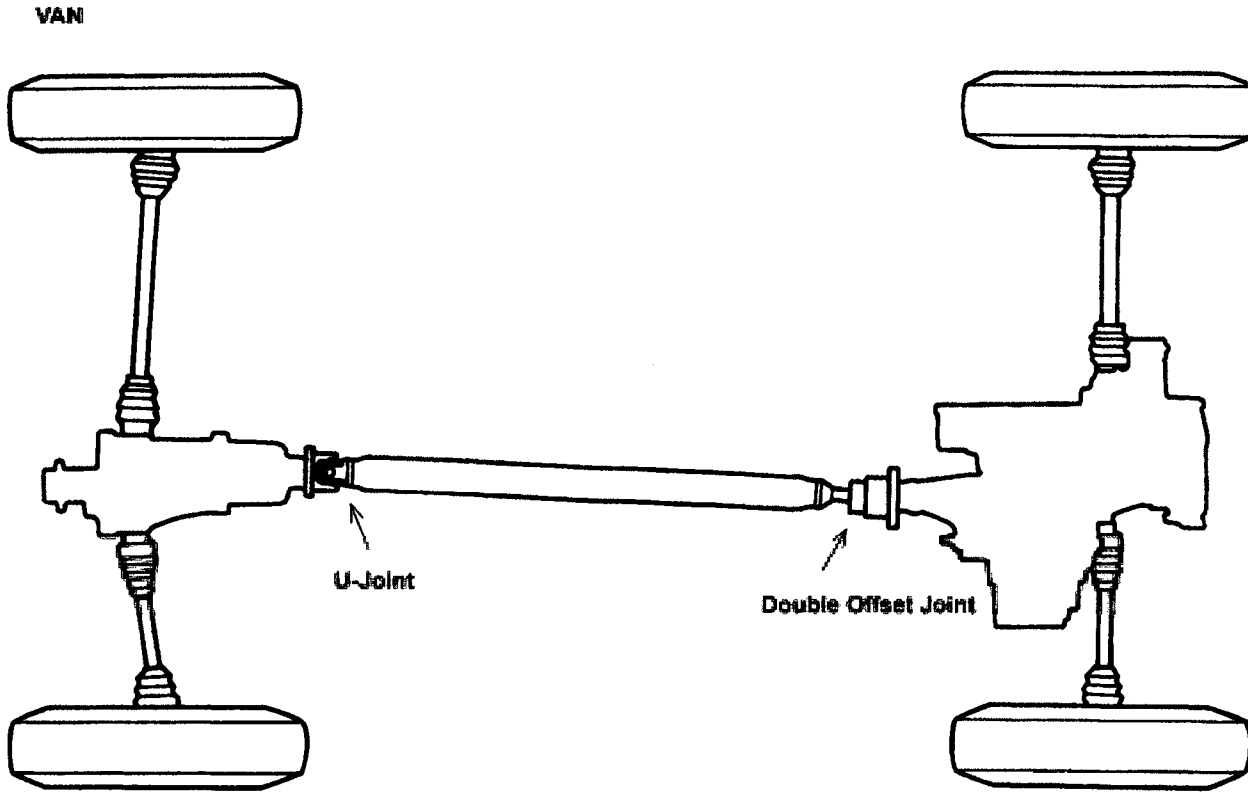
2WD



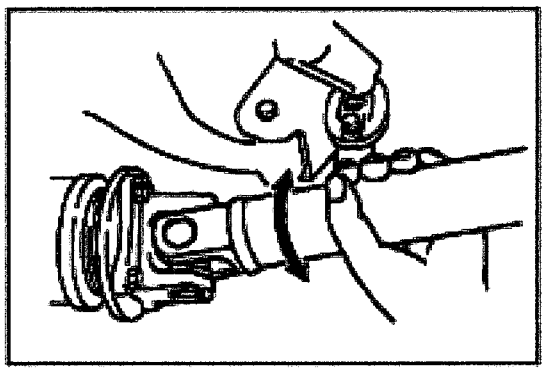
4WD



Driveshaft System: Van 4WD



Driveshaft Inspection

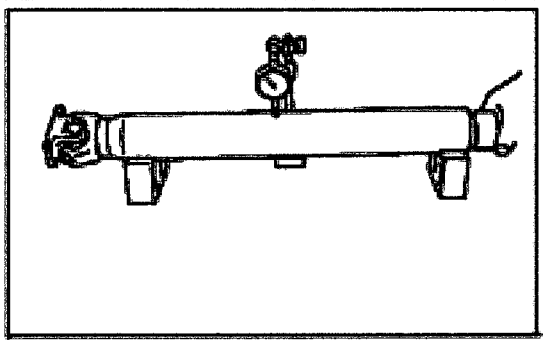


U-Joint Backlash

1. Mark the Driveshaft
2. Turn Up & Down as shown.
3. Measure Engagement.

Limit: 3mm

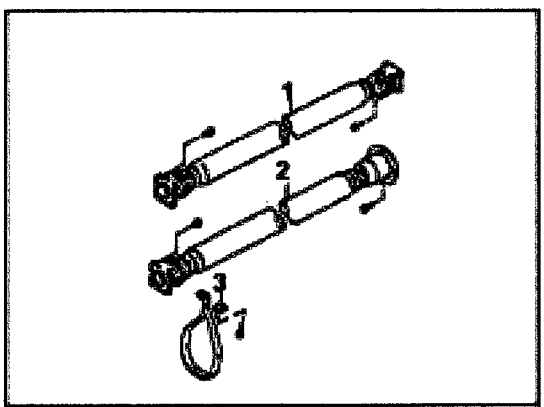
4. Replace U-Joint is over limit.
5. Retest



Driveshaft Run Out (Warpage)

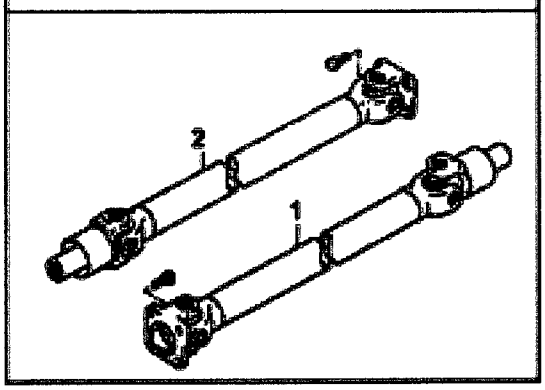
1. Use a Dial Gage as shown and place Driveshaft in V-Blocks. Rotate and check Warpage.

Limit: 1.0mm



Driveshaft Identification: Van

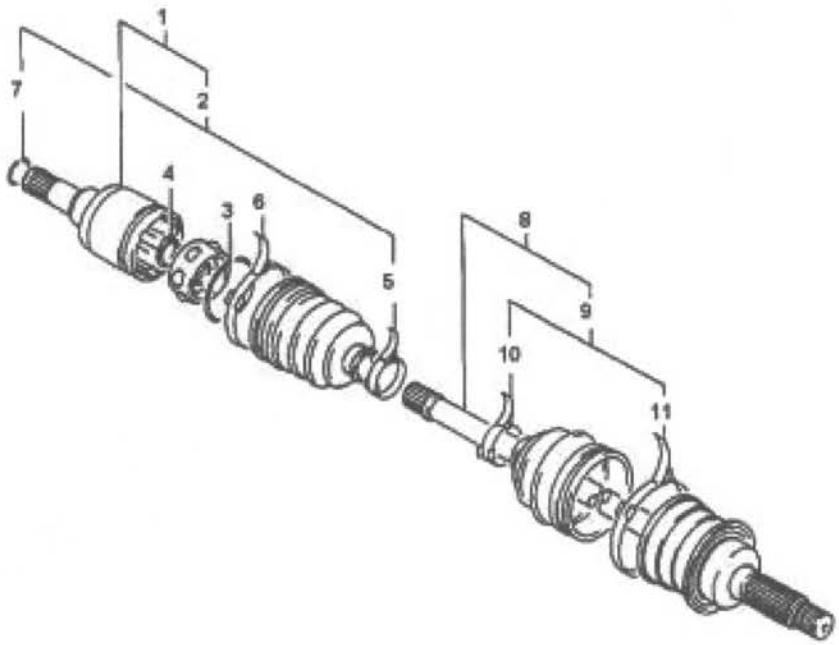
1. Part Time 4WD
2. Full Time 4WD
3. Safety Loop



Driveshaft Identification: Truck

1. Front Driveshaft: 4WD
2. Rear Driveshaft

Front Axel Shaft: 4WD

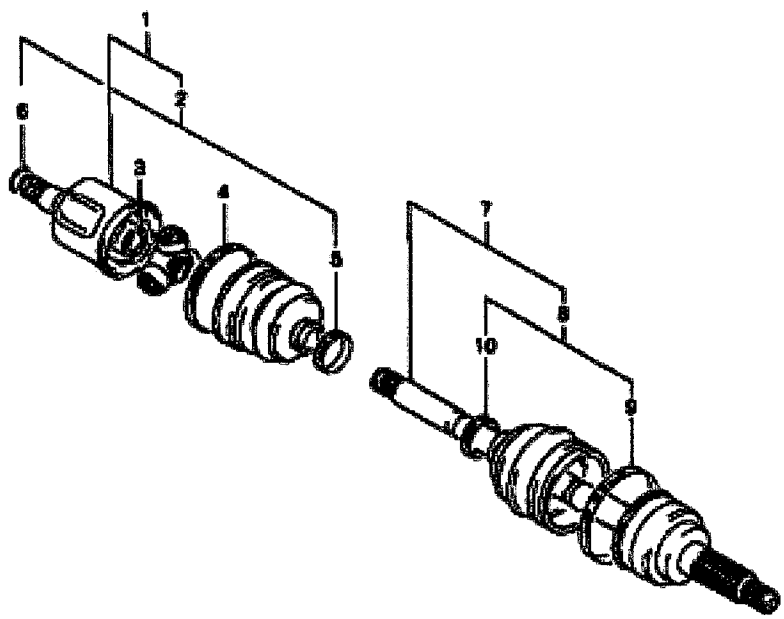


Components

1. Differential Side: Joint Assembly
2. Differential Side: Boot Set
3. Snap Ring
4. Snap Ring
5. Boot Band
6. Boot Band
7. Snap Ring
8. Wheel End: Joint Assembly
9. Boot Band
10. Boot Band

Rear Axel Shaft: 2WD

2WD: Rear

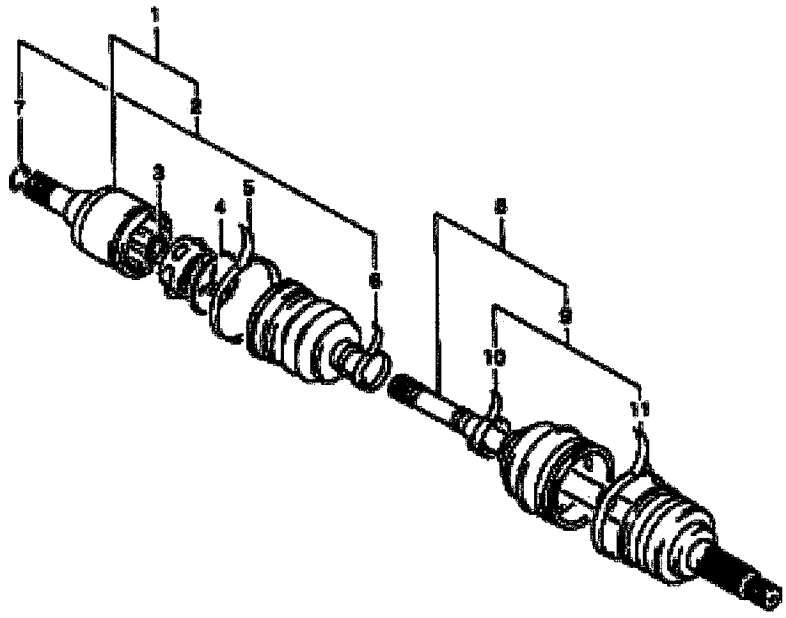


Components

1. Differential Side: Joint Assembly
2. Differential Side: Boot Set
3. C-Clip
4. Boot Band
5. Boot Band
6. Snap Ring
7. Wheel Side: Joint Assembly
8. Wheel Side: Boot Set
9. Boot Band
10. Boot Band

Rear Axel Shaft: 4WD

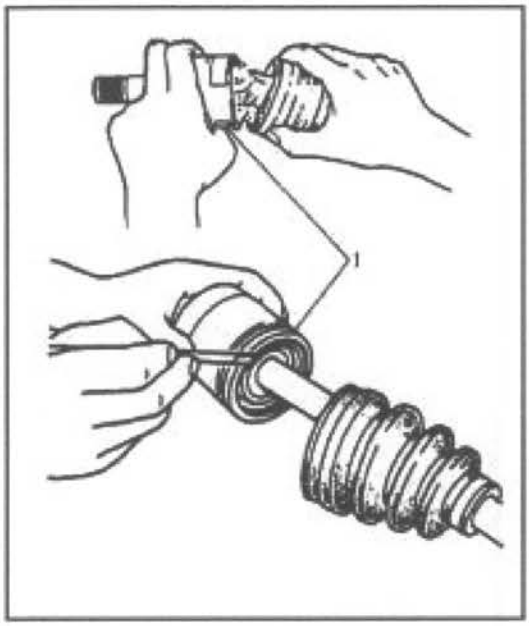
4WD Rear



Components

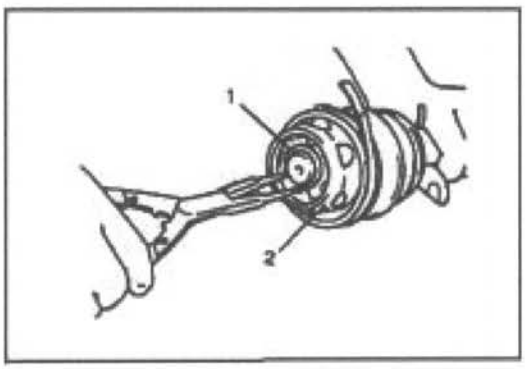
1. Differential Side: Joint Assembly
2. Differential Side: Boot Set
3. C-Clip
4. Snap Ring
5. Boot Band
6. Boot Band
7. Wheel Side: Joint Assembly
8. Wheel Side: Boot Assembly
9. Boot Band
10. Boot Band

Axel Shaft: Overhaul CV Type



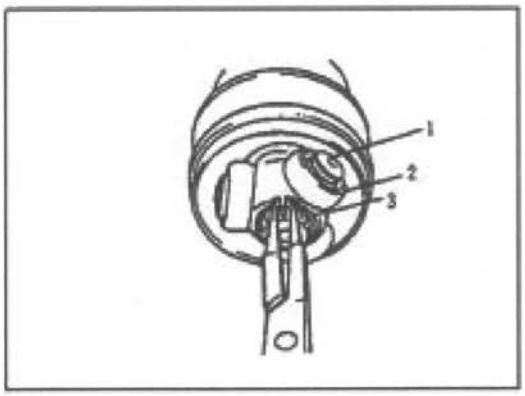
CV Joint Disassembly

1. Remove Boot Band and separate Boot from Housing as shown.



2. Remove C-Clip (1).
3. Remove Ball Joint (Spider Bearings) and slide out shaft
4. Thoroughly clean and Inspect all parts. If vehicle has over 100,000 kilometers it is recommended to replace the bearings.

Note: Never reuse boots or bands. These items must be replaced once disassembled.

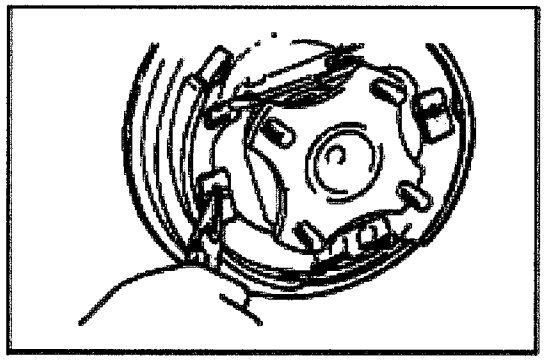


5. Install Items in reverse order.

Items

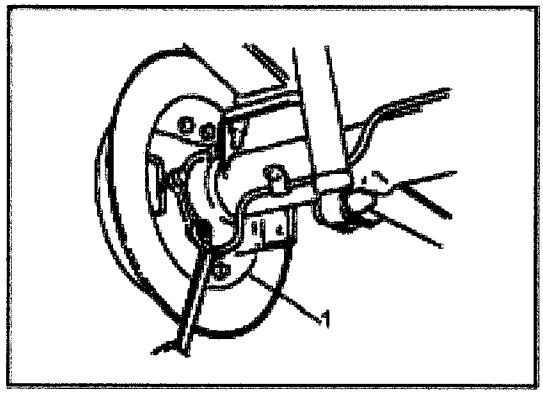
1. Spider
2. Bearings
3. C-Clip

Note: If Spider Housing has been damaged or cracked the Bearing must be replaced as a set.

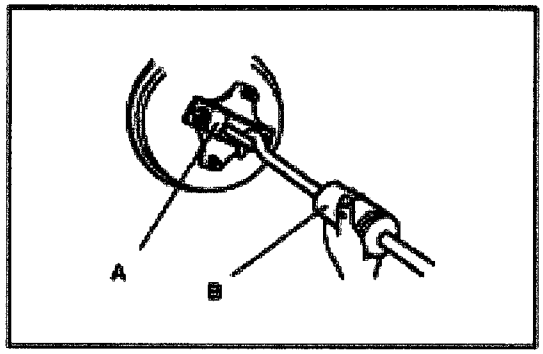


Rear Axel Bearing Replacement

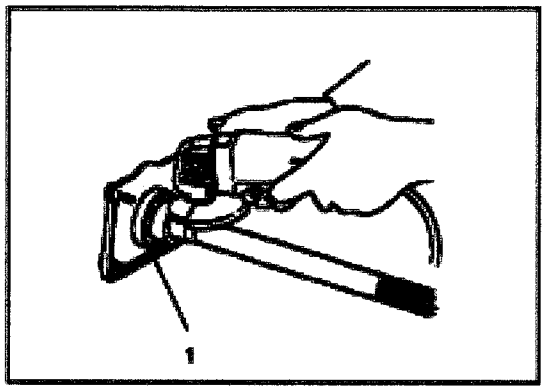
1. Remove Brake Shoes



2. Remove the Four (4) Retaining Bolts from the rear plate.

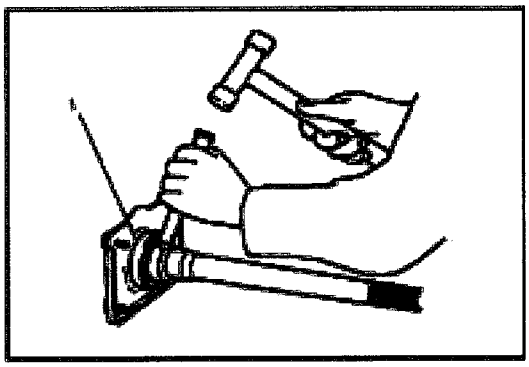


3. Attach Rear Axle Removal Tool (A) Part # 09943-17910. Use Slide Hammer (B) 09942-15510 and pull Rear Axel as shown.

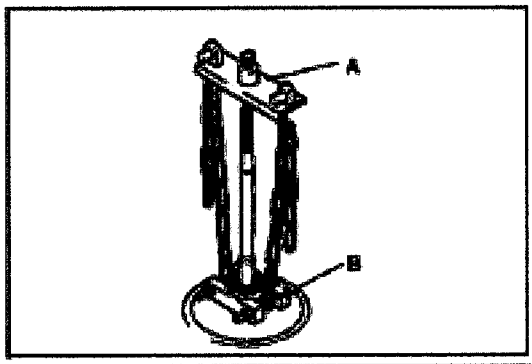


4. Use a grinder and carefully remove 0.5 to 1.0mm of metal from the race retainer.

Note: Do not cut all the way through the Race of the Axle will be damaged.



5. Remove Retainer after grinding with a chisel as shown.

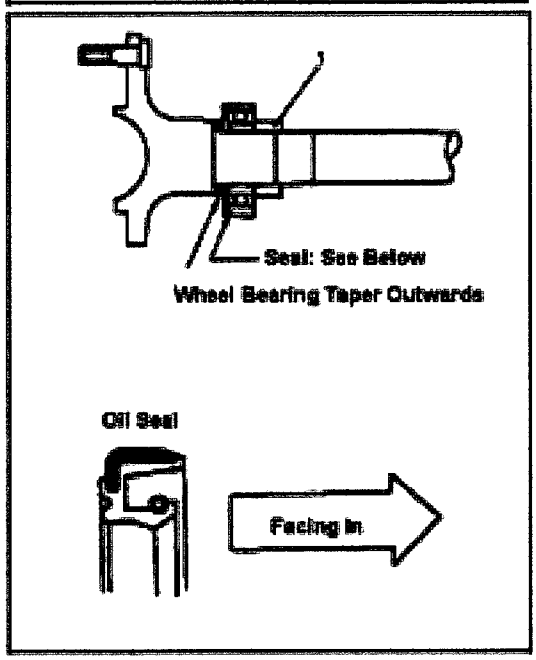


6. Use the tools listed below to pull off the Wheel Bearing as shown.

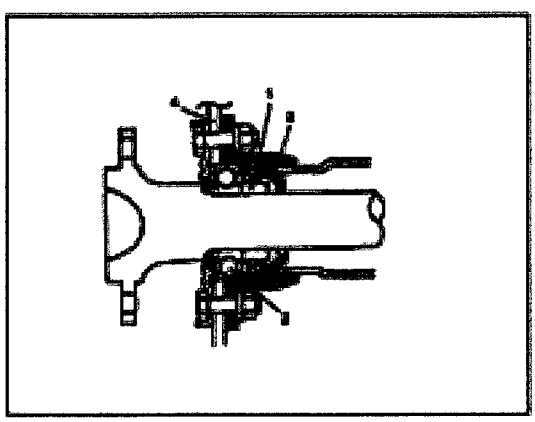
A: 09927-18411

B: 09921-57810

Note: Once a Wheel Bearing has been removed it must be replaced with a new unit.



7. Installation is in the reverse order. Use the Diagrams on the left for proper installation of the Bearing and Oil Seal. Coat the Bearing and Seal with Axle Grease before installation.



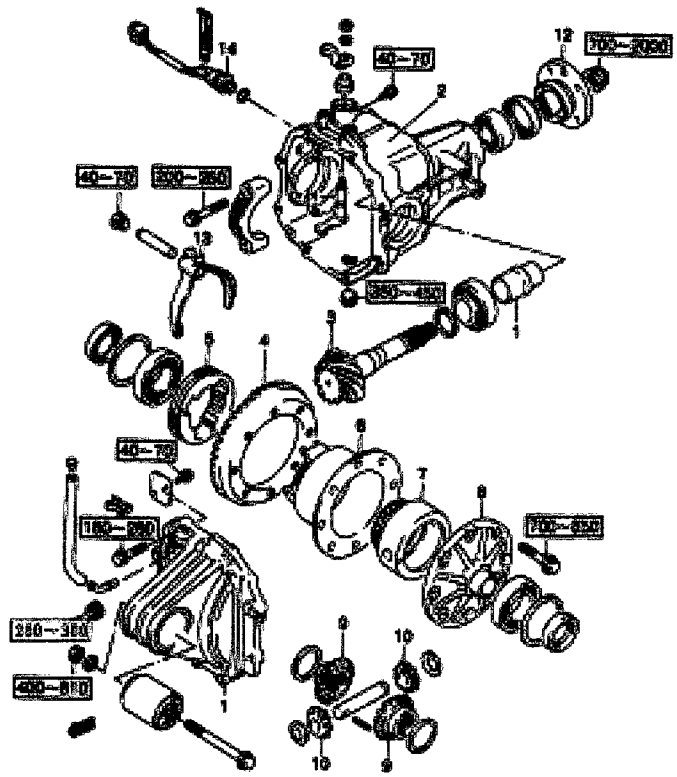
1. Retainer Ring
2. Oil Seal Protector
3. wheel Bearing
4. Back Plate

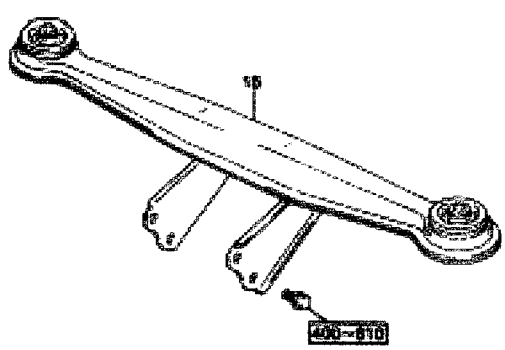
Front Differential: Part Time 4WD (Van)

Differential

Front Differential Part Time 4WD

Van Version



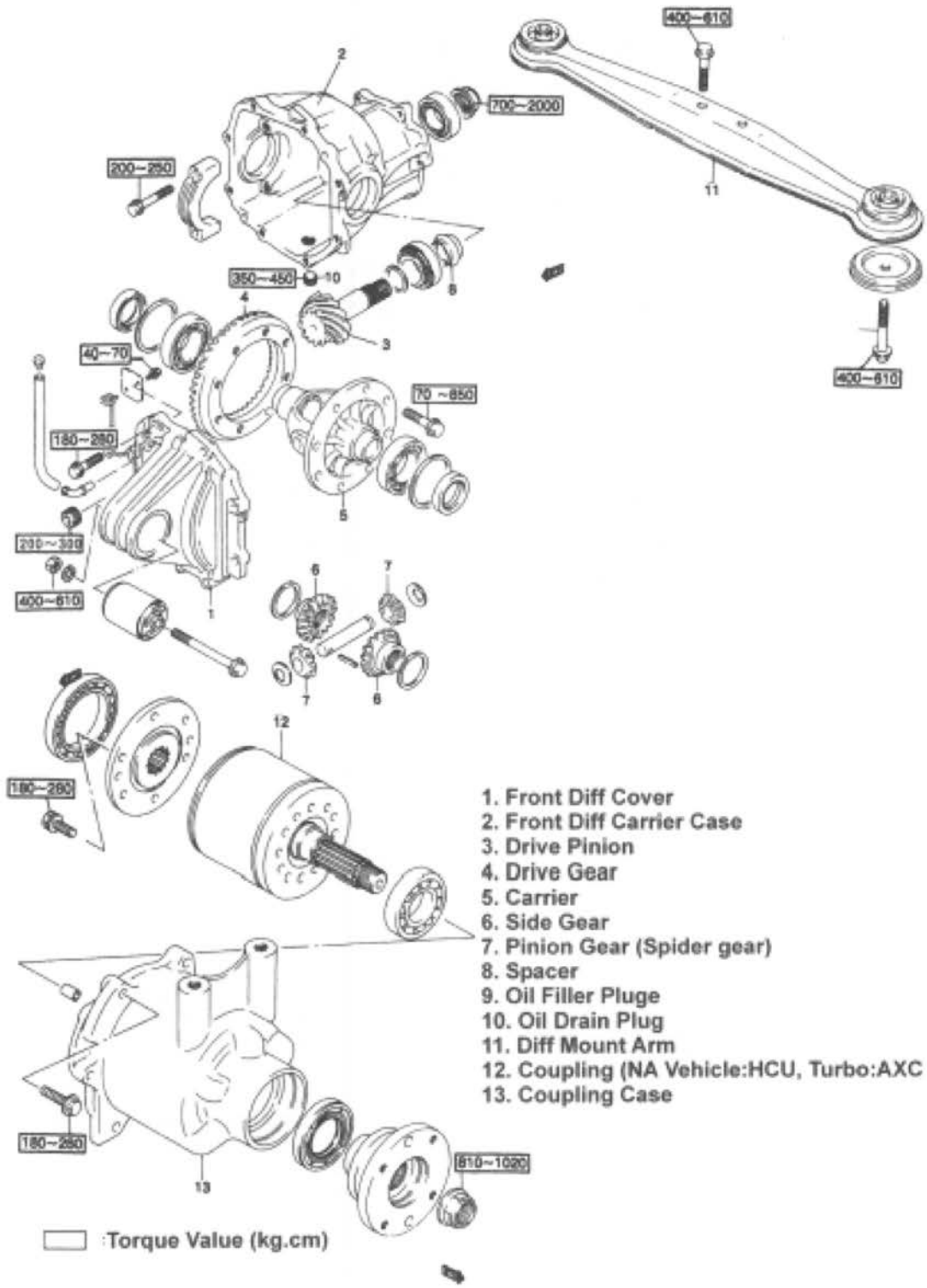


1. Front Diff Cover
2. Front Diff Carrier
3. Drive Pinion
4. Drive Ring
5. Free Axle Sleeve
6. Diff Gear Light Case
7. Free Axel Sleeve #2
8. Diff Gear Shift Case
9. Side Gear
10. Pinion
11. Spacer
12. Copanion Flange
13. Free Axel Hook
14. Axel Lock Switch
15. Diff Mount Arm

□ :Torque Value (kg.cm)

Differential

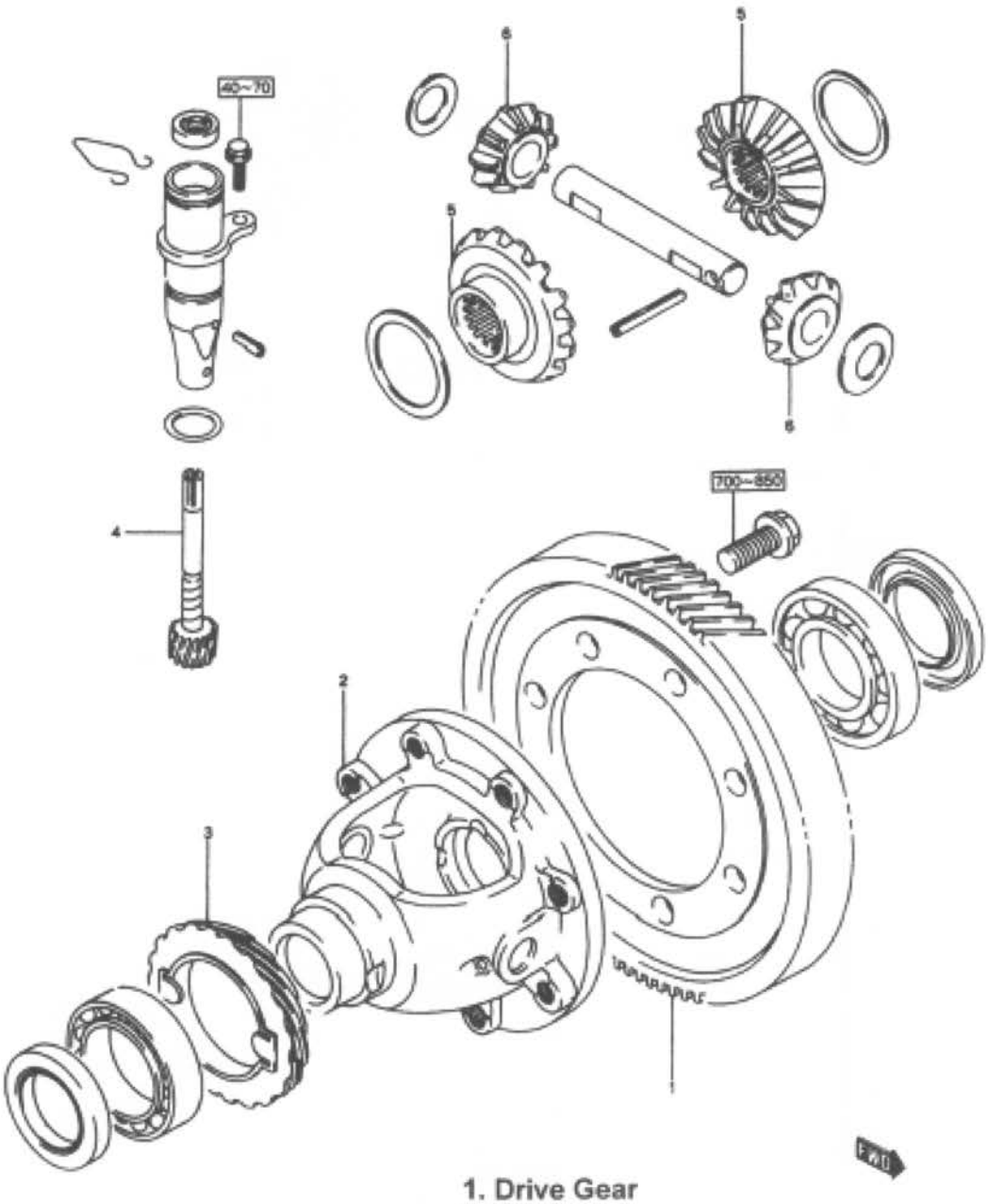
Front Differential Full Time 4WD



1. Front Diff Cover
2. Front Diff Carrier Case
3. Drive Pinion
4. Drive Gear
5. Carrier
6. Side Gear
7. Pinion Gear (Spider gear)
8. Spacer
9. Oil Filler Pluge
10. Oil Drain Plug
11. Diff Mount Arm
12. Coupling (NA Vehicle:HCU, Turbo:AXC
13. Coupling Case

Differential

Rear Differentail 2WD



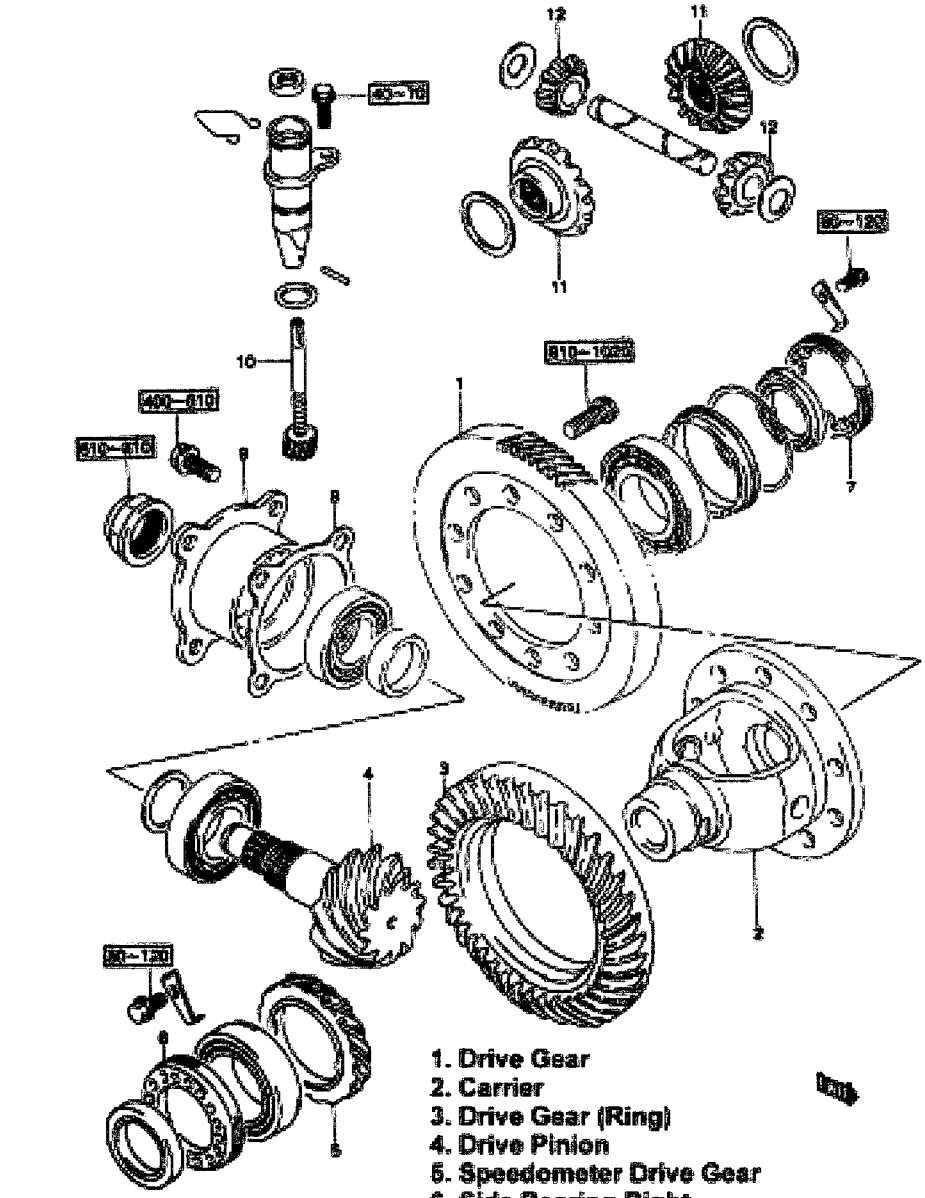
1. Drive Gear
2. Carrier
3. Speedometer Drive Gear
4. Speedometer Pick Up Gear
5. Spider Gear
6. Pinion

Torque Value (kg.cm)

Differential

Rear Differential Standard 4WD

Non-Diff Lock



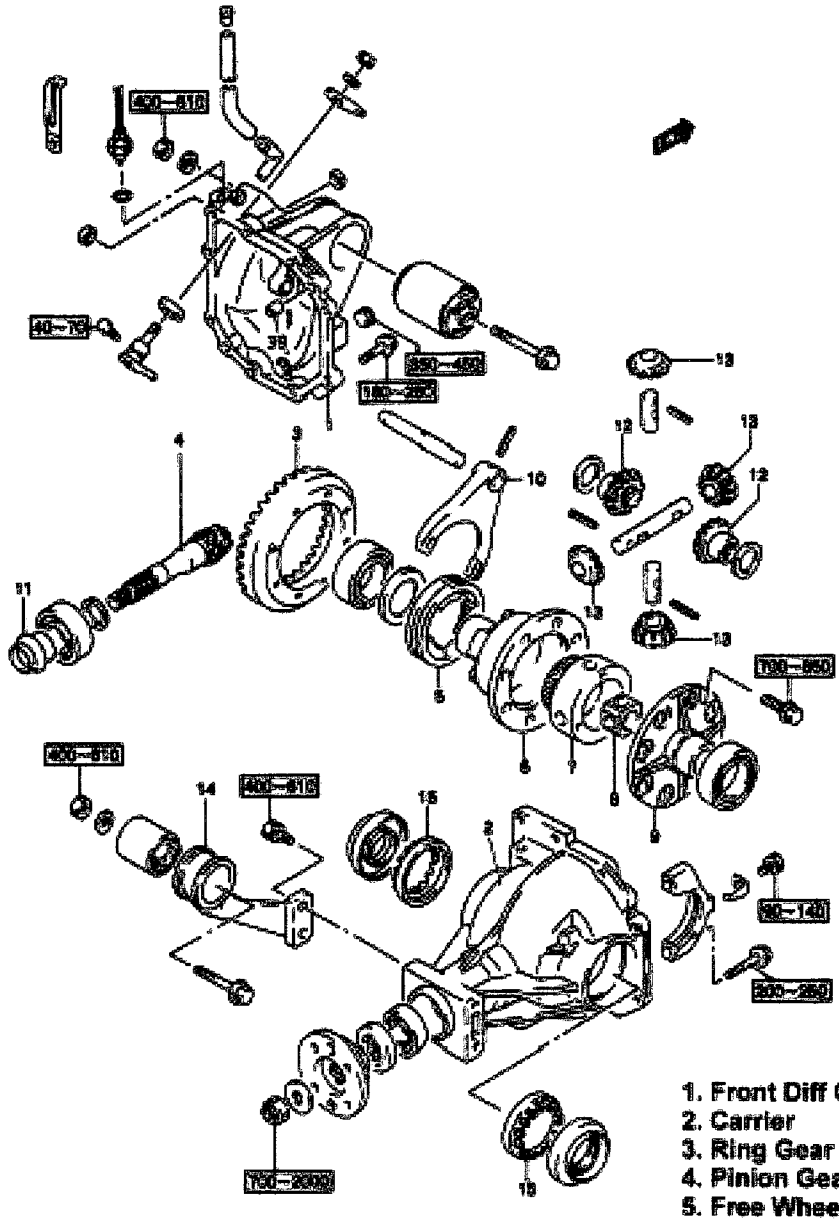
1. Drive Gear
2. Carrier
3. Drive Gear (Ring)
4. Drive Pinion
5. Speedometer Drive Gear
6. Side Bearing Right
7. Side Bearing Left
8. Shim
9. Transfer Pinion Retainer
10. Speedometer Pick Up Gear
11. Side Gear
12. Pinion

Torque Value (kg.cm)

Differential

4WD Front Differential

Truck Version

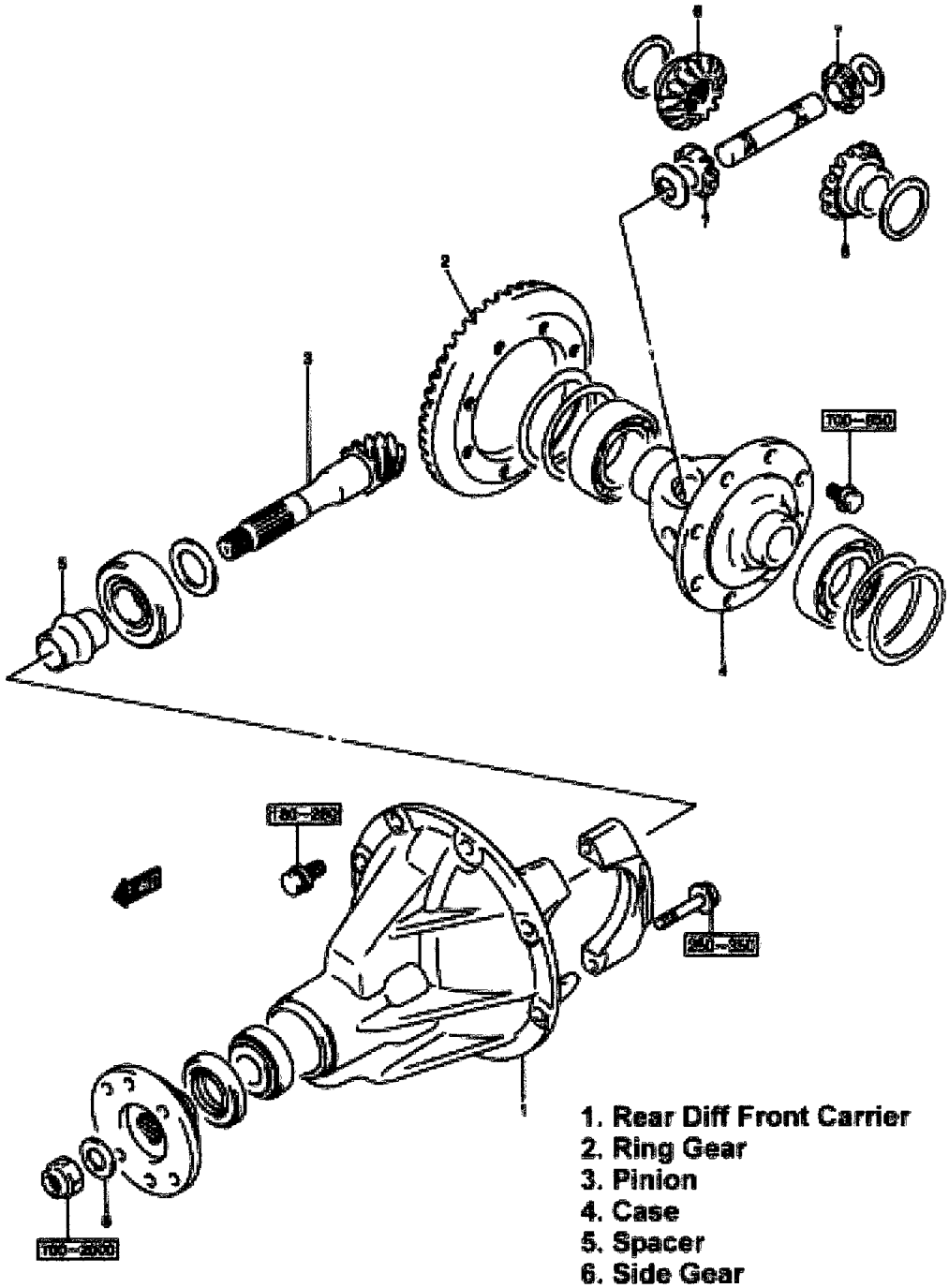


1. Front Diff Cover
2. Carrier
3. Ring Gear
4. Pinion Gear
5. Free Wheel Lock Sleeve
6. Carrier Hub (Ring)
7. Free Wheel Lock Hub
8. Shift Joint
9. Carrier Base Plate
10. Fork
11. Spacer
12. Side Gear
13. Pinion
14. Mount Bracket
15. Side Bearing Adjuster

Torque Value (kg.cm)

Differential

Rear Differential Standard

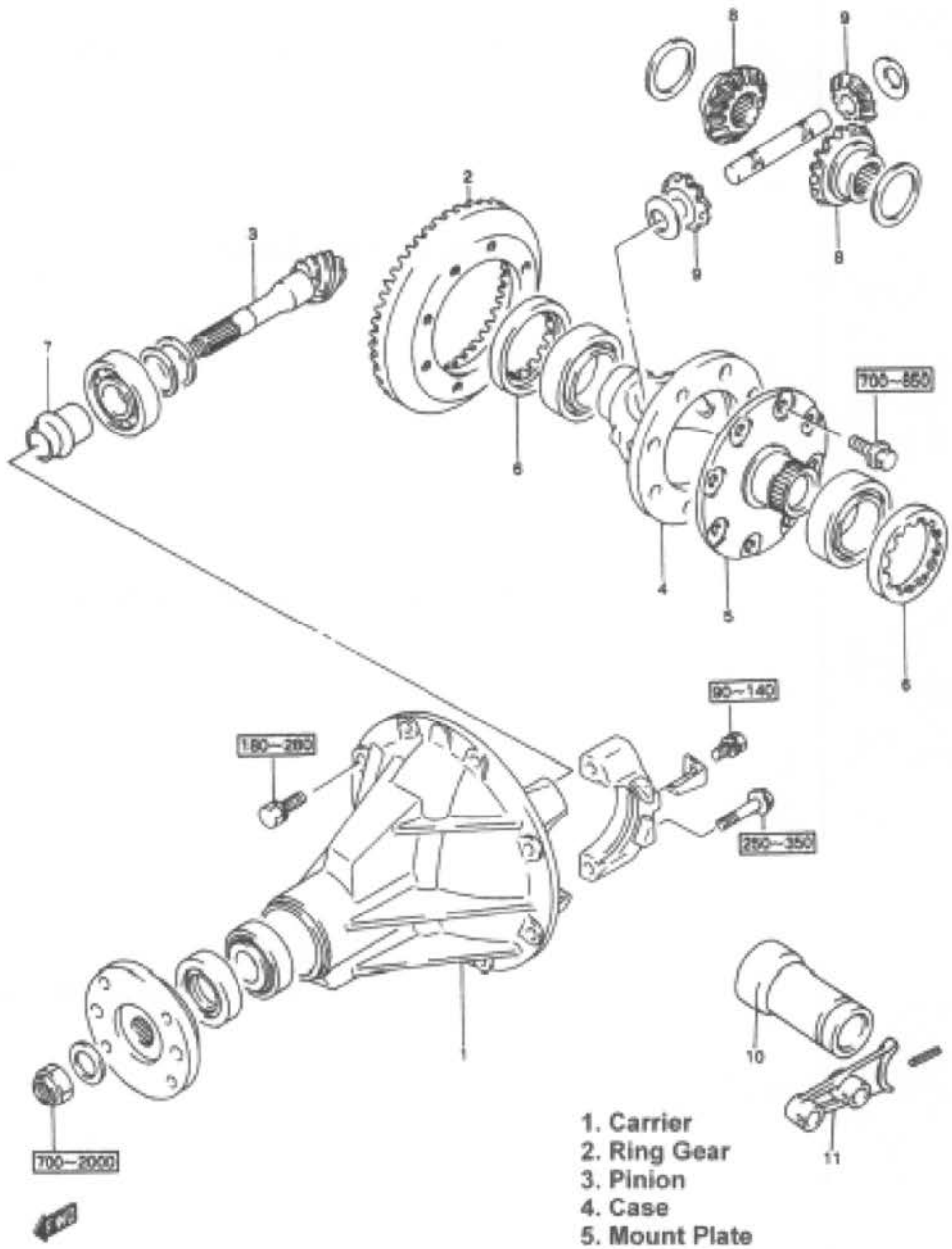


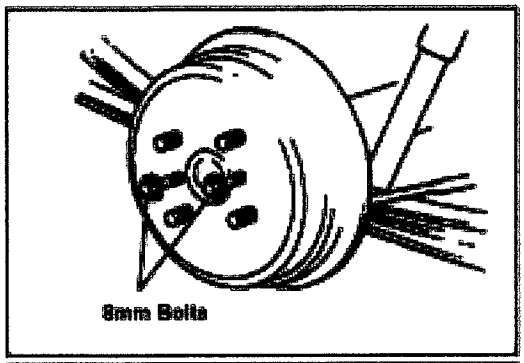
1. Rear Diff Front Carrier
2. Ring Gear
3. Pinion
4. Case
5. Spacer
6. Side Gear
7. Pinion
8. Outer Flange (Washer)

Torque Value (kg.cm)

Differential

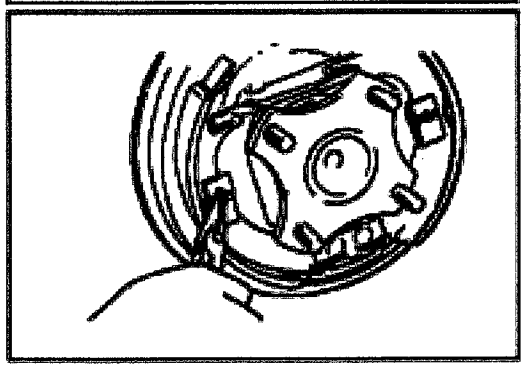
Rear Differential Diff-Lock Option



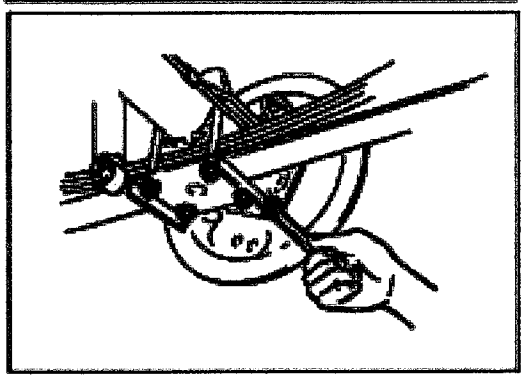


Rear Differential Overhaul

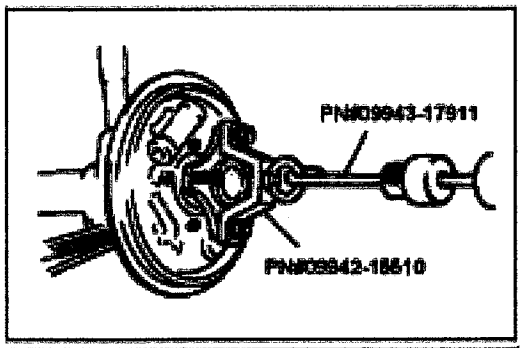
1. Raise Vehicle & Support
2. Remove Wheels
3. Attach 8mm Bolts and pull off Drum



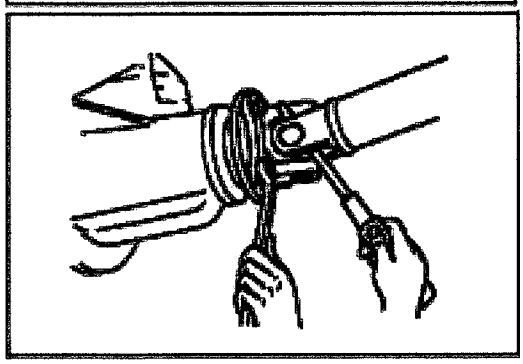
4. Remove Brake Shoes



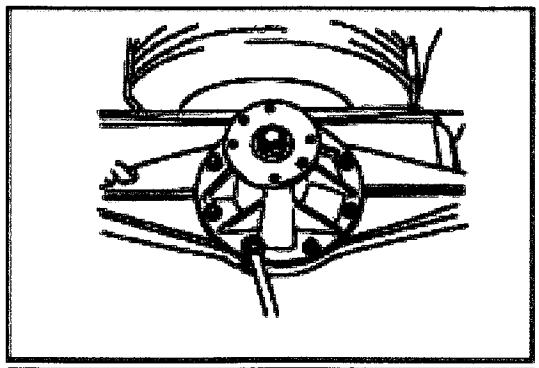
5. Remove (4) Bolts from the Back Plate



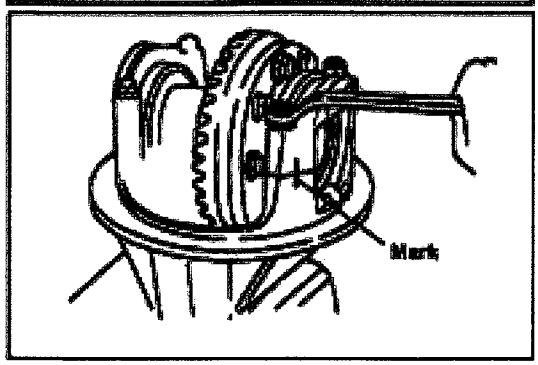
6. Use the Axle Puller and Slide Hammer to remove Axels



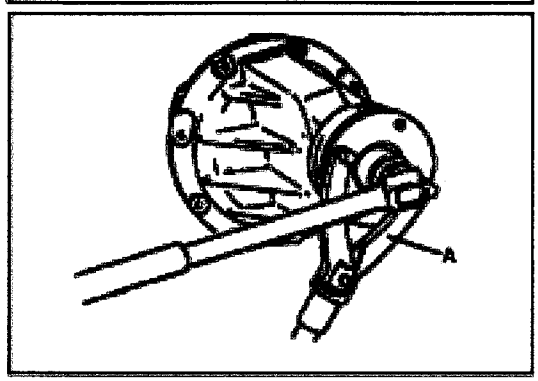
7. Remove Driveshaft



8. Remove Differential Attachment Bolts

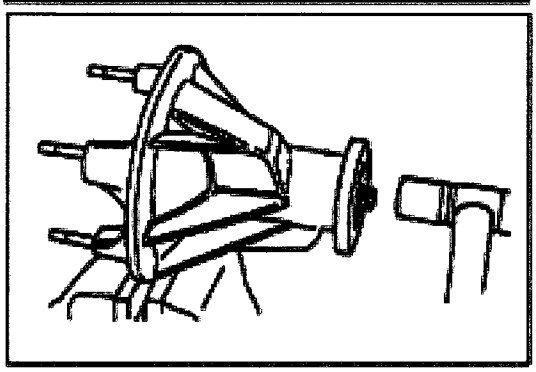


9. Mark Bearing Caps and Remove

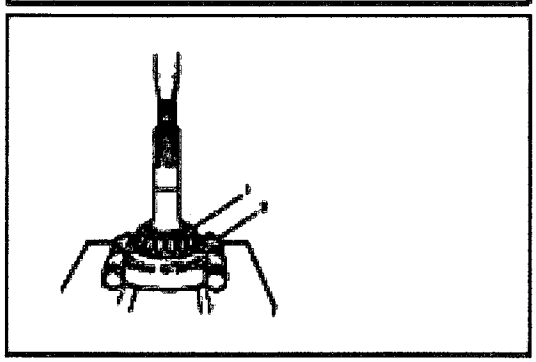


Required Tool: 09930-40113

10. Use the Holding Tool and remove Self Locking Pinion Nut



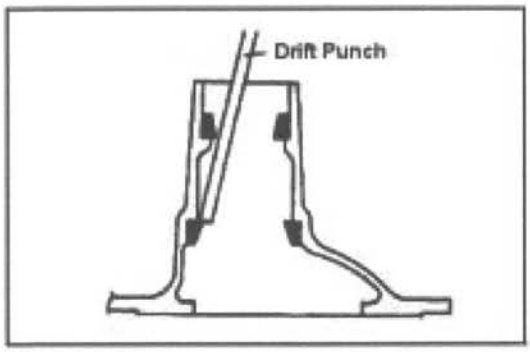
11. Use a Hard Rubber Tipped Hammer and knock back the Pinion Gear to remove



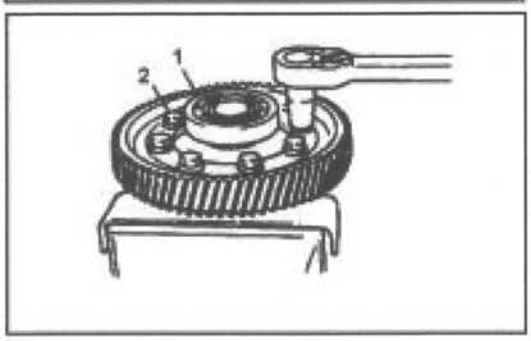
12. Use a press to press off Bearing

Item

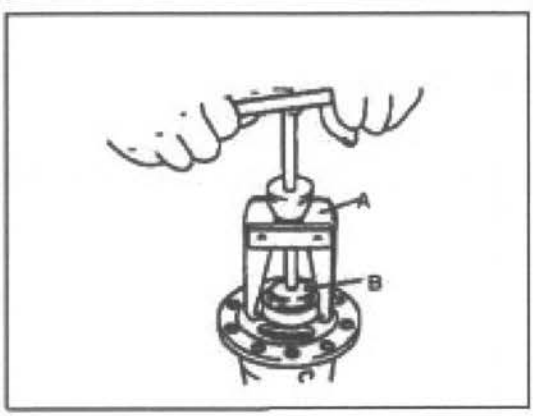
1. Bearing
2. Bearing Puller



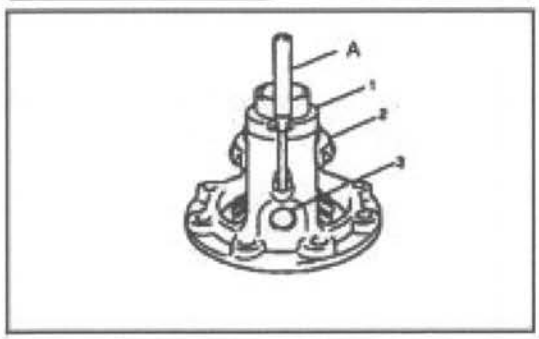
13. Use a Drift Punch to knock out Bearing Races as shown



14. Remove Drive Gear (Van 2WD=Final Gear)



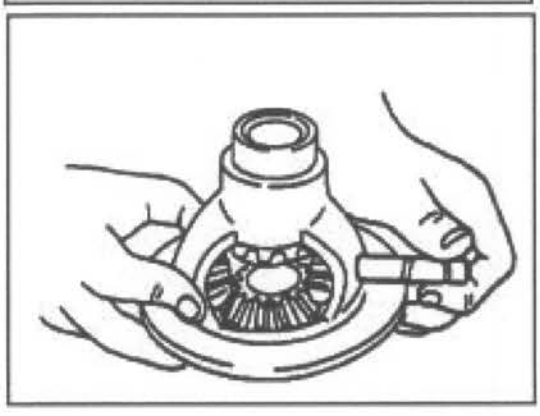
15. Remove Side Bearing



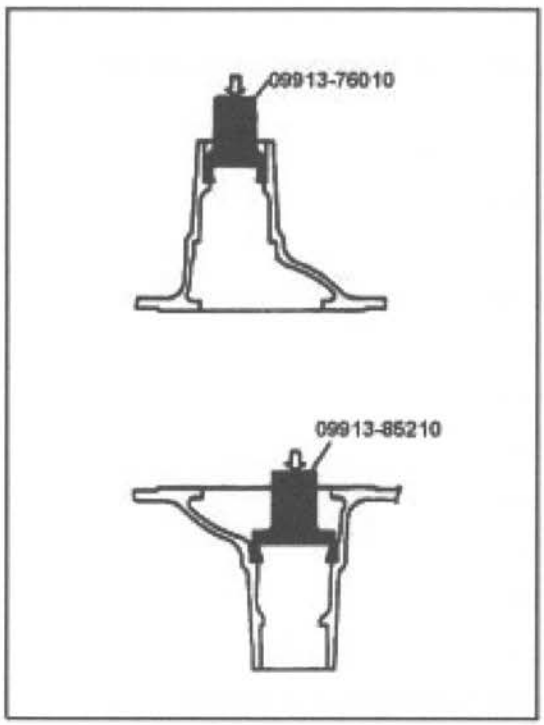
16. Use the example on the left to remove Lock Pin

A: 09913-61510

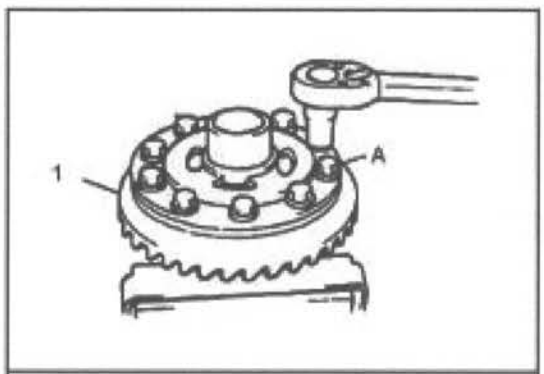
1. Case
2. Gear
3. Pinion



17. Remove Pinion Shaft



18. Use the Bearing Drivers and install new Races as shown

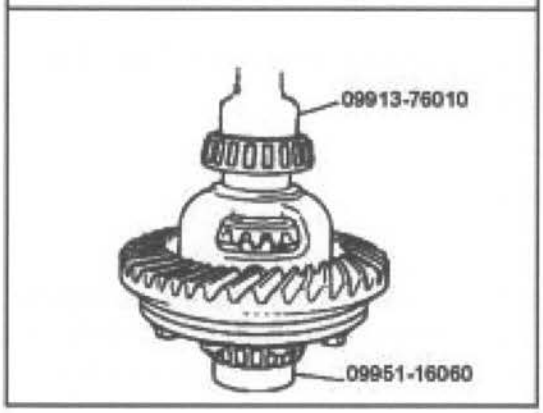


19. Attach Ring Gear

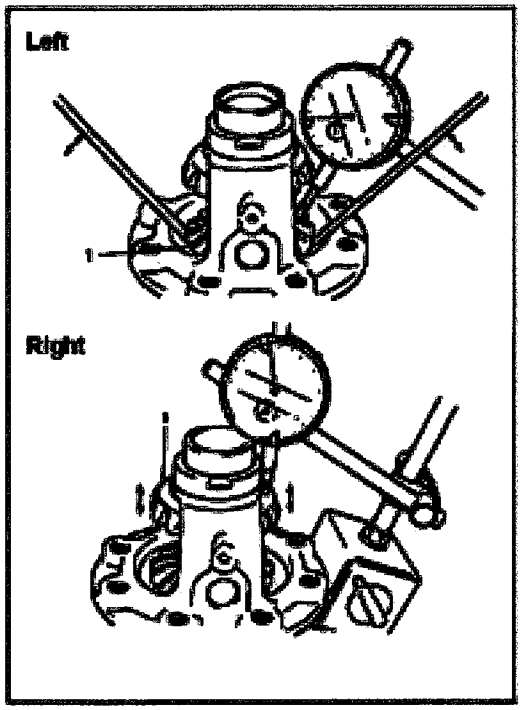
Torque

A: 700-850kg.cm

A: 810-1020kg.cm (Van 4WD)



20. Press on Bearings as shown



21. Use a Dial Gage as shown to measure Backlash.

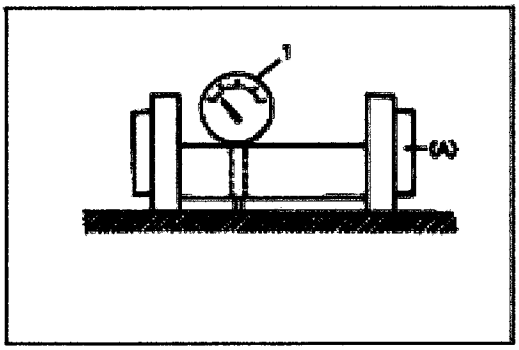
(1) Differential Gage

Limit: 0.3-0.4mm

Shims Available Sizes

- 0.9mm
- 0.95mm
- 1.0mm
- 1.05mm
- 1.1mm
- 1.5mm
- 1.2mm

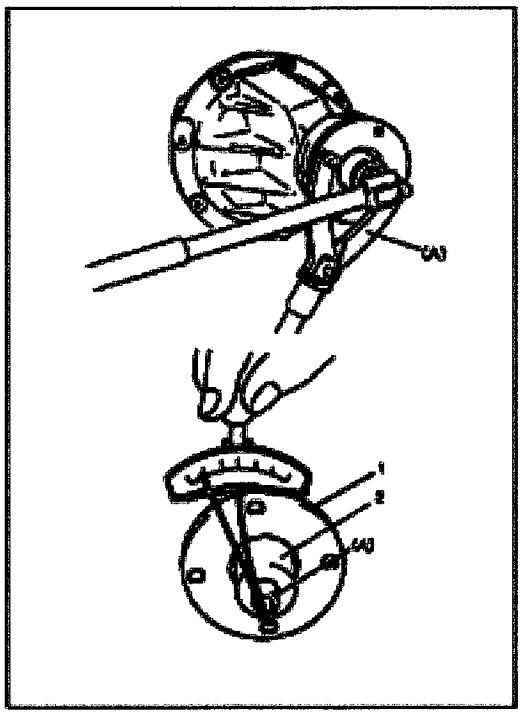
Note: See parts Catalogue for details



22. Use a Dial Gage as shown

MD=85mm

(A): 09922-77260



23. Install Pinion installed without Oil Seal. Set Preload as listed.

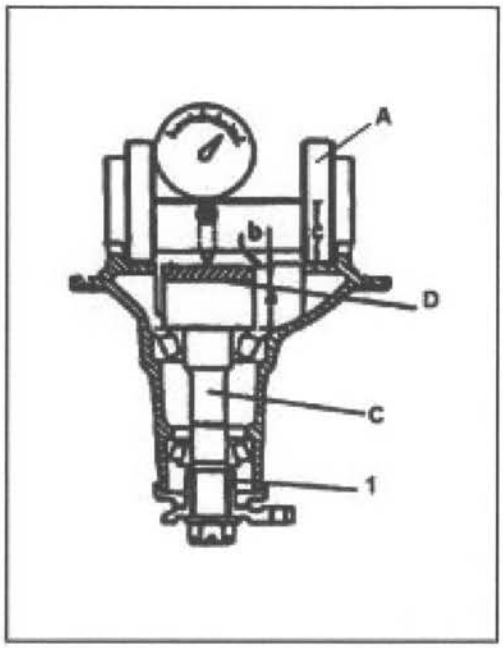
Preload: 5-13kg.cm

Note: Inspect for binding. If binding is not detected continue to next step. If binding is detected disassemble and inspect for proper Race seating.

(1): Flange

(2): Socket

24. Remove Pinion



A: 09922-77260

C: 09922-77210

D: 09922-77250

(1) Collar

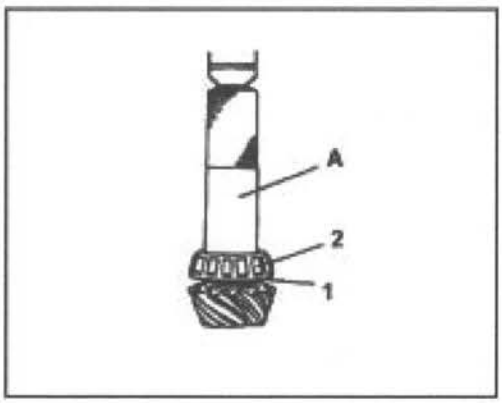
Shim Height Calculation: b±0.02mm

25. Use tool (C) Dummy Pinion Gage to determine Shim Height requirements. Use the Dial Gage as shown. The following Shim Sizes are available.

Shims

- 0.3mm
- 1.30mm
- 1.27mm
- 1.24mm
- 1.21mm
- 1.18mm
- 1.15mm
- 1.0mm

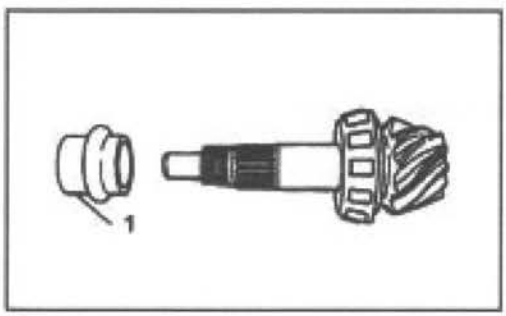
Note: See Parts Catalogue for Option Sizes



26. After determining shim size install as shown with a Bearing installer

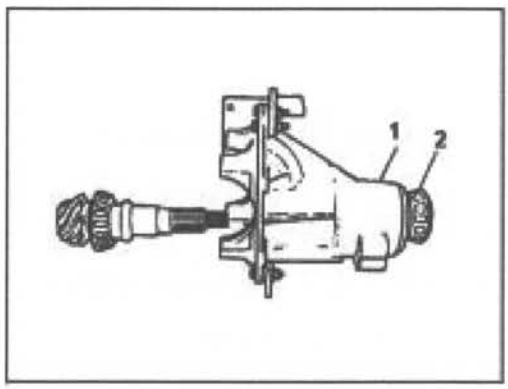
(1) Shim (2) Bearing

A: 09925-18010



27. Install Spacer as shown on Pinion

(1): Spacer

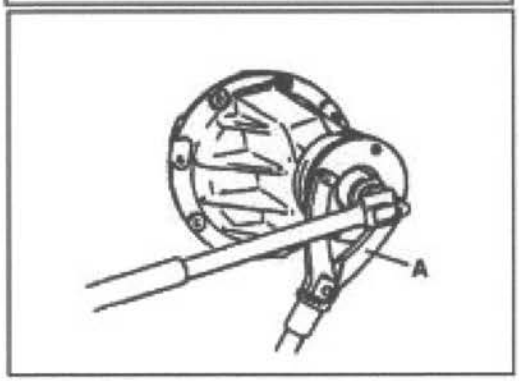


28. Insert Pinion Assembly as shown into Carrier

Carrier: (1)

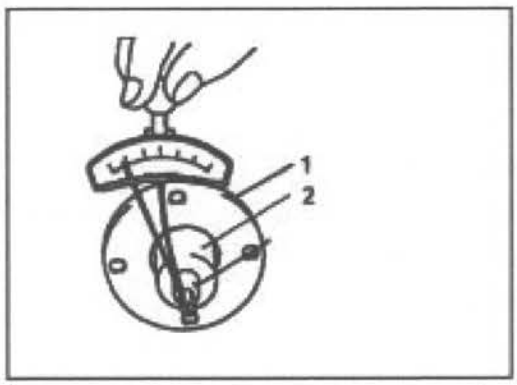
Front Bearing: (2)

29. Install Oil Seal

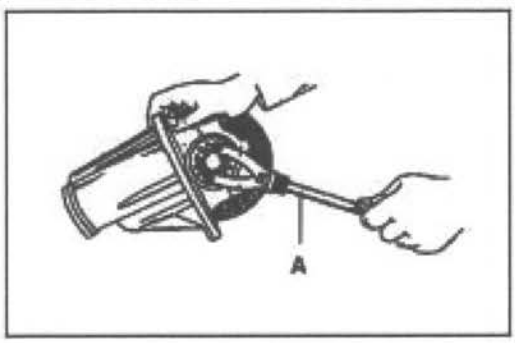


30. Set Torque

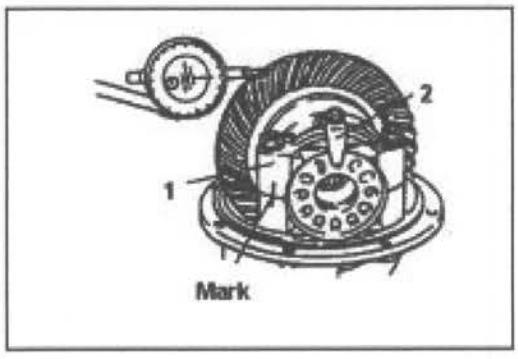
Torque
Preload: 5-13kg.cm
Final: 700-2000kg.cm



Preload Torque Method



29. Install Ring Gear Assembly

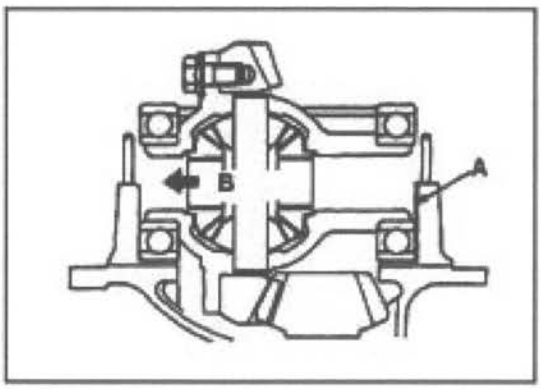


30. Use a Dial Gage and inspect Backlash

Backlash Limit: 0.1-0.02mm
Note: Confirm Bearing Caps Alignment Marks
Bearing Cap Torque: 250-350kg.cm

Rear Differential Overhaul

Assembly



Note: Diff-Lock Vehicle

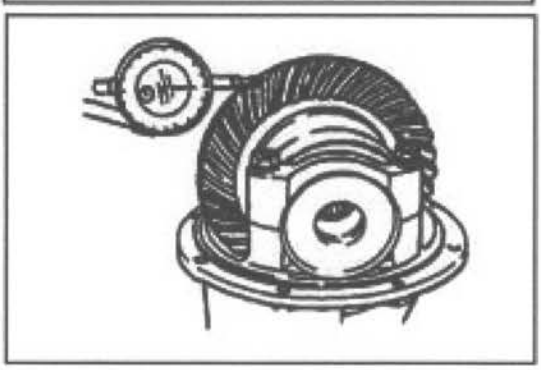
A: Thickness Gage Inspection Point

B: Axel Lock Direction

Gap Limit: 0.1mm-0.2mm

Shim Sizes

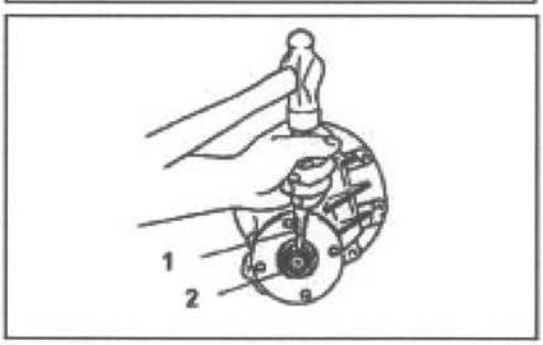
- 0.1mm
- 0.3mm
- 0.5mm
- 0.7mm



31. Ring Gear Backlash Inspection

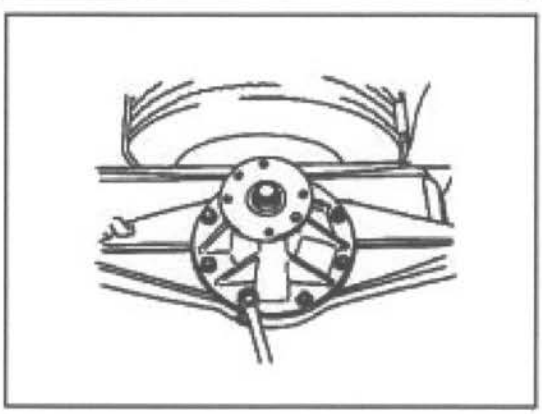
Backlash Limit: 0.1mm-0.2mm

Torque: 250-350kg.cm



32. Use a Punch as shown and crimp Nut to prevent back out

    1. Punch
    2. Self Locking Nut

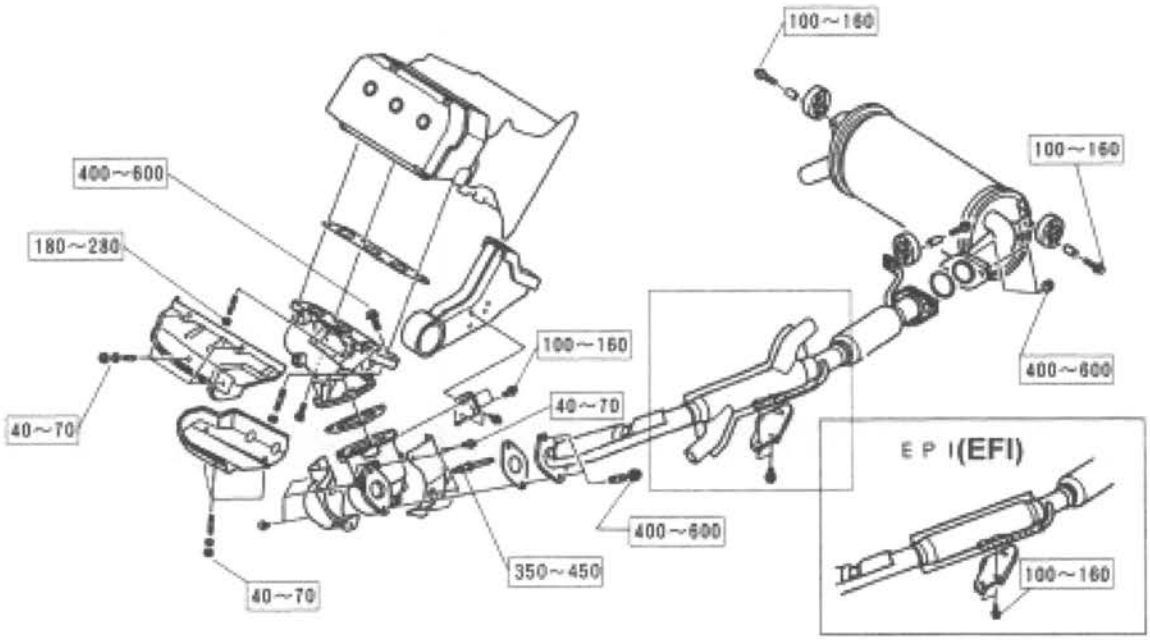


33. Install In Vehicle
34. Fill Fluid to level
35. Run Vehicle for five minutes on the secured rack using proper safety equipment. Run the vehicle through various speed ranges to break in the Differential.
36. Test Drive

Chapter 5: Exhaust

- Carbureted Vehicle
- Turbocharged
- Truck Type 1 & 2

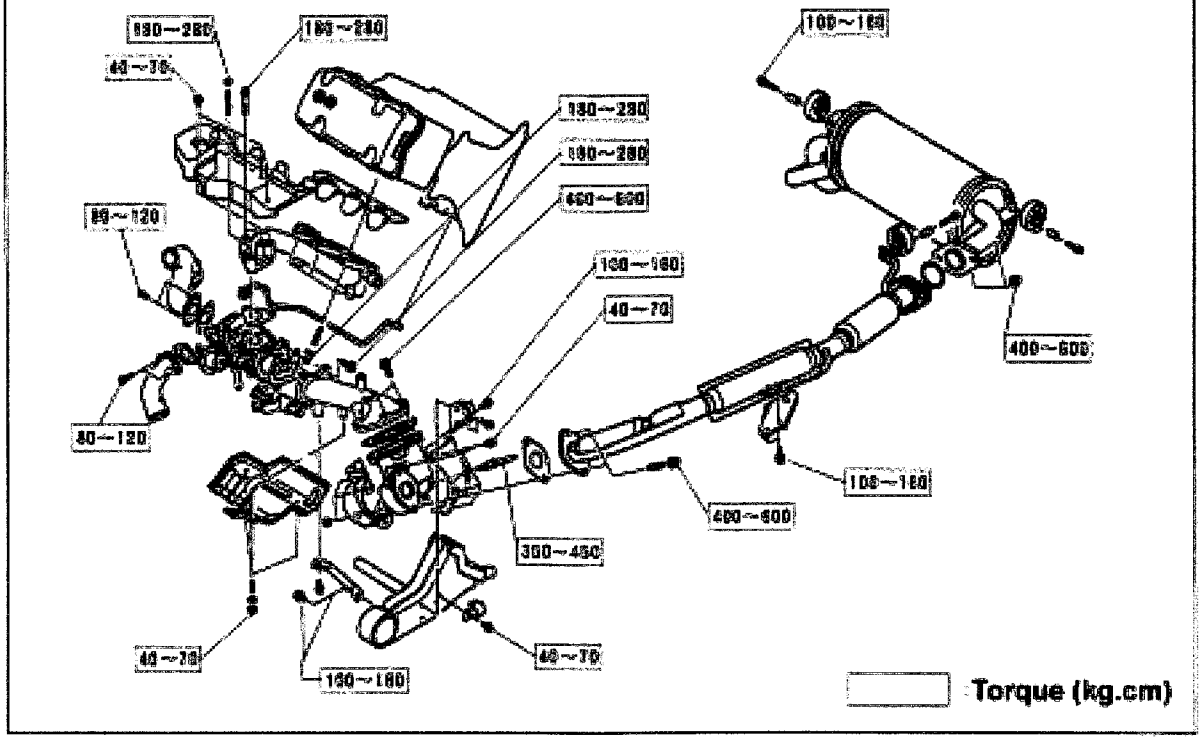
VAN Carbureted, NAEPI Vehicle



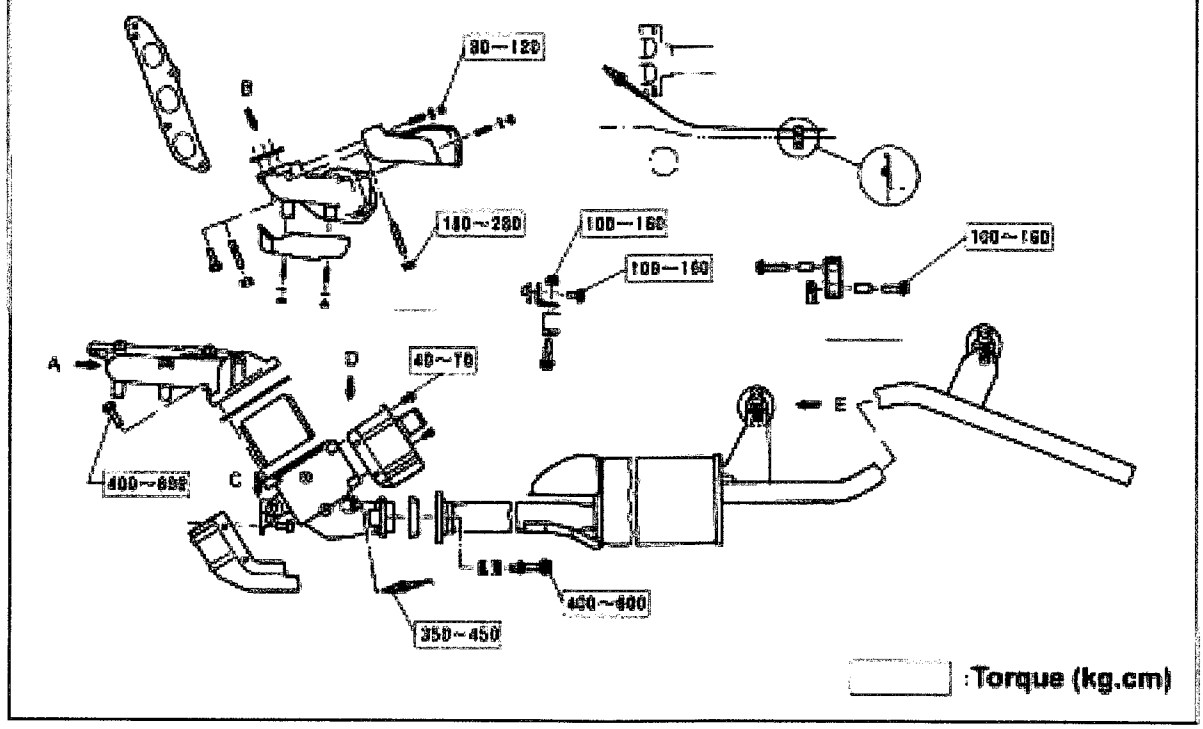
: Torque Value

Exhaust Systems Exploded Views

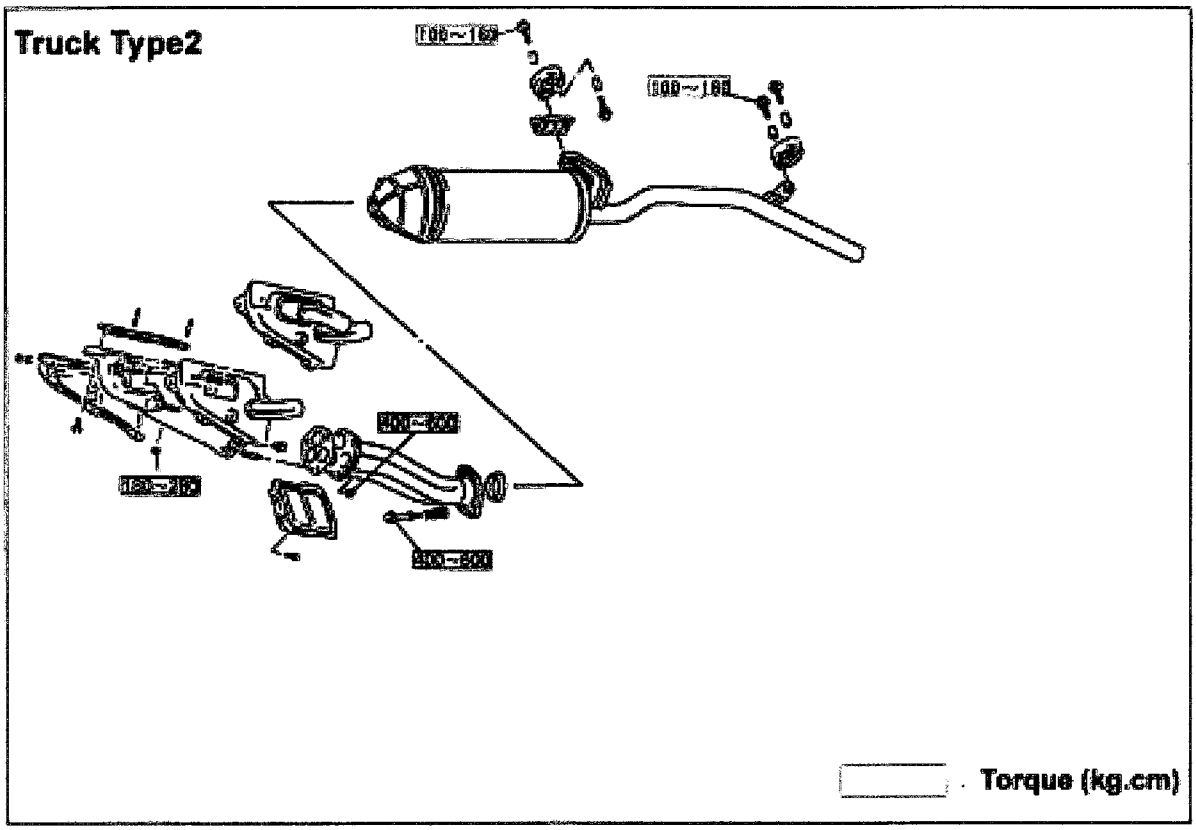
VAN-Turbo Equiped



Truck



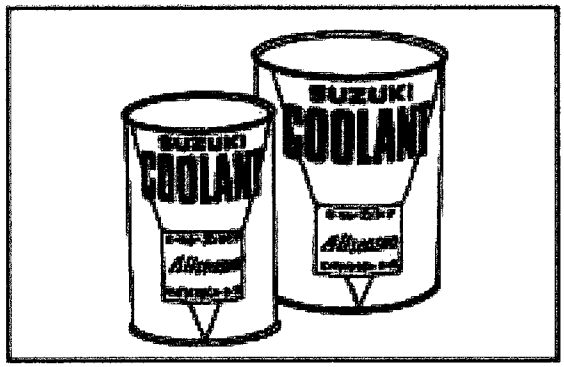
Exhaust Systems Exploded Views



Chapter 6: Cooling System

- Coolant & Capacities
- Reserve Tank: Van & Truck
- System Draining & Air Bleeding
- Radiator
- Thermostat
- Water Pump Replacement

Coolant & Capacities



Coolant Mixture Specifications

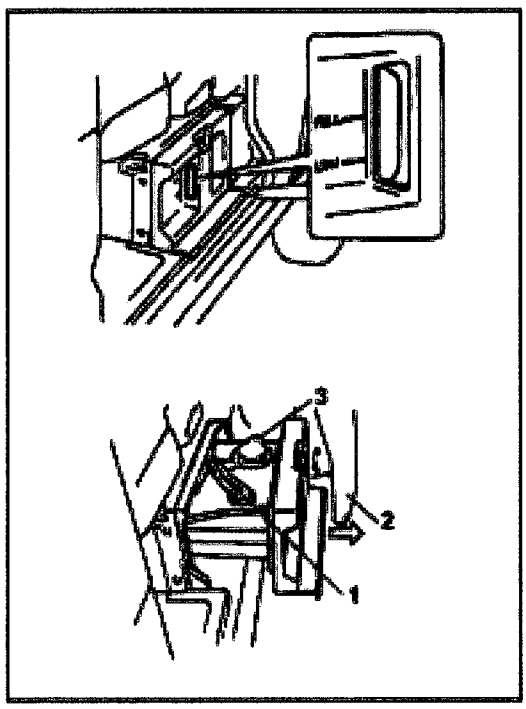
Temperature Listed in Celsius

Temperature Range	-10 C°	-15 C°	-20 C°	-25 C°	-30 C°	-40 C°
Coolant Percentage	30%	35%	40%	45%	50%	55%

Note: Never Use Less Than 30% Coolant in the System

Coolant Capacities

Capacities	Van	Truck
Reserve Tank	0.8 Liters	0.5 Liters
Full System	6.4 Liters	4.7 Liters



Reserve Tank Location: Van

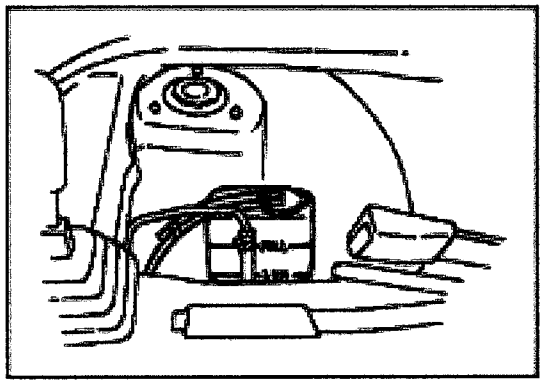
1. Open Rear Passenger Side Door
2. Remove Cover Located Under the Seat
3. Check Coolant Level

Note: If Coolant is Low remove the tray as shown. Add Coolant as required

Items

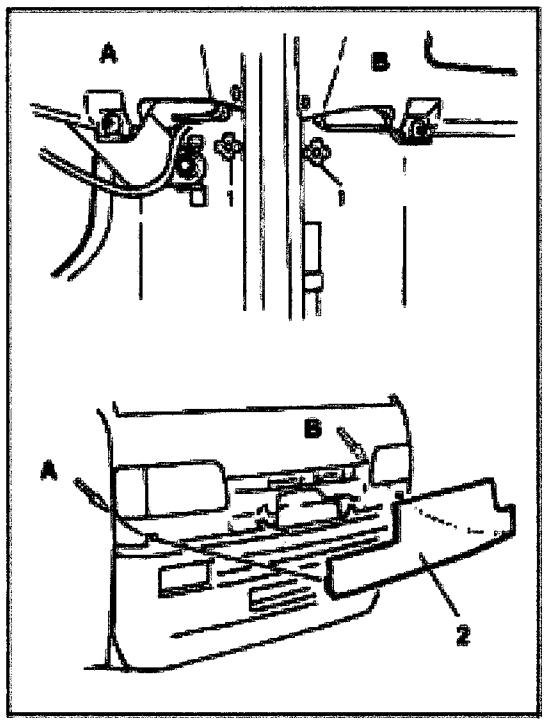
1. Coolant Reserve Tank Cap
2. Sliding Rear Door (Passenger)
3. Window Washing Fluid Tank

Reserve Tank: Van & Truck



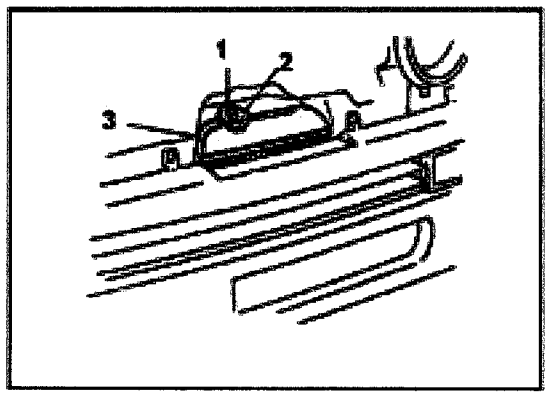
Reserve Tank Location: Truck

1. Lift Drivers Seat
2. Tank is located Near Drivers Side Strut Tower
3. Add Coolant as required



Radiator Access

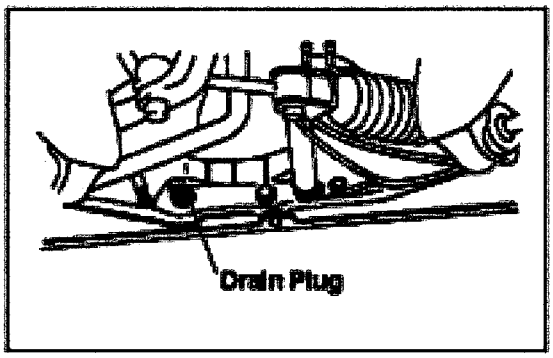
1. Remove inside Firewall Front Panel Nuts (1)
2. Remove Panel
3. Remove Radiator Cap: Engine Cool



Items

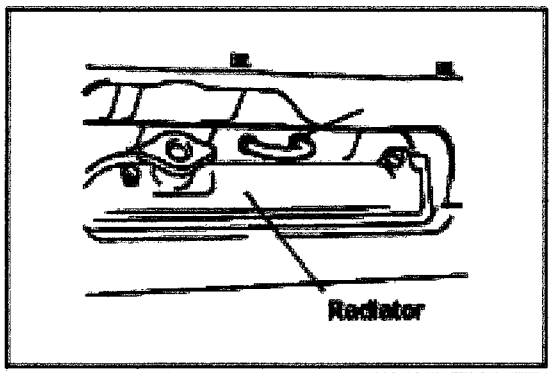
1. Radiator Cap
2. Cap Tags
3. Reserve Tank Hose

System Draining & Air Bleeding

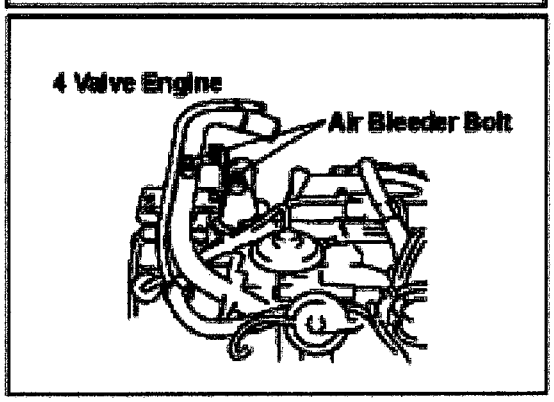


Coolant Draining Procedure

1. Remove Front Cowl Panel
2. Open Radiator Drain
3. Remove Radiator Cap



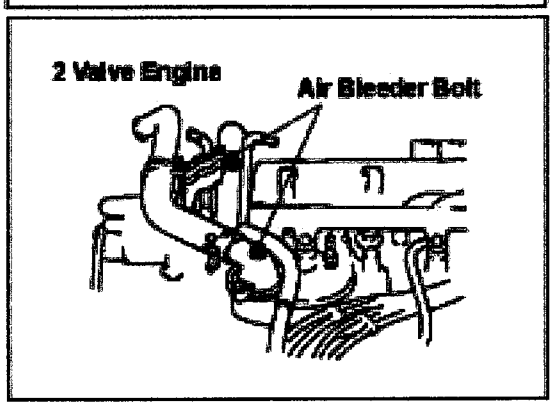
4. Cloose Radiator Drain
5. Disconnect Air Bleeder Hose



6. Open Air Bleeder Bolts

7. Fill Radiator
8. Run Engine with Caps open until Radiator Fan Engages.

9. Shut Down Engine



10. Cap Air Bleeder Plugs. Torque:20-40kg.cm

11. Run Engine with only Radiator Cap Open for 2-3 minutes. Shut down Engine after Air Bobbles stop. Add Coolant and or Water as required. Cap Radiator.

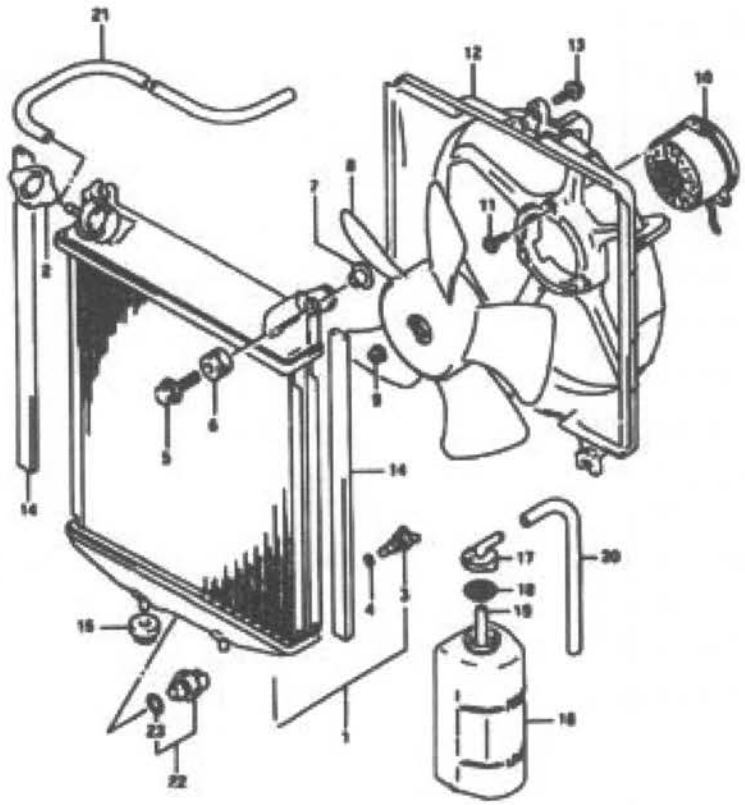
12. Install Cowl Panel

Radiator

All Carry Trucks & Every vans are water cooled with 2 to 3 core radiators depending on application. All vehicles incorporate an electric fan system to pull air through the core for cooling. Replace parts as needed.

Caution: Never work on cooling systems while engine is hot. System must be ambient temperature before maintenance can be performed.

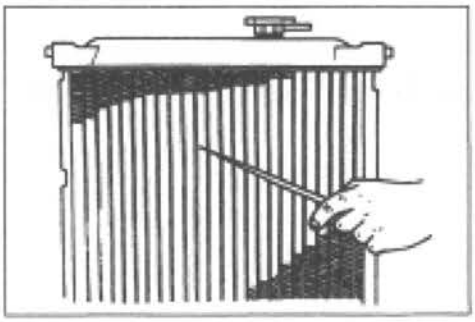
Radiator



Item #	Part Number	Description	Application	QTY
1-1	17700-55F11	Radiator	4V	1
1-2	17700-56F21	Radiator	Turbo	1
2	17920-66F01	Cap		1
3	17751-61A00	Drain Plug		1
4	17759-72010	O-Ring		1
5	01500-06207	Bolt		2

Radiator

Item #	Part Number	Description	Application	QTY
6	17886-50F00	Spacer		2
7	17887-50F00	Mount		2
8-1	17111-55F00	Fan	4V	1
8-2	17111-62D51	Fan	Turbo	1
9	08316-20053	Nut		1
10	17120-62D50	Motor		1
11	02142-04103	Screw		3
12-1	17761-55F00	Shroud	4V	1
12-2	17761-56F00	Shroud	Turbo	1
13	01550-06123	Bolt		3
14	17798-71C10	Rubber Seal		2
15	17879-70B01	Mount		2
16	17931-53F50	Reserve Tank		1
17	17932-60D20	Cap		1
18	17933-60B00	Rubber Seal		1
19	09352-70111-600	Hose	7x11x600	1
20/21	09352-70121-600	Hose	7x12x600	1
22	17680-50F70	Fan Switch		1
23	17689-50F00	O Ring		1



Make Sure To Check All Fluids Are at Their Proper Level

Inspect Radiator For Leaks

If The Radiator Has a Leak Remove & Replace

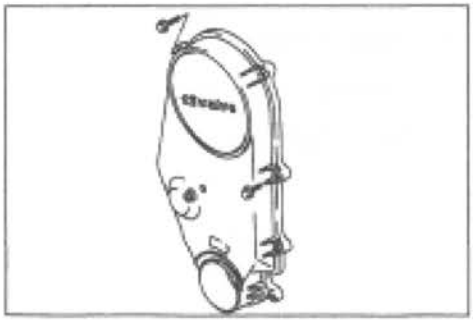
Note: Do Not Use Liquid Radiator Repair Type Products. Thermostate & Water Pump Parts Will Fail.

Radiator Replacement

1. Disconnect (-) Battery Cable
2. Remove Radiator Cap and Open Drain Plug
3. Disconnect Radiator Hoses
4. Unbolt Mounting Attachments
5. Remove Radiator

Note: Take Care Not To Damage Radiator Cooling Fins.

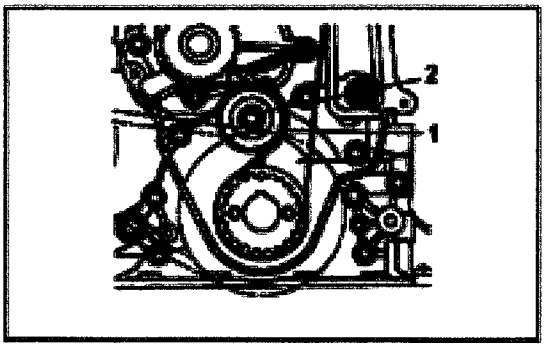
Timing Belt Cover



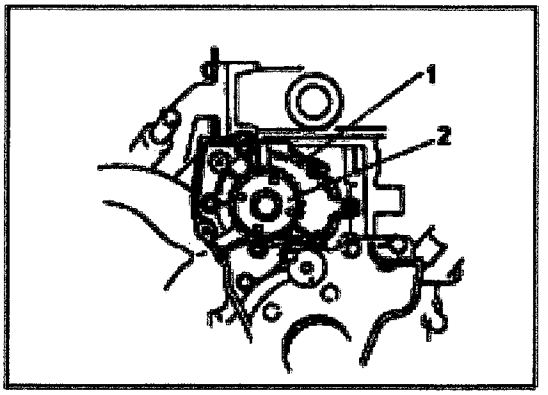
Water Pump

Proceedure:

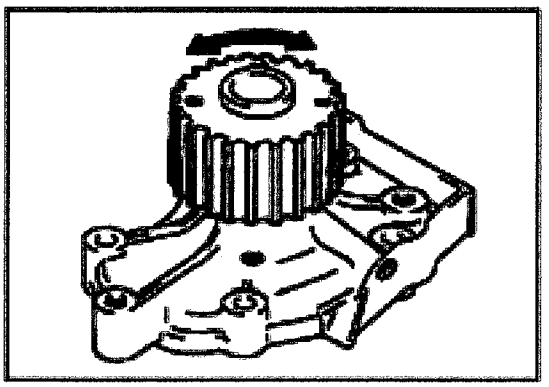
1. Disconnect (-) Negative Battery Connection
2. Drain Coolant System (While Cool)
3. Remove Belt
4. Remove Crank Pulley (See Engine Section)
5. Remove Fan
6. Remove Timing Belt Outside Cover



7. Remove Timing Belt Tensioner and Timing Belt

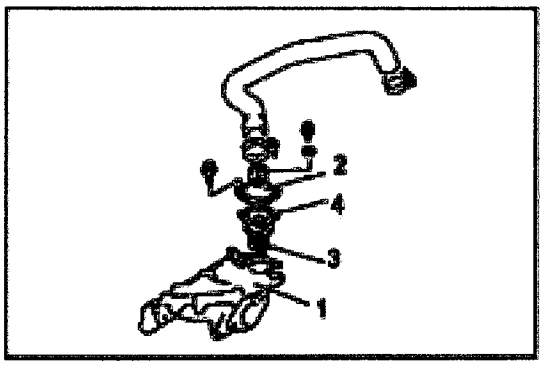


8. Unbolt Water Pump and Remove



9. Inspect New Water Pump before installation for free turning and no binding detected.
10. Install Water Pump in reverse order.

Torque: 100-300kg.cm



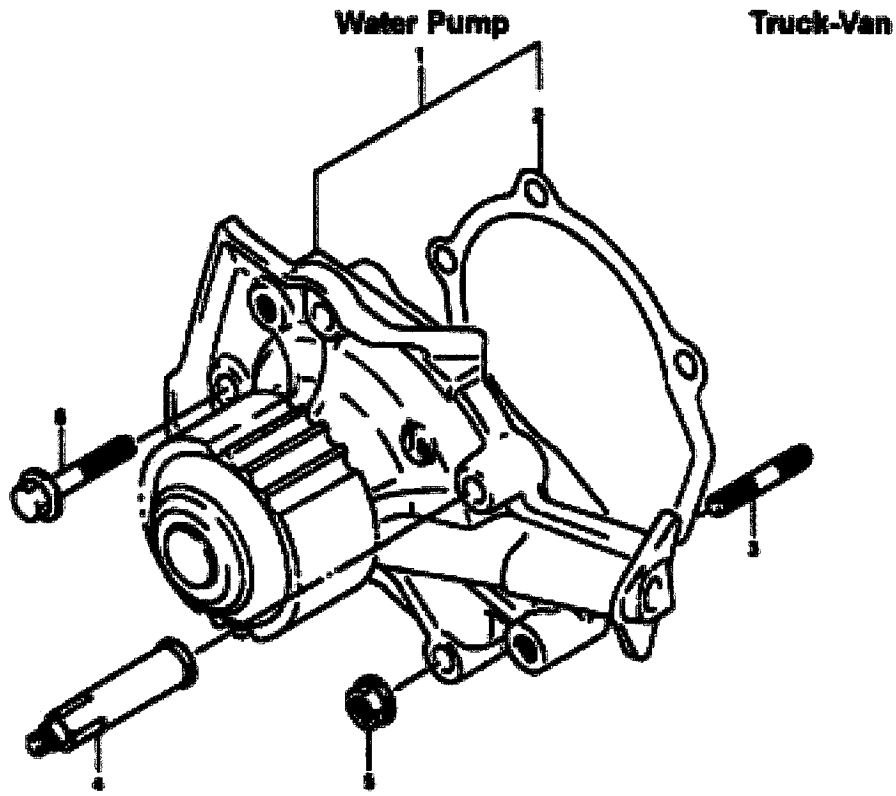
Thermostat Replacement

1. Drain Coolant
2. Remove Water Hose
3. Unbolt Thermostat Housing
4. Remove Thermostat
5. Replace with New Gasket.

Items:

1. Intake Manifold
2. Thermostat Housing
3. Thermostat
4. Gasket

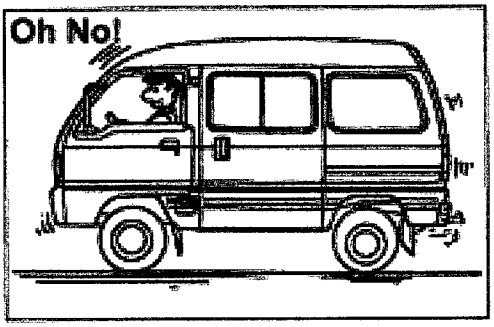
Water Pump Components



Item #	Part Number	Description	Application	QTY
1	17400-51812	Water Pump Set	Truck-Van	1
2	17431-73001	Gasket		1
3	01411-06253	Stud Bolt		2
4	17432-53F00	Bolt: Stud		1
5	08316-10063	Nut		1
6	01550-06303	Bolt		3

Chapter 7: Fuel Control, Emission Control & Ignition System

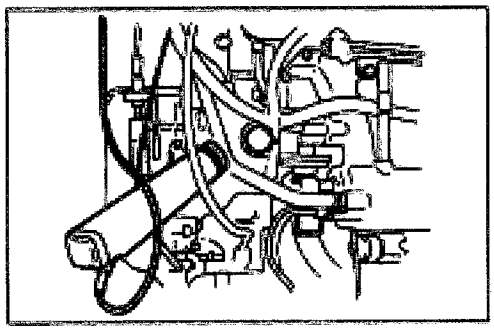
- Carburetor & Ignition Timing: Truck
- Carburetor & Ignition Timing: Van
- Fuel Lines: Carbureted & Fuel Injected: Fuel Pump & Filter
- Fuel Pump & Circuit Diagram
- Carburetor Diagrams & Components
- Carburetor Adjustment Tool
- Emission Control Diagrams & Vacuum Hose Routing: Carbureted Type 1
- Emission Control Diagrams & Vacuum Hose Routing: Carbureted Type 2
- Emission Control Diagrams & Vacuum Hose Routing: Fuel Injected
- Emission Control Diagrams & Vacuum Hose Routing: Turbocharged
- EPI Fuel Injected 4 Valve & Turbocharged Engine Components
- Turbocharged Engine Emission Component Location Guide
- Fuel Injected Engine Emission Component Location Guide
- Turbocharged ECM EPI Computer Circuits
- Standard Fuel Injected ECM EPI Computer Circuits (Non-Turbo)
- ISC Solenoid: EPI
- Fuel Injectors
- Fuel Pump Relay
- EGR Valve & TPS Sensor
- EPI Fuel Injected Ignition System
- Standard Point Type Ignition



Van

If Vehicle is Running Rough The Cause is Gennerally Timing or Carburetor Settings are not Correct

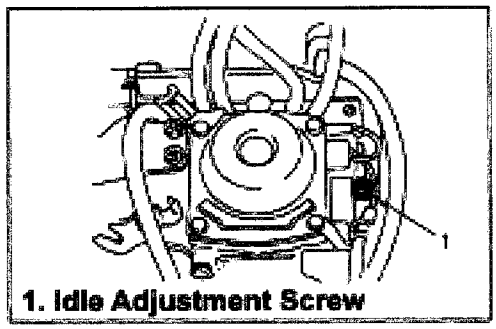
Preventative Maintenence is Recommended Before Trouble Occurs



See Vehicle Spec Sticker In Engine Room

If Not Located Set To Factory Specifications

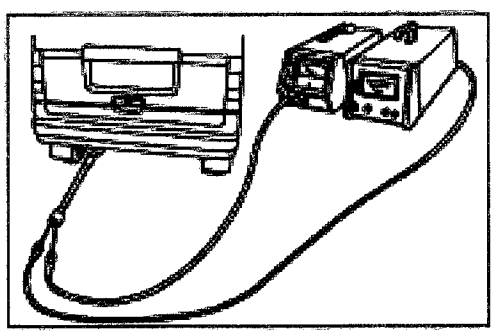
Engine Timing to (Degrees) (RPM)
7 BTDC 950(+-)50



1. Idle Adjustment Screw

Next Locate Adjustment Screw as in Diagram to the Left.

Set Idle to (RPM): 950 (+-)50

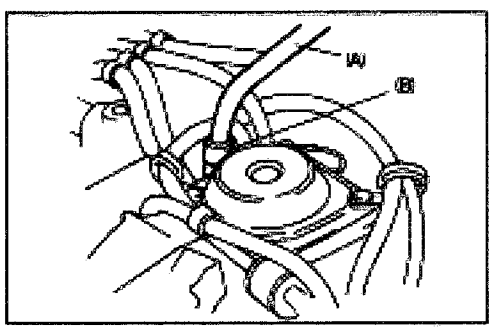


CO2 Check

Run Engine to 2500 RPM

Check CO2 Level

Co HC CO(%) 1.5(+-)0.5
HC(ppm) Below 1100



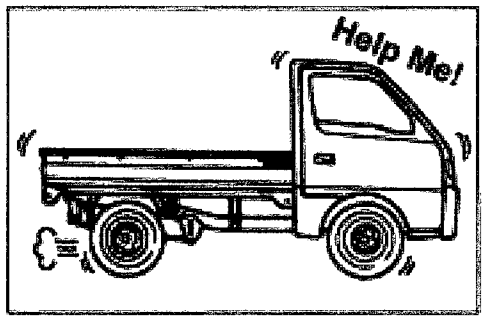
Adjustment

Use Tools (A)(B) Pilot Screw Adjustment

Turn Screw Slowly to Adjust Level

Tool
(A) 09918-38320
(B) 09918-38350

Carburetor & Ignition Timing (Van)

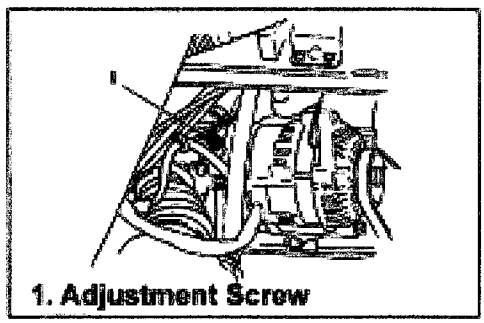


Truck

If Your Vehicle is Running Rough, The Cause is Gennerally Timing or Carburetor Settings are Not Correct

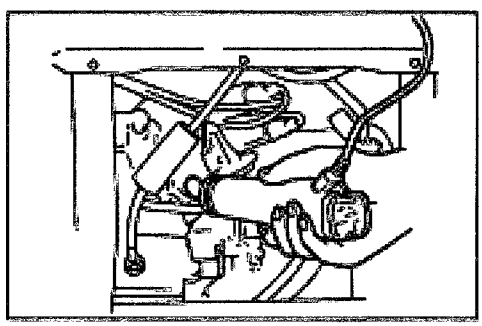
Note: Major cause of rough idle is dirty fuel filters or vacuum leaks. Diff-Lock Vehicles with a defective actuator will cause rough idle.

Note: Warm Vehicle to proper operating temperature before adjusting settings



Locate Adjustment Screw as in the Diagram to the Left.

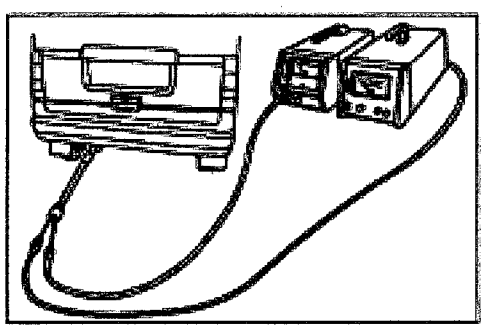
Set Idle to RPM: 950(+-)50



See Vehicle Spec Sticker in Engine Compatement

If Not Locatable, Set to Factory Spec

Engine Timing to (Degrees) (RPM)
7 BTDC 950(+-)50

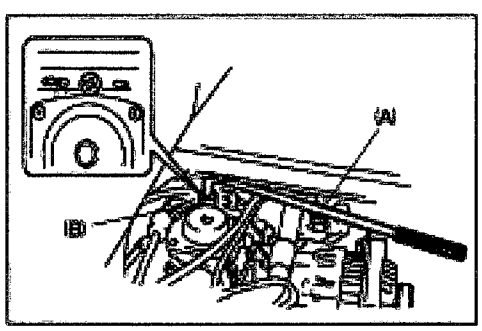


CO2 Check

Run Engine to 2500 RPM

Check CO2 Level

CO HC CO(%) 1.5(+-)0.5
HC(ppm) Below 1100



Adjustment

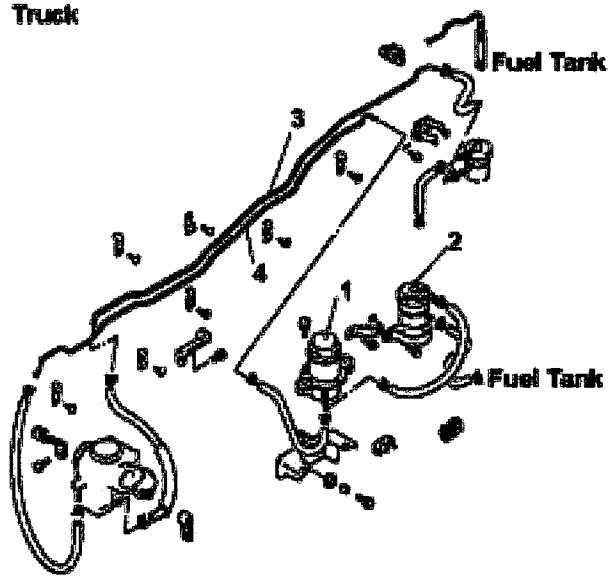
Use Tools (A)(B) Pilot Screw Adjustment

Turn Srew Slowly to Adjust Level

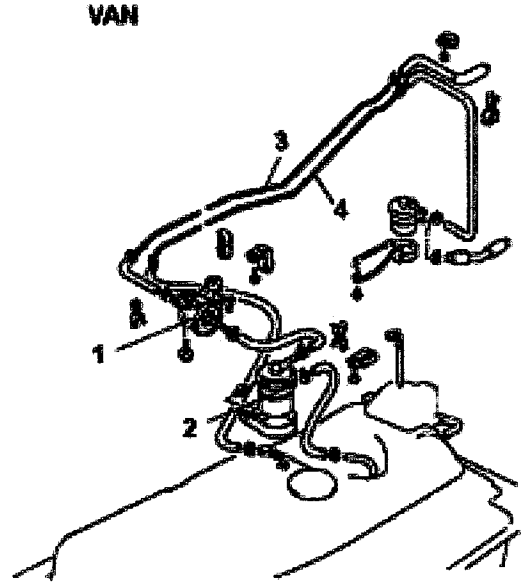
Tool
(A) 09918-38320
(B) 09918-38350

Fuel System Fuel Lines

Carburetor
Truck

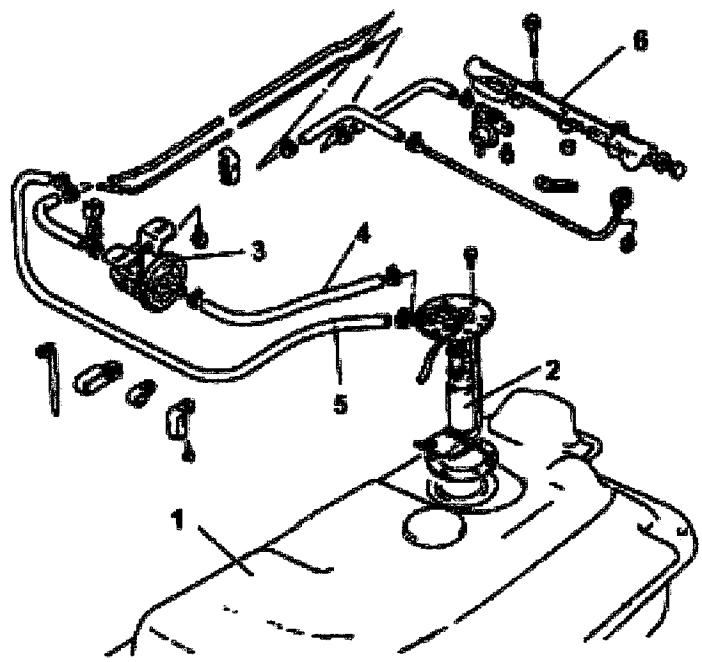


VAN



1. Fuel Pump	2. Fuel Filter
3. Fuel Line (Main)	4. Fuel Return Line

Fuel Injected System



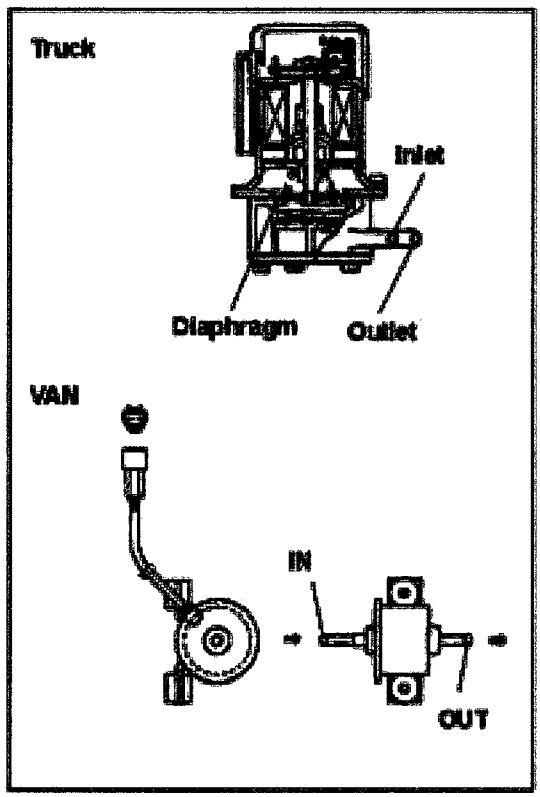
1. Fuel Tank	2. Fuel Pump
3. Fuel Filter	4. Fuel Pipe
5. Fuel Return	6. Fuel Line (Main)

Note: For Fuel System Parts check the 1990-1998 Parts Catalogue for Suzuki Cary & Every

Fuel Pump Unit & Electrical Circuit

Note: Fuel Pumps rarely fail. Always check fuses and electrical connections before replacing the pump. The major cause of failed fuel pumps is debris in the fuel line or tank. The second major issue is the fuel pump relay is defective (located left side of speedometer head).

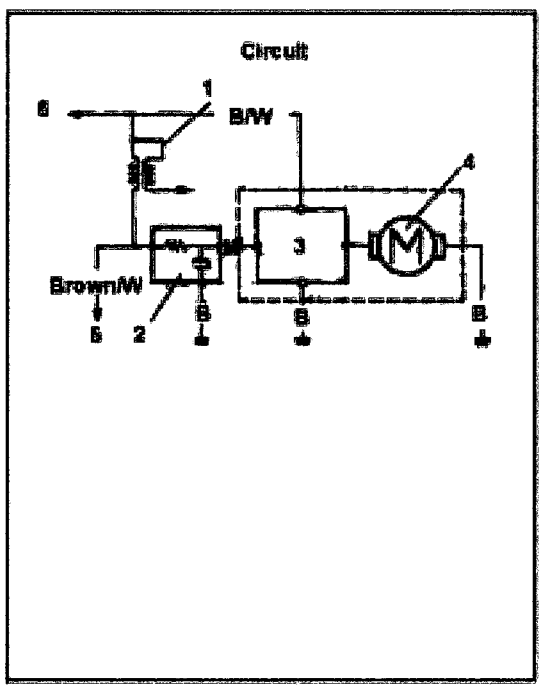
Note: Do not install a high pressure fuel injection pump (40+PSI) into a low pressure carbureted vehicle (6-12 PSI). Damage will occur. Check Parts Catalogue for Part numbers.



Fuel Pump Types

Truck: Frame Mounted

Van: Internal Full Tank Type

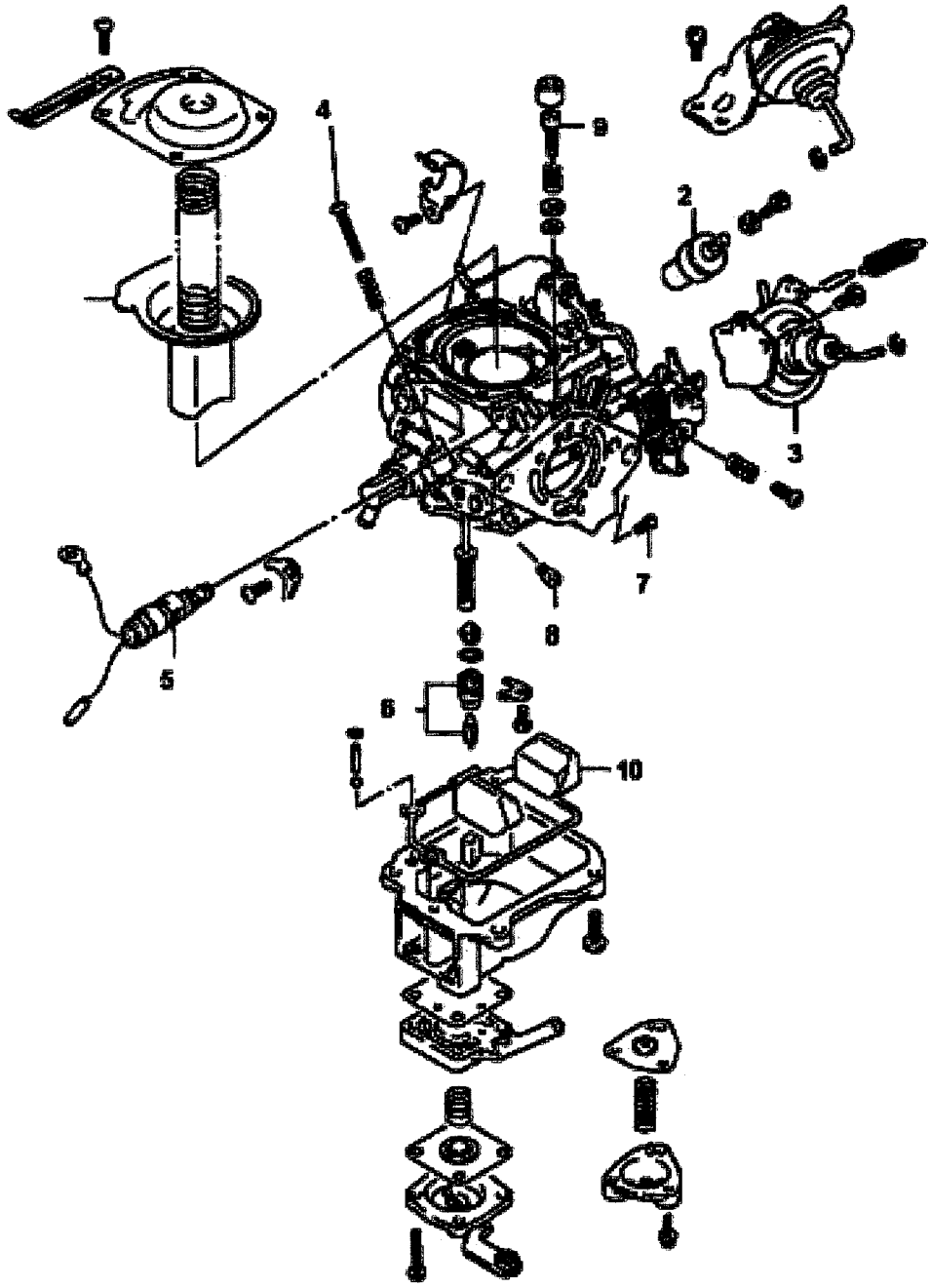


Note: See Electrical Section for Complete Wring Circuit.

Note: Turn Ignition Switch to ON the pump will energize for 2-3 Seconds. They are not continues Feed Pumps. A drop in Fuel Pressure activates the Fuel Pump Relay. Check Relay before replacing Pump.

1. Ignition Coil
2. Noise Filter
3. Fuel Pump relay
4. Fuel Pump
5. Distributor
6. Ignition

Carburetor Exploded View

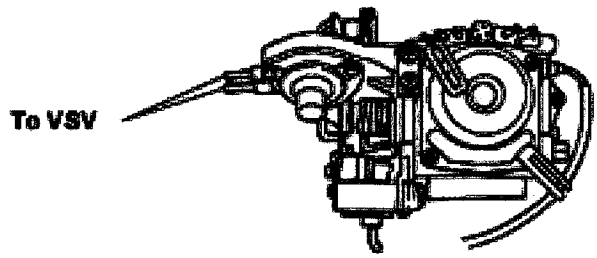


Main Components

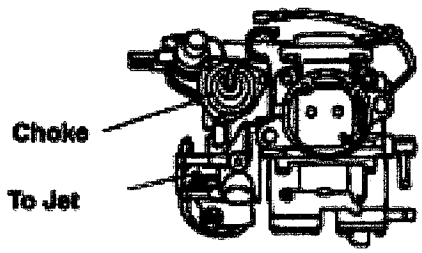
1. Piston Valve	2. Thermo Element
3. Choke Pull Off Valve	4. Throttle Adjustment Screw
5. Fuel Cut Off Valve	6. Needle Valve
7. Power Jet	8. Main Jet
9. Fuel Air Adjustment	10. Float

Carburetor View: Van

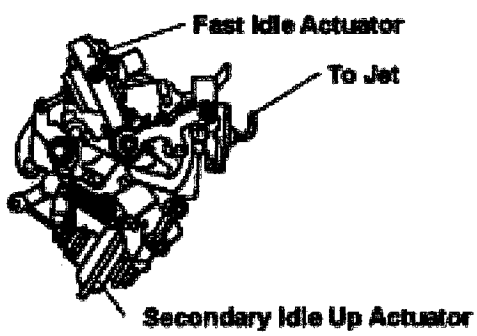
Side View



Top View

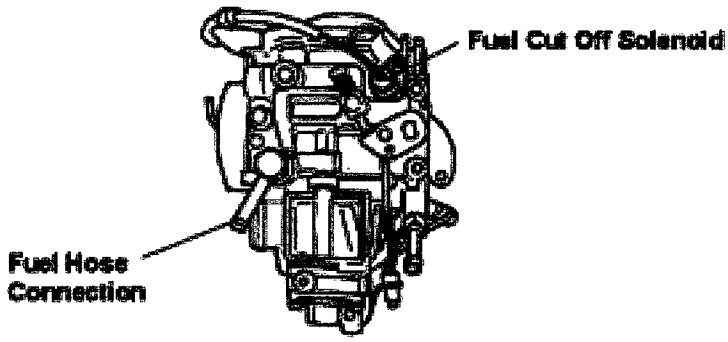


Left Side View

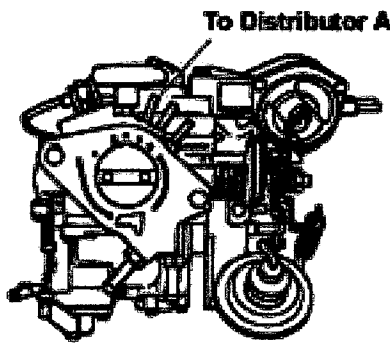


Carburetor Diagram: Van

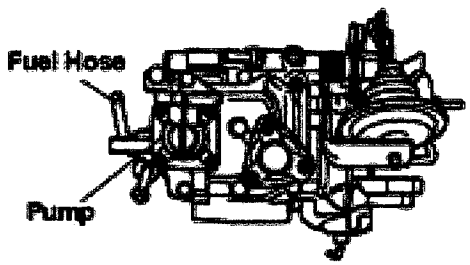
Right Angle



Bottom View

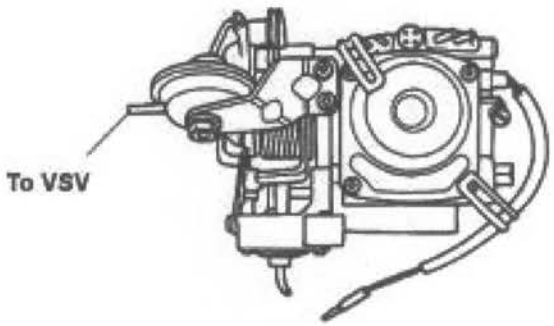


Flip View

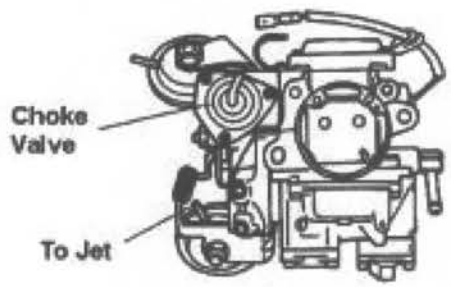


Carburetor Diagram: Truck

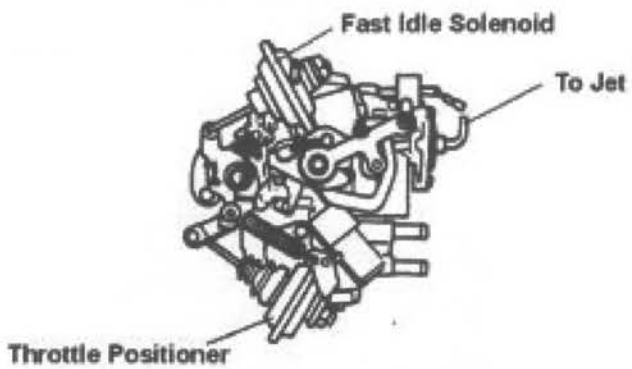
Side View



Top View

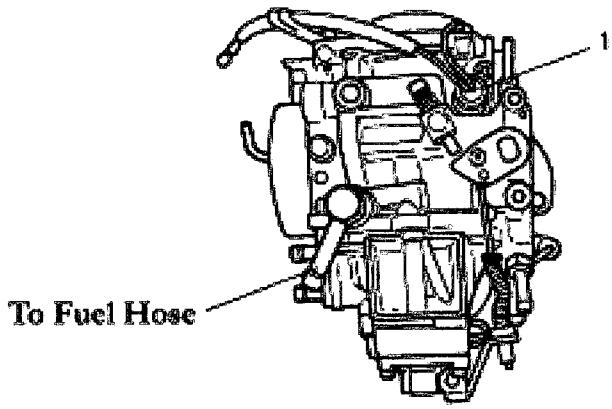


Left View



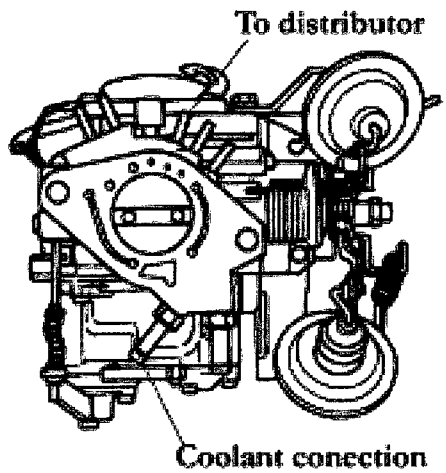
Carburetor Diagram: Truck

Right Side View

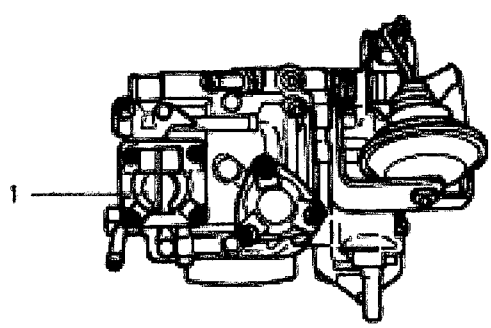


1. Fuel cut off solenoid

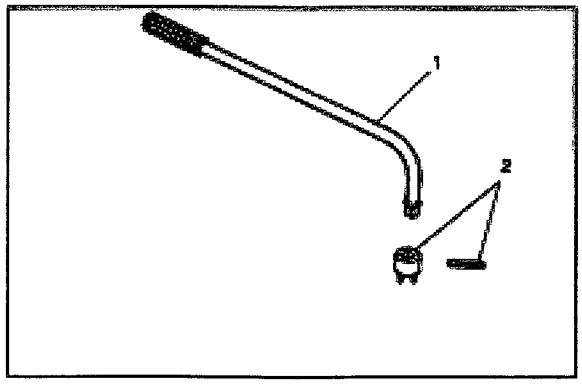
Botom View



Flipped View



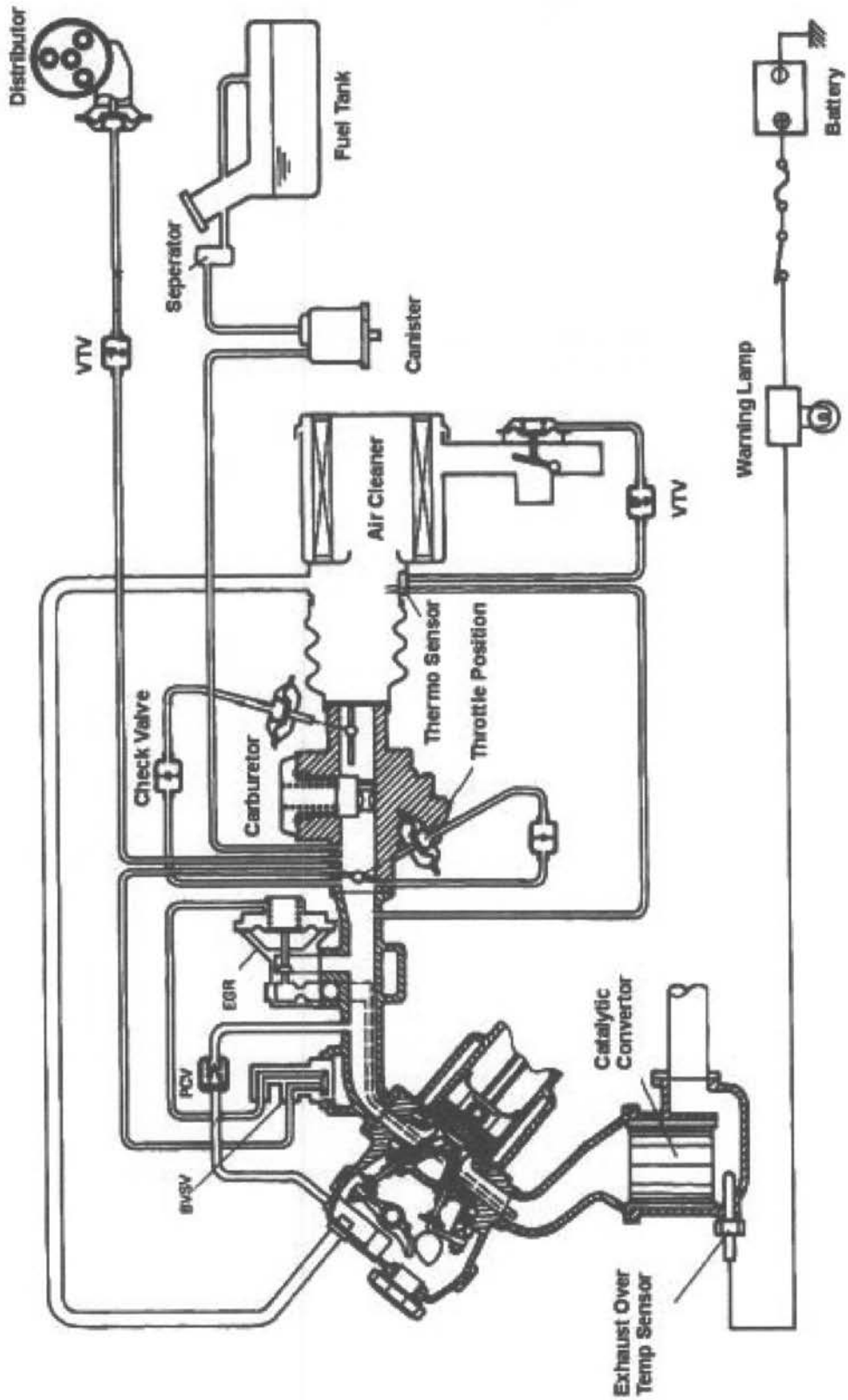
1. Accel Pump



1. 09918-38320 Handle
2. 09918-38350 Fuel/Air Adjustment Adapter

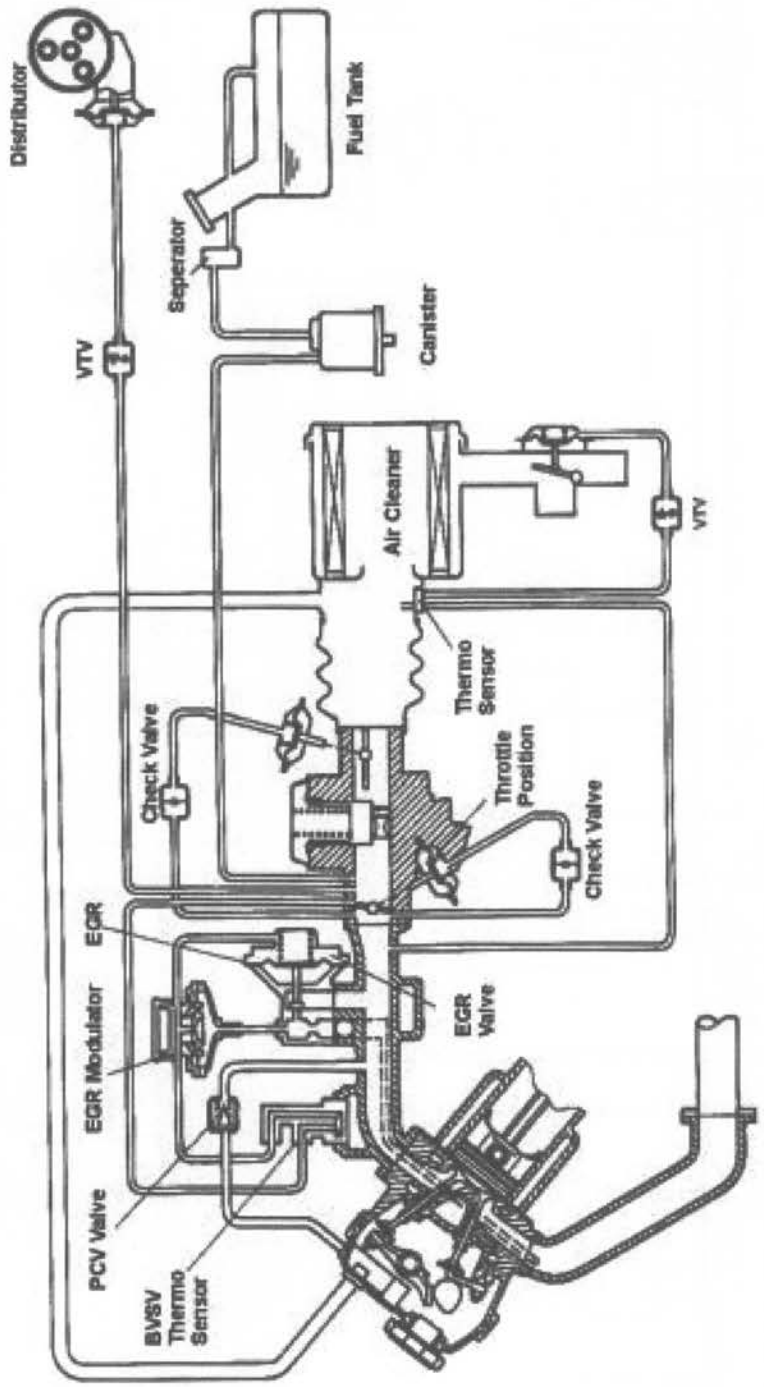
Emission Control Diagrams & Vacuum Hose Routing: Carbureted

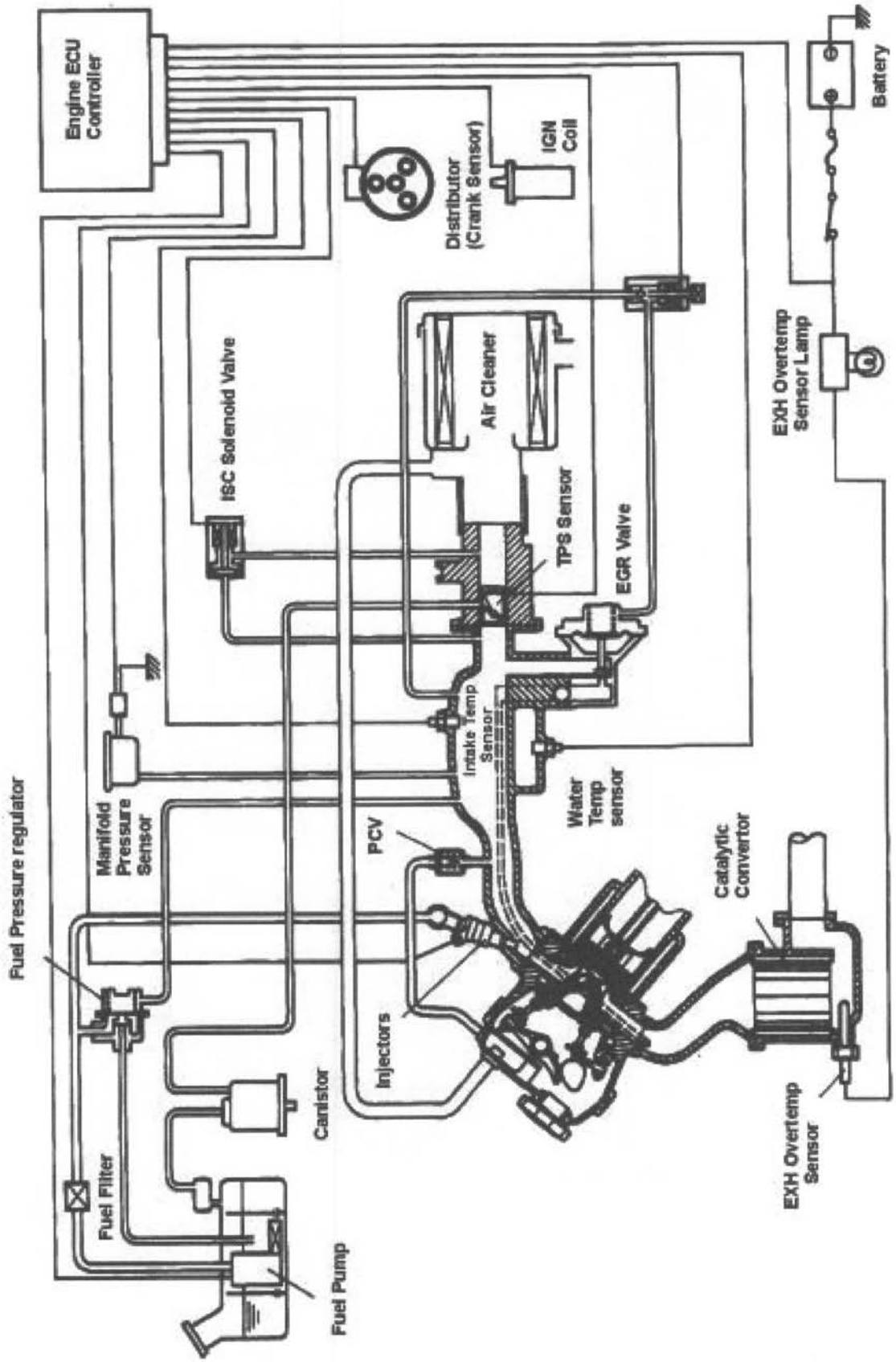
Type 1 from 1992~

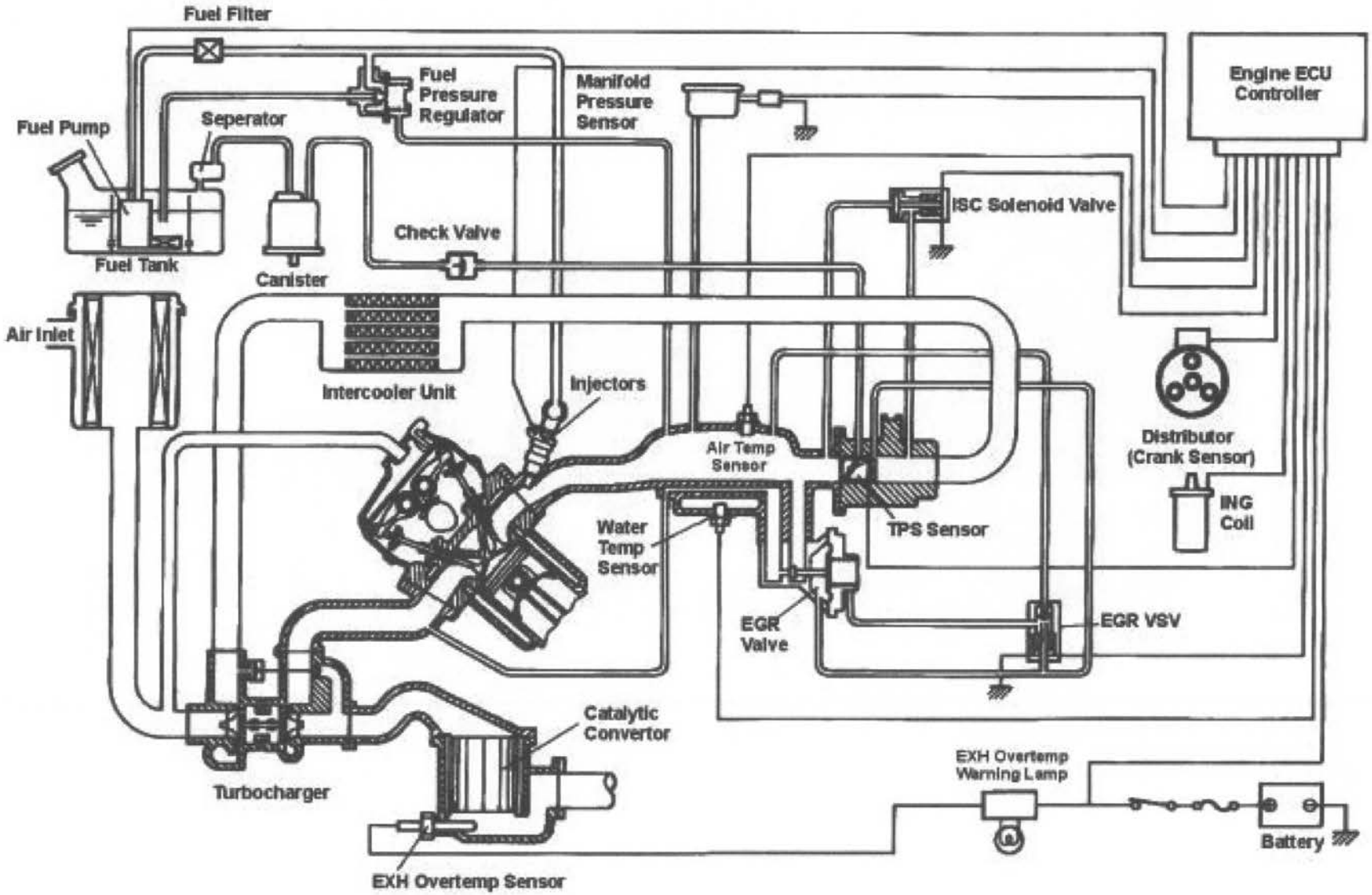


Emission Control Diagrams & Vacuum Hose Routing: Carbureted

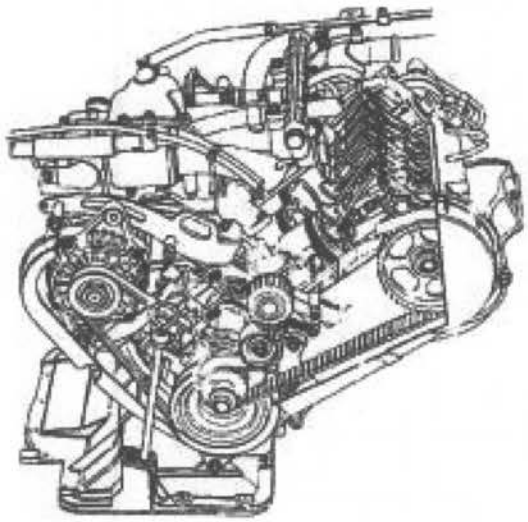
Type 2 Pre-1991



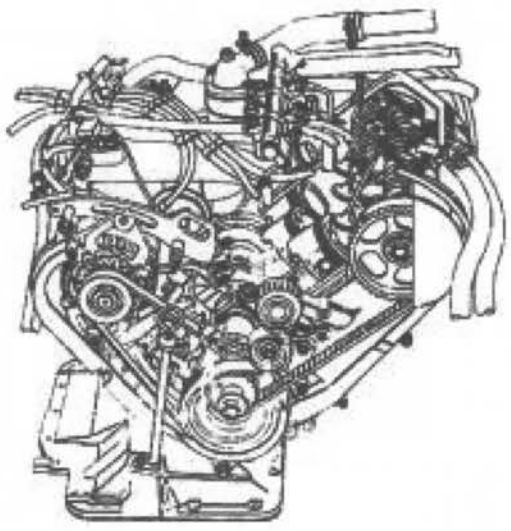

Engine ECU Controller
Distributor (Crank Sensor)
IGN Coil
Battery
ISC Solenoid Valve
Air Cleaner
TPS Sensor
EGR Valve
EXH Overtemp Sensor Lamp
Intake Temp Sensor
Water Temp sensor
Manifold Pressure Sensor
PCV
Catalytic Convertor
Fuel Pressure regulator
Injectors
Canistor
Fuel Filter
Fuel Pump
EXH Overtemp Sensor


Fuel Filter
Fuel Pump
Seperator
Fuel Pressure Regulator
Manifold Pressure Sensor
Engine ECU Controller
ISC Solenoid Valve
Check Valve
Fuel Tank
Canister
Air Inlet
Intercooler Unit
Injectors
Air Temp Sensor
Distributor (Crank Sensor)
ING Coil
TPS Sensor
Water Temp Sensor
EGR Valve
EGR VSV
Catalytic Convertor
Turbocharger
EXH Overtemp Warning Lamp
Battery
EXH Overtemp Sensor

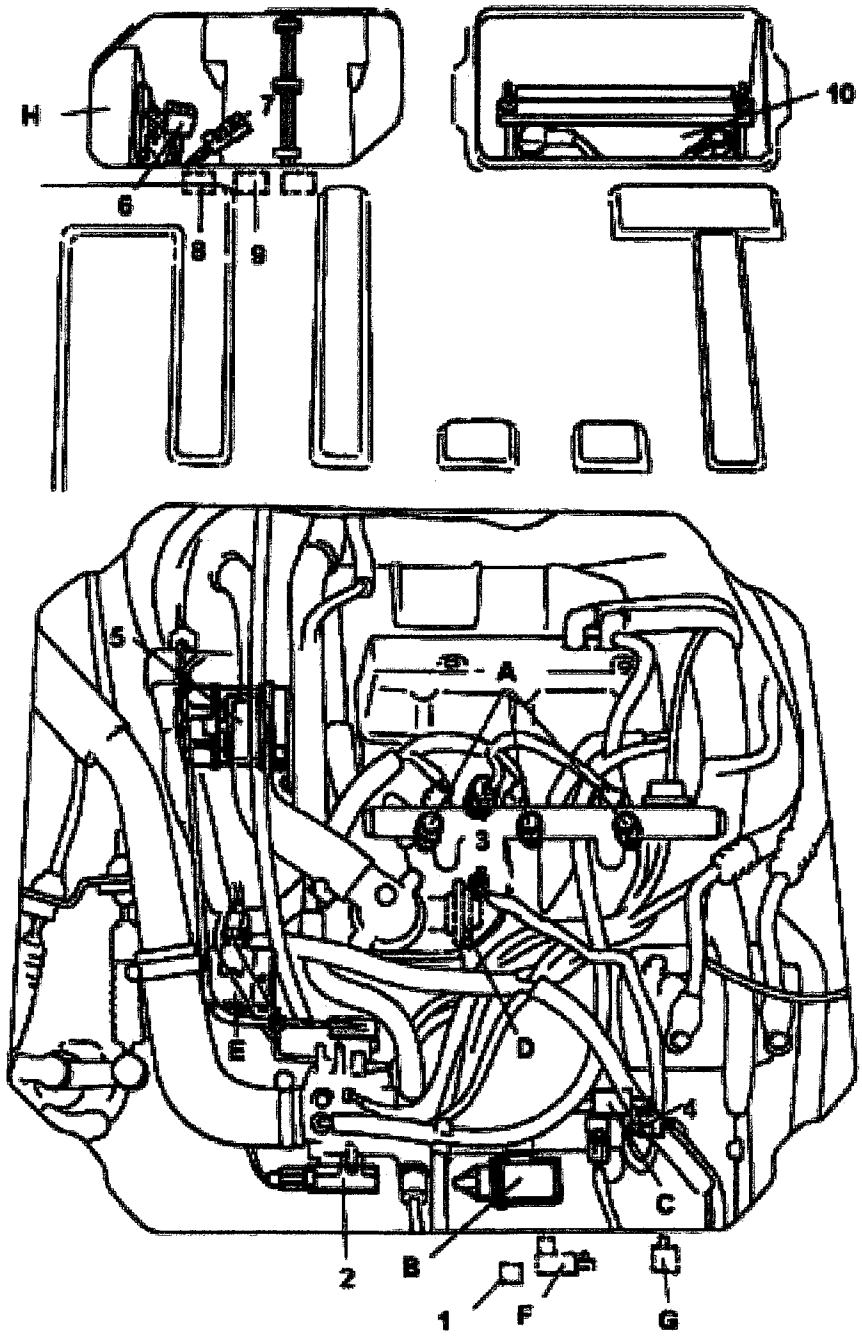
4 Valve EPI Engine



2 Valve Turbocharged EPI Engine



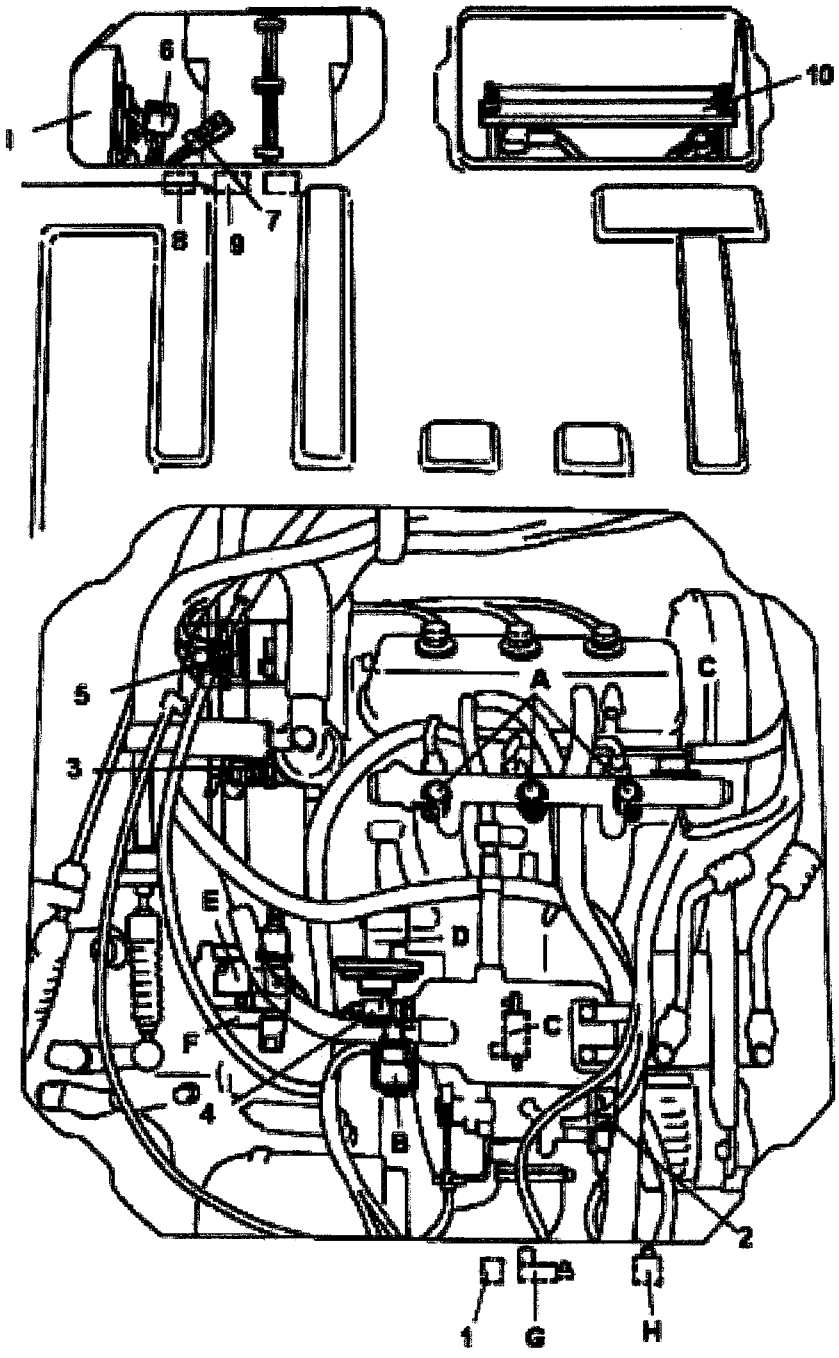
Turbocharged Engine Emission Component Location Guide



1. Pressure Sensor	2. TPS	3. Water Temp Sensor
4. Air Temp Sensor	5. Distributor (Crank Sensor)	6. Diagnostic Connection
7. CO Connector	8. Fuel Pump Relay	9. Main Relay
10. Battery		

A: Fuel Injector	B: ISC Solenoid Valve	C: EGR-VSV
D: EGR Valve	E: Ignition Coil	F: P/R-VSY
G: A/C Fast Idle VSV	H: ECM Controller	

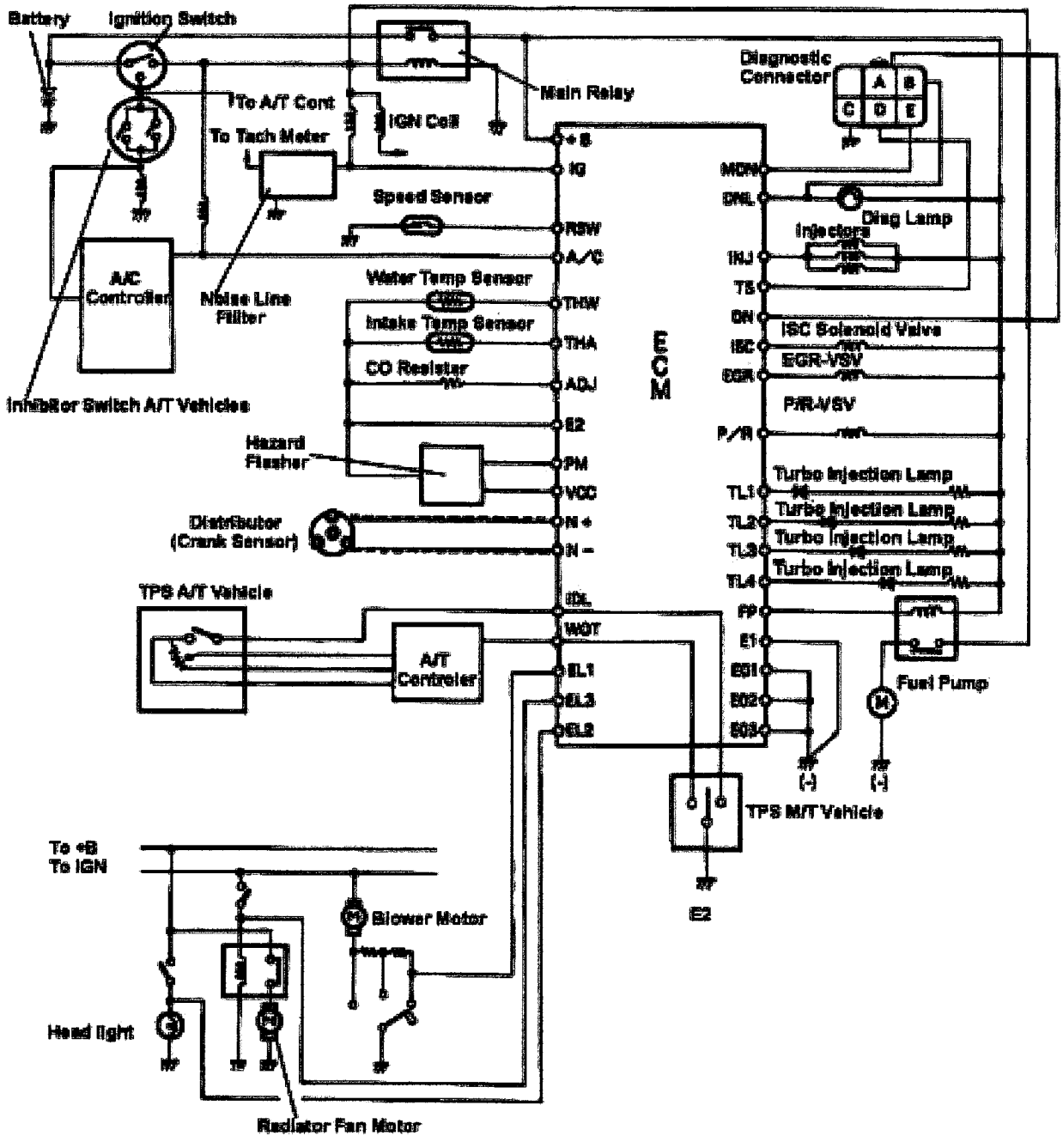
Fuel Injection Engine Emission Component Location Guide



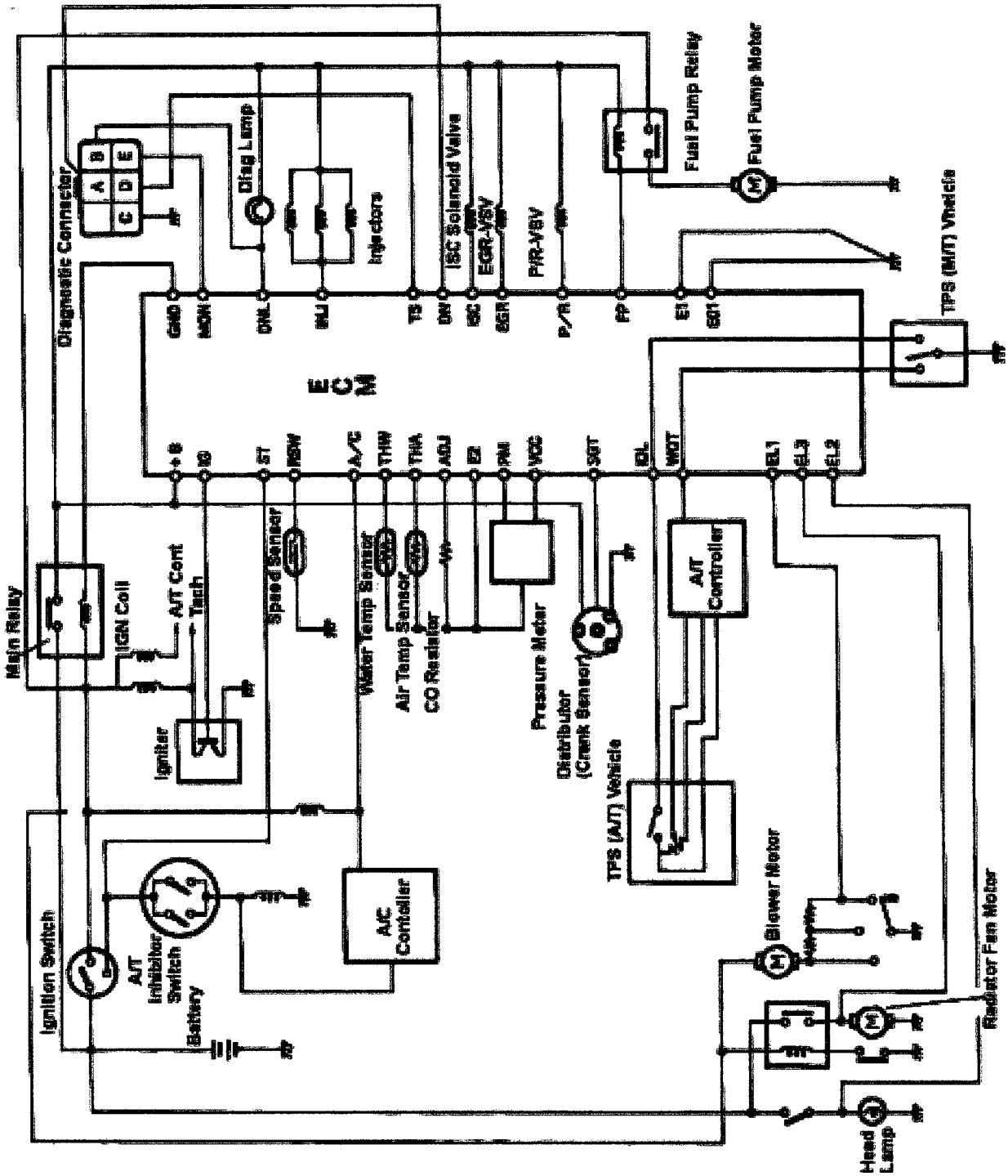
1. Pressure Sensor	2. TPS
3. Air Temp Sensor	4. Distributor (Crank Sensor)
5. CO Connector	6. Fuel Pump Relay
7. Battery	

A: Fuel Injector	B: ISC Solenoid Valve	C: EGR-VSV
D: EGR Valve	E: Igniter	F: Ignition Coil
G: P/R-VSV	H: A/C Fast Idle VSA	G: ECM Controller

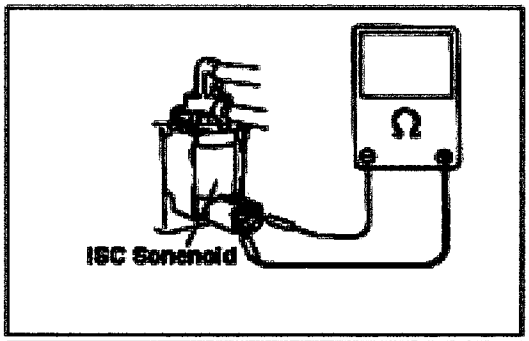
Turbocharged ECM EPI Computer Circuits



Standard Fuel Injected ECM EPI Computer Circuits (Non-Turbo)



ISC Solenoid: EPI & Fuel Injectors

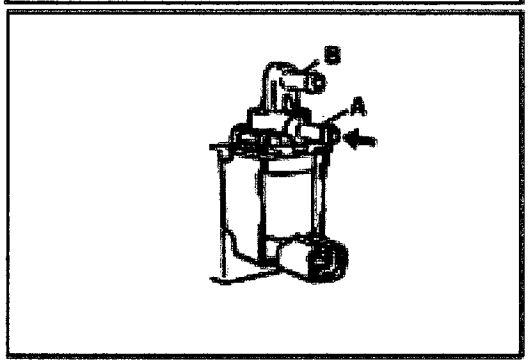


ISC Solenoid Valve

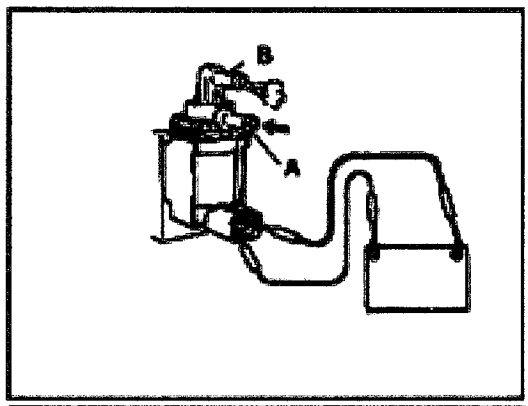
1. Remove Connector
2. Connect an Ohm Meter as shown

Limit: 22-26 Ohm

Note: Out of Range replace ISC Solenoid Valve

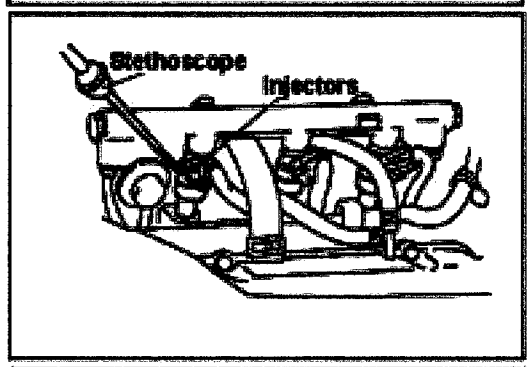


3. Remove the two Vacuum Hoses
4. Remove Connector
5. Blow air through Port "A". The valve must be closed and no air passing to Port "B".

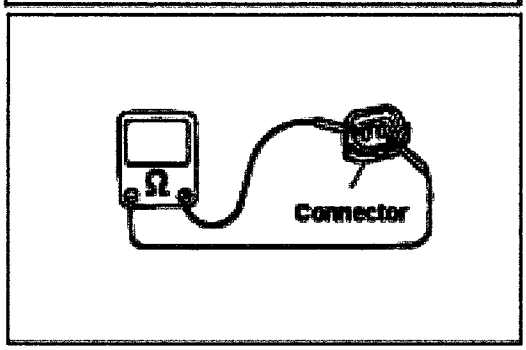


6. Power On Test. Connect a 12Volt Power Source as shown. With power connected blow Air through Port "A". Air should pass through to Port "B". If any of the tests performed fail replace the ISC Solenoid Valve.

Fuel Injectors Testing



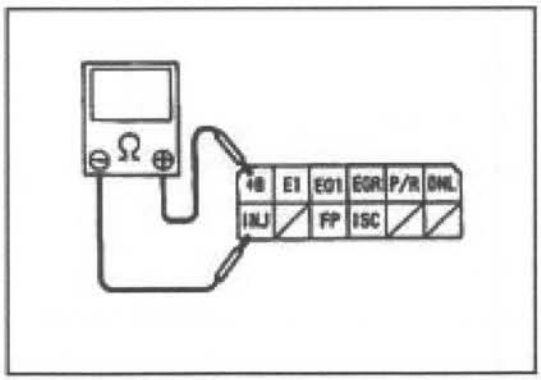
1. With the Engine running use a Stethoscope to listen for the injector opening and closing. A distinguishable "Tick-Tick" should be heard. If there is no sound check for voltage. If voltage is present replace the Injector.



2. Ohm Test. Remove the Injector Connector and attach an Ohm Meter as shown.

Ohm Range: 13.1-14.5 Ohm

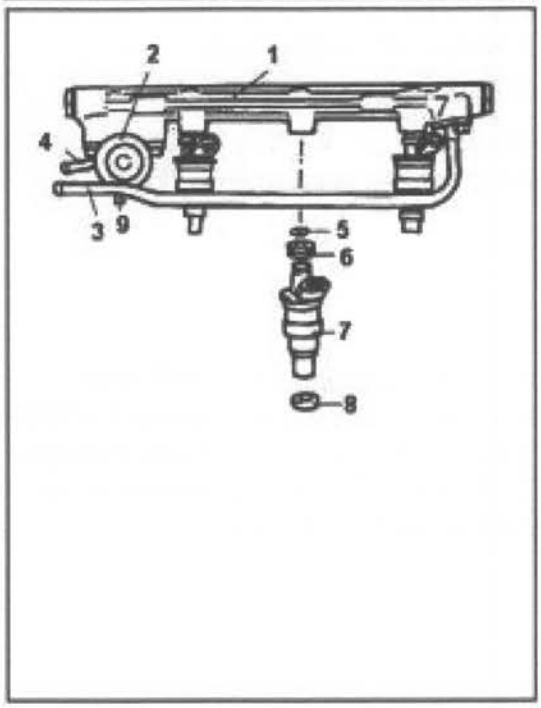
Note: Out of Range replace Injector



Injector ECM Connection Test

3. Disconnect the ECM Computer Connector
4. Use an Ohm Meter as shown and test Ohm Range between Pins +B & INJ(Injector)

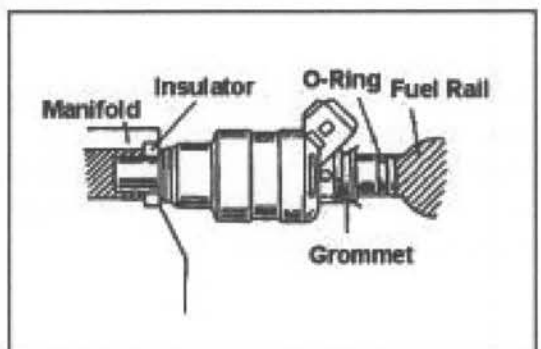
Ohm Range Limit: 434-4.0 Ohm



Injector Removal

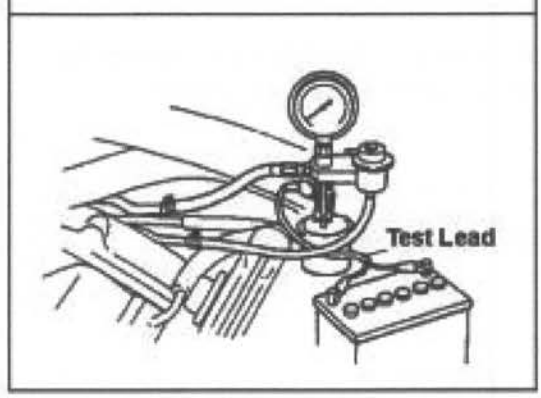
Remove the following components

1. Fuel Rail
2. Fuel Pressure Regulator
3. Fuel Inlet Pressure Line
4. Fuel Return Line
5. O-Ring: Must Replace
6. Grommet: Must Replace
7. Fuel Injector Unit
8. Insulator: Must Replace
9. Vacuum Line



O-Ring Setting

Note: Before installing O-Ring and Insulator coat with a light coat of Engine Oil.



Injector Volume Test

1. Use a set up as shown with a fuild measurement container. Attach the Injector to the top of the container (not submerged). Use a test lead for direct power for 15 seconds.

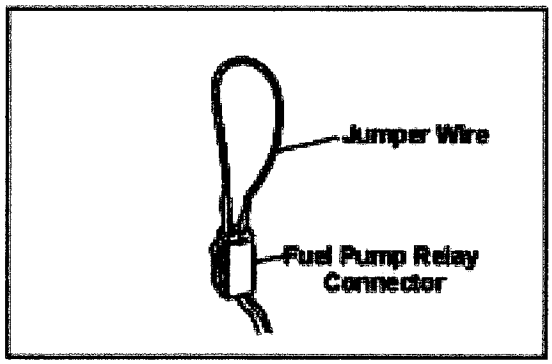
Limit

Turbocharged: 37-47cc

Non-Turbo: 31-41cc

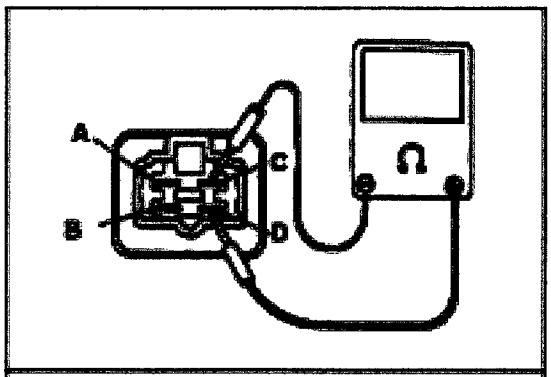
Note: Replace failed units.

Fuel Pump Relay



Fuel Pump Bypass Jumper

Note: For bypassing the Fuel Pump Relay and testing the Fuel Pump use this method.



Fuel Pump Relay Test

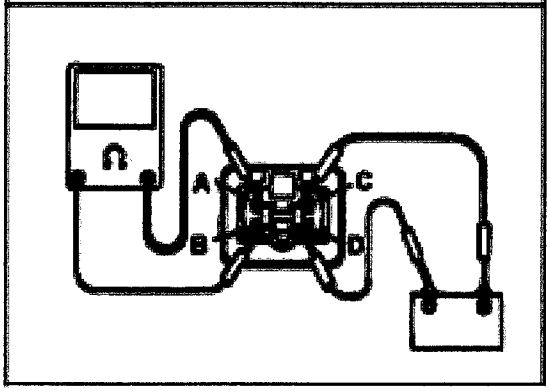
2. Connect an Ohm Meter between terminals "C" & "D"

Ohm Range

Turbocharged: 60-80 Ohm

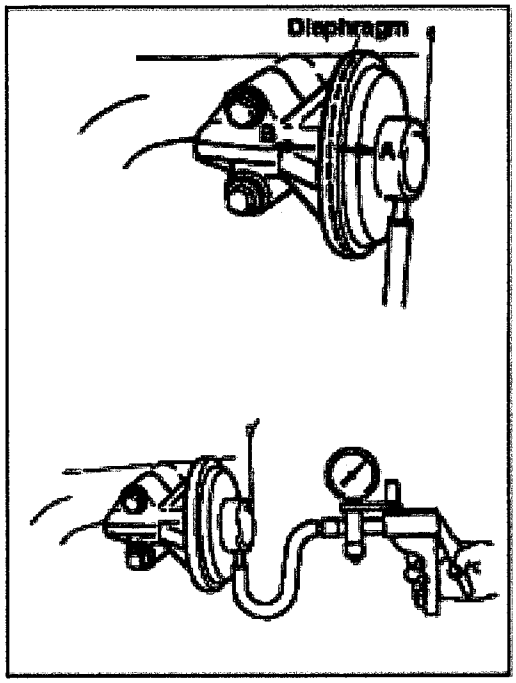
Non-Turbo: 65-85 Ohm

Note: Out of range units must be replaced



3. Connect power 12V between "C" & "D" terminals. Connect an Ohm meter between "A" & "B" terminals. If the Ohm range is zero replace the unit.

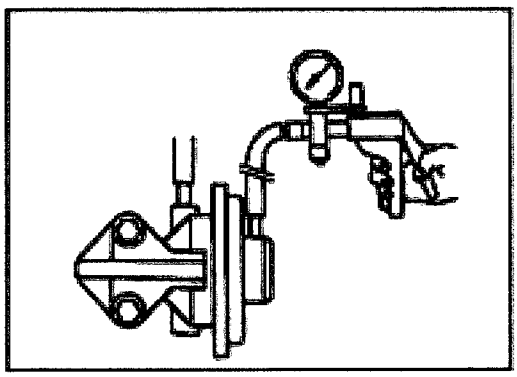
EGR Valve



EGR Valve: Non-Turbocharged

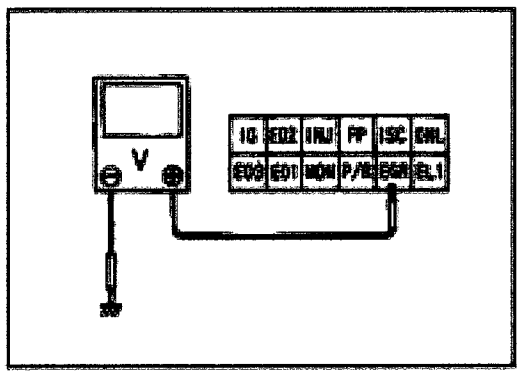
Note: The EGR Valve is automatically closed below 60 degrees Celsius. If the valve is open below that range it will cause idling issues and must be replaced.

1. Inset a Vacuum pump as shown. Valve Diaphragm will open at 120Hg. The valve travels in the A to B direction as shown in the top left. Replace bad Valves.



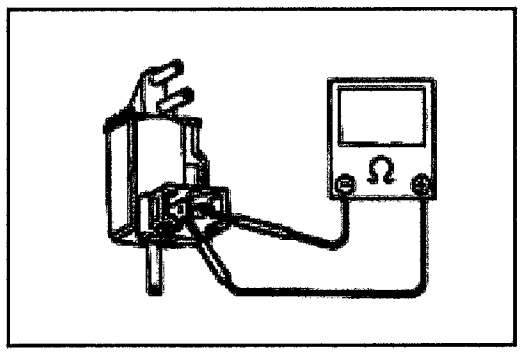
Turbocharged EGR Valves

2. Inset a Vacuum pump as shown. Valve Diaphragm will open at 120Hg. Replace defective Valves.



ECM EGR Circuit

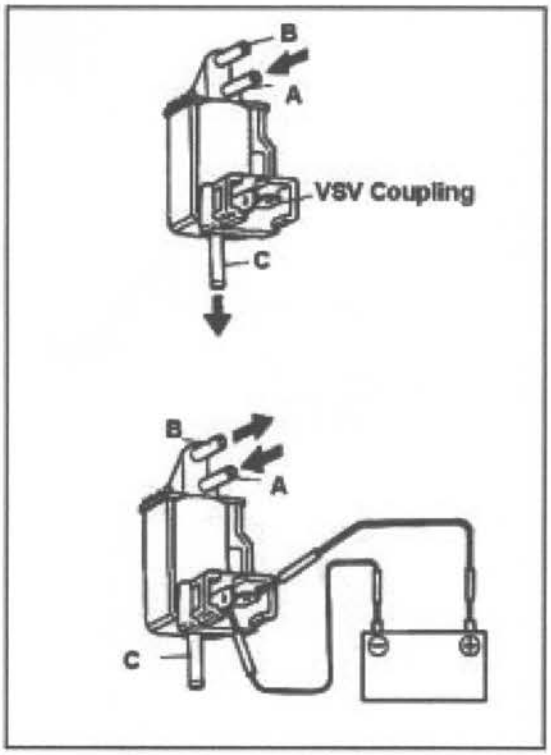
1. Disconnect the ECM connector and attach a Volt Meter to the EGR Terminal as shown.
2. Below 60 degrees Celsius the Voltage shall be Zero Volts (0v). If a reading is detectable check the EGR-VSV solenoid.



EGR-VSV Solenoid

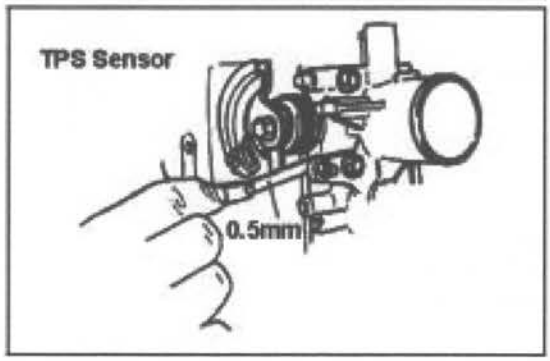
1. Use an Ohm Meter and test range

Limit: 37-44 Ohm: Replace out of range units.



2. With no power connected blow through Port "A". Air should exit through Port "C".

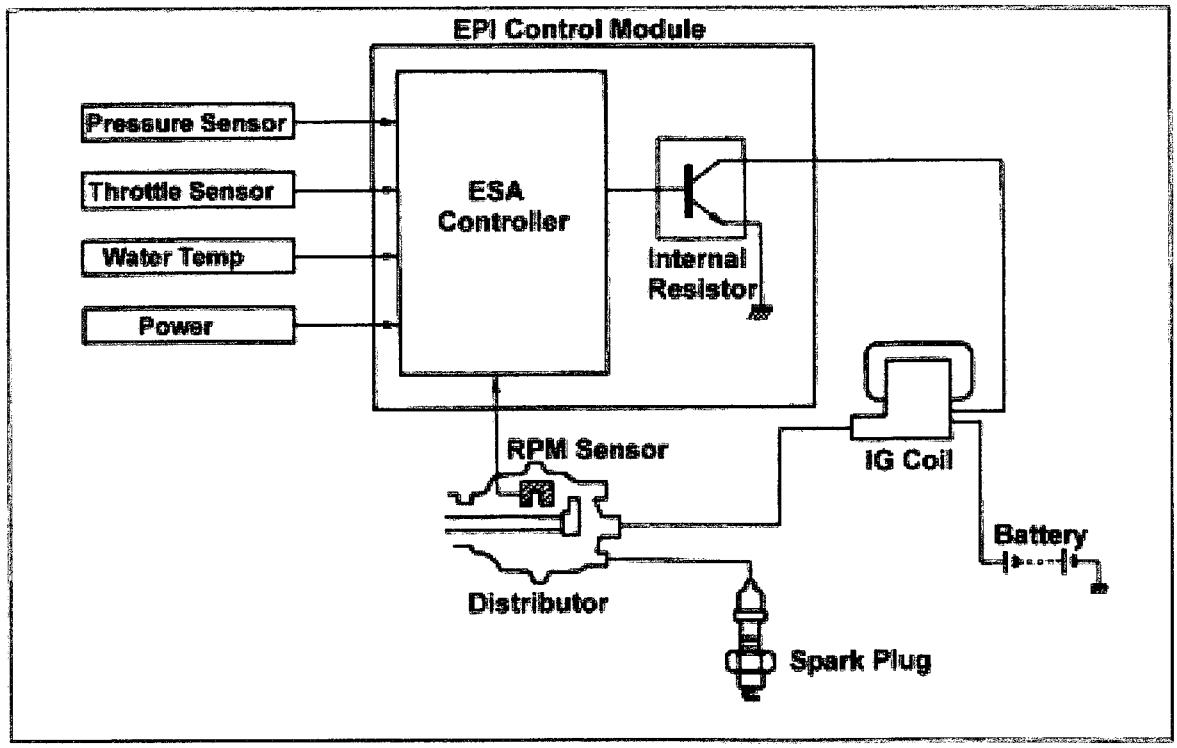
3. Connect Power as shown (12V). Blow through Port "A" and the Air should exit from Port "B". No Air should exit through Port "C". Replace Valve if any of the tests have failed.



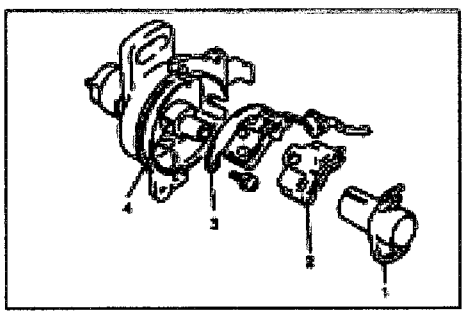
TPS Sensor Gap Setting

1. Use a Thickness Gage (Feeler Gage) as shown. Set the Gap to 0.5mm. Opening will engage TPS at 1.5 degrees. Do not set Gap to more that 0.5mm or Idling will become rough and CO2 emission will increase.

EPI Fuel Injected Ignition System



EPI Distributor



Distributor (Crank Sensor Type)

1. Rotor
2. Dust Cover
3. Generator (Pick up)
4. Signal Rotor (Cam)

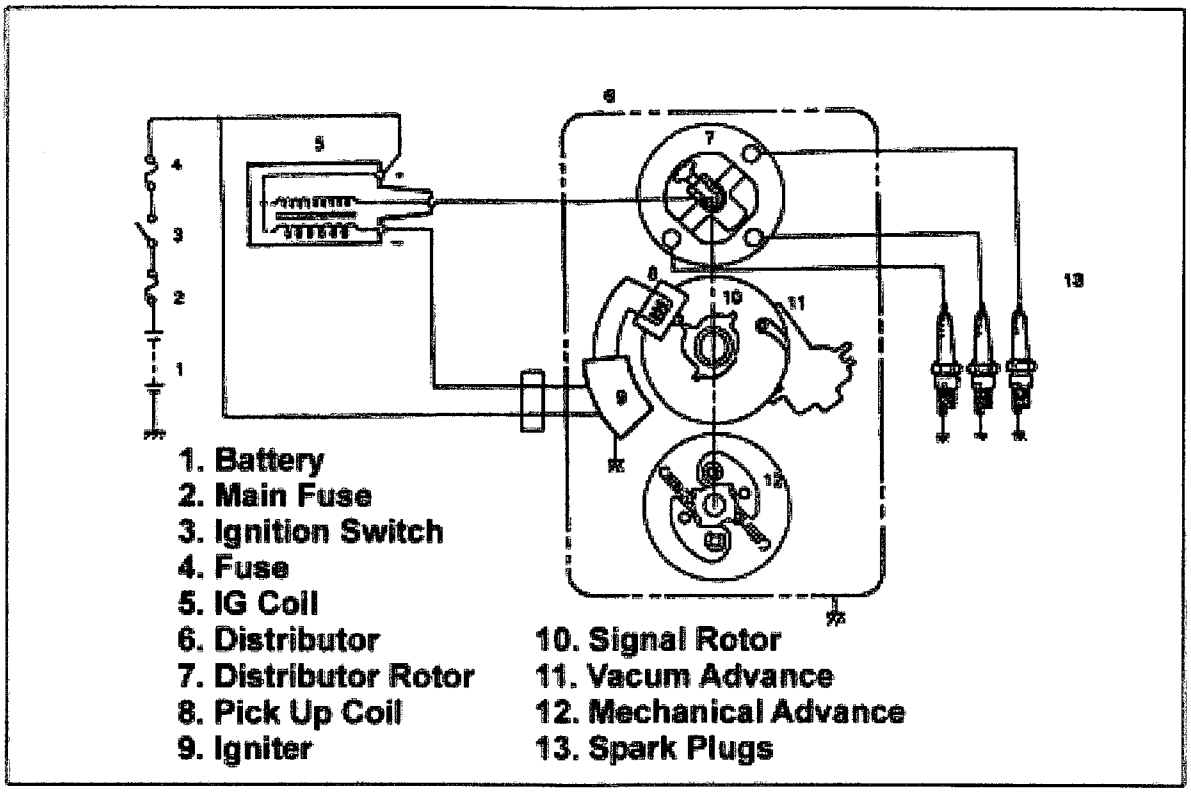
Note: Petrol = EFI (Electronic Fuel Injection)

Note: ESI = Electronic Spark Advance

Note: Early EFI systems are throttle body types were as late model are Injector type.

The electronic control module controls both the fuel injection and ignition spark control through the EPI Controller. The spark control is maintained by a crank trigger device. If the vehicle is running but a rough idle the usual problem is the "Throttle Position Sensor". Use the wiring diagram section for troubleshooting circuits. The control module does not have any external adjustment. If all sensors are in working order the main issues to note are blocked fuel filters or vacuum leaks.

Standard Point Type Ignition



Ignition Settings Van & Truck

Vehicle	Van	Truck
Gap Setting (mm)	0.20-0.40	←
Dwell (Degrees)	59-65	←

Note: Both Vans & Trucks utilized the standard ignition system

Note: Points should be changed every 18,000 Kilometers. Both 550cc & 660cc inclusive

Note: Electronic pickup module type the gap shall be inspected at 8,000 kilometer intervals

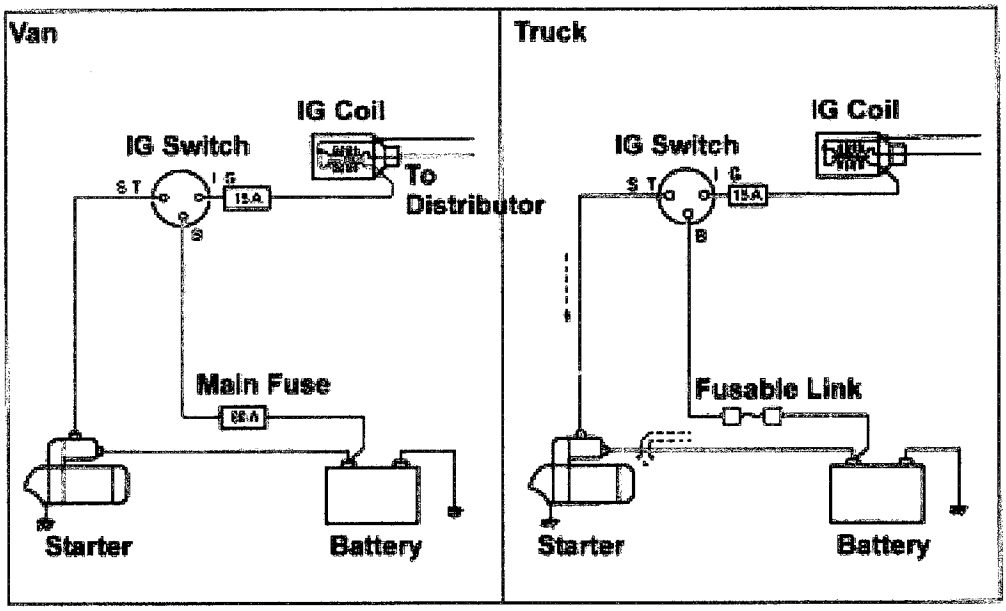
Note: Systems equipped with coil ballast resisters must have an input of 11-14 volts and output 10-12 volts. If the ballast resistor has failed the coil will not fire. Coil and (if equipped) ballast resistors should be changed in pairs at 60,000 kilometers.

For complete wiring see the wiring circuit section of this book or purchase the complete Electronic Service Manual for all circuit diagrams

Chapter 8: Starter Motor & Alternator

- Starter Circuit System
- Starter Motor (M/T-A/T)
- Alternator Unit
- Charging Circuit

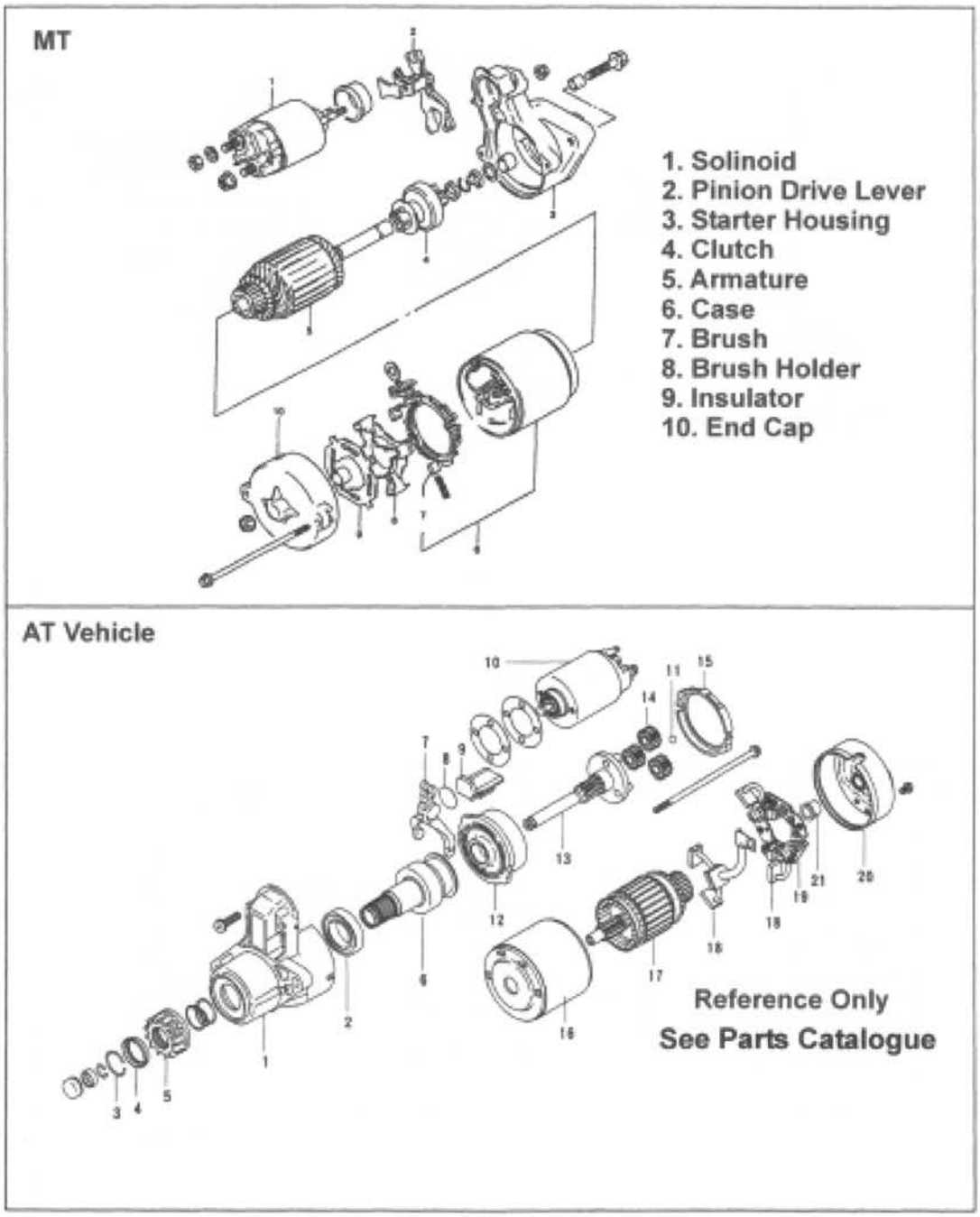
Starter Circuit



Starter Motor Specs

	MT		AT	
	Normal	HD	Normal	HD
Maker	Nippon Denso	Mitsubishi	Mitsubishi	
Draw (kw)	0.6	0.8	1.2	

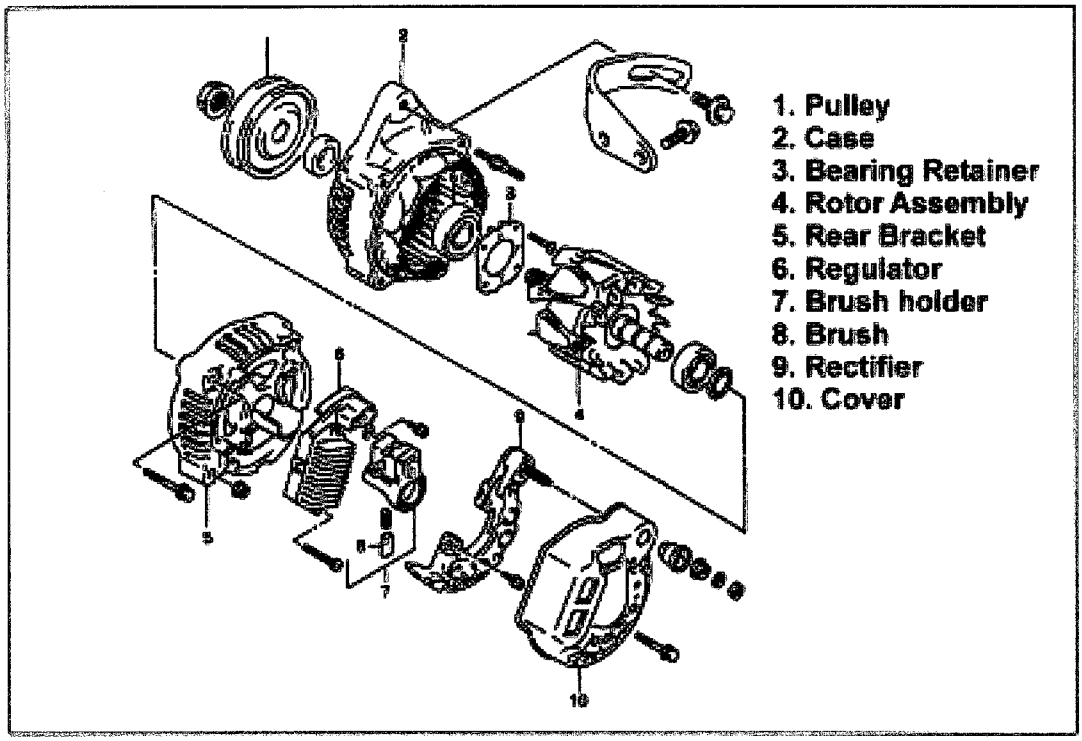
Starter Motor Exploded View



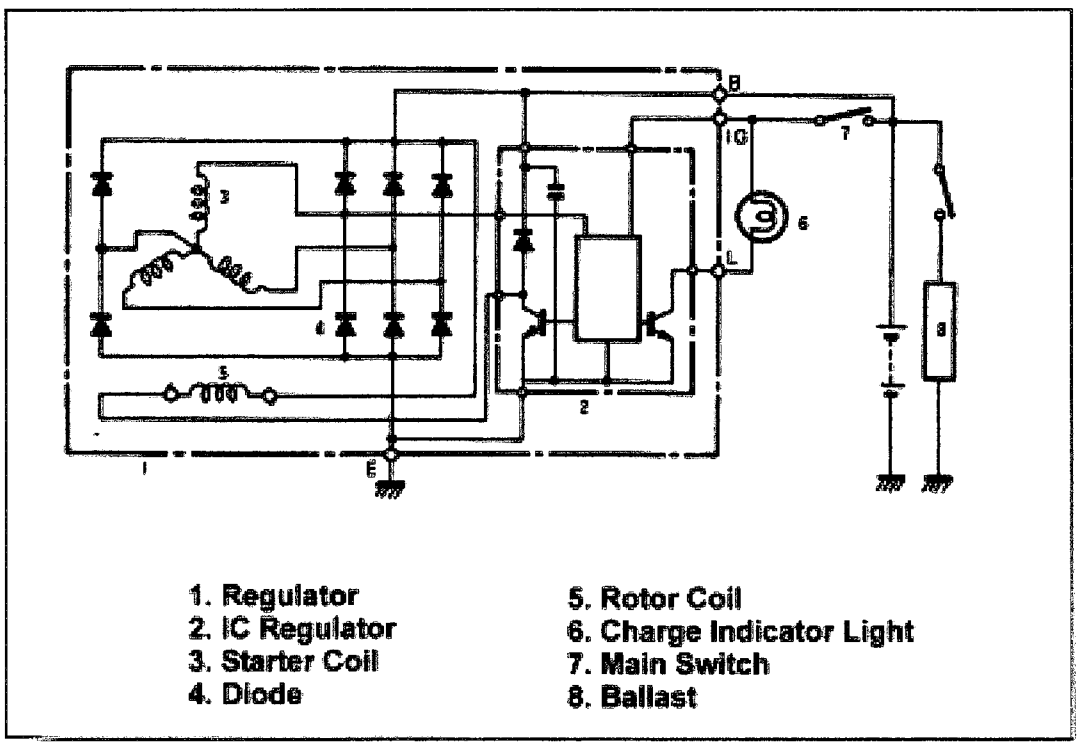
Note: Manual Transmission (MT) & Automatic Transmission (AT) Starters are not interchangeable

Note: There are three different AT starters used in automatic vehicles. Cross vehicle number with parts catalogue to determine correct version.

Alternator & Charging Circuit



Charge Circuit



Note: For complete charging circuit details check the main electrical harness section in this book

Chapter 9: Transmission MT: 2WD-4WD-4 Speed-5 Speed

- Engine & Transmission Mounts
- Transmission Oil
- Gear Shift Control 2WD & 4WD
- 4WD Transfer Case Shift System
- Transmission Case 2WD
- Transmission Case 4WD
- Transmission Cutaway Diagram: EL+5 & 4Speed
- Transmission Cutaway Diagram EL+5 Transfer
- Transmission Cutaway Diagram 4 Speed (with transfer)

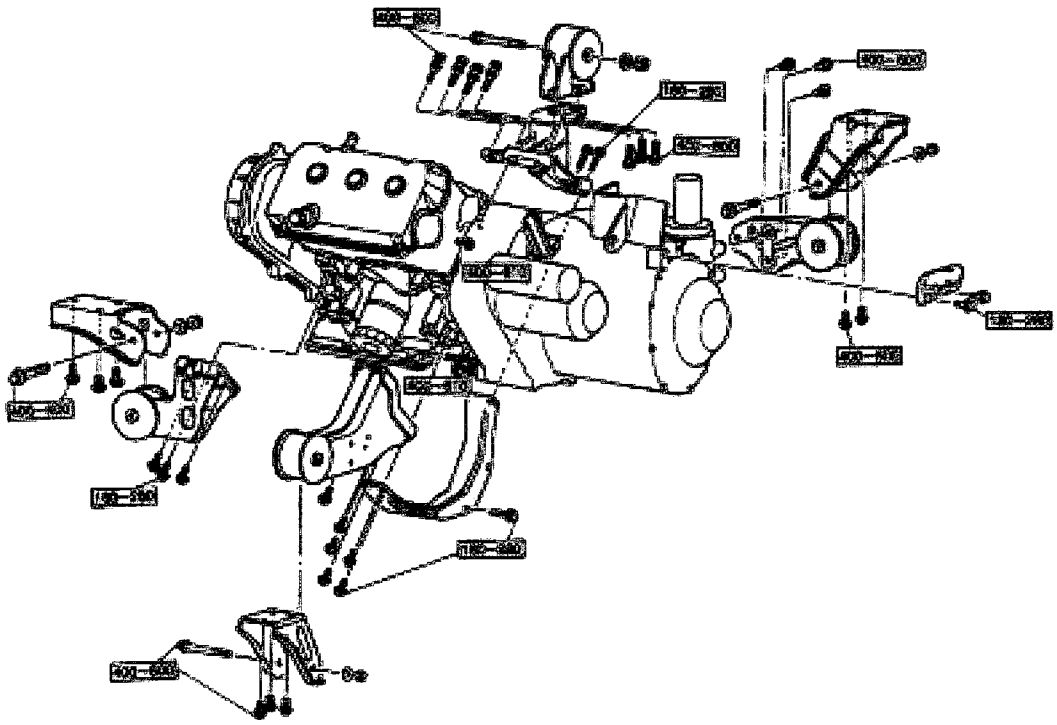
Transmission Internal Assemblies

- 4-Speed Gear Shift Fork System
- 5-Speed Gear Shift Fork System
- 4MT Input & Countershaft
- 5MT Input & Countershaft
- Clutch Replacement

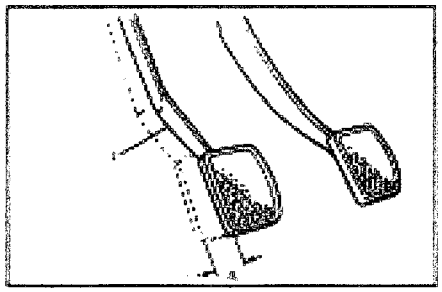
Transfer Case: Van

- System Diagram
- Full & Part Time Drivetrain & Transfer Module
- Transfer Unit

Engine & Transmission Mount Diagram

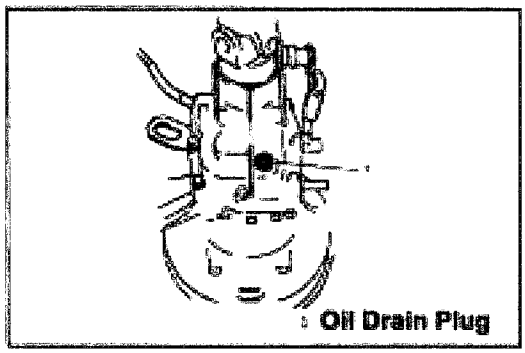


: Torque Value (kg.cm)



Clutch Pedel Engagement(mm) 110
More information see clutch section

Transmission Oil Replacement



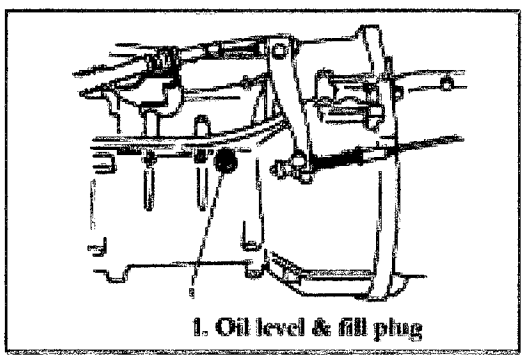
1. Oil Drain Plug

Oil Check

1 .Remove Drain Plug and inspect for contaminents

2 .Replace plug after cleaning, add fluild as listed bellow

Use only 75W-90W



1. Oil level & fill plug

Oil Capacity

4 speed=1.0 Liter

5 speed=1.2 Liter

4WD 2.6 Liter

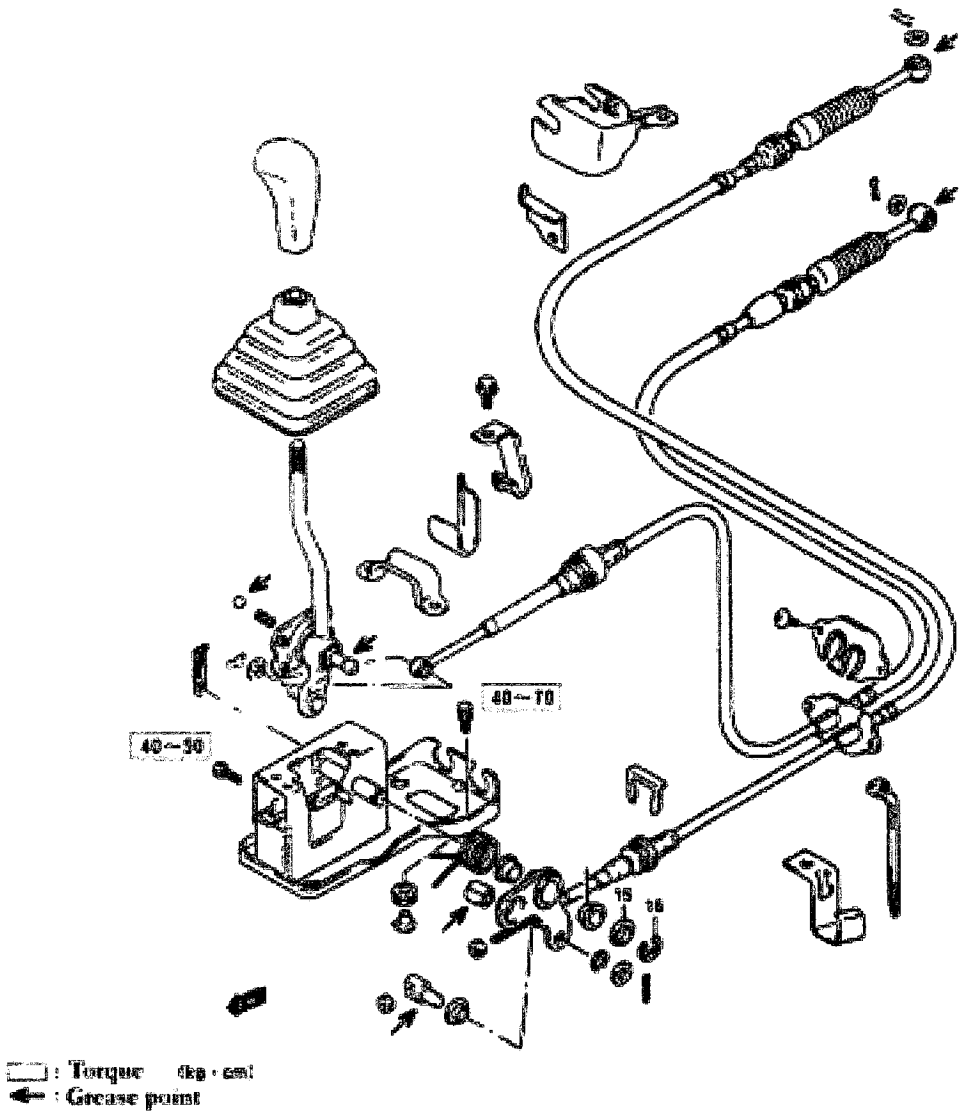
3. Fill oil to inspection plug level

4. Clean plug and tighten 10-12 foot pounds

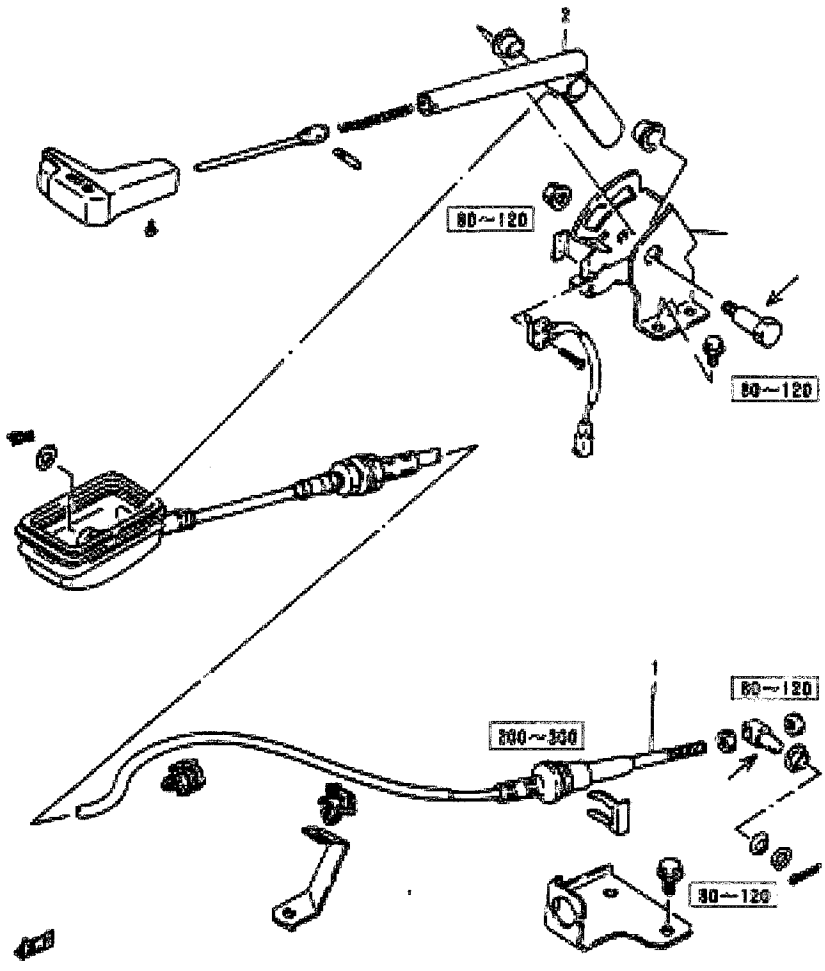
Oil Change Interval: Every two years or 20,000 Kilometers

Off Road Use one a year or 5000 kilometers

Gear Shift Control Schematic
2WD & 4WD



Transfer Case Shift Control Schematic

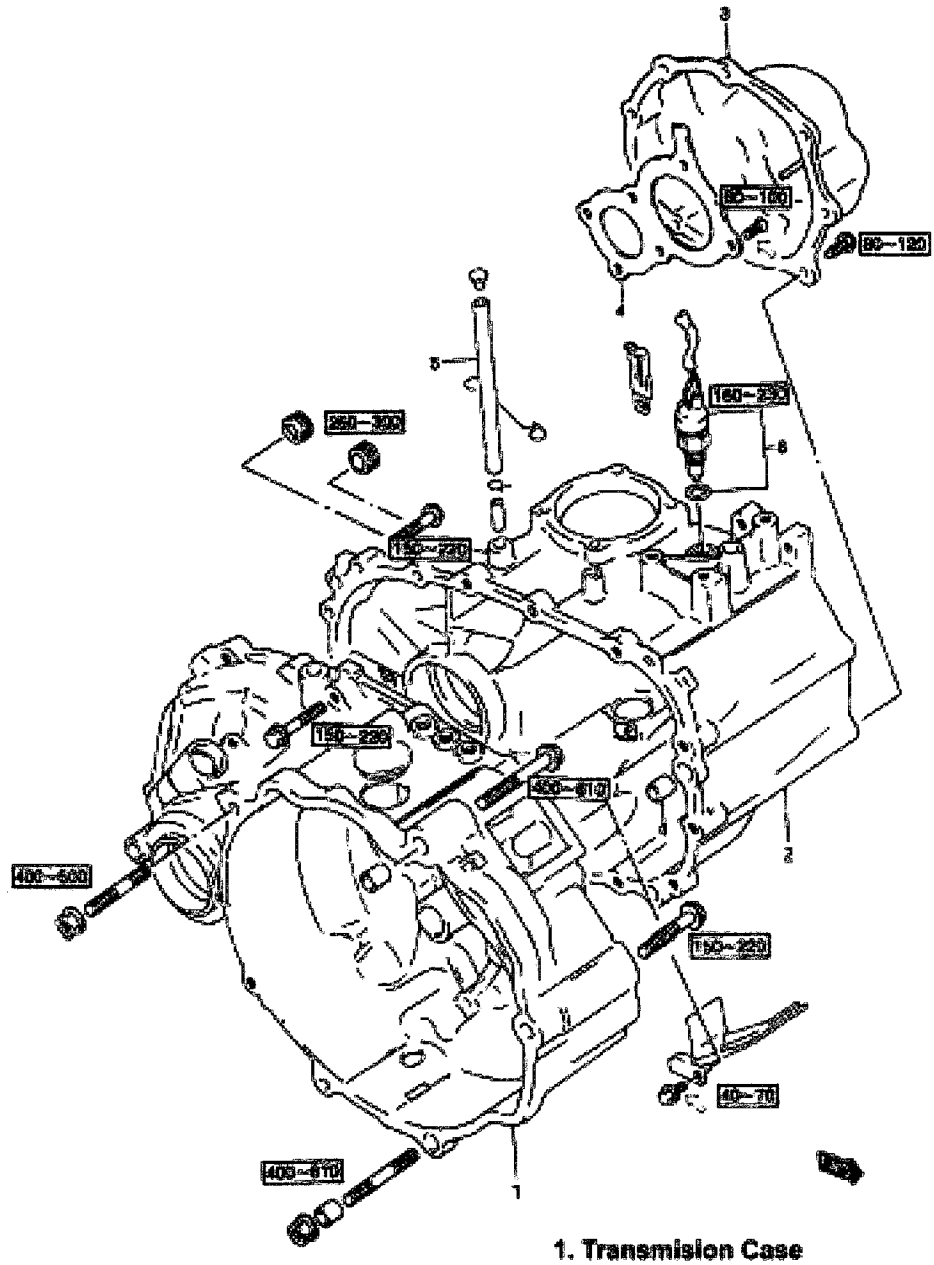


: Torque spec(kg • cm)
: Grease Point

1 . Transfer gear shift control cable
2 . Transfer gear shift lever

Transmission Case (2WD)

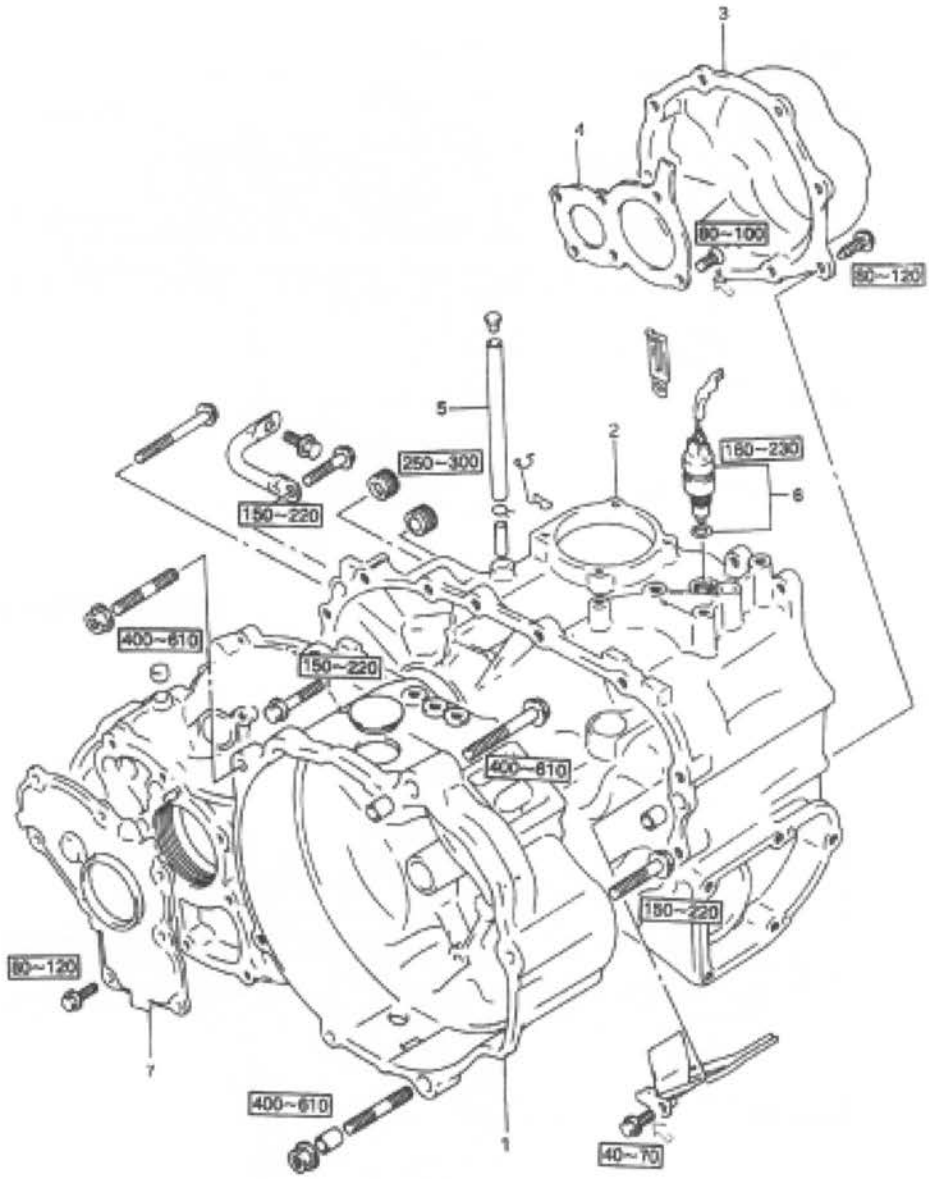
2WD Version



1. Transmision Case
2. Transmision Left Case
3. Transmision Side Cover
4. Transmision Left Case Plate
5. Breather Hose
6. Bake Up lamp Switch

□ :Torque Value (kg.cm)

Manual Transmission Case 4WD

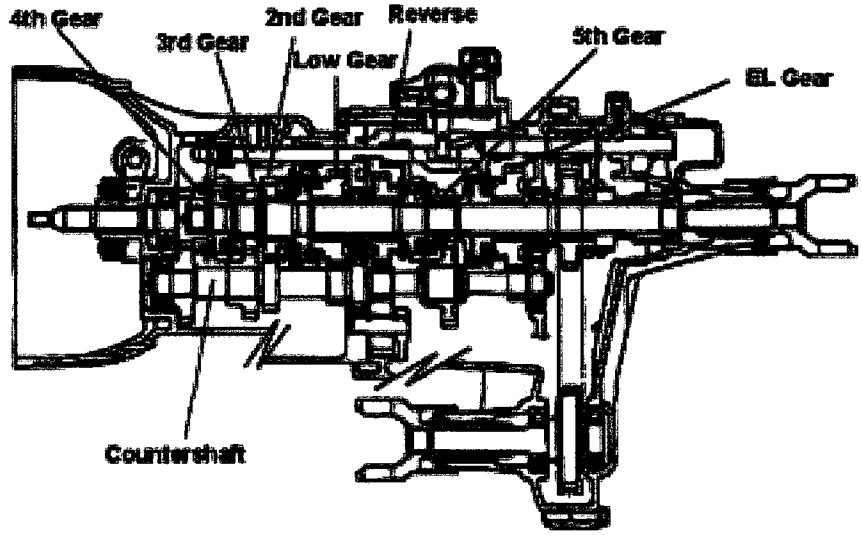


1. Transmission (Right) Case
2. Transmission (Left) Case
3. Transmission Side Cover
4. Left Case Plate
5. Breather Hose
6. Back-up Light Switch
7. Side Right Case

: Torque Value (kg.cm)
⇨ : Use thread lock (Locktite)

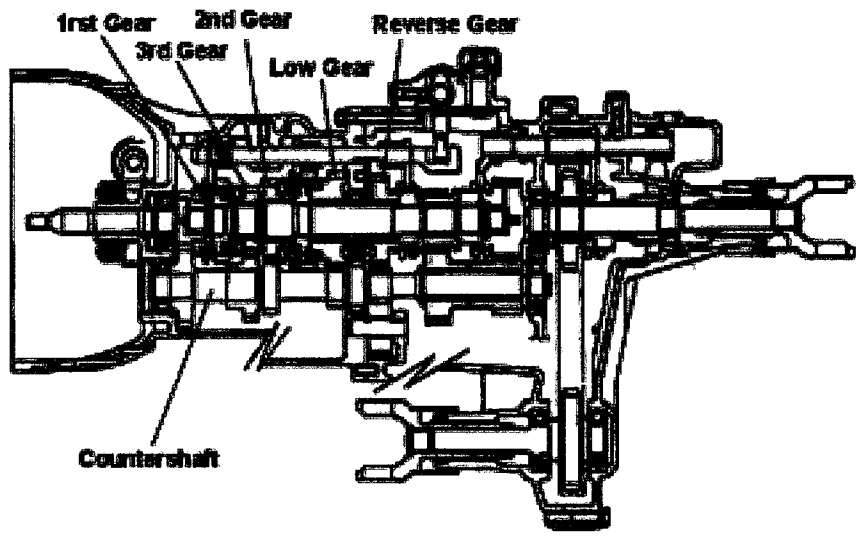
Transmission Cutaway Diagram: EL+5 & 4Speed

EL+5 Speed



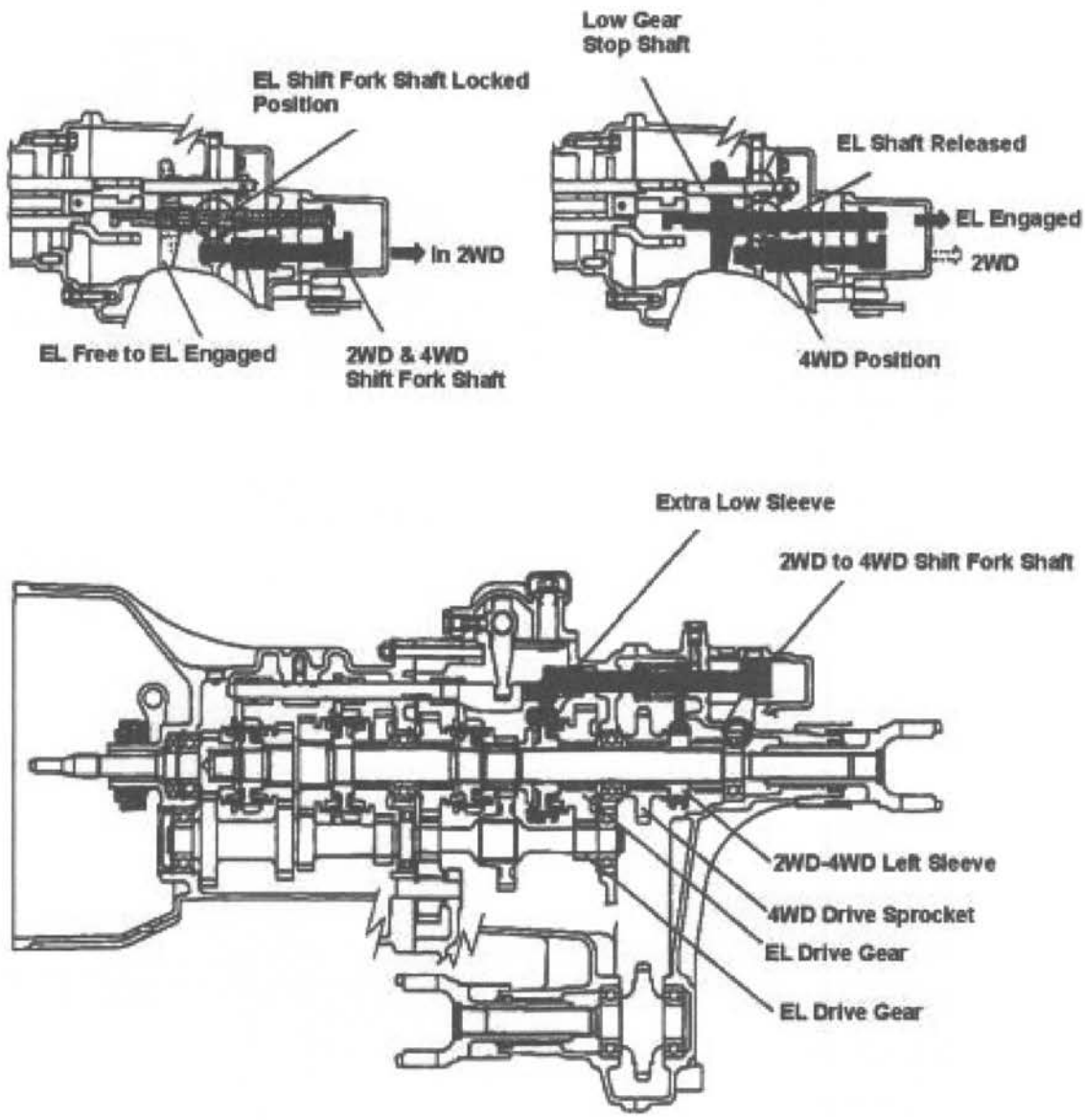
EL=Extra Low Gear Option

4 Speed+ Transfer

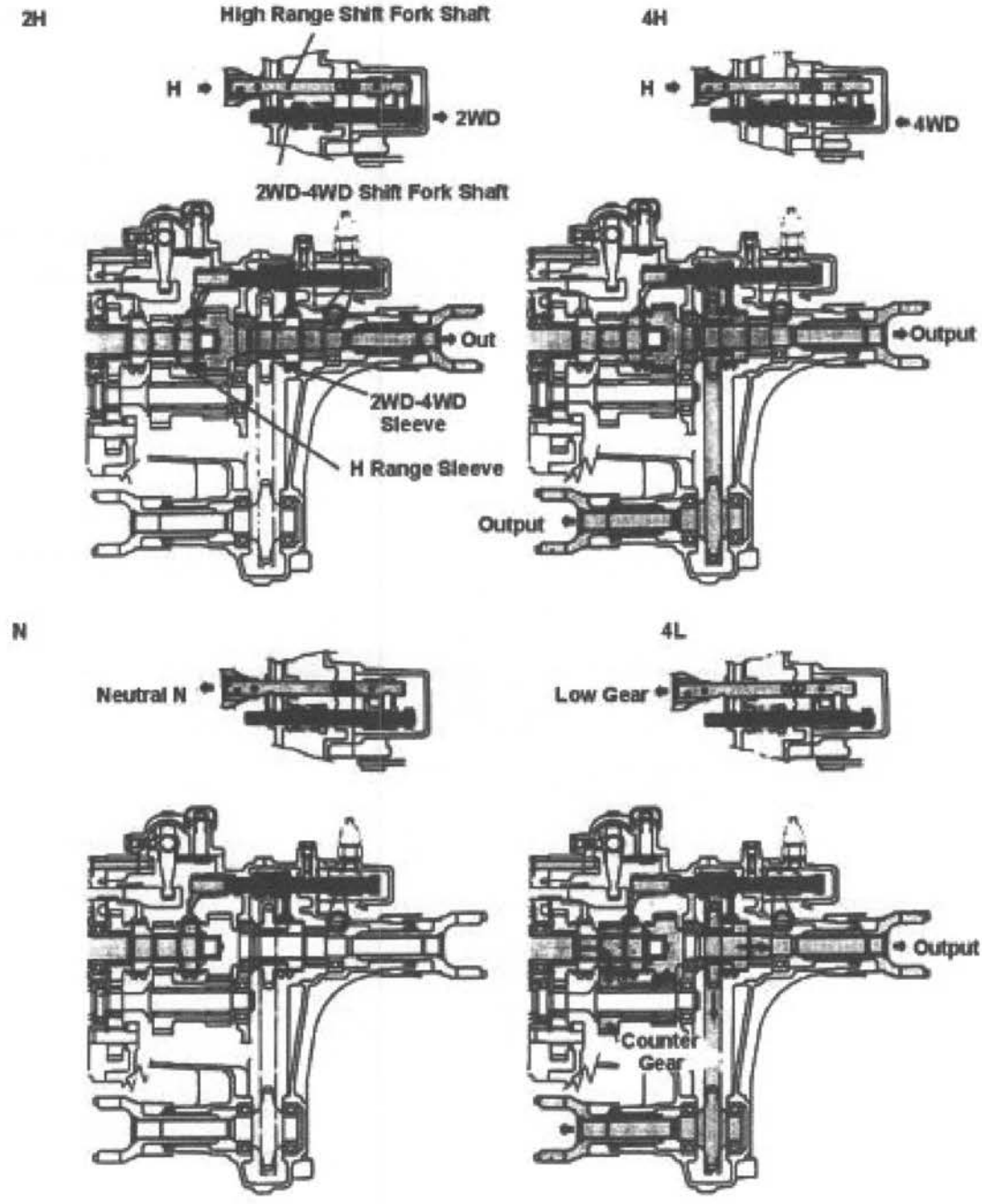


Transmission Cutaway Diagram EL+5 Transfer

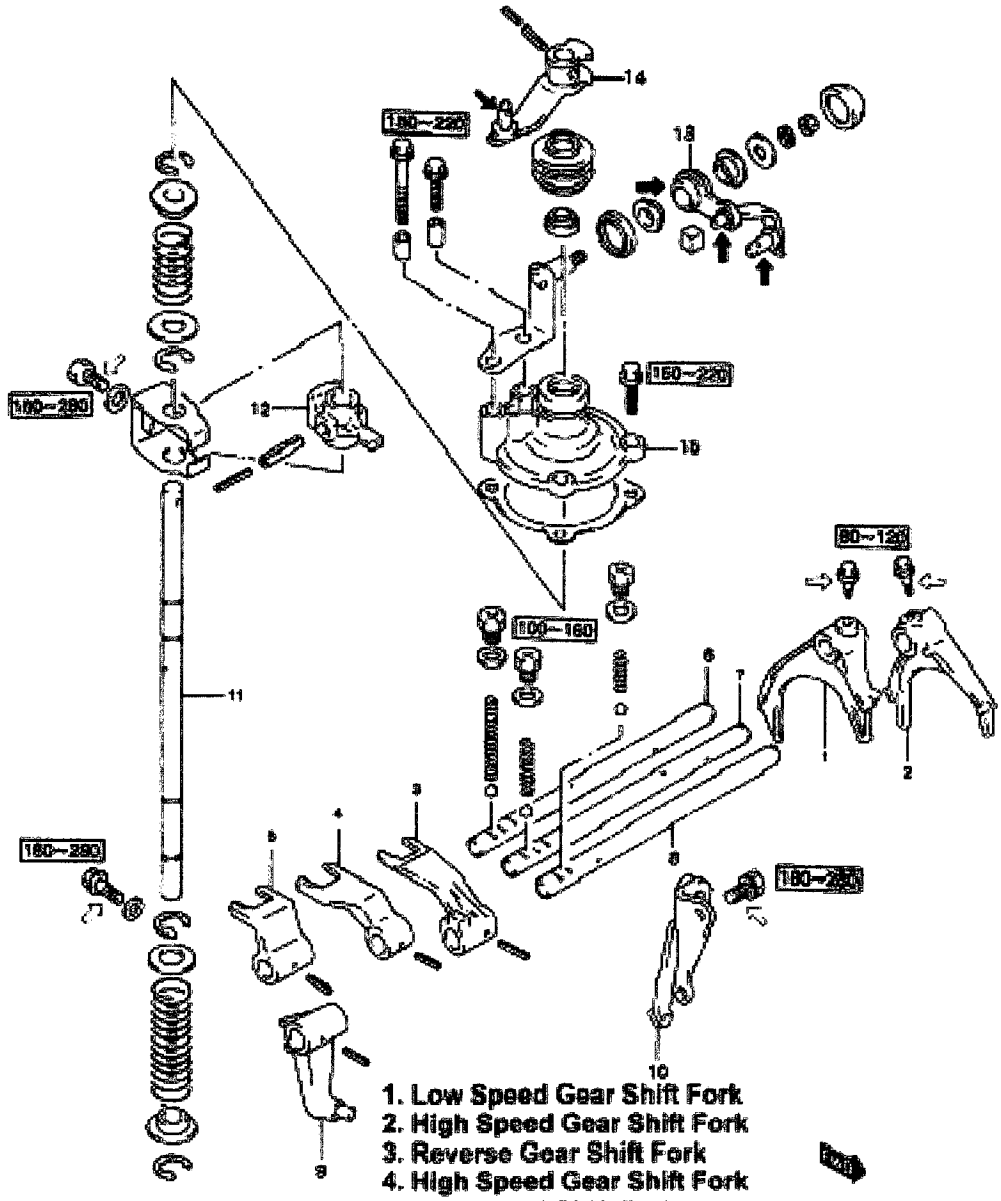
EL+5F Transfer & Extra Low Gear Option



Transmission Cutaway Diagram 4 Speed (with transfer)



4MT Gear Fork System

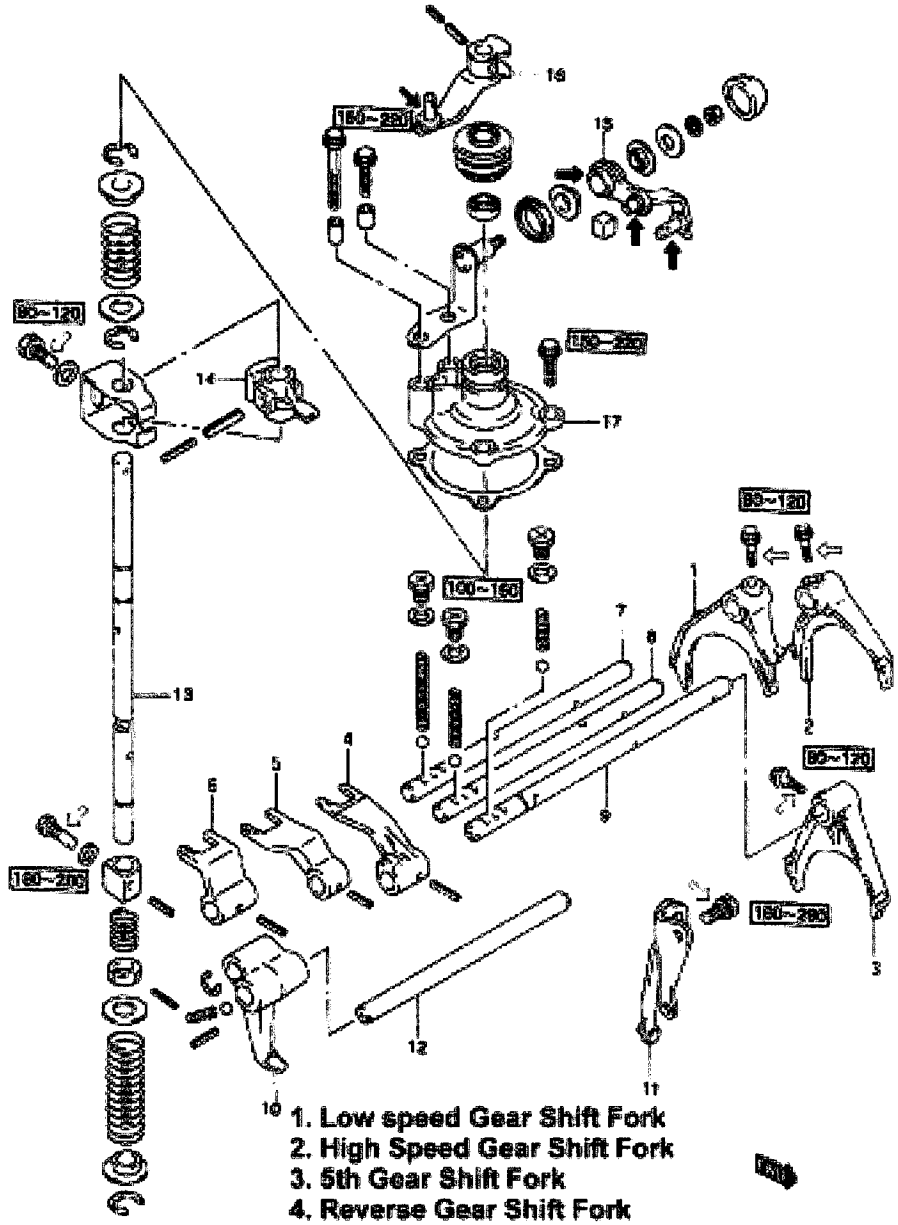


1. Low Speed Gear Shift Fork
2. High Speed Gear Shift Fork
3. Reverse Gear Shift Fork
4. High Speed Gear Shift Fork
5. Low Speed Shift Fork
6. Low Speed Gear Shift Fork Rod
7. High Speed Gear Shift Fork Rod
8. Reverse Gear Shift Fork Rod
9. Reverse Shift Arm
10. Reverse Shift Lever
11. Gear Shift Select Shaft
12. Gear Shift Select Lever
13. Selection Cable Lever
14. Shift Cable Lever
15. Gear Shift Guide Case

: Torque Value (kg.cm)
⇨ : Locktite
➡ : Grease Point

5MT Gear Shift Fork System

5MT

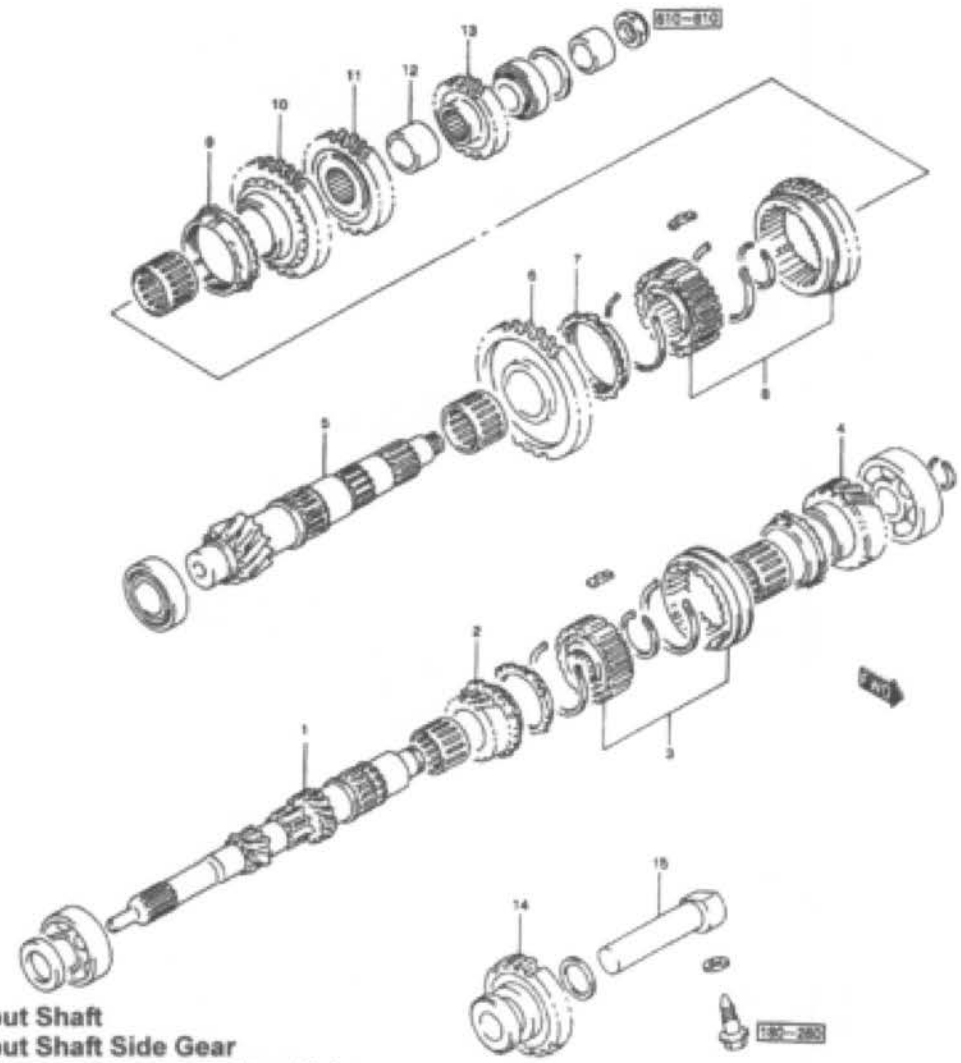


1. Low speed Gear Shift Fork
2. High Speed Gear Shift Fork
3. 5th Gear Shift Fork
4. Reverse Gear Shift Fork
5. High Speed Gear Shift Fork
6. Low Speed Gear Shift Fork
7. Low Speed Fork Rod
8. High Speed Shift Rod
9. 5th & Reverse Shift Rod
10. Reverse Gear Arm
11. Reverse Gear Arm
12. 5th&Reverse Shift Rod
13. Gear Select Shaft
14. Gear Shaft Select Lever
15. Select Cable Lever
16. Shift Cable Lever
17. Guide Case

: Torque (kg.cm)
: Locktite
: Grease Lithium

Note: For individual parts see parts catalogue

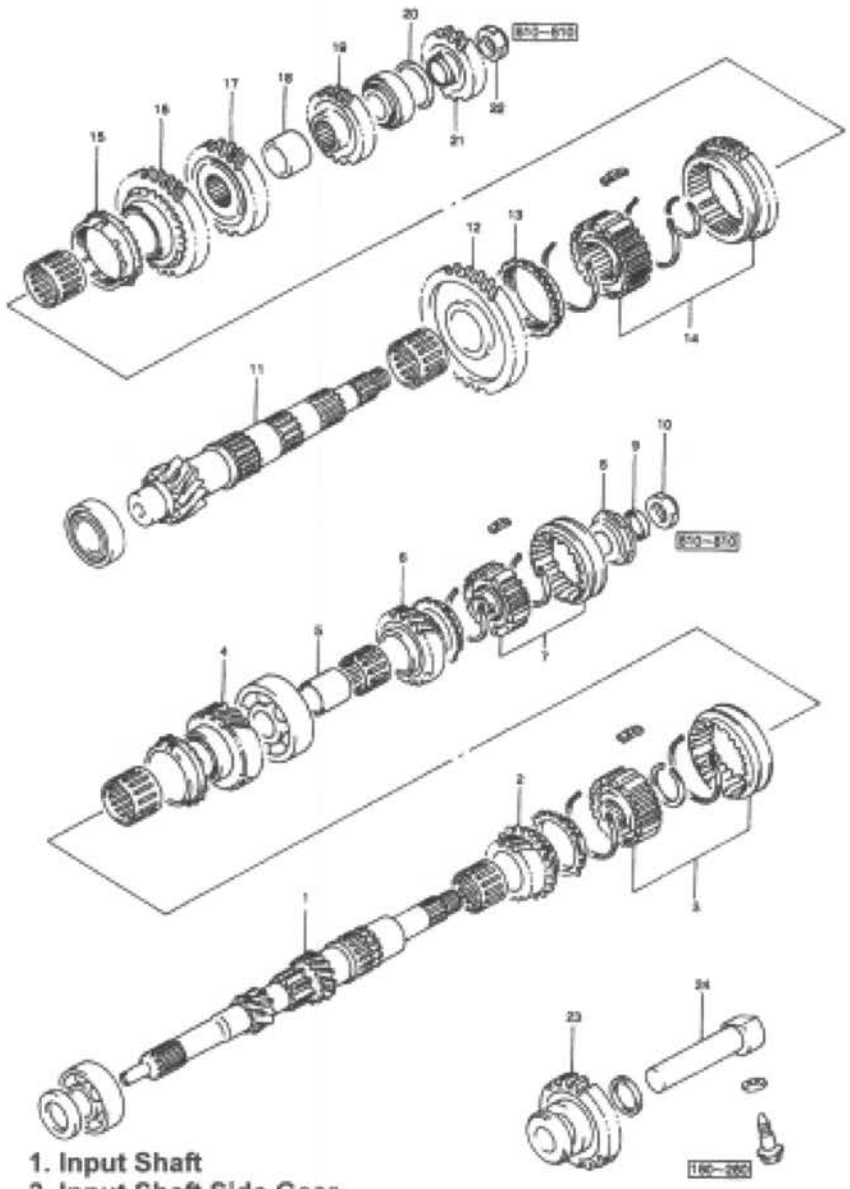
4MT Input & Countershaft Assemblies



1. Input Shaft
2. Input Shaft Side Gear
3. High Speed Synchronizer Hub
4. Input Shaft 4th Gear
5. Countershaft
6. Countershaft 1rst Gear
7. Low Gear Synchronizing ring
8. Low Speed Synchronizer Hub Assembly
9. 2nd Gear Synchronizer Ring
10. Countershaft 2nd Gear
11. Countershaft Side Gear
12. 3rd & 4th Gear Spacer
13. Countershaft 4th Gear
14. Reverse Idler Gear
15. Reverse Gear Shaft

Torque Value (kg.cm)

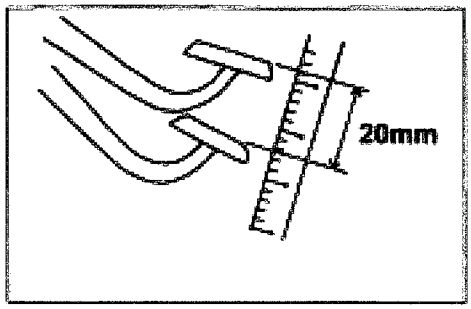
5MT Input Shaft & Countershaft Assemblies



1. Input Shaft
2. Input Shaft Side Gear
3. High Speed Synchronizer Hub Assembly
4. Input Shaft 4th Gear
5. Input Shaft 5th Gear Spacer
6. Input Shaft 5th Gear
7. 5th speed Synchronizer Assembly
8. 5th Gear synchronizer Hub Plate
9. Spacer
10. Input Shaft Nut
11. Countershaft
12. Countershaft 1rst Gear
13. Low Gear Synchronizer Ring
14. Low Speed Synchro Ass.
15. 2nd Gear Synchro Ring
16. Countershaft 2nd Gear
17. Countershaft Side Gear
18. side 4th Gear Spacer
19. Countershaft 4th Gear
20. Shim
21. Countershaft 5th Gear
22. Countershaft Nut
23. Reverse Idle Gear
24. Revearse Gear Shaft

Torque

Clutch Pedal Adjustment

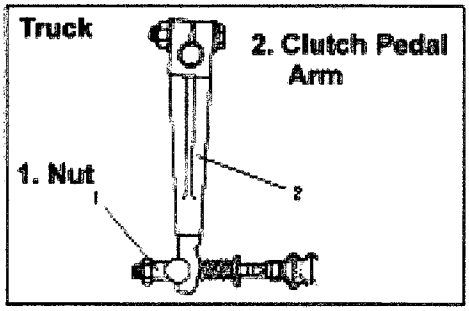


Adjustment

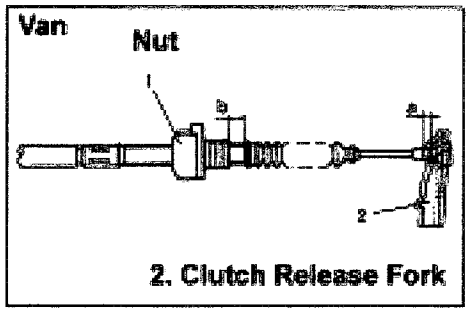
Measure Clutch Pedal Free-Play

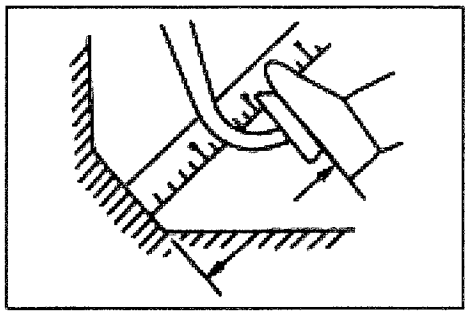
Free Play Shound Not Exceed (mm) 20

Adjust as Listed Below



Use The Diagram(s) On The Left for Truck and Van adjustments





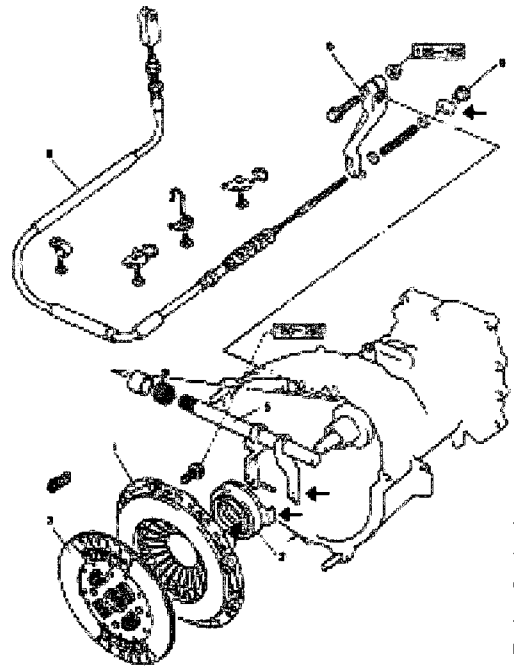
Clutch Engagement

***Note: Make Sure Free-Play Adjustment Has Been Completed**

Clutch Engagement Travel (mm) 110 & Over

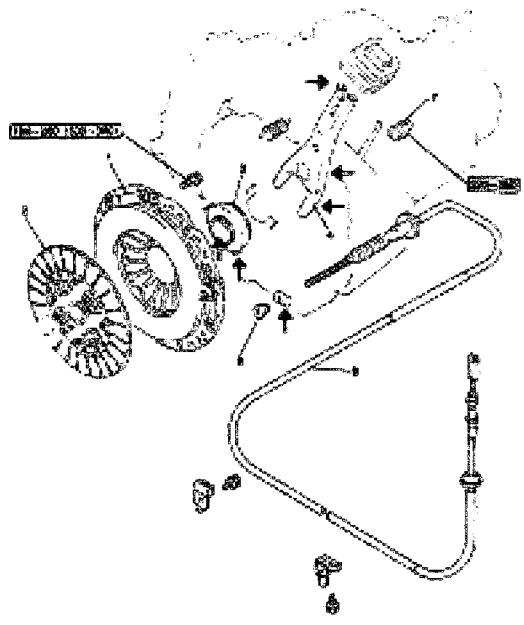
Pressure Plate, Clutch Disk, Bearing & Flywheel

Truck

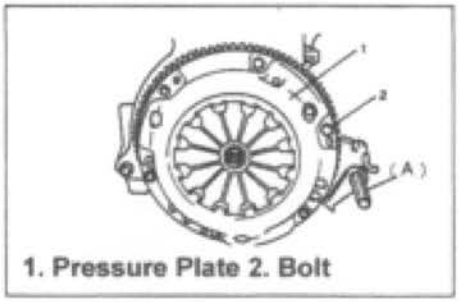


1. Pressure Plate
2. Cltuch Disk
3. Throw-out bearing
4. Clutch release Fork
5. Clutch Release Shaft
6. Clutch Release Arm
7. Release Fork Support
8. Clutch Cable
9. Adjustment Nut

VAN



→ Grease Point
▭ Torque
( ) Turbo Vehicle



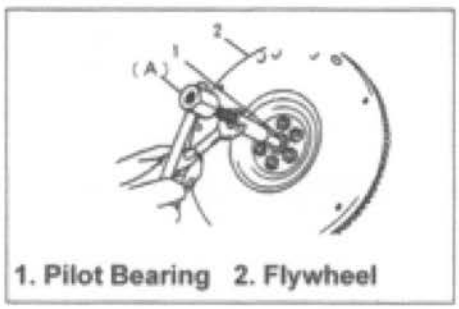
1. Pressure Plate 2. Bolt

Remove Transmision

Place Flywheel Holding Tool (A) in Position

Remove Pressure Plate Retaining Bolts
Remove Disk and Discard

Tool (A) : 09924-17810

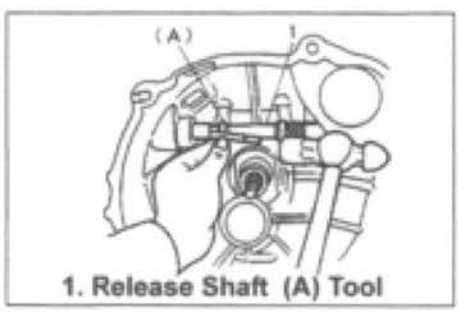


1. Pilot Bearing 2. Flywheel

Use Tool (A) Pilot Bearing Remover Tool

Tool (A): 09924-17810

Inspect Flywheel: If Surface Looks Burnt or Warped Replace. See: Engine Section For Specifications



1. Release Shaft (A) Tool

Truck

Turn Release Shaft and Remove Release Bearing.

Use Remover Tool if Necessary

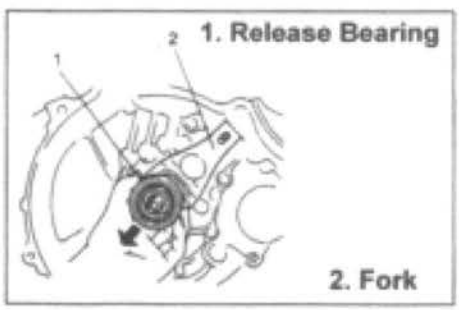
Tool (A): 09917-58010

2. Release Fork 3. Dust Boot

Van

Van: Unhook Tension Spring

Remove Dust Boot (Replace if Cracked or Warn)

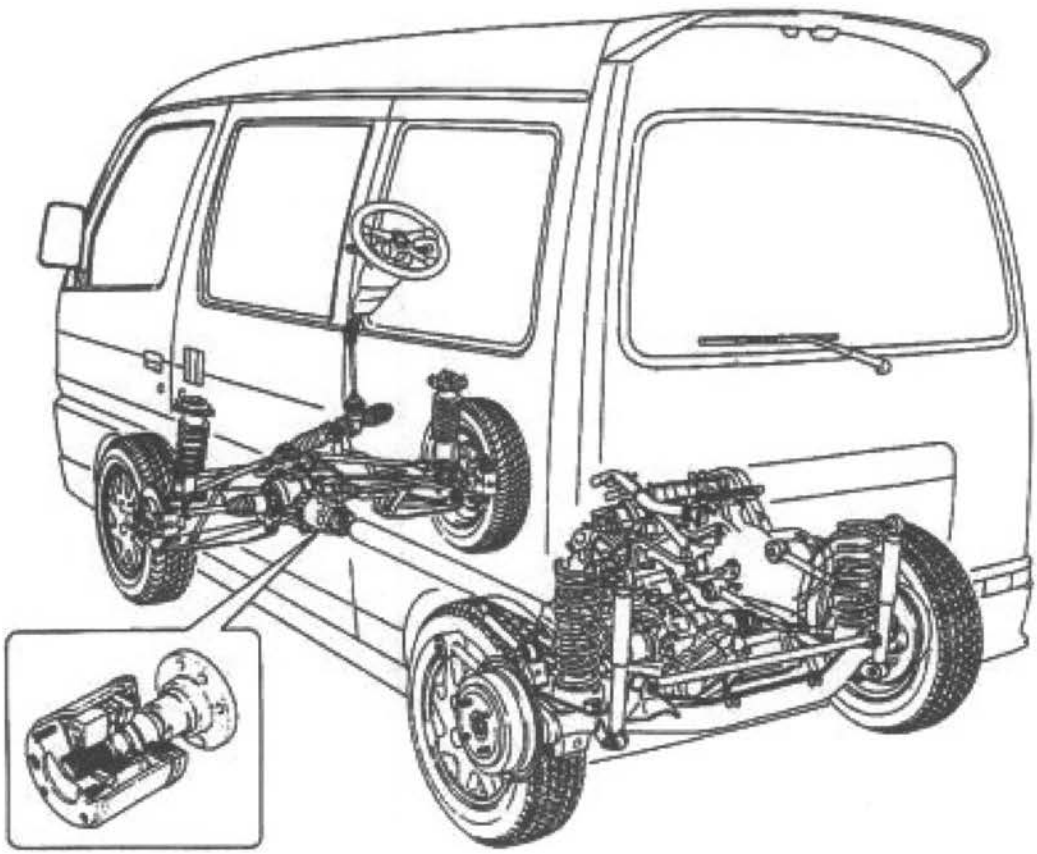


Remove Release Bearing as Shown in the Diagram on the Left

Note: Replace Parts in a Set, Do Not Replace Individual Parts. Part Failure Will Occure

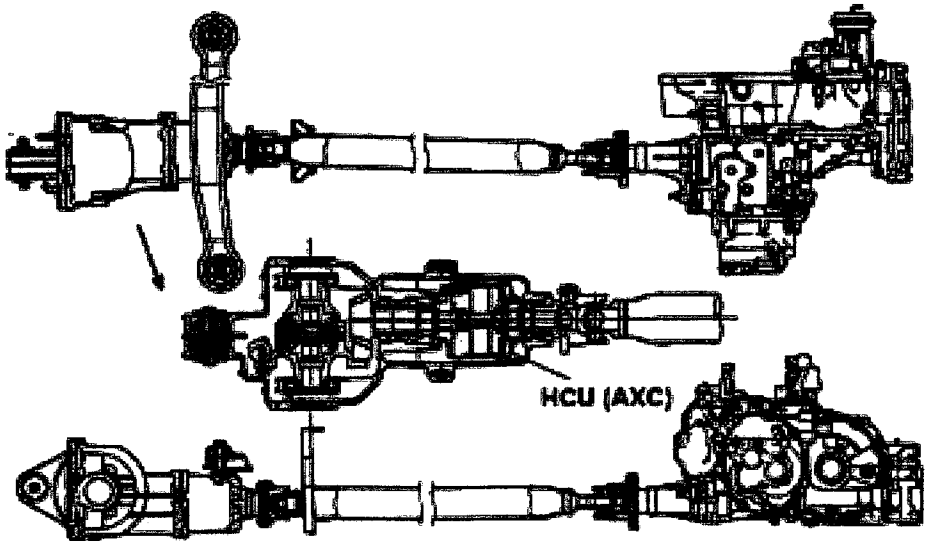
Replace Parts, Install Transmision

4WD Van

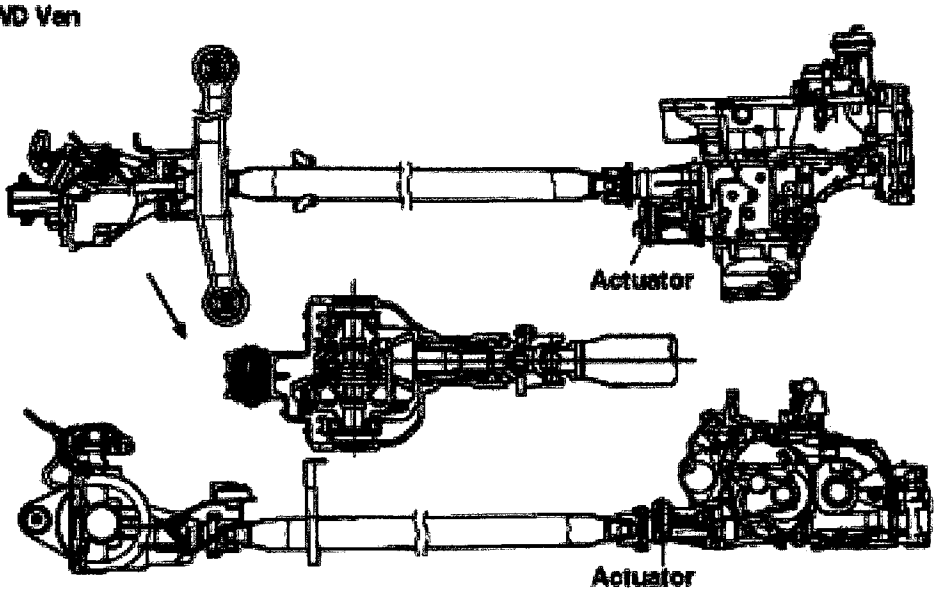


HCU Coupling

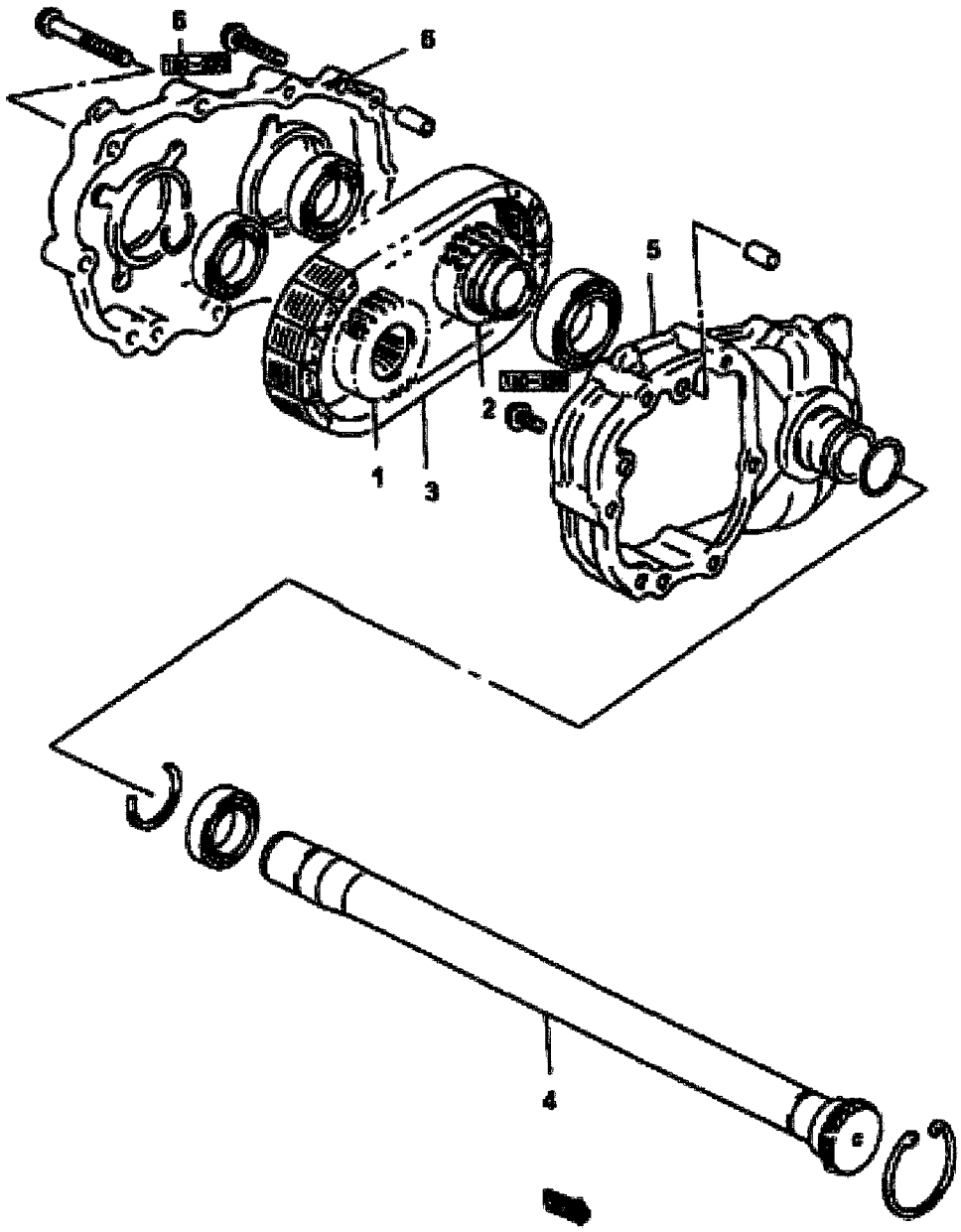
Full Time 4WD Van



Part Time 4WD Van



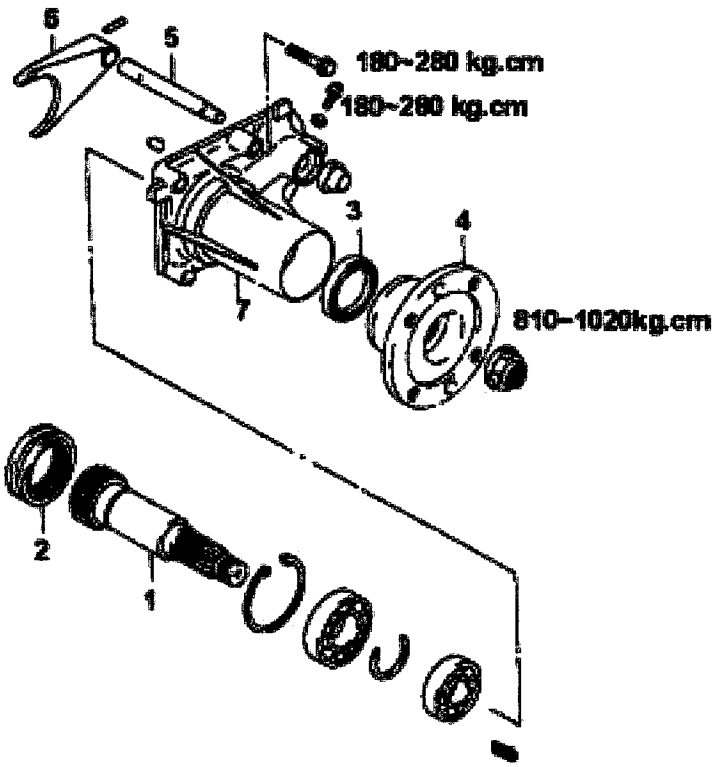
Transfer Unit



Components

1. Transfer Drive Sprocket
2. Transfer Drive Sprocket
3. Drive Chain
4. Driveshaft Unit
5. Front Case
6. Rear Case

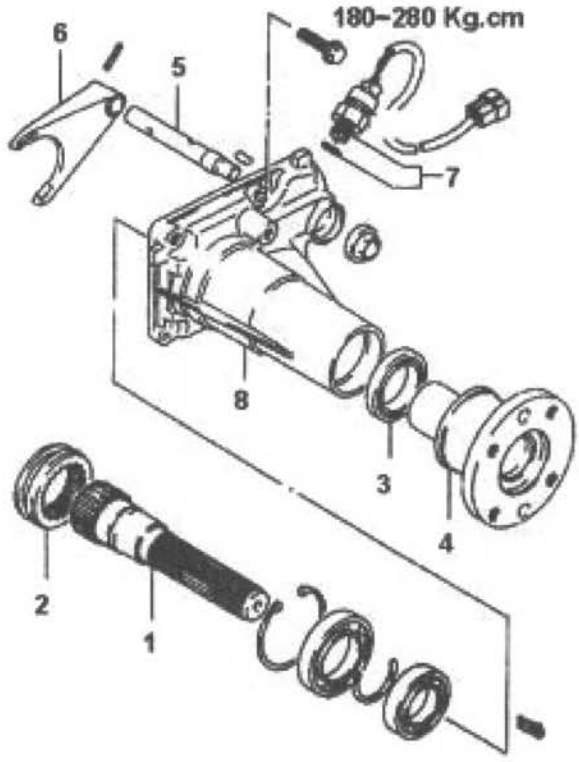
Part Time 4WD Van



Components

1. Transfer Output Shaft
2. Transfer Output Sleeve
3. Output Flange Oil Seal
4. Output Shaft Flange
5. Shift Shaft
6. Shaft Fork
7. Case

Full Time 4WD



Components

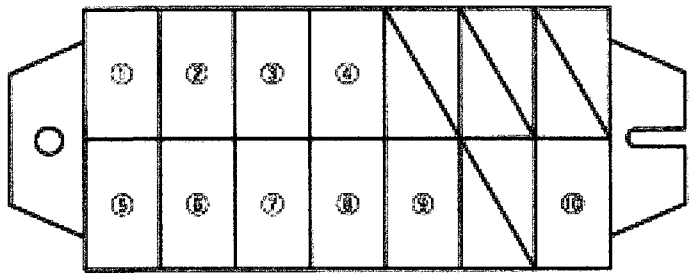
1. Transfer Output Shaft
2. Transfer Output Sleeve
3. Output Flange Oil Seal
4. Output Shaft Flange
5. Shift Shaft
6. Shaft Fork
7. 4WD Switch
8. Case

Chapter 10: Electrical

- Fuse Box
- Electrical Lighting Bulb Wattage
- Main Harness Routing
- Turn Signal Circuit
- Complete Body Diagram: EFI Fuel Injected
- Complete Body Diagram: Carbureted Vehicles

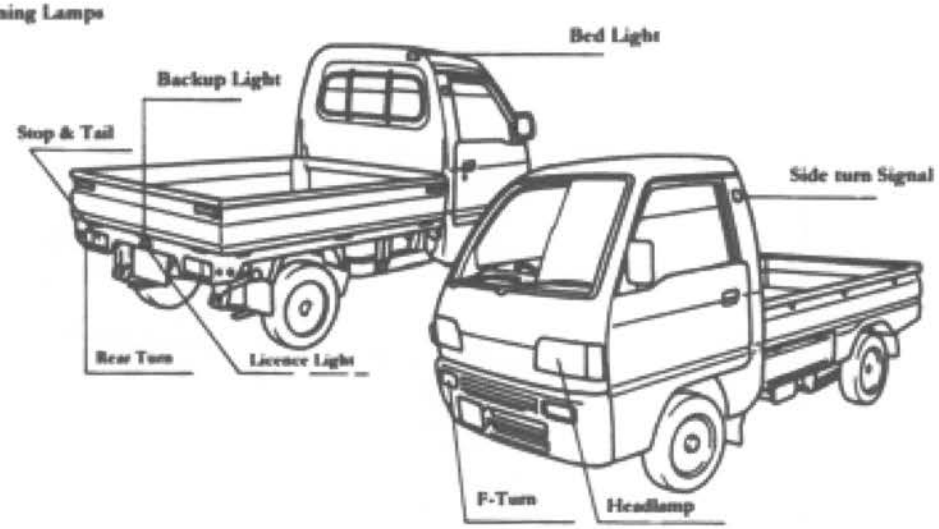
Note: Due to the size of the Full Electrical Service Manual it is not possible to include individual circuits outside of what is published in this book. For the full version please visit our publisher's website for the Full Suzuki Electrical Service Manual.

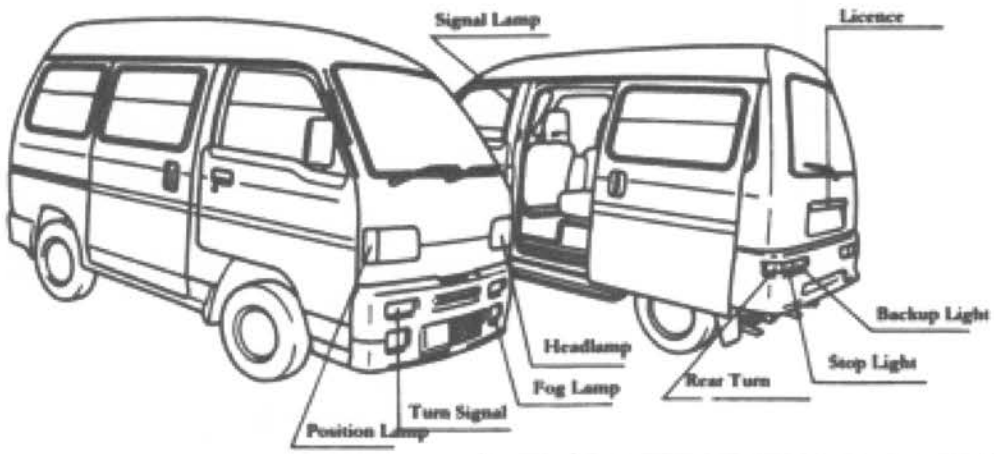
Fuse Box



No.	Use	Circuit Funtion
①	HAED R-L	Headlamp (R)
②		Haedlamp (L)
③	TAIL·STOP	Tail Lamp, Stop Lamp, Dome, Lisence Plate, Background Light(Meter), Radio
④	HAZARD·HORN	Hazard, Radio
⑤	IG·COIL METER	Charging System, Ignition System, Fuel System, Meter
⑥	TURN·BACK	Turn Signal lamps, Backup lamps, 4WD Controller
⑦	WIPER WASHER	Front Wiper & Washer
⑧	HEATER	Heater & A/C Option Vehicles
⑨	RDTR	Cooling System
⑩	RADIO·CIGAR	Cigar Lighter & Radio (Option)

Runing Lamps

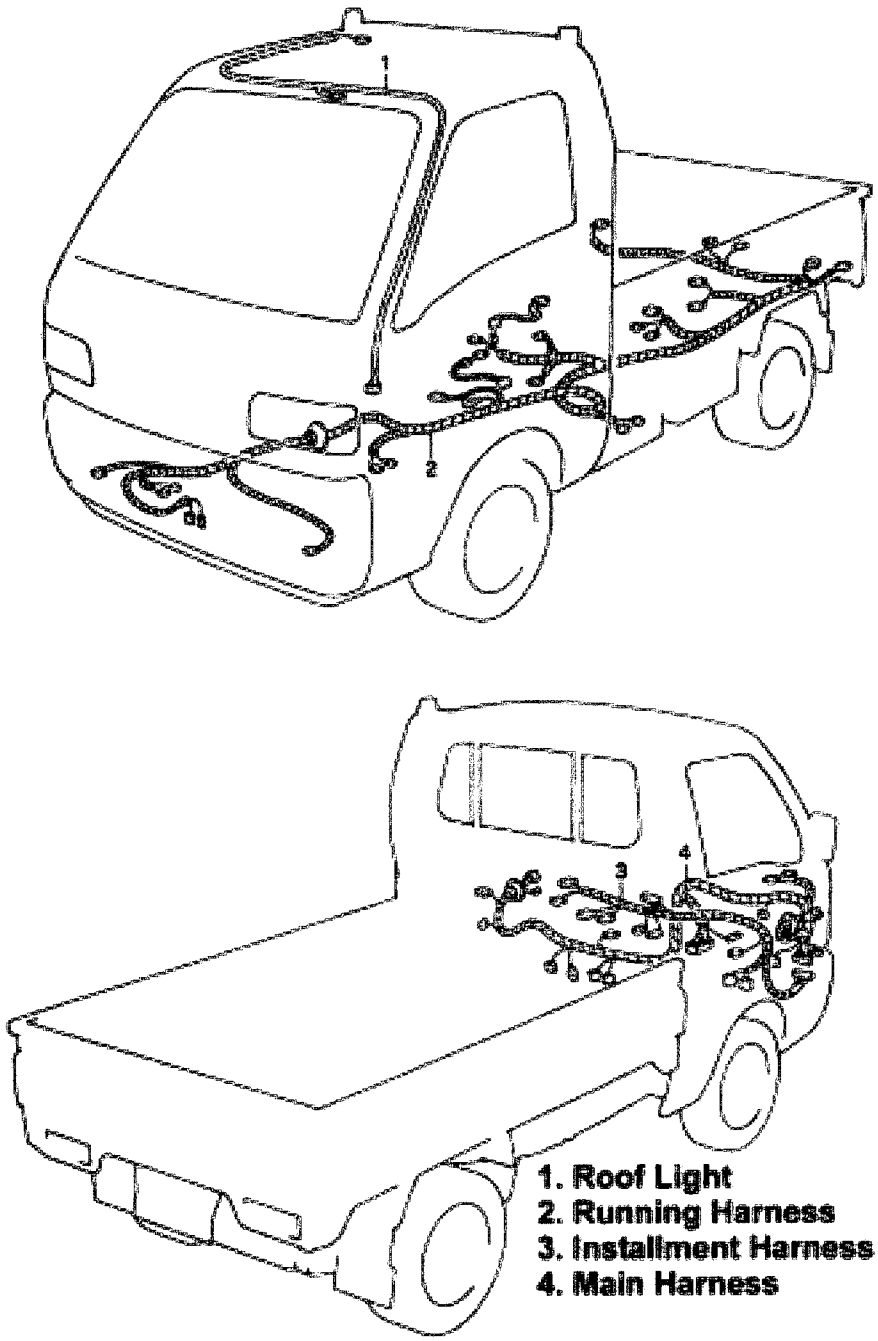




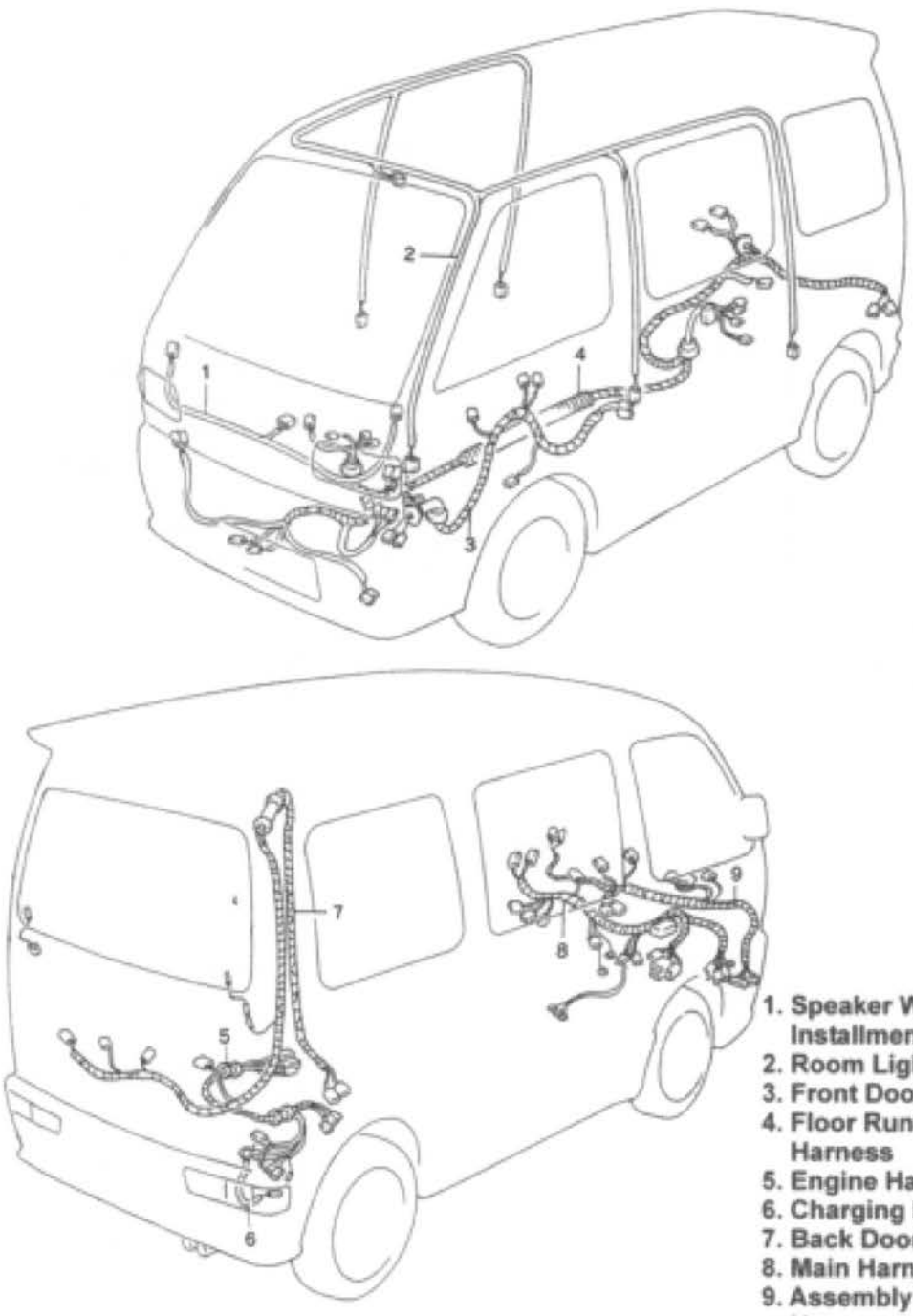
Lamp Name	Wattage
Head Lamp	60/50W White
	60/55W Halogen
Fog Lamp	35W
Front & Side Turn Signal	21W/5W
Position Lamps	5W
Tail Lamps	5W
Stop Lamps	21W
Rear Turn Signal	21W
Licence plate light	5W
Dome Light	5W
Back Lamp	8W 21W×2 Cases Every
Truck bed lamp	5W
High Mounted Stoplamp	18W × 2

Main Harness Routing (Truck)

Truck

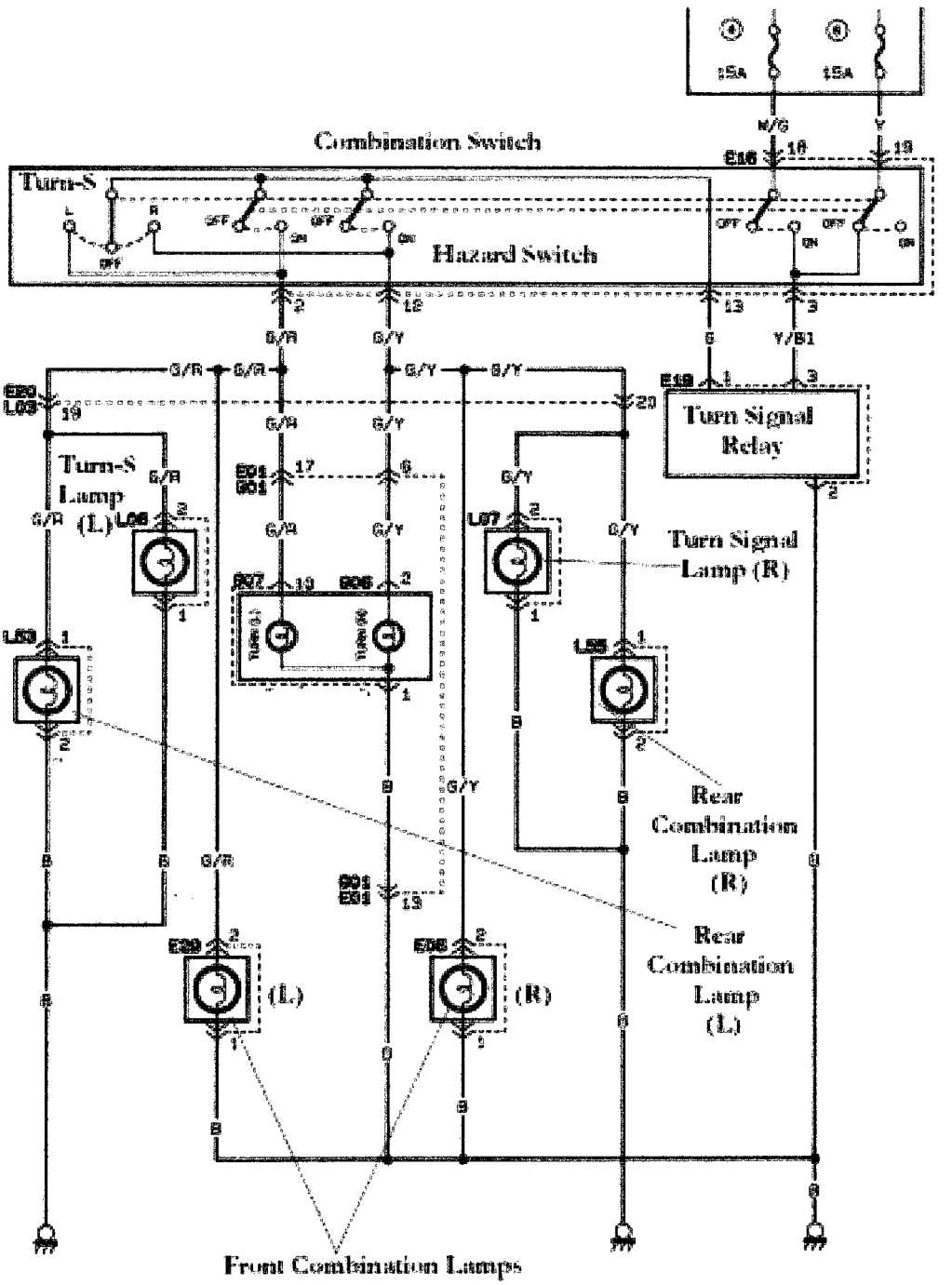


VAN



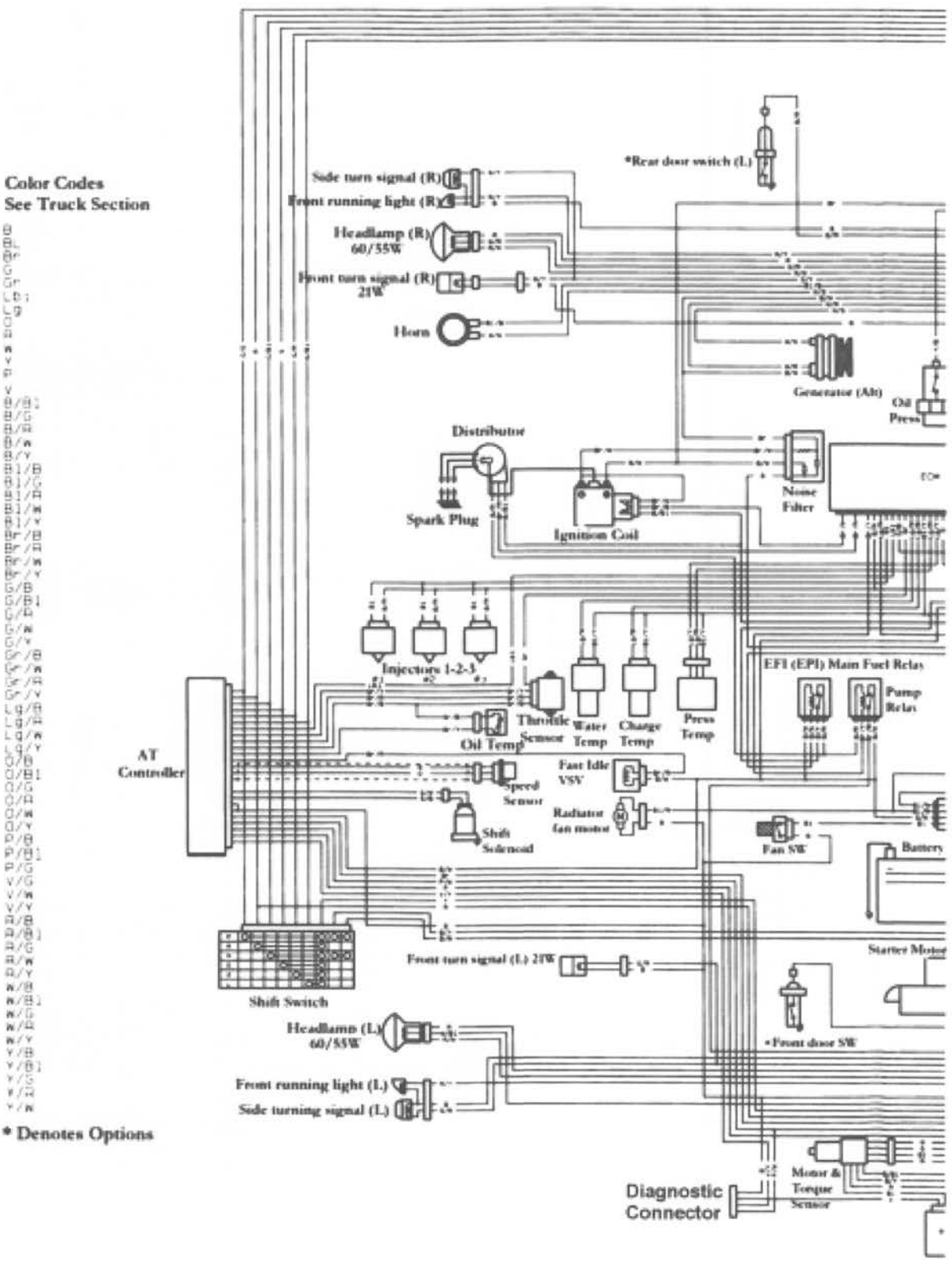
1. Speaker Wire Installment Panel
2. Room Light
3. Front Door Harness
4. Floor Runner Harness
5. Engine Harness
6. Charging Harness
7. Back Door Harness
8. Main Harness
9. Assembly Main Harness

Turn Signal & Main Light Circuit

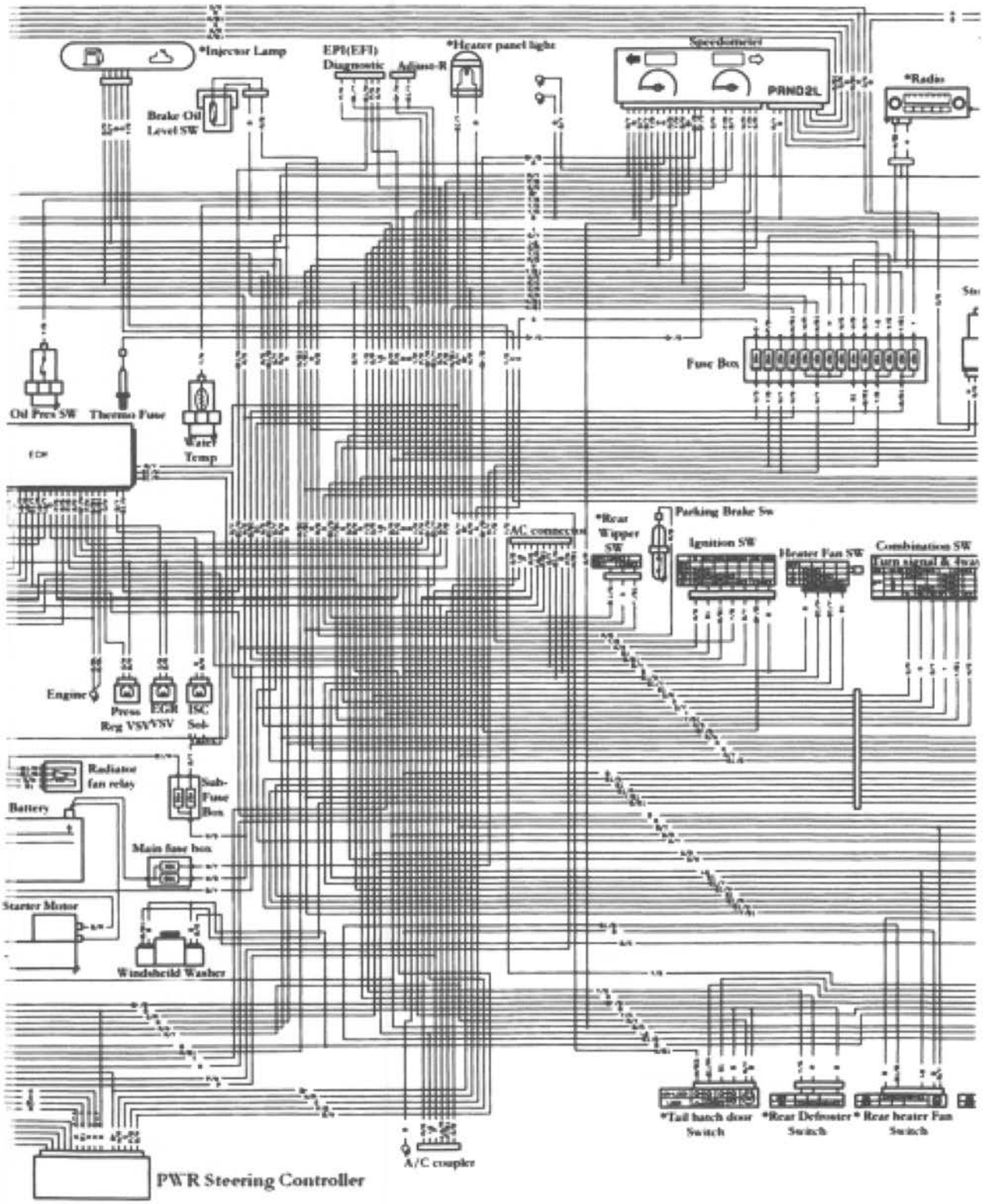


Complete Circuit Diagram EFI Vehicle Part 1

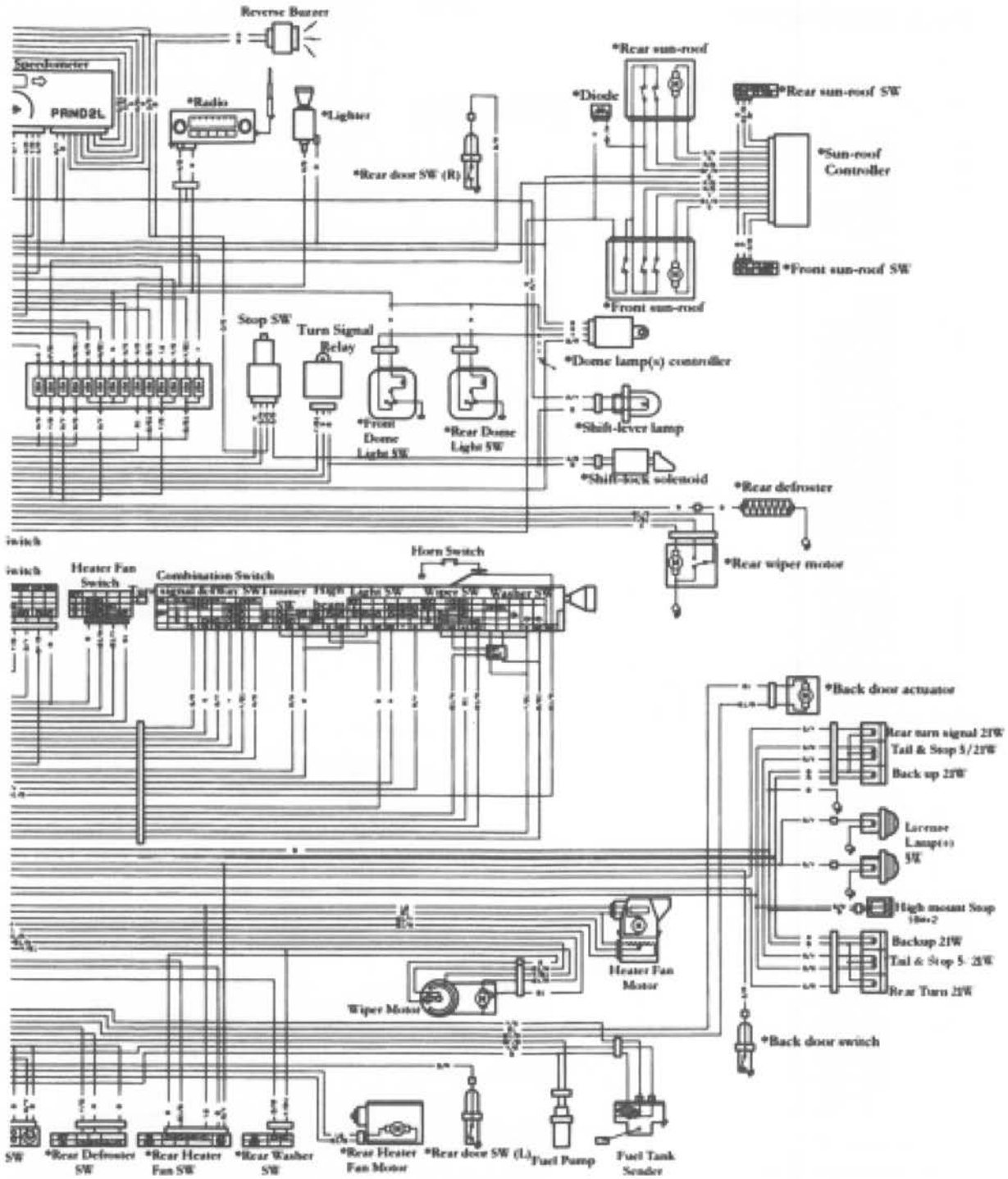
EFI Part 1



Complete Circuit Diagram EFI Vehicle Part 2

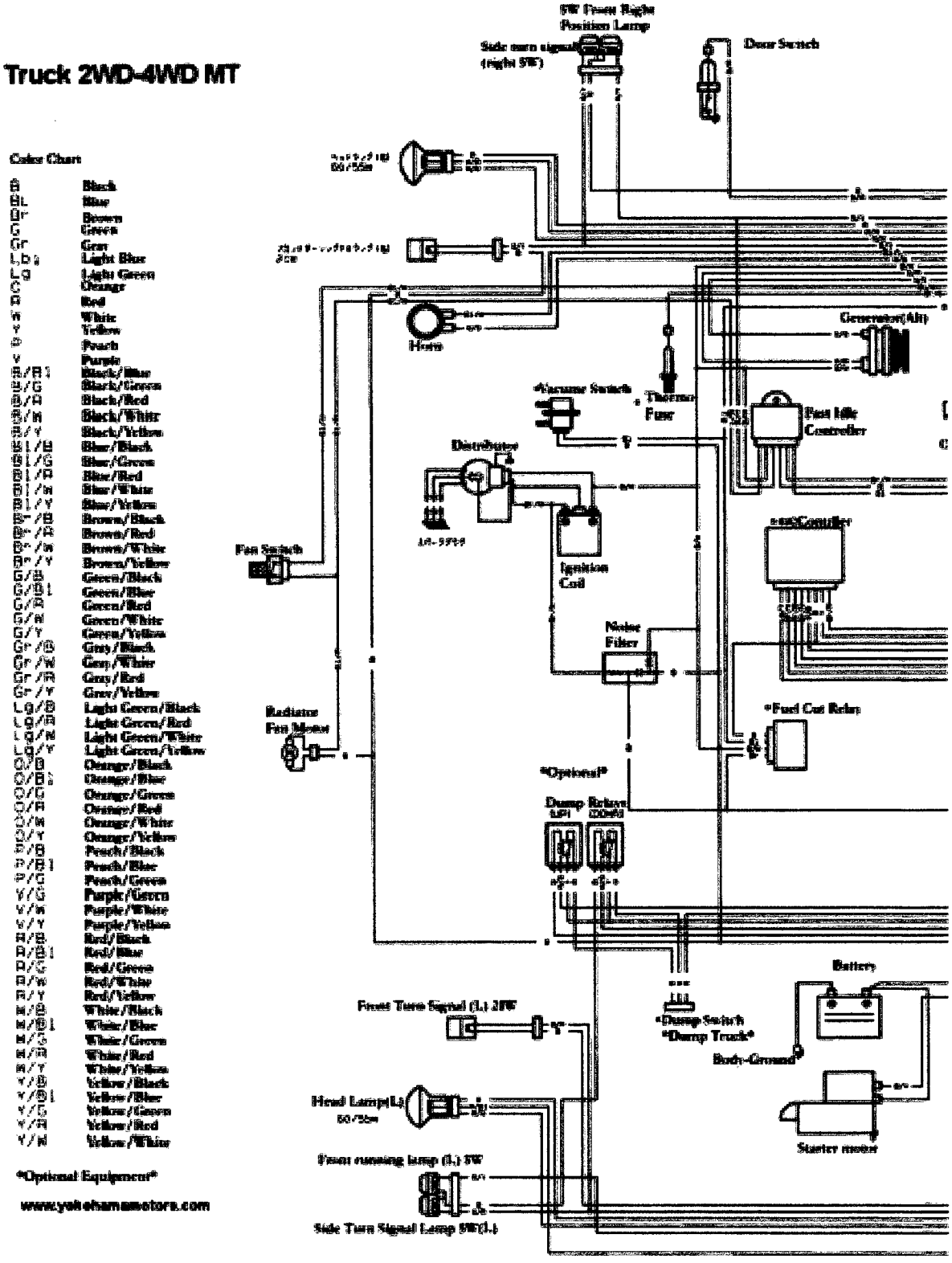


Complete Circuit Diagram EFI Vehicle Part 3

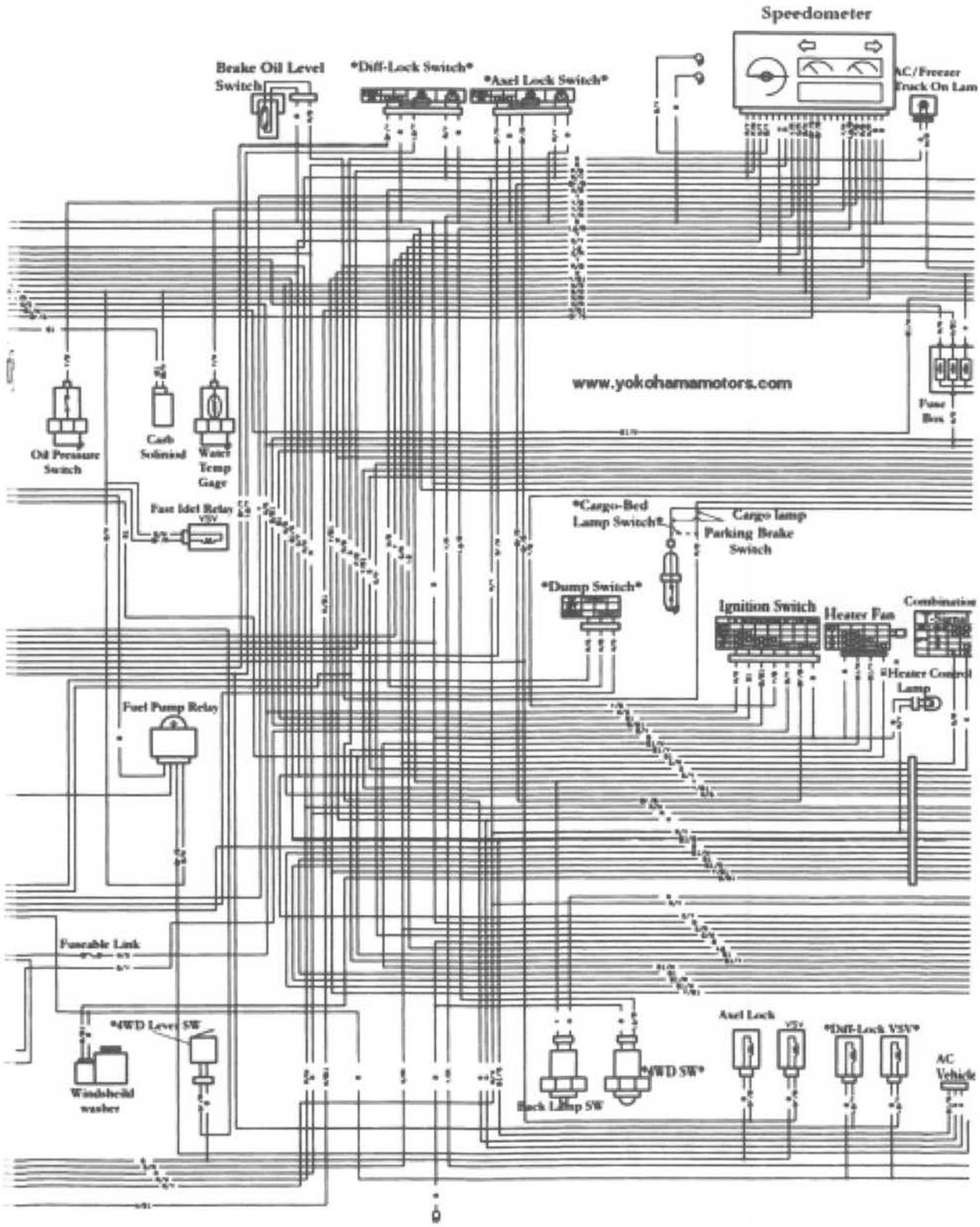


Complete Circuit Diagram Carbureted Vehicle Part 1

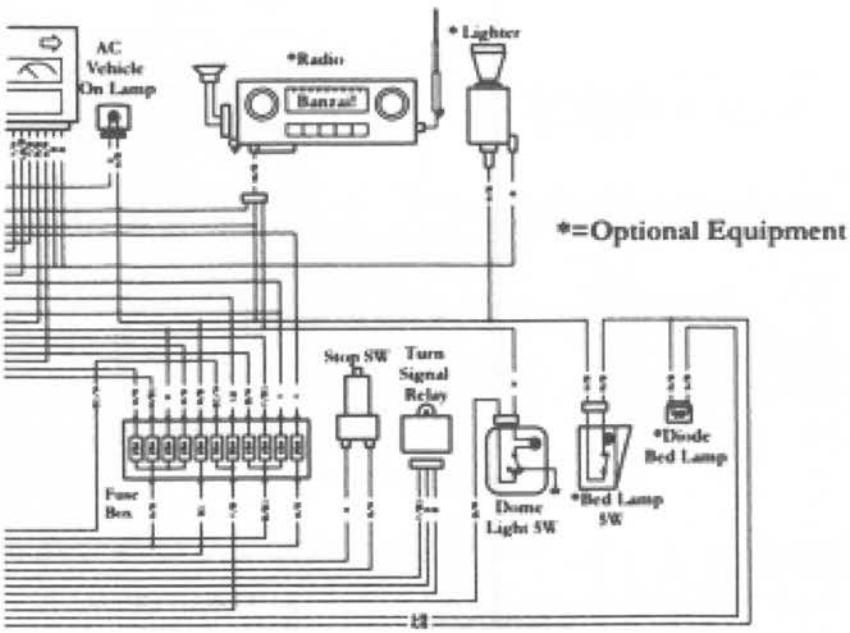
Truck 2WD-4WD MT

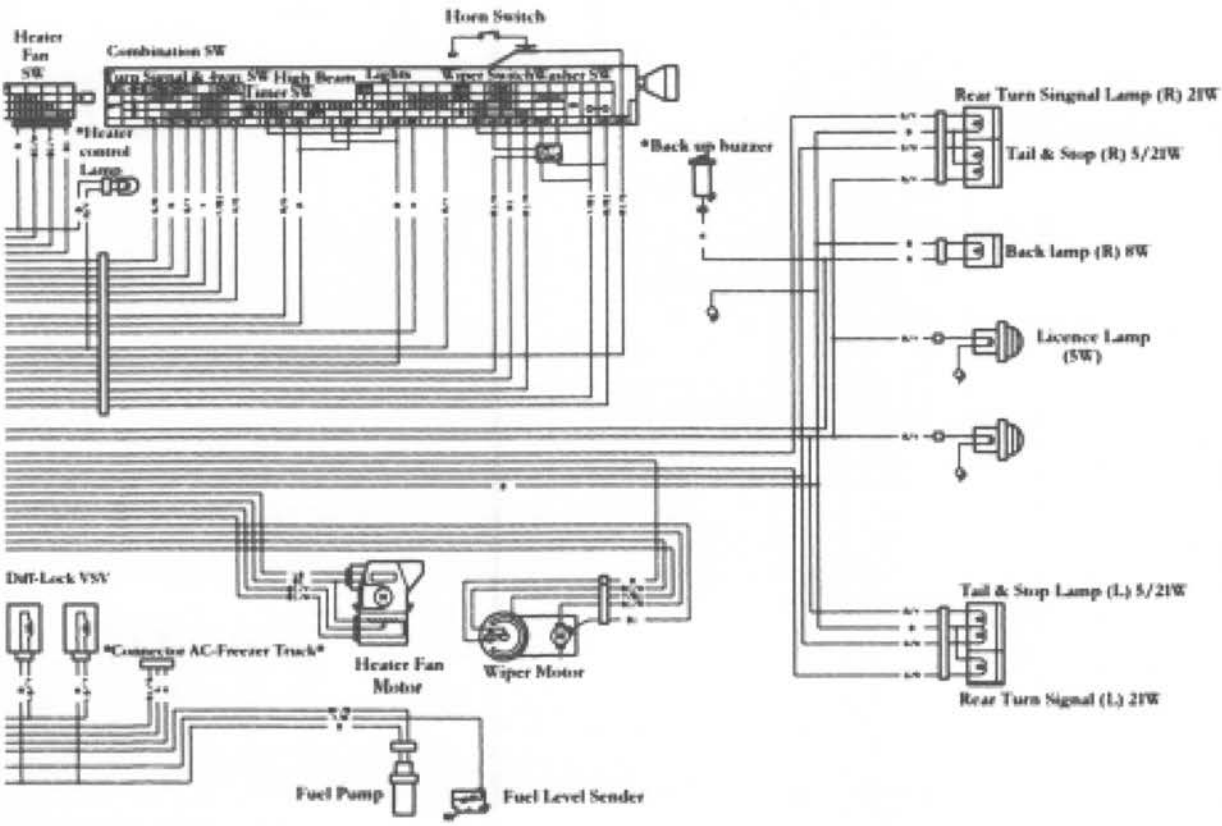


Complete Circuit Diagram Carbureted Vehicle Part 2



Complete Circuit Diagram Carbureted Vehicle Part 3





Components Diagrams

Individual Circuit Diagrams for Localized Parts & Systems can be found in Their Respective Sections.

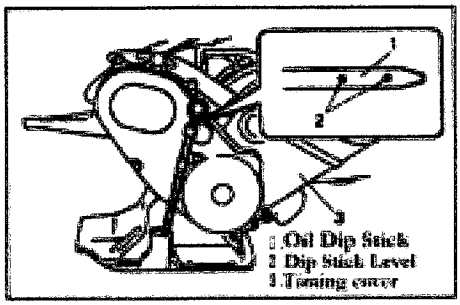
Example #1: Alternator (Go to Charging System Section)

Example #2: Starter Circuit (Go to Starter Section)

For the complete Electrical Service Manual that breakdown all individual circuits please order the full factory circuit manual. Follow the direction at the end of this book on where to purchase

Chapter 11: Engine Overhaul & Component Specifications

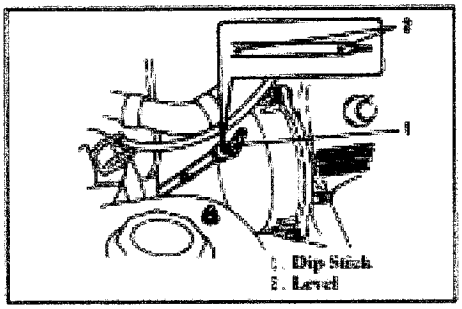
- Engine Oil
- Engine Mounts
- Engine Removal
- Intake Manifold
- Throttle Body Replacement
- Timing Belt
- Valve Lash
- Oil Pressure
- Oil Pump
- 2 Valve Cylinder Head Overhaul
- 4 Valve Cylinder Head Overhaul
- Engine Block Components & Overhaul
- Pistons & Rings
- Connecting Rods
- Crankshaft
- Block
- Turbocharger
- Tools



Engine Oil Level

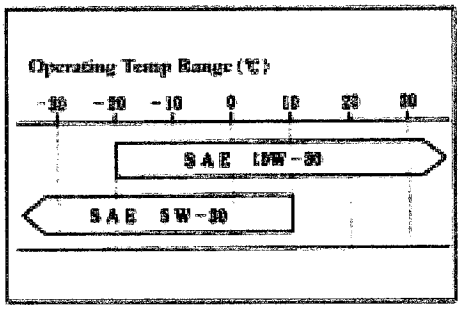
1. Remove dip stick and check level.
   Level should be between the dots

2. If clean, add oil to proper level.

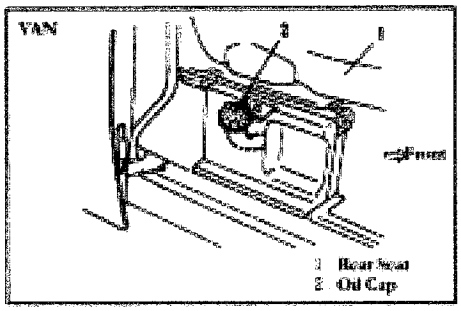


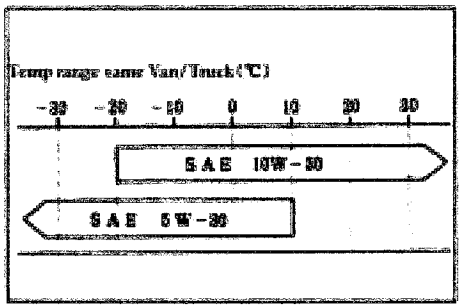
Oil Change

1. Remove drain plug from oil pan.
2. Inspect oil for contaminents, if clean replace plug.



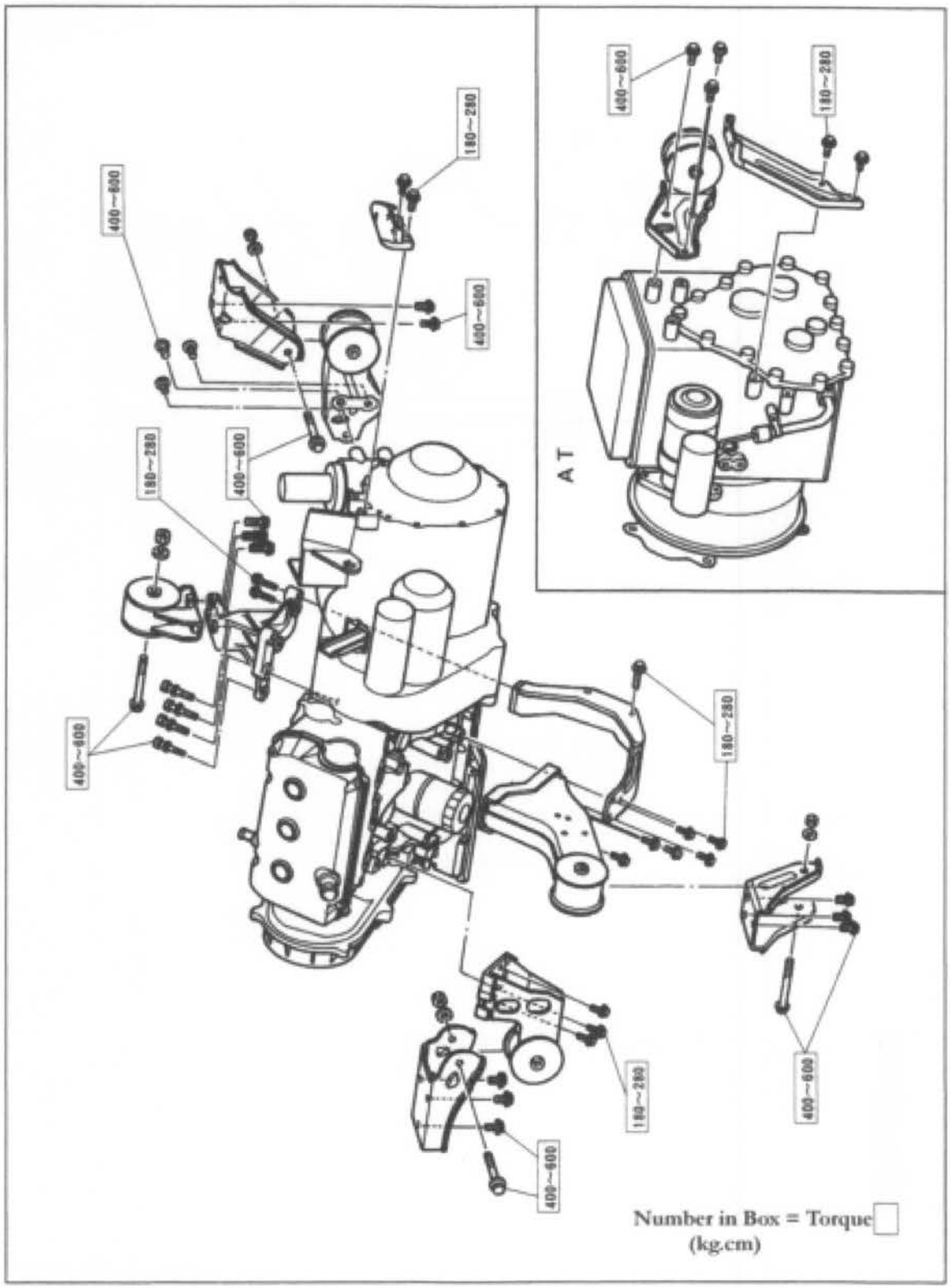
3. Fill oil to proper capacity with recomended oil from the temperature chart. Verify level with dip stick.

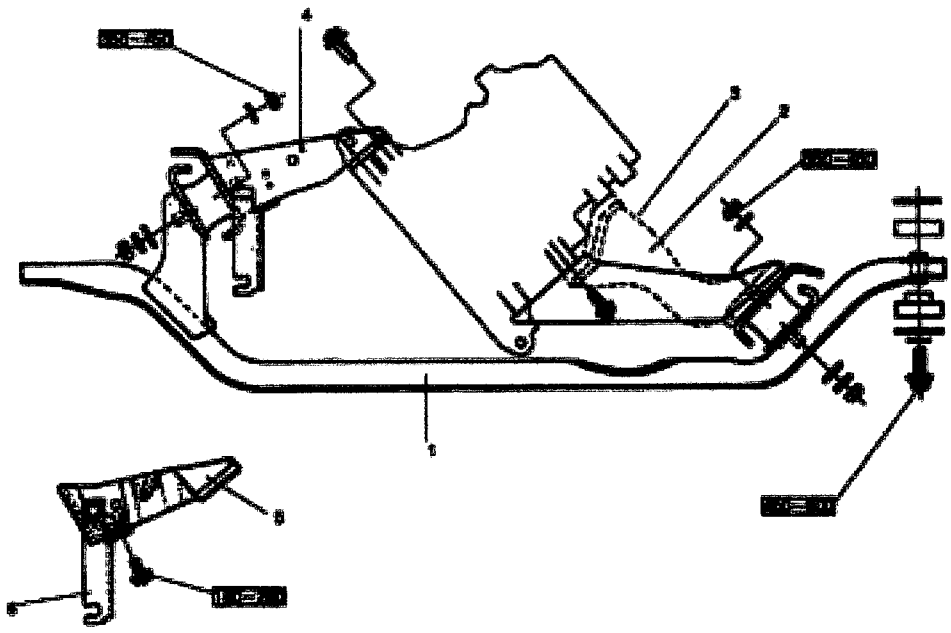




Oil Capacity 2.3 Liters
Check Vehicle Tag for More Information

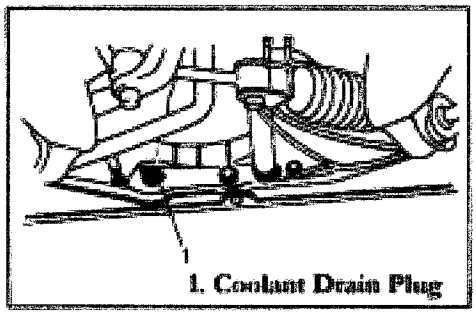
Engine & Transmission Mounts



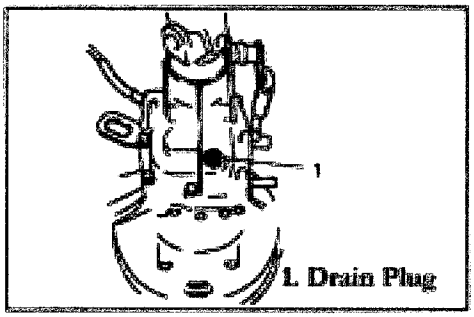


1. Front Mounting Member
2. Front Mounting Bracket Left (4WD)
3. Front Mounting Bracket Left (2WD)
4. Front Mounting Right Bracket (Truck)
5. Front Mounting Right Bracket (Van)
6. Clutch Cable Bracket (MT)

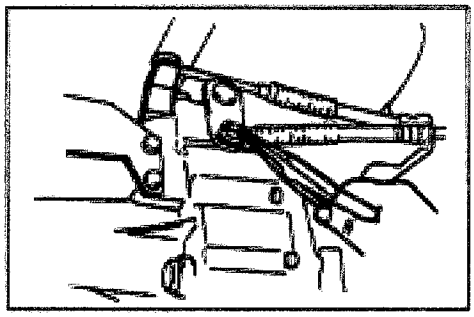
Box=Torque Spec (kg.cm)

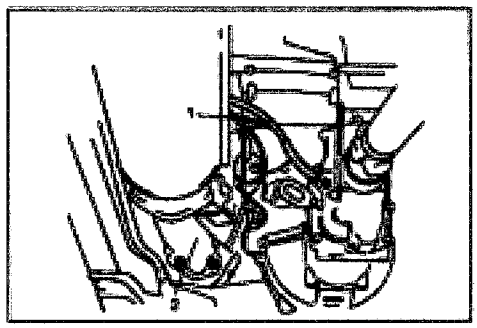


1. Coolant Drain Plug



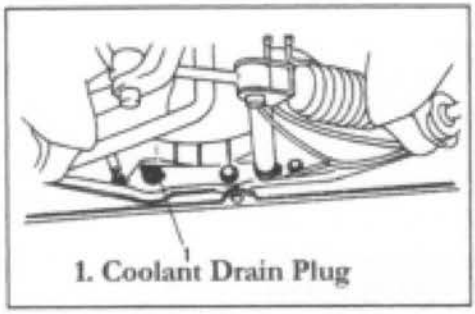
1. Drain Plug



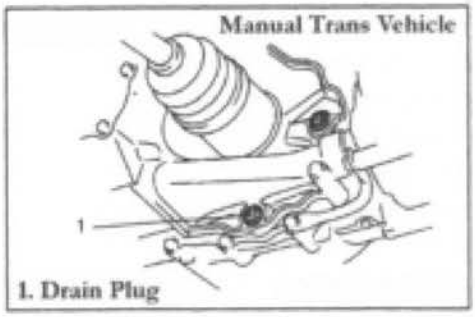


1. Speedometer Cable
2. Exhaust Pipe

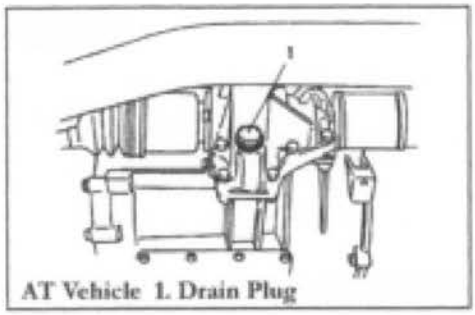
1. Remove Front Seat
2. Remove Front Door (Easy Access)
3. Remove Battery
4. Drain Coolant
5. Drain Transmission Oil
6. Disconnect Exhaust Pipe
7. Remove Rear Driveshaft
8. Remove Front Driveshaft (4WD)
9. Disconnect Clutch Cable (MT)
10. Disconnect shifter Connections
11. Disconnect Speedometer Cable
12. Disconnect Electrical Connections
13. Remove Heater Hoses
14. Remove Air Cleaner
15. Remove Air Duct
16. Disconnect Accelerator Cable
17. Disconnect Fuel Hose & Plug Line
18. Un-Bolt Mounts
20. Remove Engine



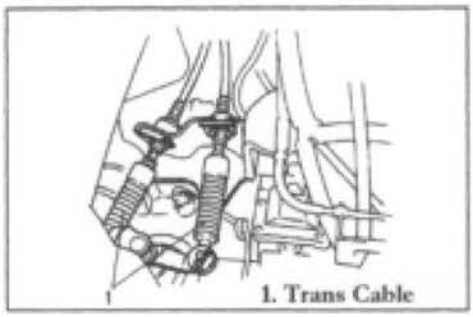
1. Coolant Drain Plug



1. Drain Plug



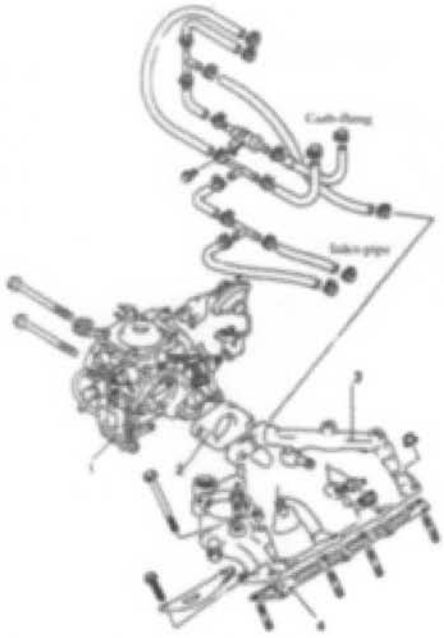
AT Vehicle 1. Drain Plug



1. Trans Cable

1. Remove Battery Connctions
2. Remove Engine Service Cover
3. Remove Rear Bumper
4. Drain Coolant System
5. Remove right-left wheel
6. Drain Transmision Oil
7. Disconnect Electrical Harness from Engine
8. Disconect Speedometer Cable
9. Disonnect Accelerator Cable
10. Disconnect Transmision Cable
11. Disconnect Clutch Cable (MT Vehicle)
12. Remove Water Hose
13. Disconnect Vacume Hoses
14. Disconnect Fuel Hose
15. Remove (L-R) Brake Drum
16. Remove (L-R) Driveshaft hub
17. Disconnect Diveshaft connections
18. Disconnect Exhaust Center Pipe Bracket
19. Remove Front Drive Shaft (4WD Version)
20. Engine & Tranny Stiffiner
21. Remove Muffler
22. Remove Exhuast Center Pipe
23. Turbo-Charger Air Cleaner (If Equiped)
24. Remove Oil Filler Pipe (If Equiped)
25. Disconnect Tranny Mount
26. Remove Rear Engine Mounting Bracket
27. Unbolt Engine Front Mount
28. Unbolt Right Engine Mount
29. Remove Engine

Intake Manifold Carbureted Truck



1. Carburetor Base
2. Carburetor Insulator
3. Intake Manifold
4. Gasket

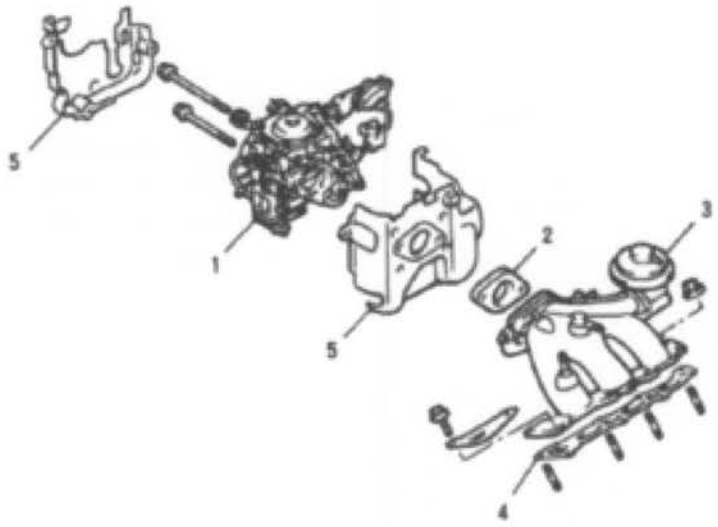
Remove or Disconnect

1. Front Seat
2. Console Box
3. Engine Room Center Cross Member
4. Air Cleaner Box
5. Drain Radiator
6. Remove Carburetor Coolant Hose
7. Disconnect Accelerator Cable
8. Disconnect Fuel Hose and Plug
9. Disconnect Vacuum Hose
10. Disconnect (-) Battery Connection
11. Disconnect Electrical Connections (If Equipped)
12. Remove Carburetor
13. Remove Manifold

Note: Thoroughly Clean All Parts before Reassembly

Torque: Intake Manifold Bolt (kg.cm) 180-280

Intake Manifold Carbureted Van



1. Carburetor Base
2. Carburetor Insulator
3. Intake Manifold
4. Gasket
5. Cover (Heat)

Note: Never work on engines while hot

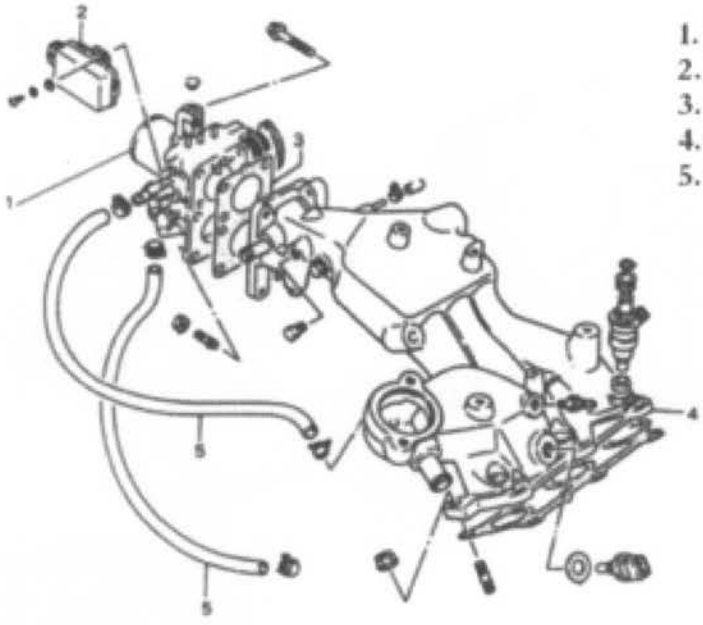
1. Drain Radiator
2. Remove Engine Service Cover
3. Remove Air Cleaner Case
4. Disconnect (-) Negative Battery Terminal
5. Disconnect Vacuum Hoses
6. Disconnect Accelerator Cable from Carburetor
7. Disconnect Fuel Line and Cap to Prevent Dirt Entering the Fuel System
8. Remove Protective Carburetor Cover
9. Disconnect Coolant Hose
10. Unbolt and Remove Carburetor
11. Remove Intake Manifold Bolts and Remove Manifold

Note: Never Reuse Gaskets, Make Sure All Surfaces are Thoroughly Cleaned before Reinstallation

Note: Always use Fresh Coolant when Replacing Fluids

Torque: Intake Manifold (kg.cm) 180-280

Throttle Body Injection



1. Throttle Body
2. Throttle Sensor
3. Throttle Body Gasket
4. Intake Manifold
5. Water Hose

Remove or Disconnect

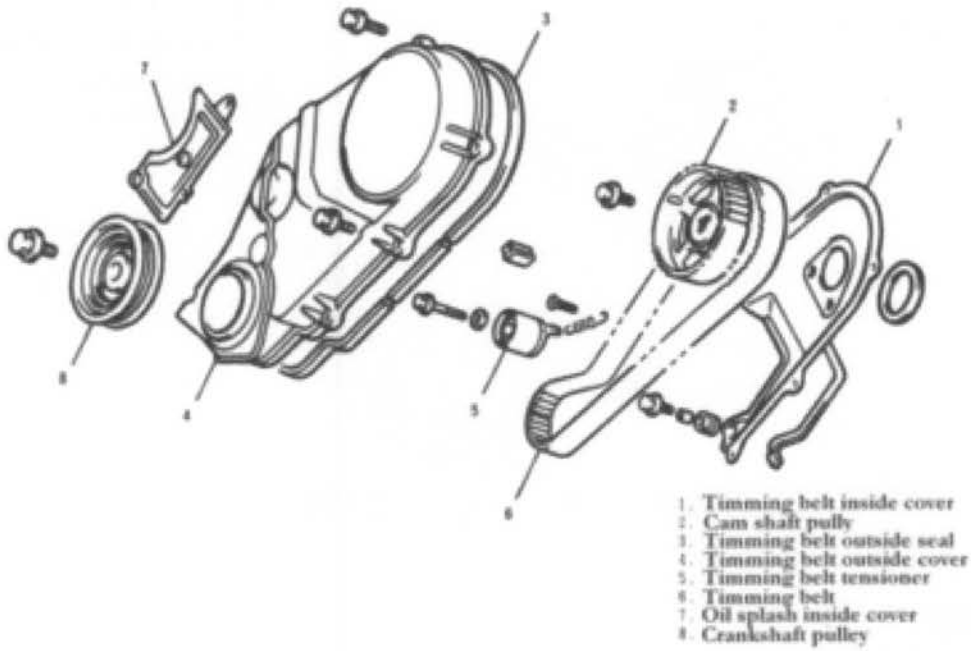
1. Front Seat
2. Console Box
3. Air Cleaner Case
4. Water Hose
5. Bleed Fuel Pressure. Turn Ignition Key to "ON" Position 2 Seconds and "OFF" Position. Remove Fuel Pump Relay or Pump Terminal. Start Engine and Run Until Out of Fuel in Fuel Line System.
6. Disconnect Fuel Line
7. Disconnect (-) Battery Terminal
8. Disconnect Accelerator Cable
9. Remove Vacuum Hose
10. Disconnect Electrical Connections
11. Remove Throttle Body
12. Remove Intake Manifold

Note: Clean All Parts Thoroughly before Reassembly

Torque: Manifold Bolts (kg.cm) 180-200

Throttle body Bolts (kg.cm) 80-120

Timing Belt Tensioner



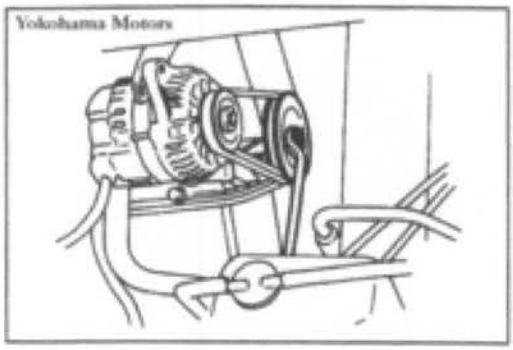
Replacement

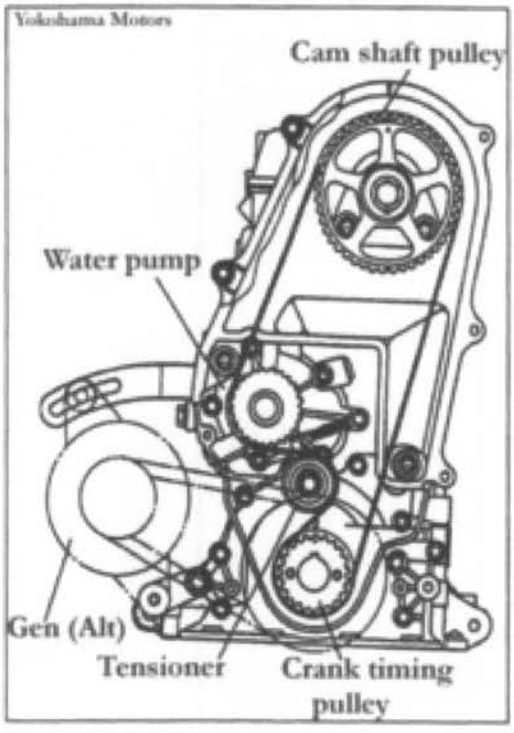
1. Disconnect (-) battery connection
2. Raise the front of the vehicle using the proper method listed in the front of this book
3. Remove the engine service cover
4. Turn over crankshaft until TDC (Top Dead Center). To confirm remove distributor cap to verify the rotor is pointed to No.1. Check the service mark on the transmission line up hole is in alignment
5. Remove the alternator and if equipped A/C belts
6. Remove the crankshaft pulley
7. Remove alternator belt inside cover
8. Remove timing belt outside cover
9. Remove Tensioner. Inspect Tensioner for free spinning ability. If binding is noticed replace unit. If unit has over 50,000 kilometers replace. If unit has over 80,000 kilometers replace timing belt as a set
10. Reassemble in reverse order
11. Inspect valve lash and timing

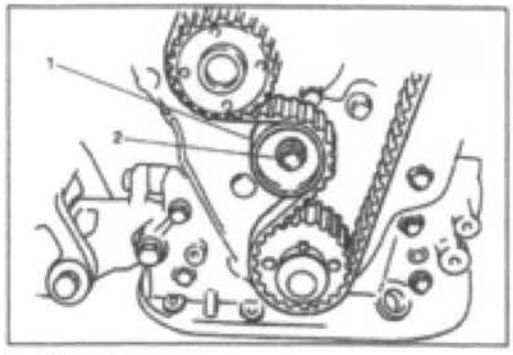
Timing Belt Replacement

Replacement

1. Disconnect (-) battery connection
2. Raise the front of the vehicle using the proper method listed in the front of this book
3. Remove the engine service cover
4. Turn over crankshaft until TDC (Top Dead Center). To confirm remove distributor cap to verify the rotor is pointed to No.1. Check the service mark on the transmission line up hole is in alignment
5. Remove the alternator and if equipped A/C belts. Replace worn or cracked belts during reassembly
6. Remove the crankshaft pulley
7. Remove alternator belt inside cover
8. Remove timing belt outside cover
9. Loosen Tensioner and remove timing belt. If over 50,000 kilometers remove Tensioner and replace as a set
10. Inspect water pump for leaks and replace gasket if necessary
11. Install Tensioner and New Timing Belt
12. Replace all gaskets as necessary
13. After assembly inspect valve lash and ignition timing
14. Idle run vehicle for 5 minutes before test driving.

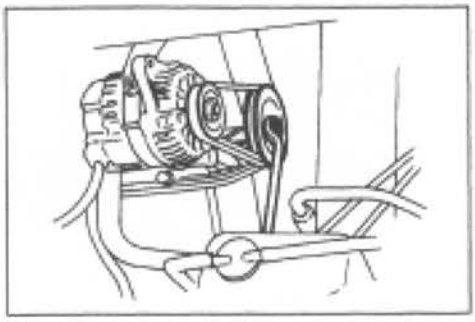


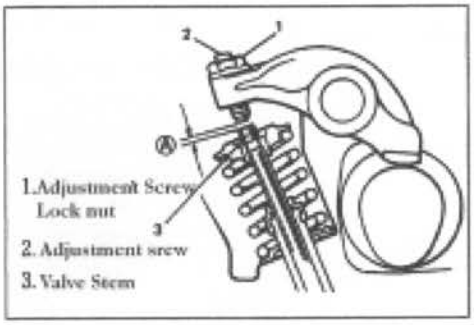


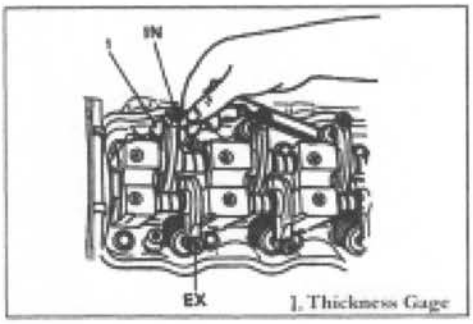


1. Tensioner
2. Tensioner bolt

2 Valve Lash Adjustments







Valve Lash adjustment

2 Valve Engine

1. Remove Cylinder head valve cover

2. Rotate crankshaft to TDC position. Remove distributor cap and verify rotor buttom is facing #1 cylinder.

3. Using the chart below, use a feeler gage to slip between the adjustment screw and valve stem. Set to the specifications listed below.

Cylinder Number		1	2	3
Cylinder 1 TDC	IN	○	○	
	EX	○		○
Cylinder 1 Rotate the crank 1 turn	IN			○
	EX		○	

○ Circle mark =Time to adjust

Valve clearence measurments

Cold (mm)	IN	0.15
	EX	0.17
Hot (mm)	IN	0.25
	EX	0.27

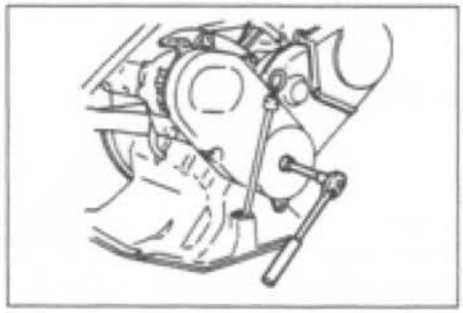
4. Install a new valve cover gasket and install valve cover. *do not over tighten valve cover bolts*

5. Set timing to specifications (see timing settings at the begining of this book).

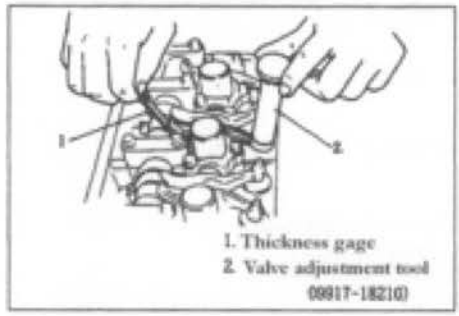
6. Test drive vehicle

Adjustment Screw Lock Nut Torque (kg.cm): 150-200

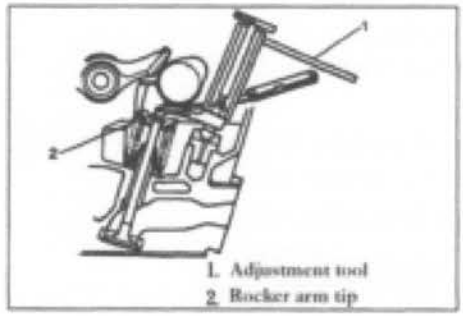
4 Valve Lash Adjustments



Valve lash adjustment
4 Valve
1. Remove Cylinder head valve cover
2. Rotate cranshaft to TDC posistion. Remove distributor car and verify rotor buton is facing #1 cylinder
3. Using the chart below, use a feeler gage to slip between the adjustment screw and valve stem. Set to the specifications listed below.



1. Thickness gage
2. Valve adjustment tool 09917-18210



1. Adjustment tool
2. Rocker arm tip

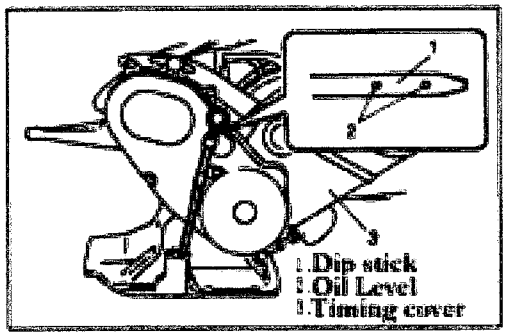
Cylinder Number		1	2	3
Cylinder #1 TDC	IN	○	○	
	EX	○		○
Cylinder #1 Rotate the crank 1 turn	IN			○
	EX		○	

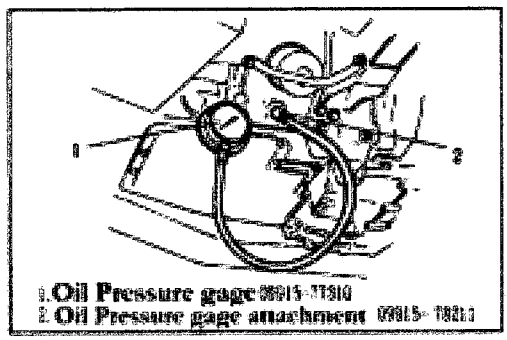
○ Circle mark=Time to adjust

Cold (mm)	IN	0.08
	EX	0.10
Hot (mm)	IN	0.12
	EX	0.12

Adjustment screw lock nut torque (kg.cm) 100 to 130

Note: It is recommended to only set valves when engine is cold.





Part # for gage & Adapter is Suzuki Equipement

Oil Presure

Caution: Make sure to check oil level is correct!

- **Check oil level**
  add if necessary
- **Make sure oil is clean**
  Change before test if dirty.

. If contaminents such as metal shavings are found, damage will occure to test equipment. At this point recomended to disassemble engine for inspection.

1 . Remove plug from cylinder block as shown.

2 . Attach gage and adapter as shown

3 . Start engine and run to operating temperature.

4 . Operating temp 90℃~100℃

Run engine to 4000RPM. Presure range below.

Oil Pressure

(kg/cm) : Turbo 3 . 3 ~ 4 . 3
Non-Turbo 2 . 7 ~ 3 . 7

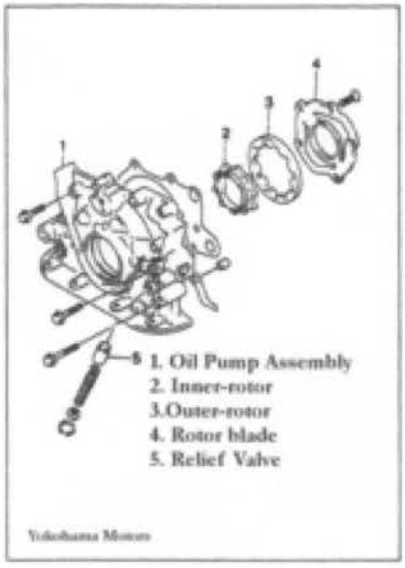
5 . Remove gage and adapter. Use new silicon tape on plug and torque to specification bellow.

6 . Start engine and inspect for leaks.

Plug torque (kg · cm) : 120~150

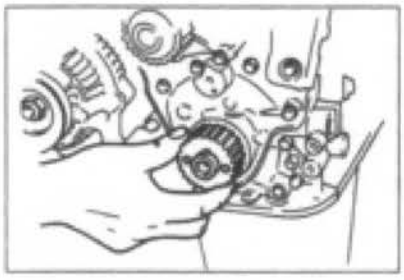
Pressure out of range: Replace pump and repeat procedure.

Oil Pump

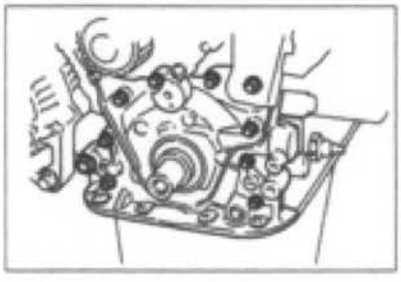


Procedure

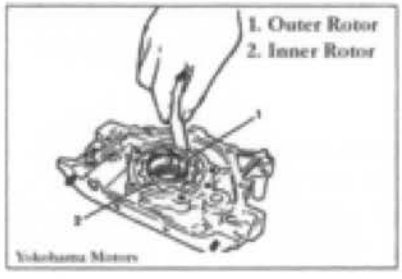
1. Remove the following
   Cranck pulley, outside cover, timing belt tensioner, timing belt. *more information see "Timing belt removal".



Remove
2. Timing belt pulley
3. Engine front mounts
4. Oil pan
5. Oil strainer

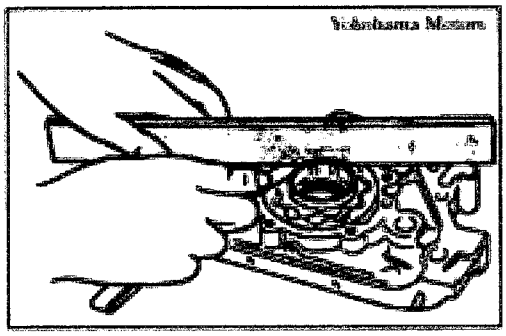


6. Remove the oil pump bolts (10).
7. Carefully remove assembly



Outer rotor to case clearance must be below 0.13 (mm).

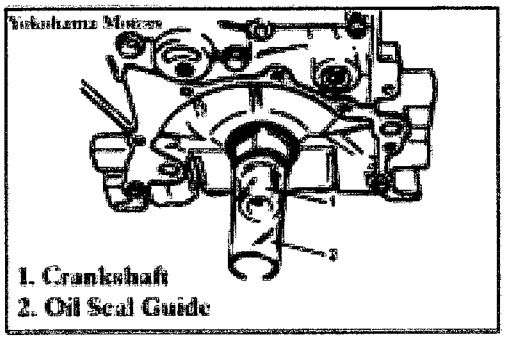
Replace if clearence is out of range

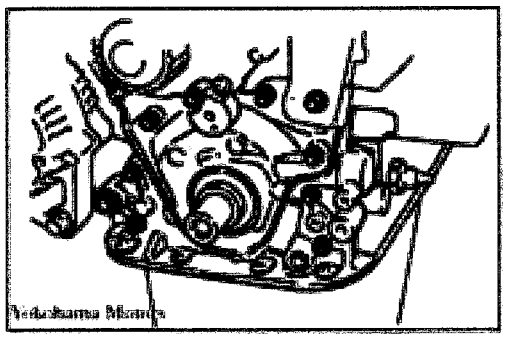


Side Clearence

Measure side clearence.
Side clearence must be below 0.15(mm)

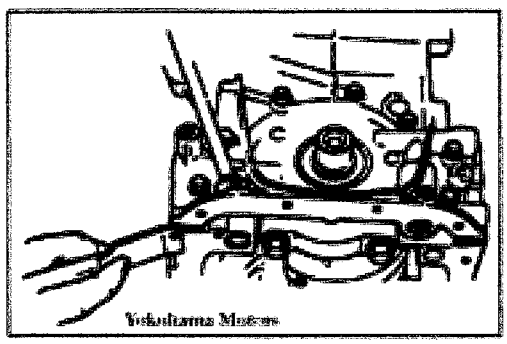
Out of range replace





Attach oil pump *Do not over torque*

Torque bolts to (kg.cm) 90-120

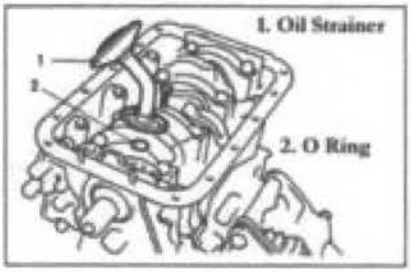


Oil Pump Gasket

Make sure all of the old gasket has been removed ans surface is clean before installing new gasket

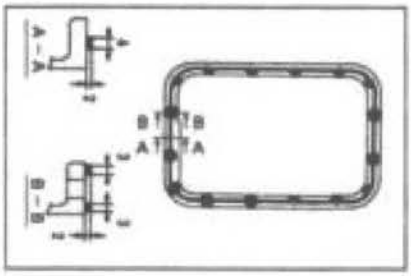
Re-assemble timing cover assembley
Always fill engine with new oil
Run engine a check oil pressure (begining of chapter)

Oil Pan & Oil Strainer



Note: Always Replace O Ring. Coat with Engine Oil before Installation

Torque: Oil Strainer (kg.cm) 90~120



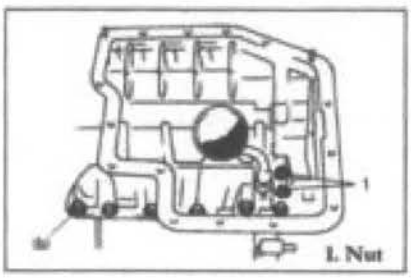
Type 1

Oil Pan Gasket. Apply High Temp Gasket Sealer

Note: Make sure all surfaces are oil free before applying sealant

Suzuki Sealant Part#1207C 99000-31150

Oil Pan Torque (kg.cm) 90-120



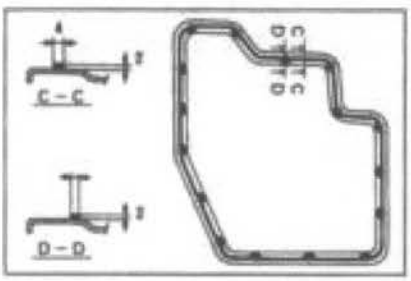
Type 2

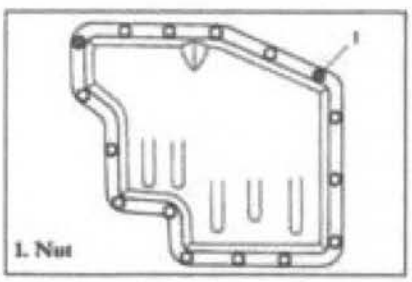
Oil Pan Gasket. Apply High Temp Gasket Sealer

Note: Make sure all surfaces are oil free before applying sealant

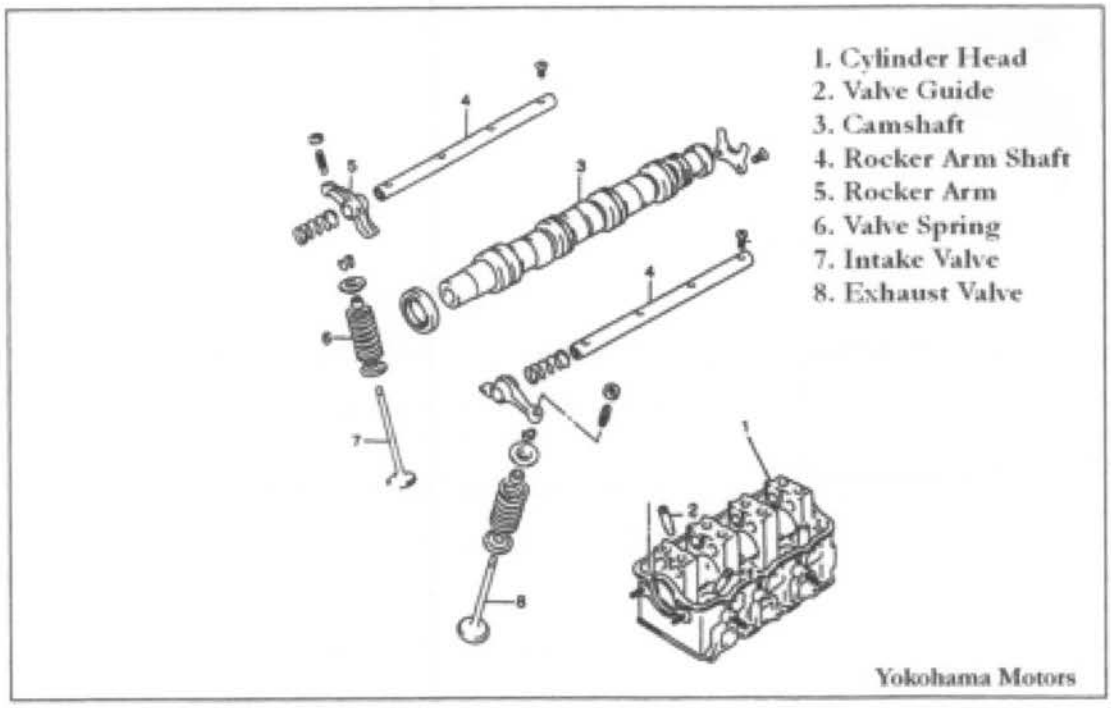
Suzuki Sealant Part#1207C 99000-31150

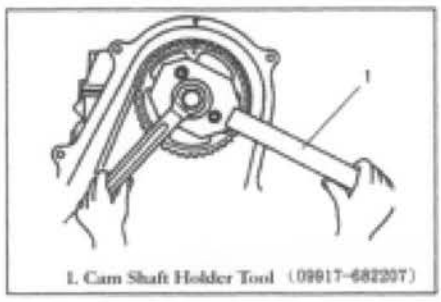
Oil Pan Torque (kg.cm) 90-120





2 Valve Head Overhaul

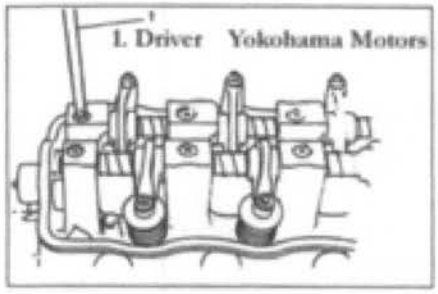




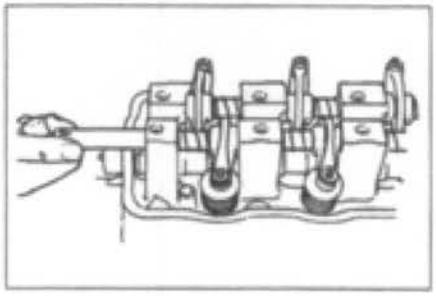
1. Remove front seat
2. Disconnect negative (-) battery cable
3. Remove Engine service cover
4. Drain coolant system
5. Remove air cleaner case
6. Remove water pump
7. Disconnect fuel hose
8. Disconect vacume hoses
9. Disconnect accelerator cable
10. Disconnect wiring
11. Remove timming belt (see previous)
12. Remove cam shaft pulley
13. Disconnect exhaust pipe and Manifold
14. *If equipped Turbo attachments*
15. Remove distributor
16. Remove valve cover
17. Remove cylinder head bolts (8)
18. Remove cylinder head

2 Valve Head Overhaul

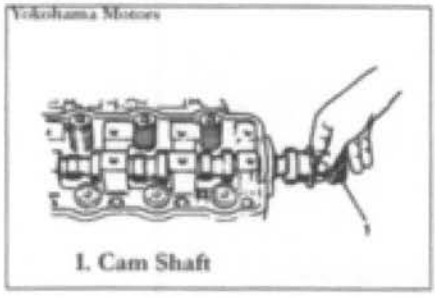
1. Remove Rocker Arm Shafts



2. Remove Intake & Exhaust Rocker Arm Shaft
3. Remove Rocker Arm Shaft Springs



4. Carefully slide Out Camshaft

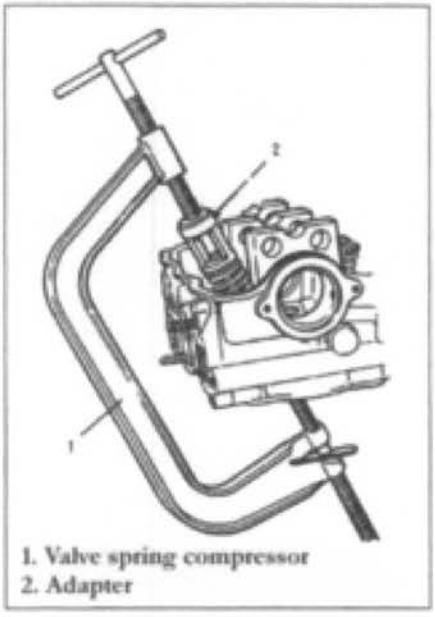


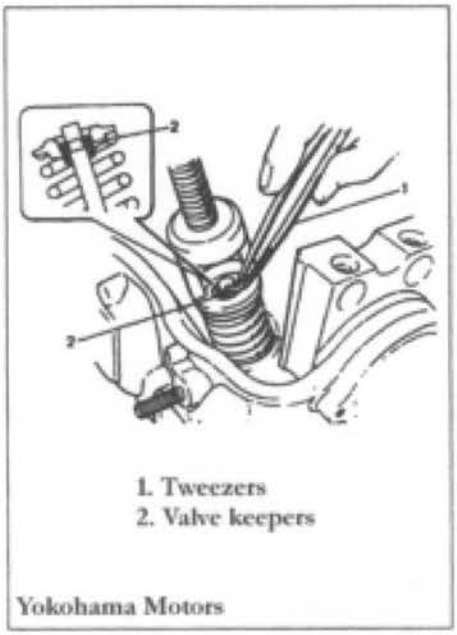
5. Use a Valve Spring Compressor and Remove Valve Springs

Note: Label all Parts to their Relevant Position

Note: Use a Rubber Hammer to Tap Sticky Valves. Never Use a Steel Hammer

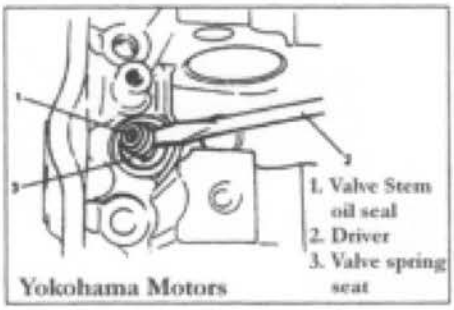
Note: If Engine is Over 100,000 Kilometer Discard Springs and Replace with New Spares



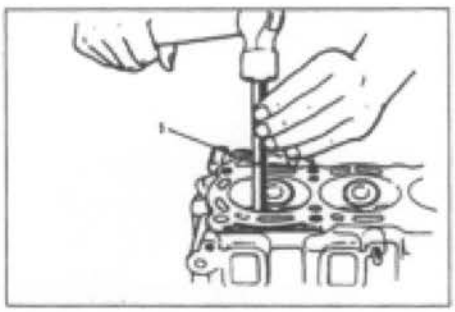


Caution- Springs under extream pressure, use saftey glasses when removing springs

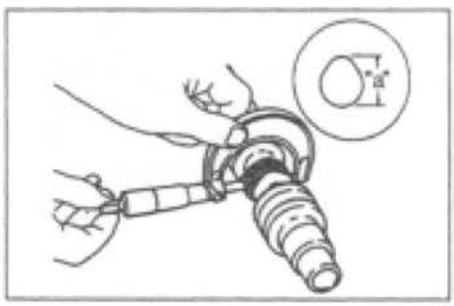
7. Remove valve lifter, spring retainer, valve spring
8. Remove valve
9. Remove valve strem oil seal, next remove valve spring seat



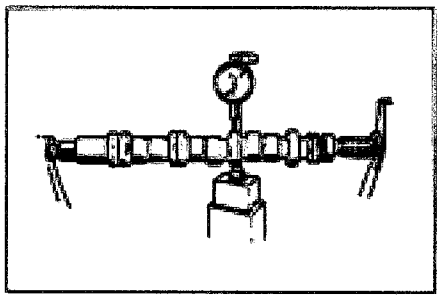
Note-if valve guides must be removed use Suzuki tool number (09916-44910)



Inspection
Using a micrometer check the cam hight. If it is out of spec replace camshaft



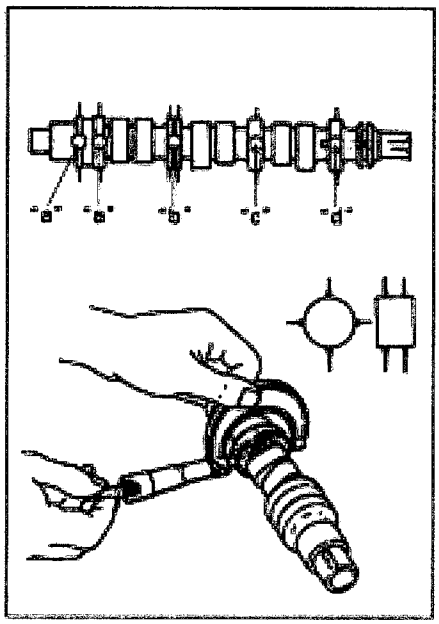
Cam Hight "a"	Acceptable	Limit
Intake cam (mm)	30.74	30.6
Exhaust cam (mm)	29.75	29.6

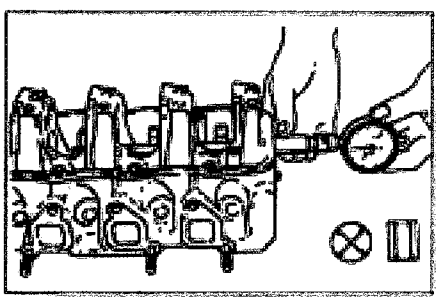


Camshaft Straightness Measurment

Use a Dail Indicator and Measure Straightness

Limit Can Not Exceed 0.10mm
Over Limit Replace Camshaft

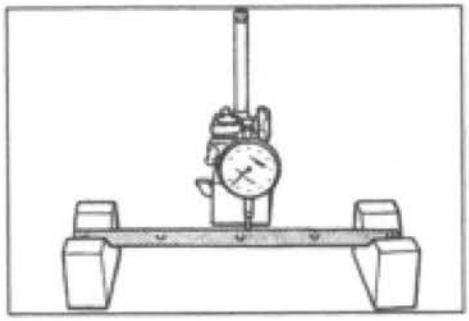




Camshaft Journal

Within Limits: 0.050~0.091
Replace: 0.15 Over

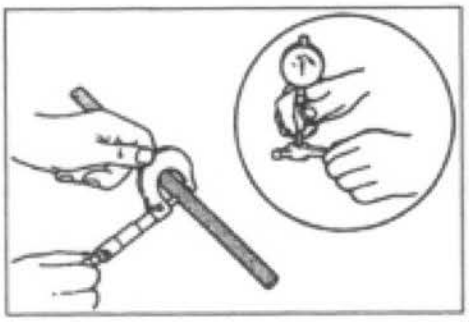
		Camshaft Outside (mm) Diameter	Cylinder Head Diameter (mm)
"a"	Normal	43.425~43.450	43.500~43.516
	Limit	43.375	43.525
"b"	Normal	43.625~43.650	43.700~43.716
	Limit	43.575	43.725
"c"	Normal	43.825~43.850	43.900~43.916
	Limit	43.755	43.915
"d"	Normal	44.205~44.050	44.100~44.116
	Limit	43.975	44.125



Rocker Arm Shaft Inspection

Use a dial gage to check diameter for warp age

*Maximum allowance 0.12 (mm)

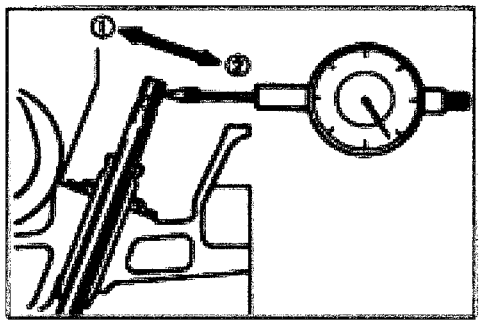


Roker Arm and Roker Arm Shaft Clearance

Rocker Arm and Shaft clearence

Allowance 0.005-0.040
Replace 0.06

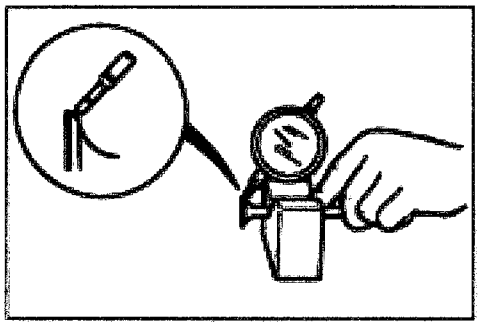
		Allowance	Limit
Valve Stem outer Diameter (mm)	I N	5.465~5.480	–
	E X	5.450~5.465	–
Valve Guide Inside Diameter (mm)	I N	5.500~5.512	5.54
	E X	5.500~5.512	5.54
Stem & Guide Clearence (mm)	I N	0.020~0.050	0.07
	E X	0.035~0.065	0.09



If a bore gage is not available, it is possible to use a dail gage. Use the diagram to the right as an example.

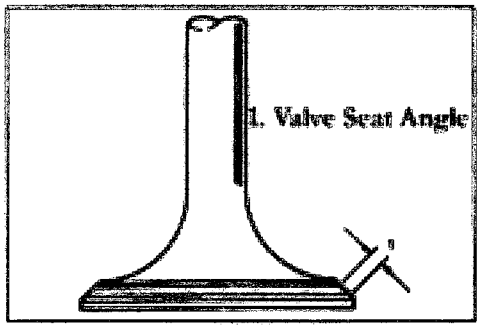
If the play between the stem and the guide are outside the range below. Replace valve guide.

IN 0.14
EX 0.18



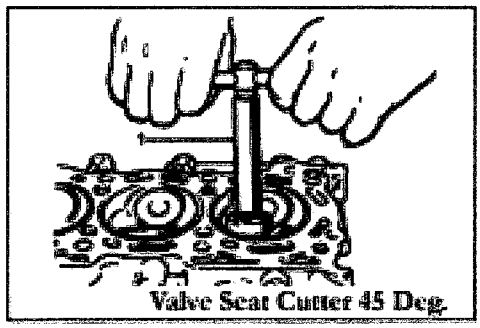
Place a Valve in a V block, and using a dial gage rotate valve.

Maximum allowance: 0.08 (mm)

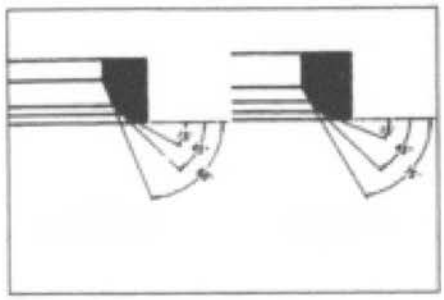


Valve to Valve Seat face

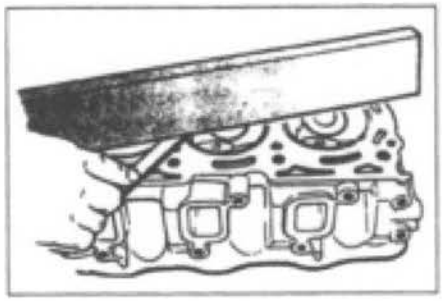
IN 1.3-1.5(mm)
EX 1.3-1.5(mm)



*Use extream caution when cutting valve seats. It is recommended to start with a small cutter and work up to a larger cutter. Finally with 45 degree cutter. It is recommended to take the head to a machine shop for this operation. Over-cutting can cause serious damage to the head.



Valve Lap Degree Diagram

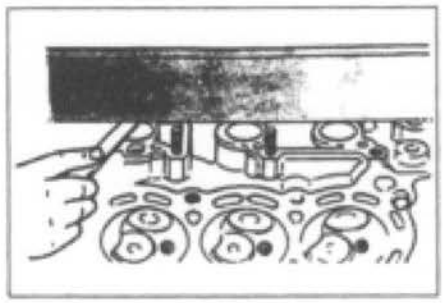


Cylinder Head Plane

Use a straight edge bar and a feeler gage

Allowange 0.05(mm)

Over range, have head machined to spec

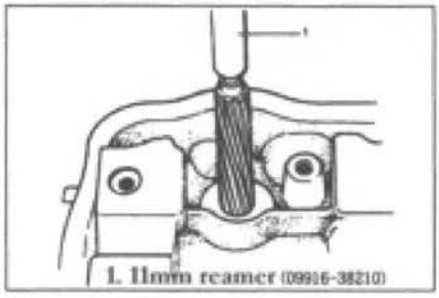


Manifold Face (Cylinder Head)

Use a straight edge bar and a feeler gage.

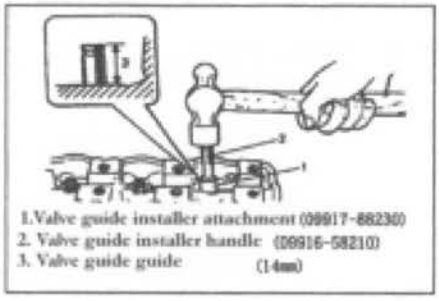
Allowance 0.10(mm)

Out of range, have face milled at a machine shop



Assembly

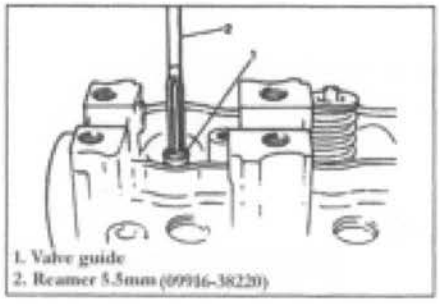
1. Before installation of new valve guides use a 11mm reamer.



2. Pre-heat cylinder head to 80-100 Degrees Celcius Use the proper tools as displayed in the box to the left. Install guides.

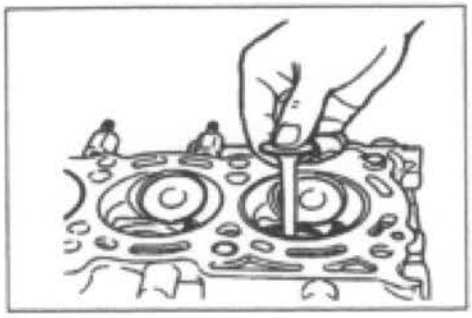
Note-if a guide has been removed for any reason it must be replaced with a new guide.

Oversize Guides (mm) 0.03

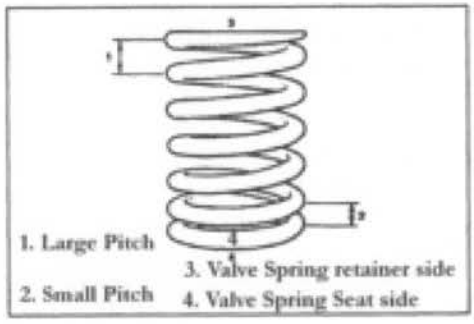


3. After installation, use a 5.5(mm) reamer to verify size.
4. Next place valve spring in place
5. Install new valvle stem oil seal

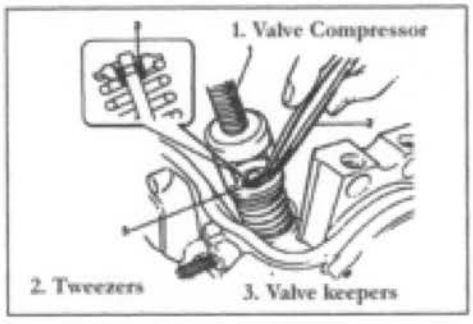
*Note-lubricate new seals with clean engine oil



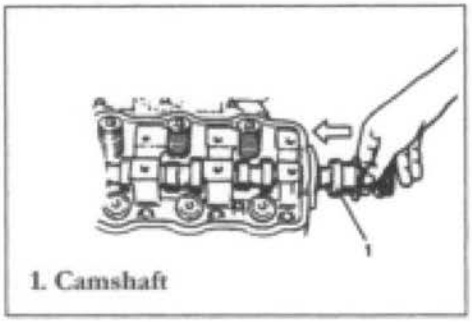
6. Lubricate valve with engine oil and slide into guide. Make sure guide slides without restriction.



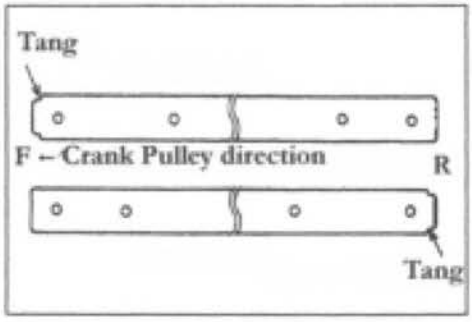
7. See chart on left for proper spring seating



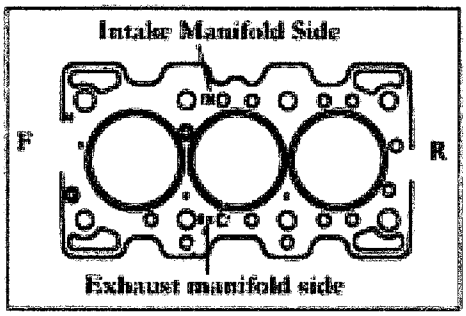
8. Using a valve compressor, install valve keepers



9. Heavily lubricate camshaft with engine oil and install

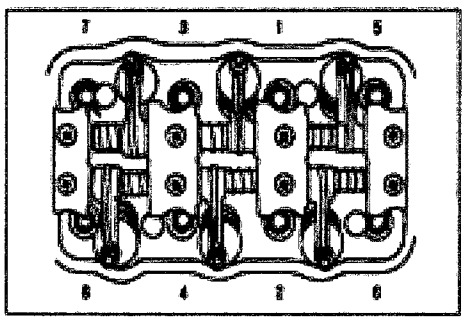


10. Install rocker arm shaft. Make sure tang is in the correct direction as noted in the diagram on the left.



Install new head gasket. Follow the diagram on the left for guidence.

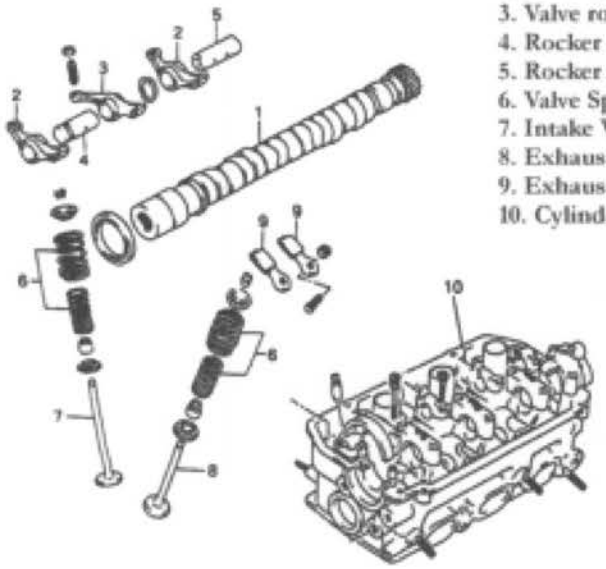
Do not use sealant
Make sure all surfaces are clean



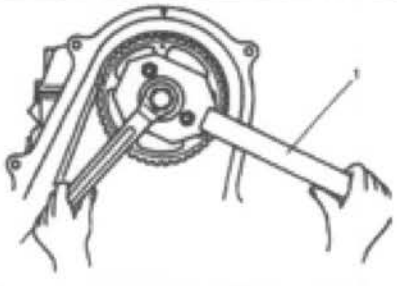
Install head assembly
Torque to (kg.cm) 550-600
Follow torque sequence on the chart to the left

Assemble remaining parts as in previous section of this chapter.

Yokohama Motors



1. Camshaft
2. Valve rocker intake No. 1 Arm
3. Valve rocker intake No.2 Arm
4. Rocker Arm No.1 Shaft
5. Rocker Arm No.2 Shaft
6. Valve Spring Set
7. Intake Valve
8. Exhaust Valve
9. Exhaust Valve Roker Arm
10. Cylinder Head



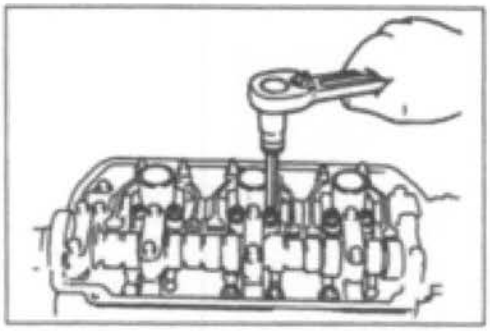
1. Camshaft holder (09917-68220)

Revomal

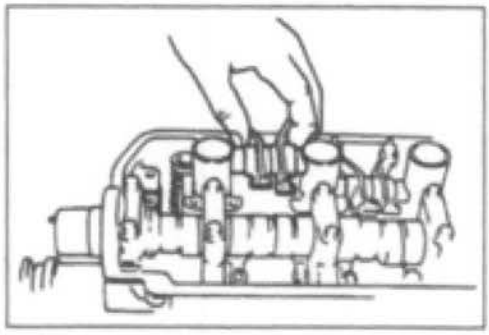
1. Drain coolant system
2. Remove service cover
3. Reome air cleaner case
4. Remove water hose
5. Disconnect vacum hoses
6. Disconnect fuel hose
7. Disconnect accelerator cable
8. Remove timing belt (see previous steps)
9. Disconnect Electrical connectors
10. Remove camshaft timing pulley
11. Remove timing belt inside cover
12. Remove exhaust center pipe
13. Remove exhaust manifold
14. Remove cylinder head

Cylinder Head Disassembly

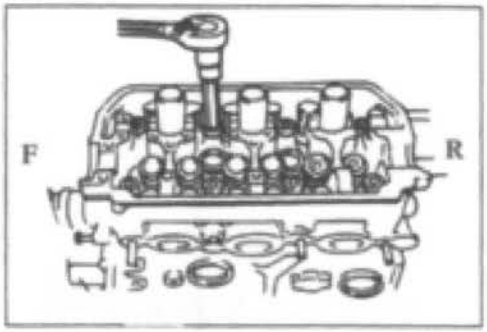
1. Remove Valve Cover
2. Remove Rocker Arm Shaft



3. Remove Intake Rocker Arm (Label Position)
4. Remove Camshaft Caps (Label Position)
5. Remove Camshaft

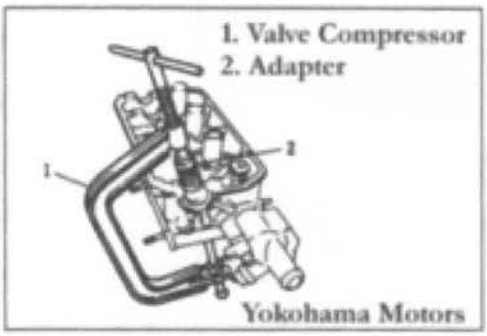


6. Remove Cylinder Head Bolts (8)
7. Remove Cylinder Head

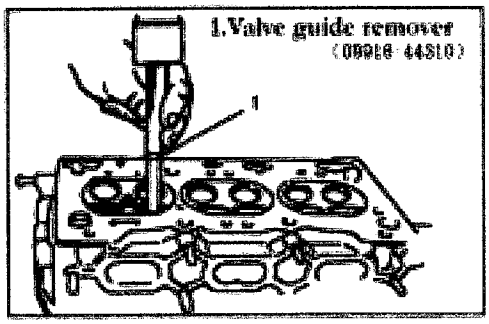


8. Use a Spring Compressor and Remove All Valves (Label Position)

Note: Replace All Springs on Vehicles with Over 100,000 Kilometers

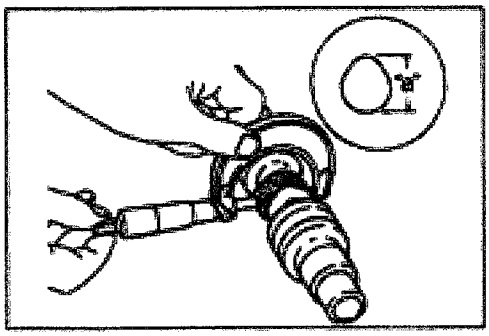


Inspection

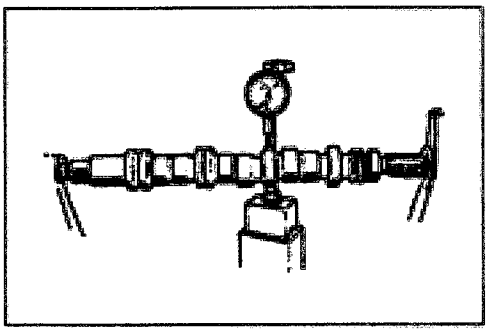


Note: Vehicles Over 60,000 Kilometers Replace All Valve Guides

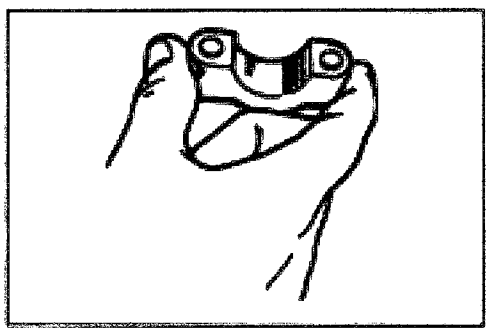
9. Remove Valve Guides With Remover Tool #09916-44510



Cam Hight "a"	Allowance	Limit
Intake Cam (mm)	30.74	30.6
Exhaust Cam (mm)	30.20	30.1



10. Check Camshaft Warpage
Limit: 0.10mm
Over: 0.11mm Replace

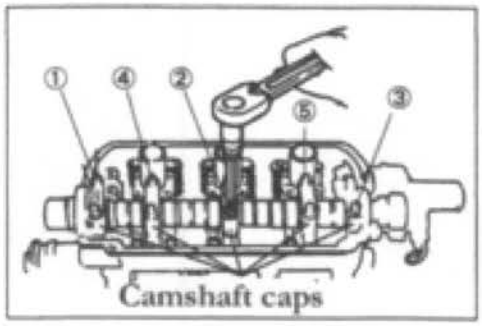


11. Inspect Housing Caps for Visable Damage. Replace as Nesessary

12. Reinsert Camshaft into Housing and Torque Caps

Torque: (kg.cm) 90-100

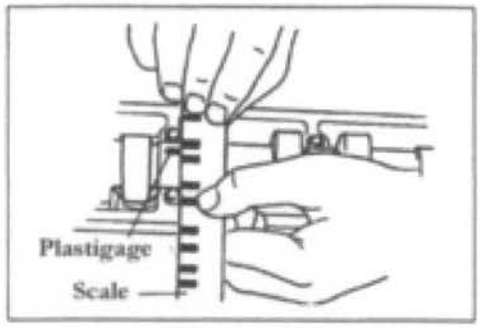
Note: Make Sure Camshaft is well Oiled

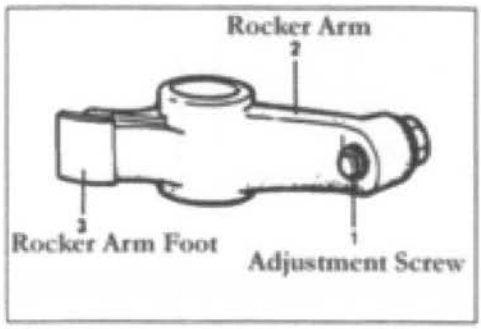


13. Use a Plastigage and Check Clearance

Allowance: 0.045-0.87mm

Limit: 0.12mm

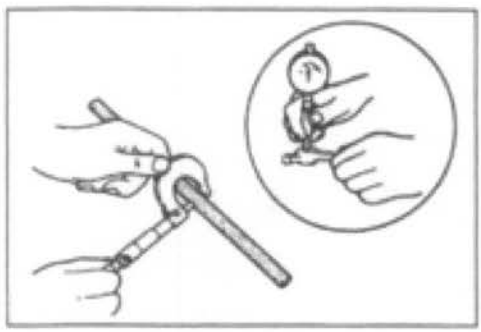


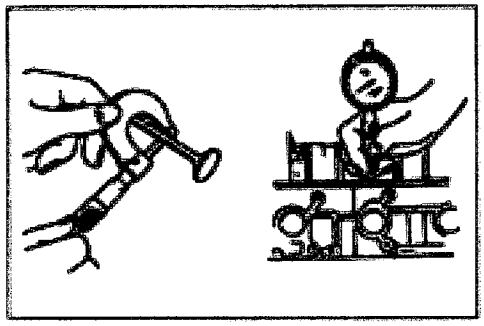


14. Rocker Arm Clearance

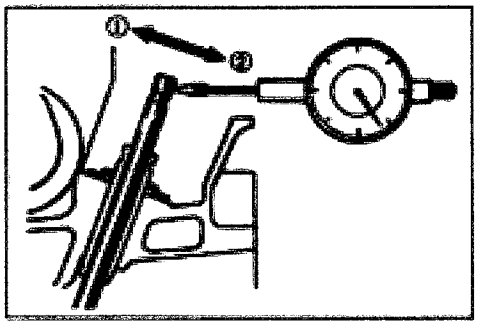
Allowance: 0.005-0.040mm

Limit: 0.006mm



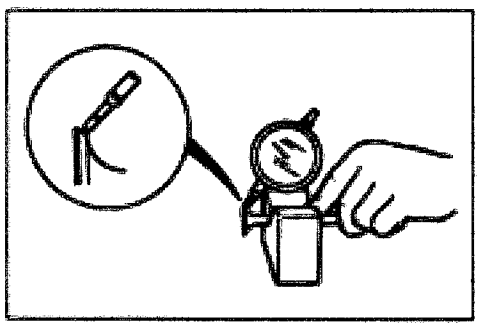


		(mm) Allowance	(mm) Limit
Valve Stem Diameter	IN	4.965~4.980	–
	EX	4.950~4.965	–
Valve Guide Inner-Dia	IN	5.000~5.012	5.04
	EX	5.000~5.012	5.04
Stem Guide	IN	0.020~0.047	0.07
	EX	0.035~0.062	0.09



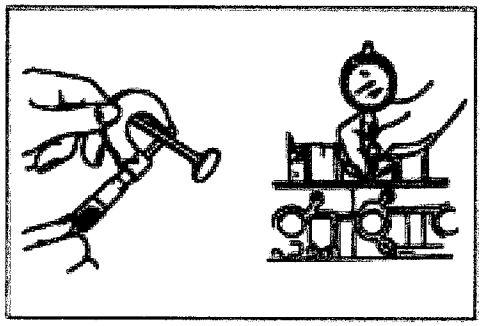
15. Use a Dialgage to Check Side Movement

Limit: IN 0.14mm
EX 0.18mm

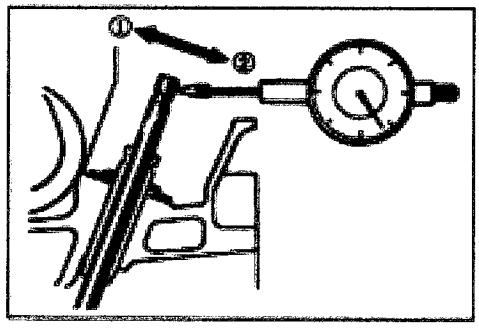


16. Use a V Block and Dialgage to Check Valve Face Angle

Limit: 0.08mm

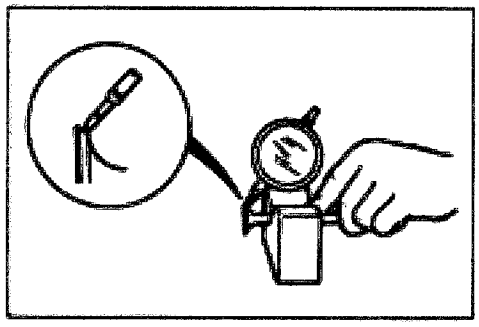


		(mm) Allowance	(mm) Limit
Valve Stem Diameter	I N	4. 965~4. 980	–
	E X	4. 950~4. 965	–
Valve Guide Inner-Dia	I N	5. 000~5. 012	5. 04
	E X	5. 000~5. 012	5. 04
Stem Guide	I N	0. 020~0. 047	0. 07
	E X	0. 035~0. 062	0. 09



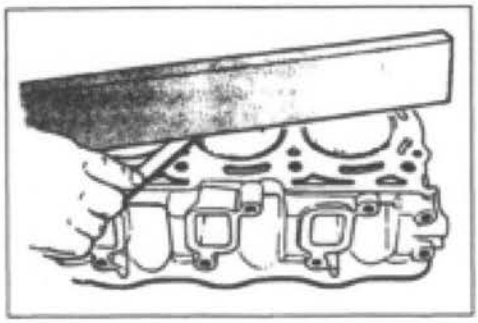
15. Use a Dialgage to Check Side Movement

Limit: IN 0.14mm
EX 0.18mm



16. Use a V Block and Dialgage to Check Valve Face Angle

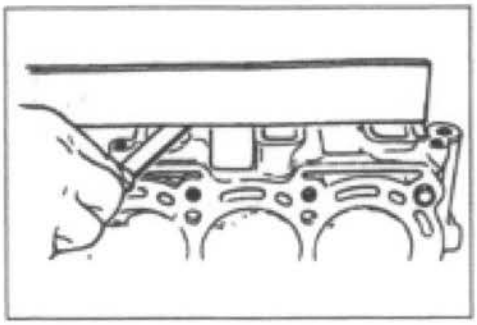
Limit: 0.08mm



Surfaces

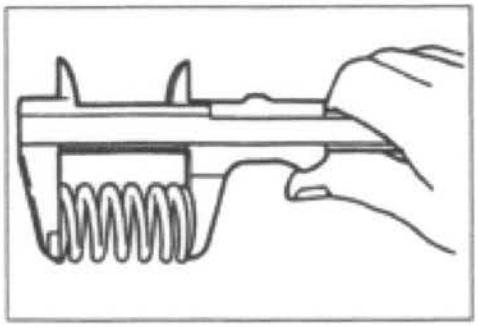
17. Use a Straight Edge and a Feeler Gage to Check Deck Surfaces

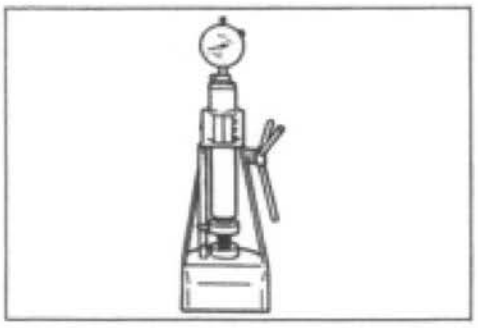
Allowance: 0.05mm



18. Inspect Manifold Deck Surface

Allowance: 0.10mm



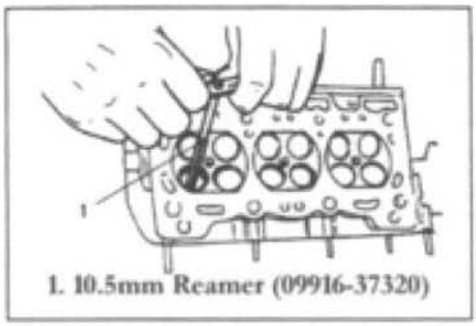


Valve Sping Chart

		Allowance	Limit
Valve Spring(mm)	Inner	32.9	31.8
	Outer	36.6	35.5
Valve Spring Pressure (kg/41.5mm)		24.8~29.2	22.8

4 Valve Head Overhaul
Assembly

1. Use a 10.5mm Reamer and Ream Out Guide Bores at Ambient Temperature



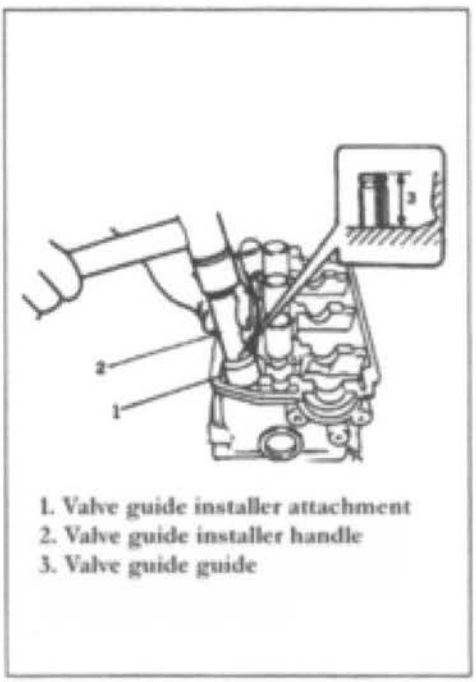
1. 10.5mm Reamer (09916-37320)

2. Warm Cylinder Head to 80-100 Degrees Celsius
3. Install Valve Guides

Note: Never Reuse Valve Guides

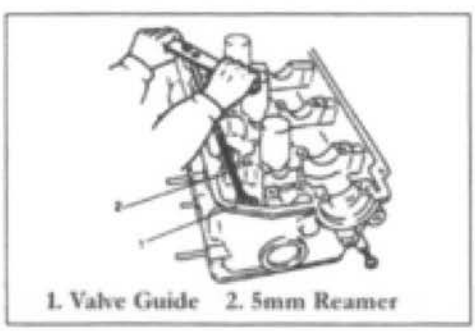
Note: Maximum Oversize 0.03mm

See parts Catalogue for Correct Part Numbers When Ordering



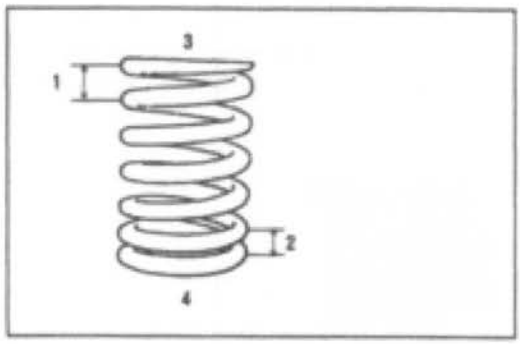
1. Valve guide installer attachment
2. Valve guide installer handle
3. Valve guide guide

4. After Guide Installation Use a 5mm Reamer to Clean Guide Bores
5. Thoroughly Clean All Surfaces to Make Sure No Metal Shavings Are Present



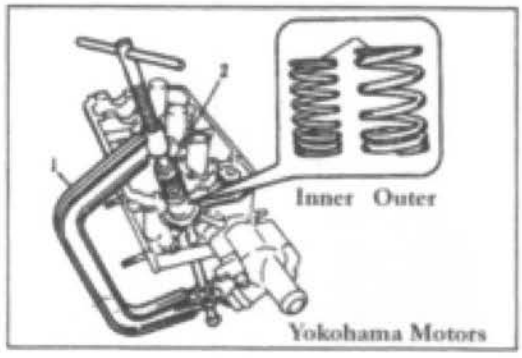
1. Valve Guide 2. 5mm Reamer

Spring Diagram



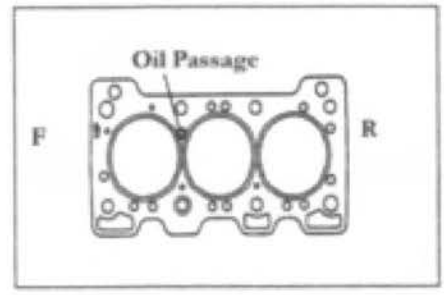
1. Large Pitch Size
2. Small Pitch Size
3. Valve Spring Retainer Side
4. Valve Spring Seat

6. Assemble Springs as Shown in the Diagram on the Right

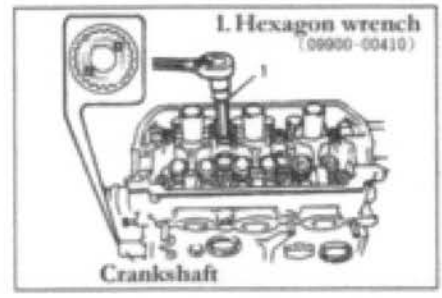


Note: Do Not Mix Old Springs With New. Change as a Set Only

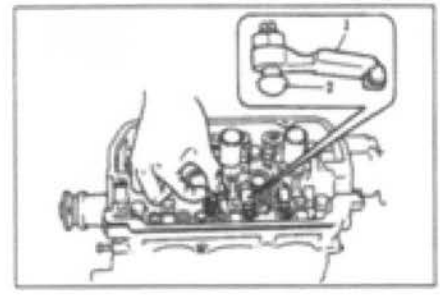
6. Install Head Gasket as Shown on the Right Side Diagram
7. Clean All Surfaces Before Installation. Do Not Put Sealant on Head Gasket



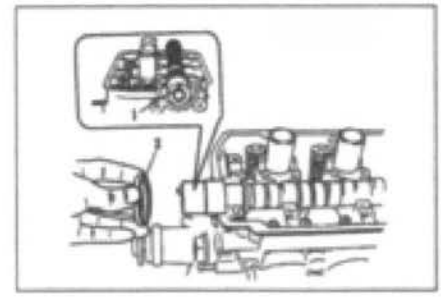
8. Torque Head Bolts to 600-650 (kg.cm)



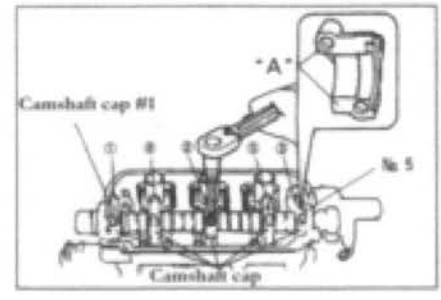
9. Place Rocker Arms in Place



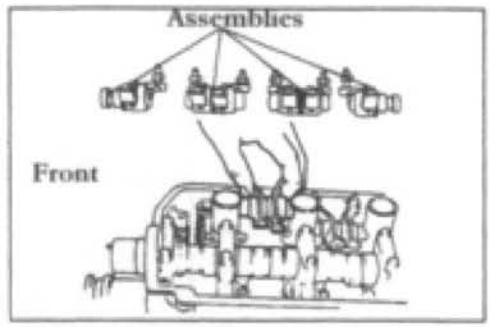
10. Place Timing Drift Key and New Oil Seal in Place



11. Install Camshaft Caps and Torque to (kg.cm) 90-120
12. Oil All Moving Parts With Fresh Motor Oil

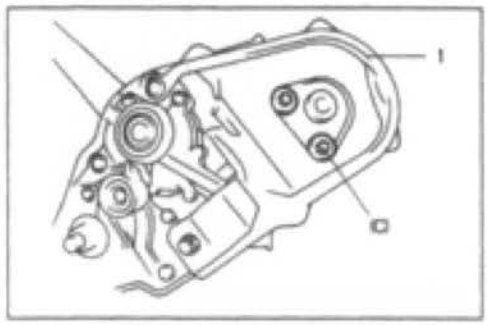


13. Assemble Rocker Arm Assemblies

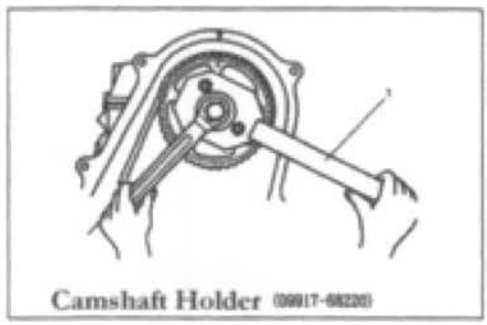


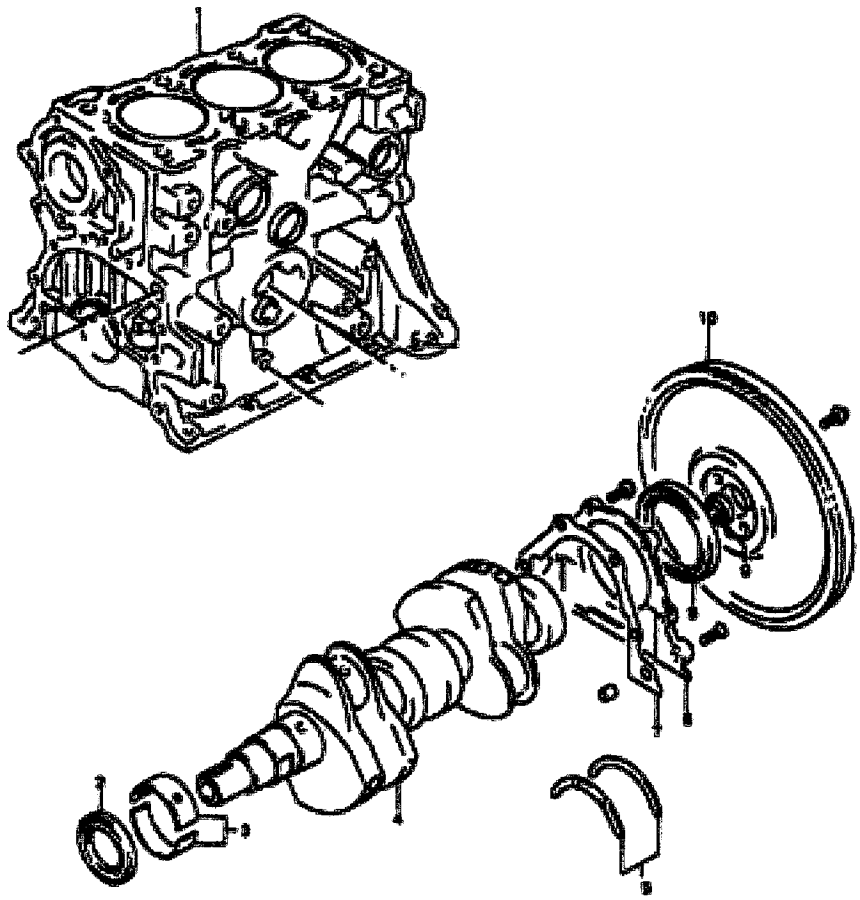
14. Install Inside Belt Cover
15. Torque Timing Belt Cover to (kg.cm) 90-120

Note: Do Not Over Torque as Bolts Will Break

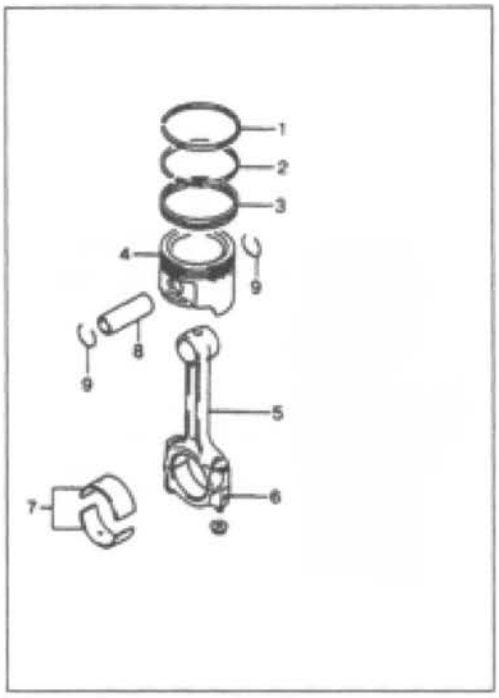


16. Install Timing Belt
17. Set Camshaft Pulley Torque to (kg.cm) 500-600
18. Assemble Belt Components as in Previous Section
19. Set Valve Lash
20. Install Valve Cover



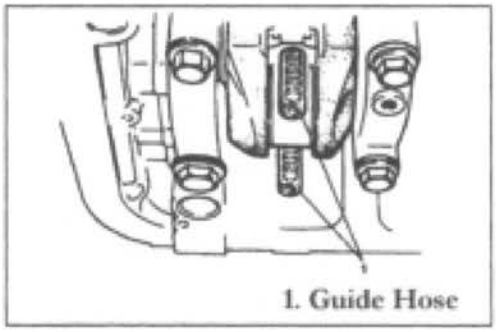


1. Cylinder Block
2. Front Main Seal
3. Main Bearing
4. Crankshaft
5. Thrust Bearing
6. rear Oil Seal
7. Oil Seal Housing Gasket
8. Oil Seal Housing
9. Input Shaft Bearing
10. Flywheel



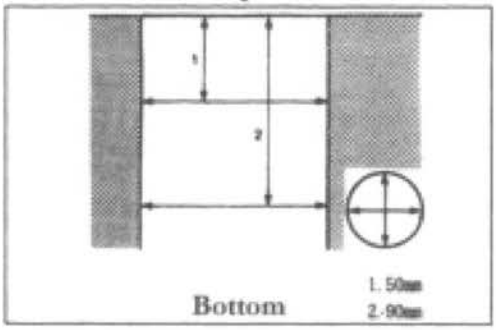
Piston Diagram 660cc 2 Valve and 4 Valve

1. Top Ring
2. 2nd Ring
3. Oil Ring
4. Piston Ring
5. Conncting Rod
6. Bearing Cap
7. Bearings
8. Piston Pin
9. C-Clip



Note-When removing pistons place vacume hose or fuel hose over the bolt ends to prevent cylinder wall scratches during removal

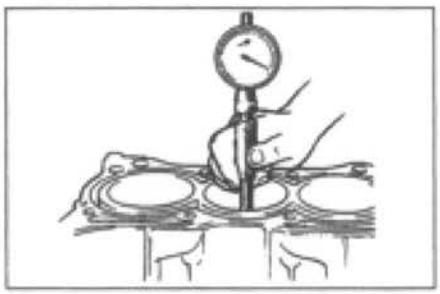
Cylinder Diagram
Top



After piston removal check for a lip to determine excessive wearing. Excessive wearing will require cylinder boring. Oversize pistons and rings are available in 0.25(mm) or maximum 0.50(mm) sizes.

Use the chart on the left to determine diameter limits. The following charts and diagrams provide the correct sizes per boring requirments

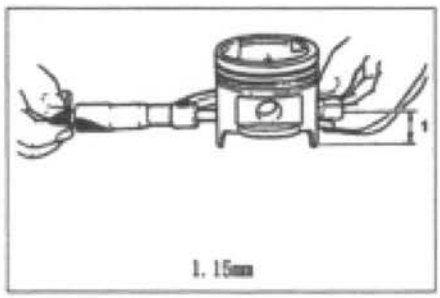
Cylinder Bore Measurements



1. Measure Bore With a Dial Gage

Inside Diameter 65.070mm
Taper Limit: 0.10mm

Note: If One Cylinder Requires Boring All Cyliners Must Be Bored to the Same Size. All Rings Must Be Replaced

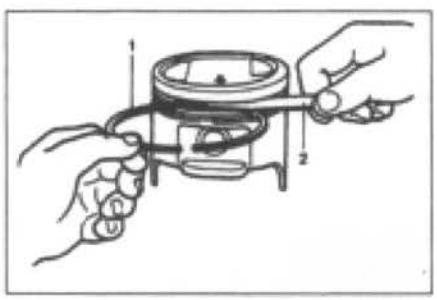


Piston Size

Piston Diameter (mm)	Allowance	64. 965~64. 985
	Oversize 0.25	65. 215~65. 235
	Oversize 0.50	65. 465~65. 485

2. Measure Piston Diameter

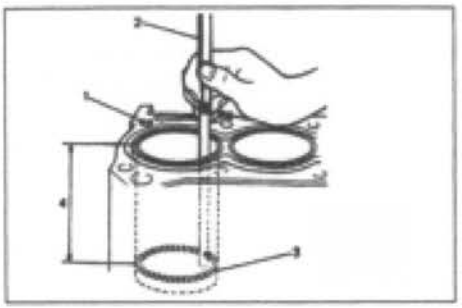
Note: See Parts Catalogue For Oversize Pistons



1. Piston Ring
2. Thickness Gage

Ring Side Clearance	Piston Ring	Allowance	Limit
	Top	0. 03~0. 07	0. 12
	Second	0. 02~0. 06	0. 10

3. Measure Ring Clearance With a Thickness Gage



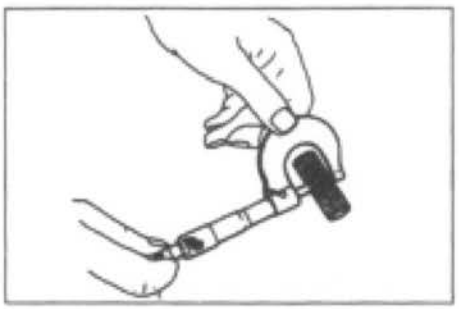
4. Measure Ring End Gap

Note: Use the Diagram on the Left for an Example. Place a New Ring and Measure from Bottom to Top. Check All Cylinders

		Allowance	Limit
	Top Ring	0.12~0.27	0.7
	2nd Ring	0.15~0.30	0.7
	Oil Ring	0.20~0.70	1.8

Note: Check Parts Catalogue for Replacement Rings

Piston Pin

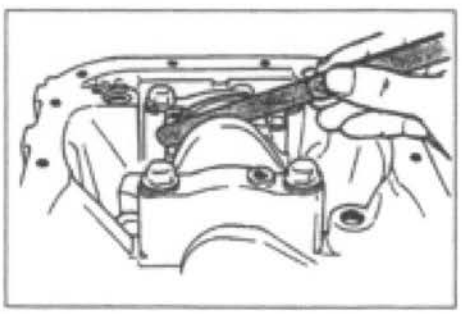


Clearance Chart

Piston Pin Hole		
	Allowance	
Outer	17.995~18.000 (15.995~16.000)	—
Piston Boss Inner Dia	18.006~18.014 (16.006~16.014)	—

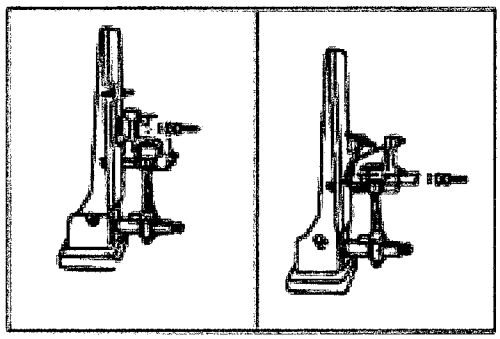
( ) =4Valve

Connecting Rod Side Clearence



5. Inspect Connecting Rod Side Clearance

Allowance: 0.1-0.2mm



Alignment Machine

Connecting Rod Alighment

If a rod knocking noise was detected before disassembly, this test should be preformed

Bend Rate Failure @ 0.05(mm)
Twist Rate Failure @ 0.10(mm)

Connecting Rod Bearings

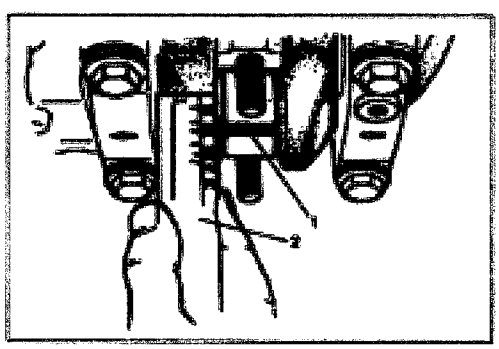
Note: Do Not Remove Old Bearings With Sharp Tools Damage Will Occure

Note: Always replace both upper and lower bearing as a set

Note: If an irregularity is indicated, measure the crank journal with a micrometer

Note: Only standard (STD) replacement bearings available

Warning: Do not rotate the crankshaft while gaging material is between the bearing and journal

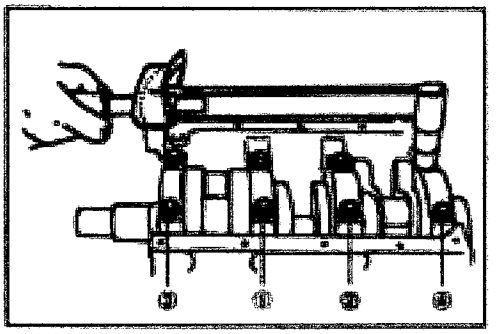


1. Plastigage 2. Scale

6. Bearing Clearance Measurement

Clearance
Allowance 0.020-0.040(mm)

Bearing Size
Normal: STD
Crankshaft (mm) 35.982-36.00
Bearing Cap Torque (kg.cm) 310-350

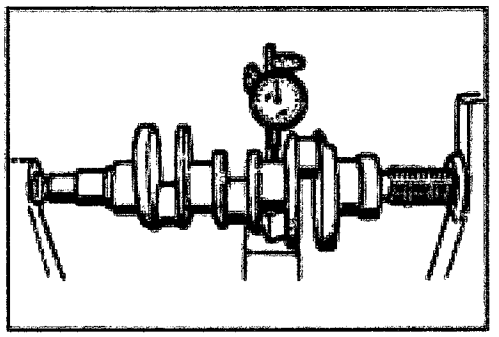


Crankshaft Inspection

***Note: Before removing crankshaft verify previous torque setting were correct**

Follow the torque sequence guild to the left.
Torque should be (kg.cm) 550-600

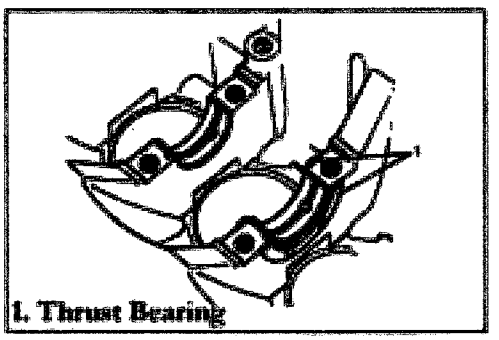
Remove Crankshaft



Crankshaft Journal Taper/Out of round Limit
Using a dial gage check the crankshaft. The test should involve minimum 3 turns per Journal

Out of round Limit: 0.03(mm)

Thrust Bearing

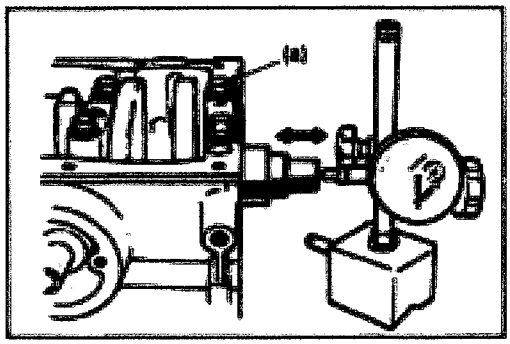


Inspect thrust bearings for unusual ware.

Remove thrust bearings and discard

***Not: Do not re-use thrust bearings**

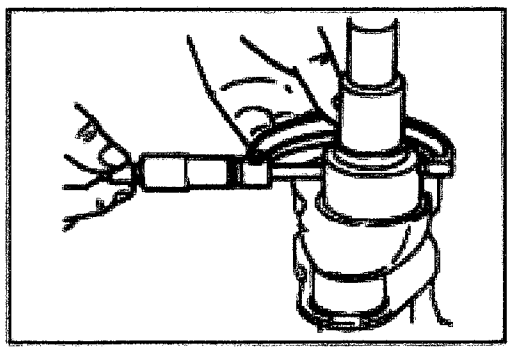
Replace with new bearings



Main Bearing torque (kg.cm) 550-600

Crancksbaft End-Play

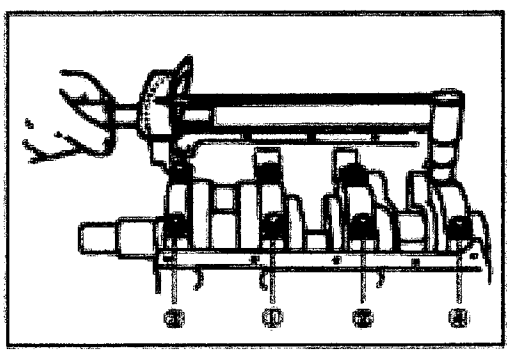
Allowance: 0.13-0.28(mm)



Using a micrometer, check journal taper

Crankshaft Journal STD
43.982-44.000(mm)

Journal Taper Allowance: 0.01(mm)

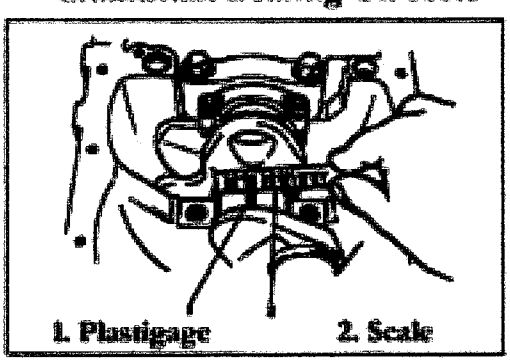


Re-Install Crankshaft and torque to Spec

Torque (kg.cm) 550-600

Use the diagram on the left for sequence

Crankshaft Bearing Oil Hole

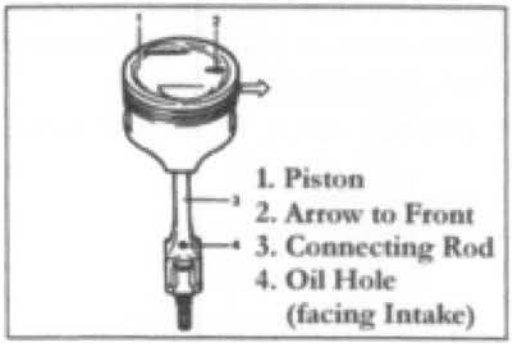


Crankshaft Bearing Orifice
(Oil Hole)

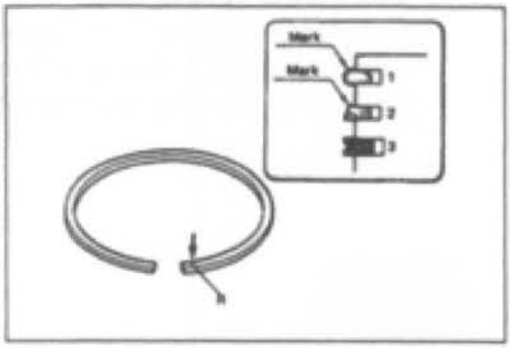
Allowance: 0.020-0.040(mm)

Note: It is Best Practice to Always install New Piston Rings. Engines with Over 60,000 Kilometers Must be Replaced

6. Install the Connecting Rod to the Piston. Make Sure The Arrow on Top of the Piston is Facing Towards the Front of the Engine
7. Use The Diagrams on the Right for Examples

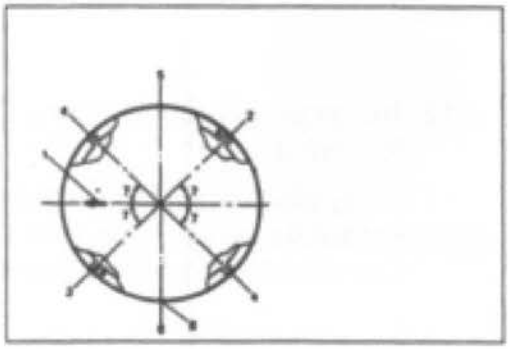


8. Use the Diagram on the Right For Ring Location

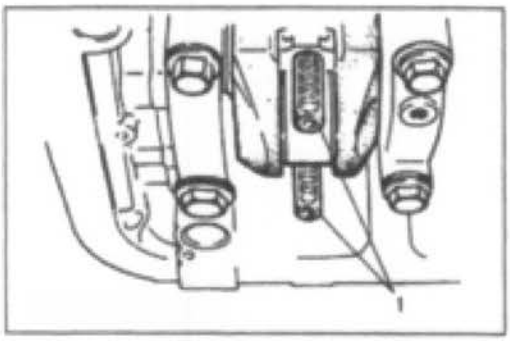


Ring Gap Location

9. Use the Chart For Proper Ring Placement



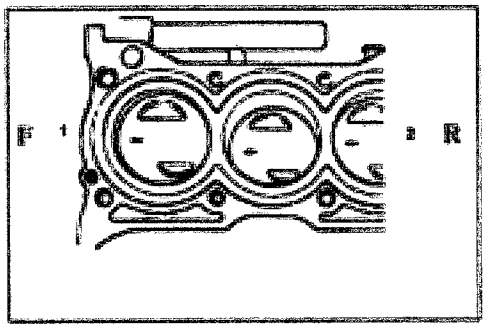
10. Place Rubber Hose Over Connecting Rod Bolts to Prevent Scratching Journal Surfaces During Installation



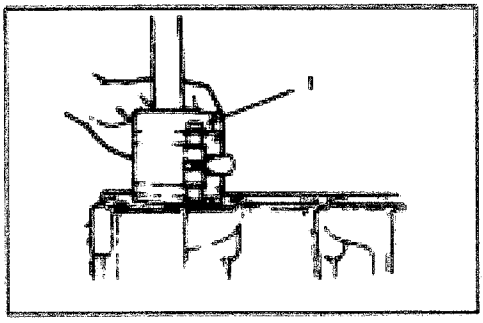
1. Guide Hose to protect journal

Note: As in the Diagram to the Right the Top of the Piston Arrow or Mark Must Face the Front of the Block

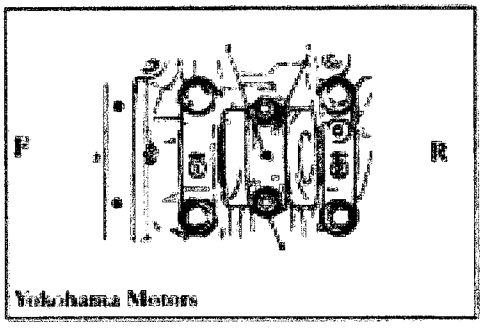
1. Engine Front 2. Flywheel Direction



11. Use A Ring Compressor and Install Pistons. Use only a Wooden or Rubber Handle to Install. Make Sure The Rubber Hose Covering the Connecting Rod Bolts Does Not Fall Off During Installation



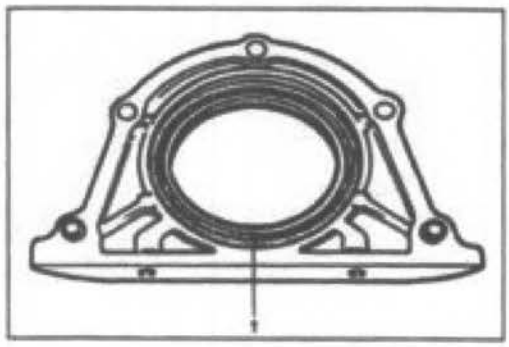
Note: While Installing Main Bearing Caps Make Sure the Arrows are Pointing to the Front of the Engine



12. Install and Torque Bearing Caps to (kg.cm) 310-350
13. Apply plenty of Oil to Cylinder Walls and Rotate Assembly. The Unit Shall Turn Freely and if Binding is Detected Locate Cause before Further Assembly

14. Install New Rear Main Oil Seal

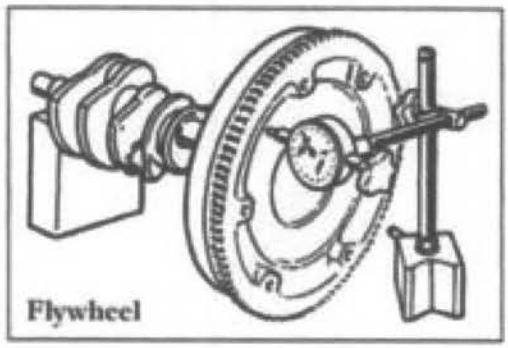
1. Rear Oil Seal



15. Inspect Flywheel Warpage

Limit: 0.2mm

Torque: (kg.cm) 400-500

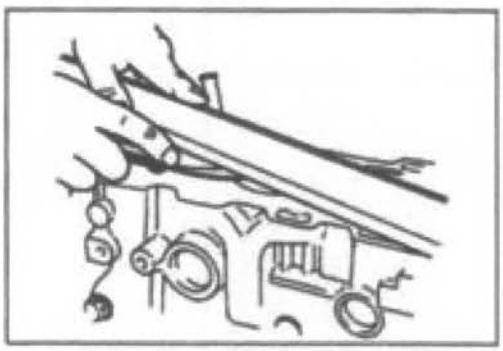


Flywheel

16. Before Final Assembly Use Straight Edge to Verify Deck Warpage After All Torque Requirements have Been Set

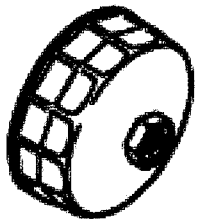
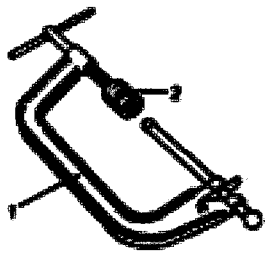
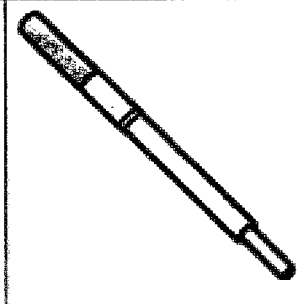
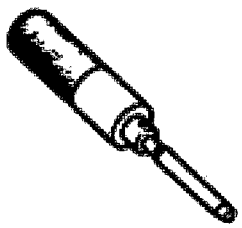
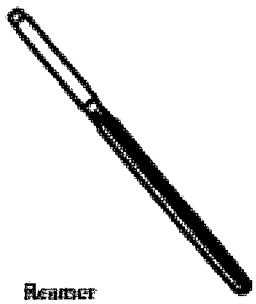
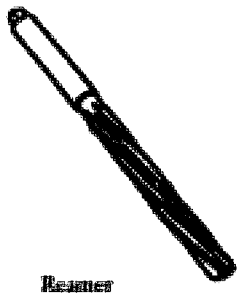
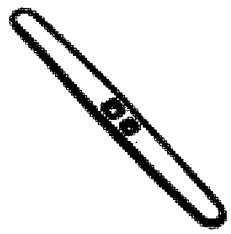
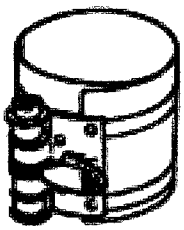
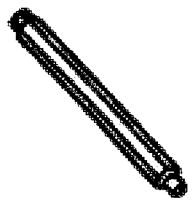
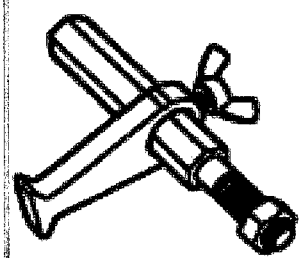
Limit: 0.05mm

17. Assemble Remaining Components as Described in Precious Chapters

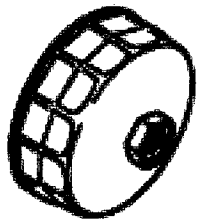
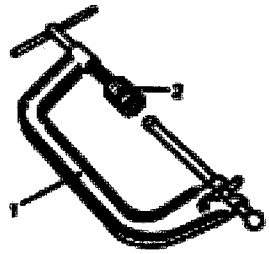
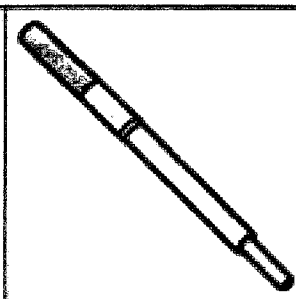
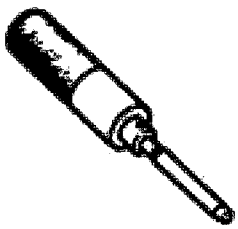
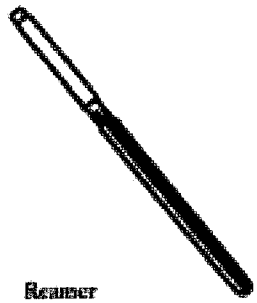
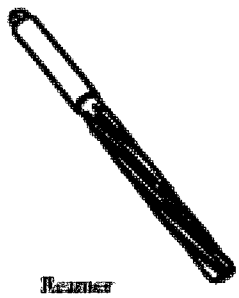
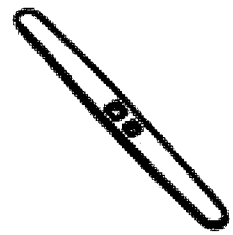
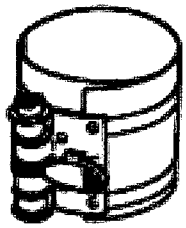
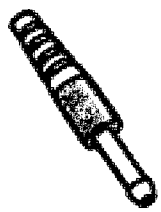
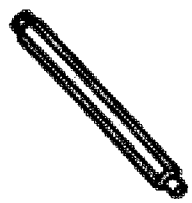
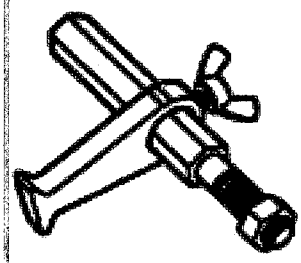


Cylinder Block Deck Check

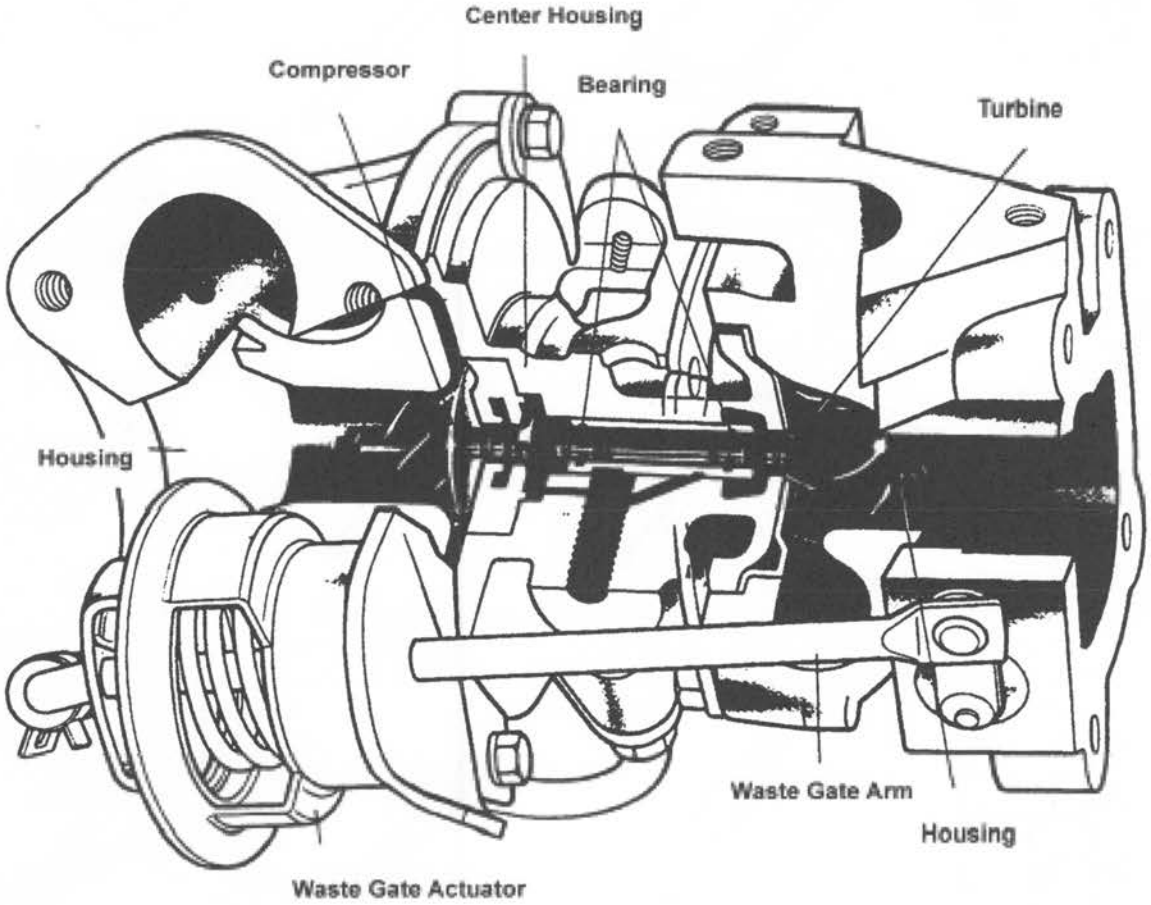
Engine Related Specialty Tools

 09915-47340 Oil Filter Wrench Socket	 1. 09916-14510 Compressor 2 Valve : 09916-48210 4 Valve : 09916-14910	 4 Valve : 09916-44310 2 Valve : 09916-44910 Valve Guide Remover	 4 Valve : 09916-57340 2 Valve : 09917-88230 Valve Guide Installer Socket
 4 Valve 09916-57330 Others 09916-58210 Valve Guide Installer	 Reamer 2 Valve 09916-38220(5.5mm) 4 Valve 09916-34570(5mm)	 Reamer 2 Valve 09916-38210(11mm) 4 Valve 09916-37320(10.5mm)	 09916-34541 Reamer Handle
 09916-77310 Spring Compressor	 09916-68210 Vacuum Hose Joint	 09900-00410 Hexagon Wrench	 09924-17810 Flywheel Holder

Engine Related Specialty Tools

 09915-47340 Oil Filter Wrench Socket	 1. 09916-14510 Compressor 2 Valve : 09916-48210 4 Valve : 09916-14910	 4 Valve : 09916-44910 2 Valve : 09916-44910 Valve Guide Remover	 4 Valve : 09916-57340 2 Valve : 09917-68230 Valve Guide Installer Socket
 4 Valve 09916-57330 Others 09916-58210 Valve Guide Installer	 Reamer 2 Valve 09916-38230(5.5mm) 4 Valve 09916-34570(5mm)	 Reamer 2 Valve 09916-38210(11mm) 4 Valve 09916-37320(10.5mm)	 09916-34541 Reamer Handle
 09916-77310 Spring Compressor	 09916-68210 Vacuum Hose Joint	 09900-00410 Hexagon Wrench	 09924-17810 Flywheel Holder

Turbocharger



Main Specifications

Type: RHB-31CW

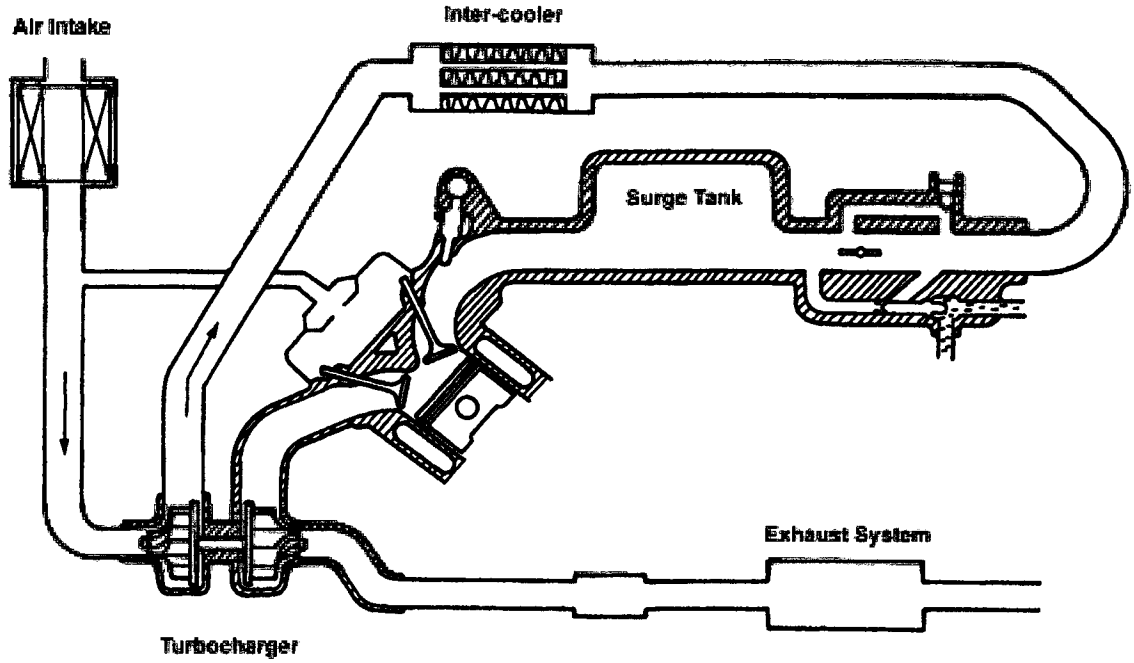
Maker: IHI Japan

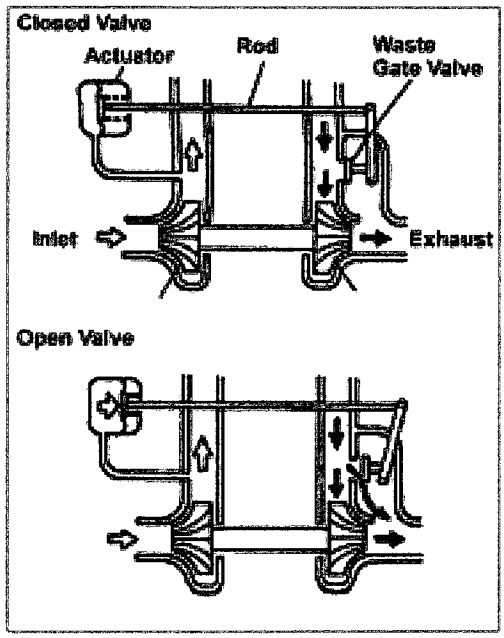
Turbine Diameter: 36.6mm

Compressor Diameter: 37mm

Maximum Boost Pressure: 0.75 kg/cm2

Turbocharger
System Diagram

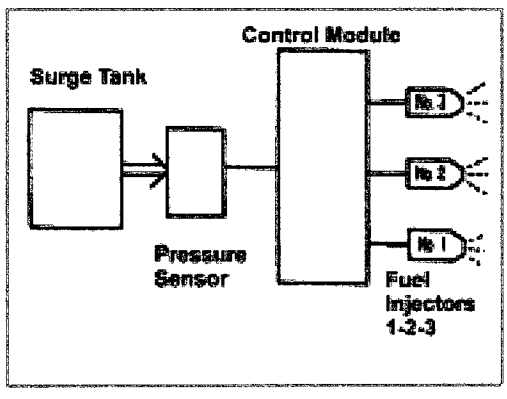




Type: Waste Gate Equipped IHI Turbo Turbocharger Operating System

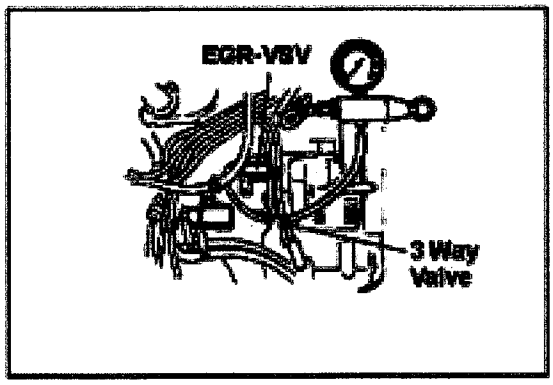
1. Waste Gate Closed Diagram

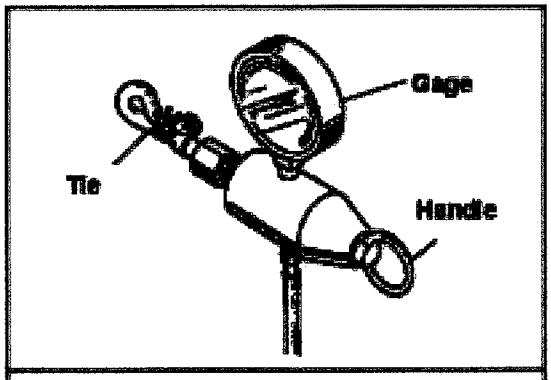
2. Waste Gate Open Diagram

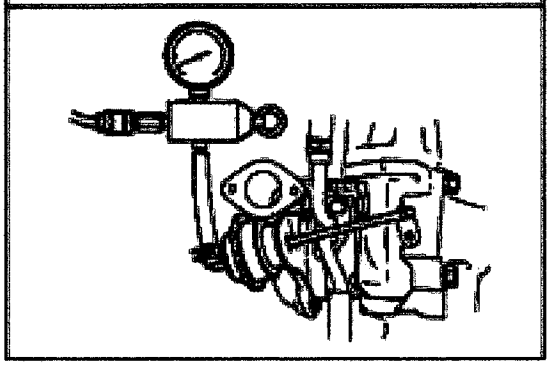


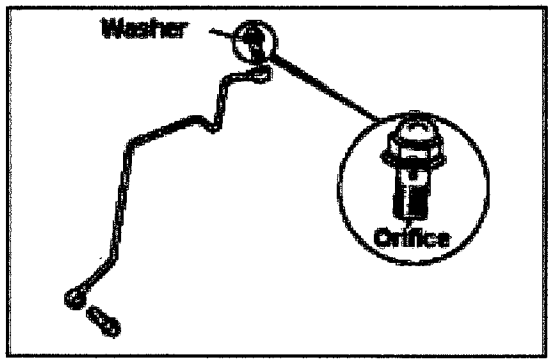
3. Control System

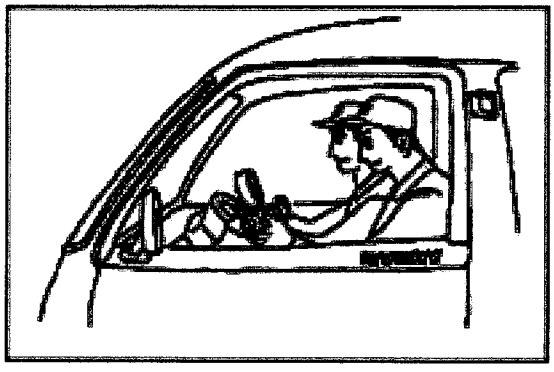
Note: See Fuel & Electronics System Sections for more details.











Turbocharger Output Pressure Test

1. Install a 3-Way adapter hose connection between the Air Intake Surge Tank and the EGR's VSV Hose as shown

2. Place the Vehicle on a lift until all tires are off the ground and the vehicle secure.

3. Runt the Vehicle up to 5000RPM in Second or Third Gear. The Turbo Boost Pressure must be between 0.65-0.80kg/cm2. If the pressure is over 0.80kg/cm22 the Waste Gate and or the Manifold Pressure Sensor has failed. Check individual components to verify the cause.

4. Use a Vacuum Gage and attach to the Waste Gate Actuator as shown. Increase Vacuum until Waste Gate Actuator Opens.

Limit: 0.75 kg/cm2

NOTE:

DO NOT increase vacuum over 0.9cm/cm2 or the Actuator Diaphragm may rupture!

Note: The Turbocharger Oil Line must have the proper Orifice Bolt Installed as shown.

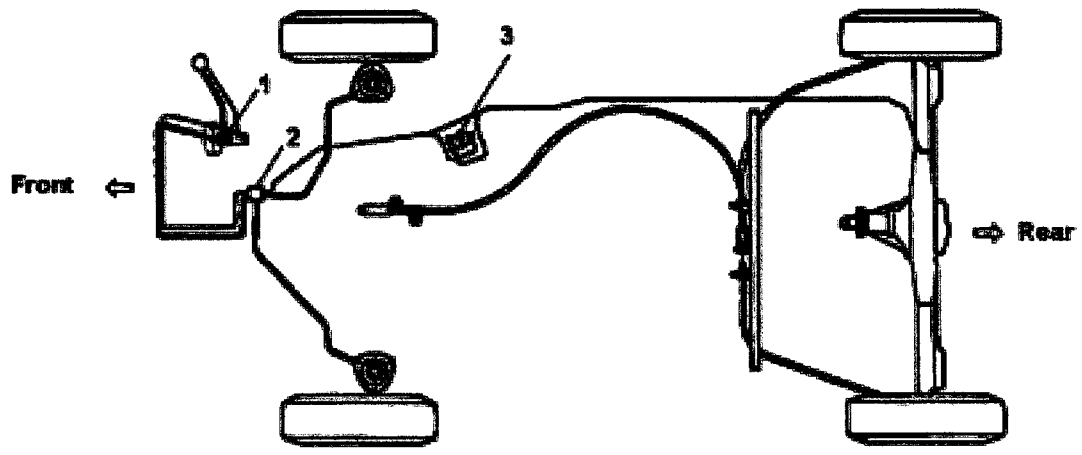
5. Let's Go!

Chapter 12: Brake System

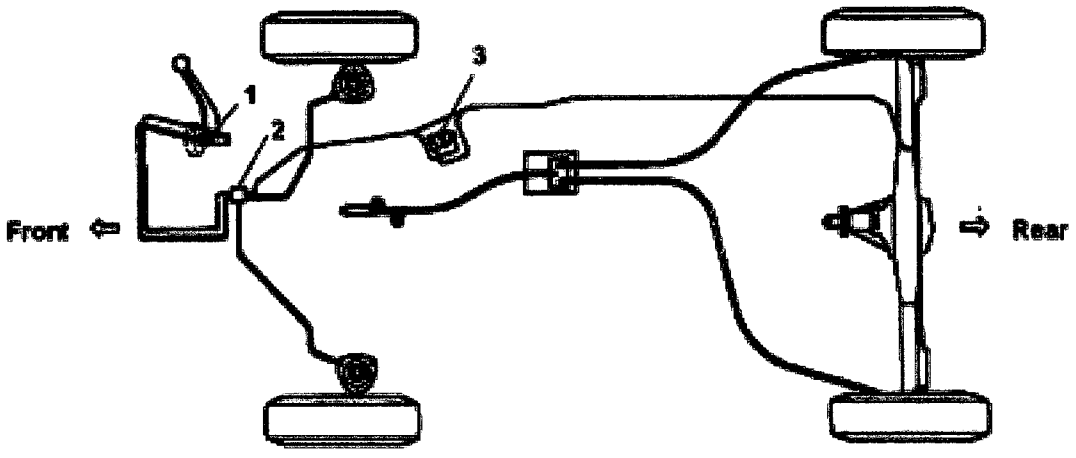
- Brake Lines System
- Front Disk Brake Component Replacement
- Front Disk Pad & Rotor Specifications
- Front Disk Brake Calipers
- Front & Rear Drum Brakes Types
- Front Drum Brakes
- Rear Drum Brakes
- Drum Specifications
- Drum Brake Shoe Settings
- Master Cylinder

Brake Lines System

Truck



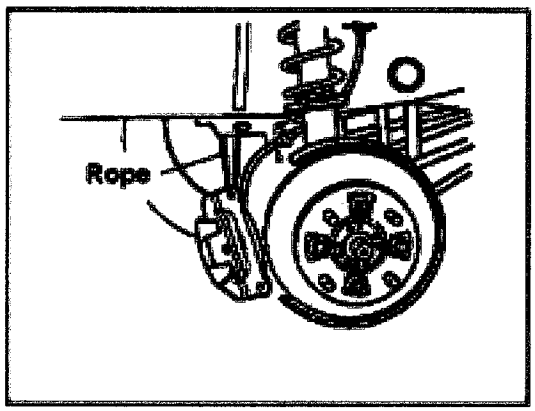
Van



Components

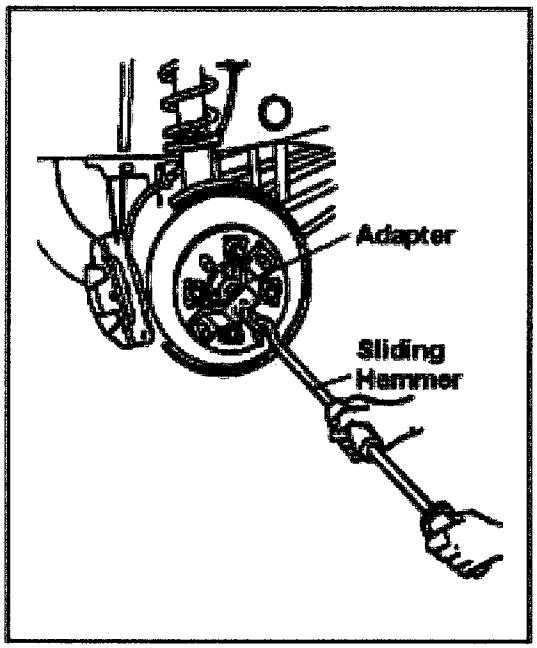
1. Master Cylinder
2. Joint Block
3. G-Valve (Truck) Proportioning Valve (Van)

Front Disk Brake Component Replacement

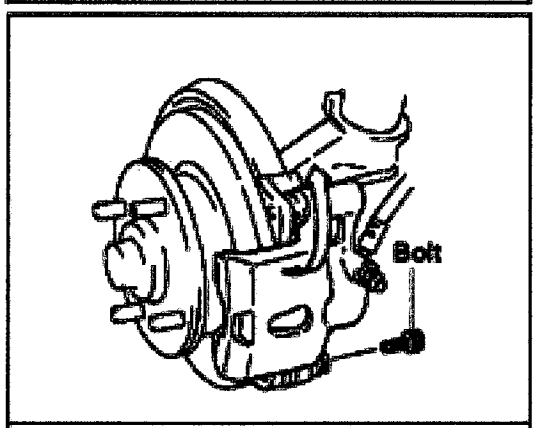


Disk Brake Rotor Removal

1. Raise Vehicle and remove Wheels
2. Remove Two (2) Caliper retaining bolts. Tie a Rope as shown as not to damage Brake Hoses when hanging to the side.

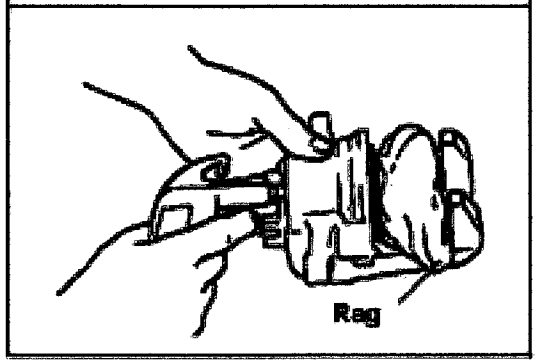


3. Remove retaining Bolts and attach Slide Hammer and Adapter as shown.
4. Remove Brake Disk Rotor.



Pad Replacement

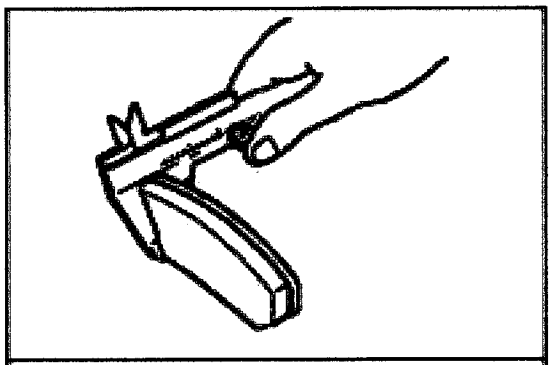
1. Raise Vehicle and remove Wheels
2. Remove Two (2) Caliper retaining bolts.
3. Remove Pads
4. Clean Part thoroughly and install new Pads
5. Install in reverse.



Stuck Caliper

1. Remove Pads from Caliper.
2. Disconnect Brake Hose.
3. Place a Rage as shown.
4. Attach an Air Hose and slowly apply Air Pressure as shown. The Caliper Piston will extend. Rebuild Caliper.

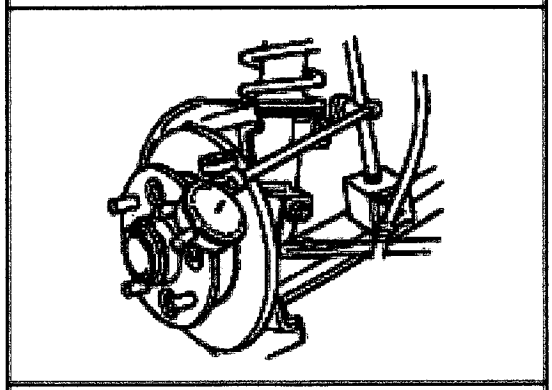
Front Disk Pad & Rotor Specifications



Brake Pad Lining Thickness Inspection

New Pad: 10mm

Limit: 3.0mm

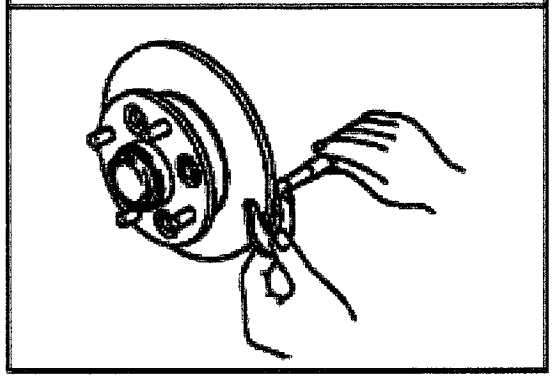


Brake Disc Run Out (Backlash)

Use a Dial Gage as shown. Rotate Rotor minimum Two Rotations.

Limit: 0.07mm

Note: If Rotor Fails the test also inspect Front Hub Backlash.



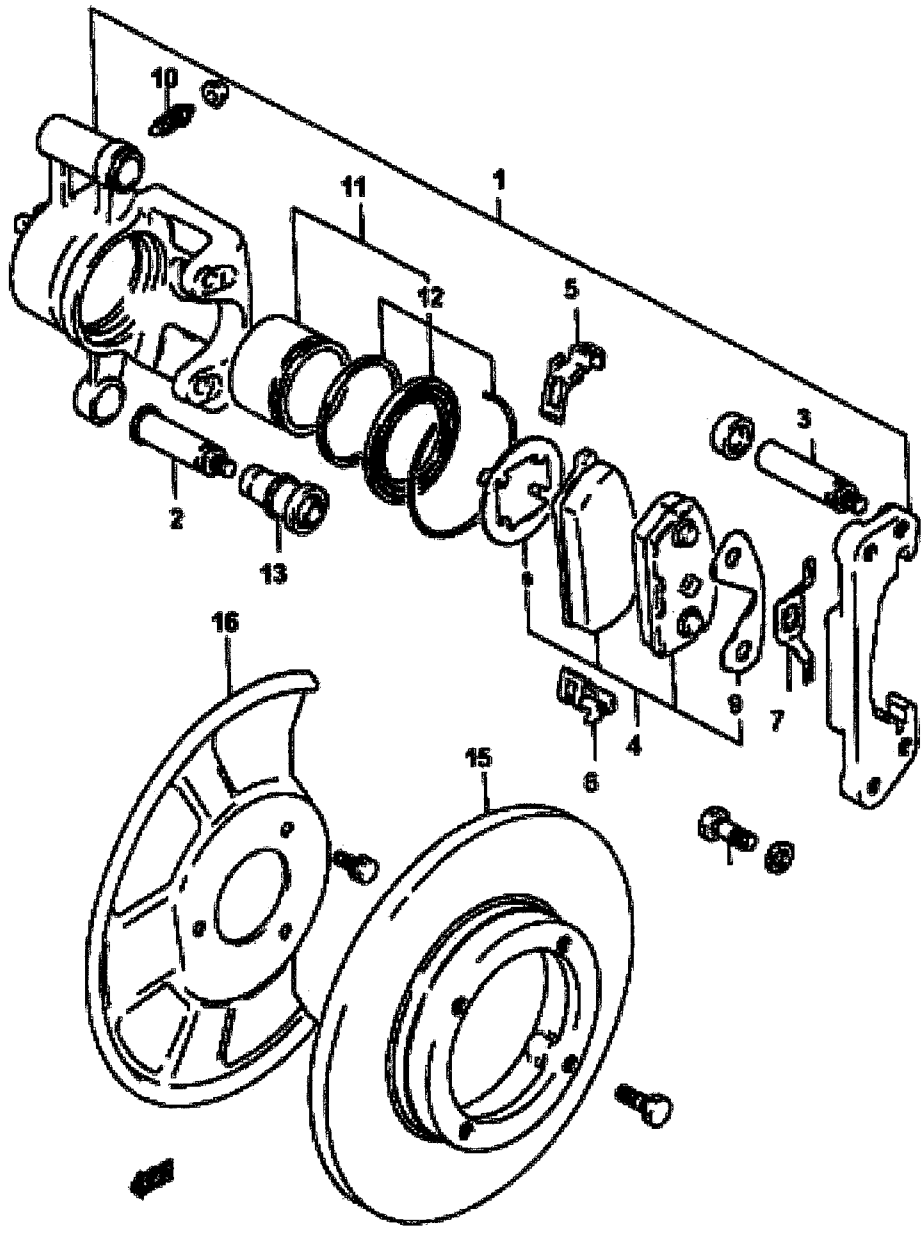
Disk Brake Rotor Thickness

New Disk: 10mm

Limit: 8.0mm

Note: Disk Brakes are used only on Wheels over 12 Inch Sizes.

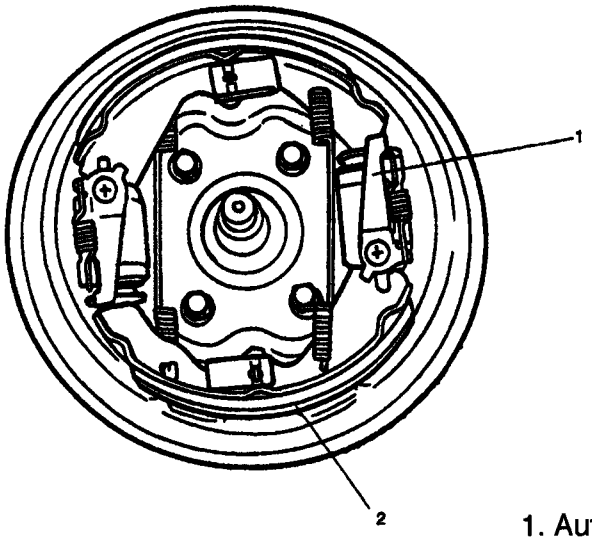
Front Disk Brake Calipers



Components

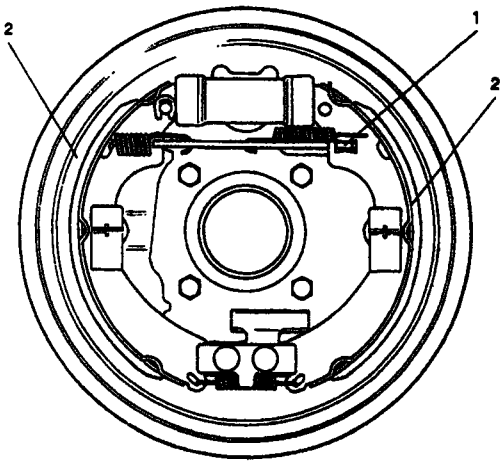
1. Disk Brake Assembly	2. Bolt Pin #1
3. Bolt Pin #2	4. Disk Brake Pad Set
5. Pad Sensor Plate #1	6. Pad Sensor Plate #2
7. Anti-Rattle Spring	8. Shim
9. Shim	10. Bleeder Plug
11. Piston Seal Kit	12. Seal Kit
13. Slide Bushing	14. Bolt
15. Disk Rotor	16. Dust Shield

Front

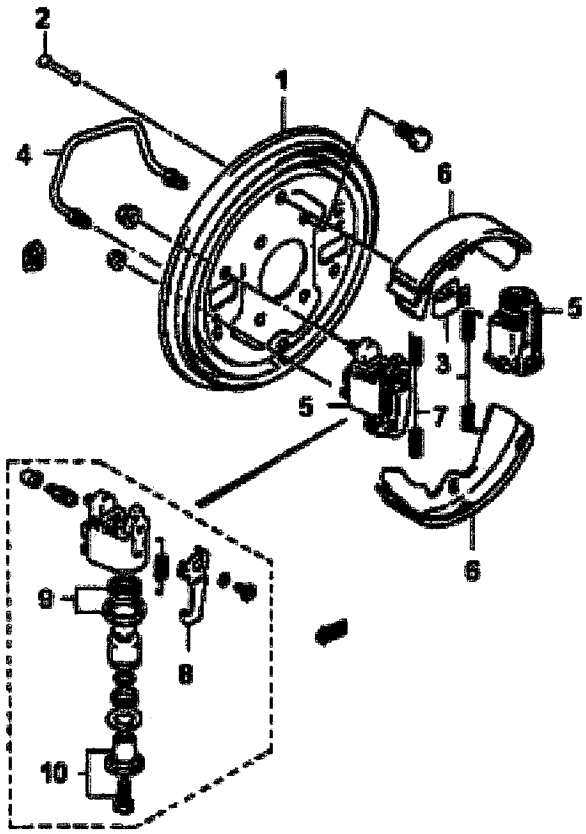


1. Auto Adjuster
2. Brake Shoe

Rear



Front Drum Brakes

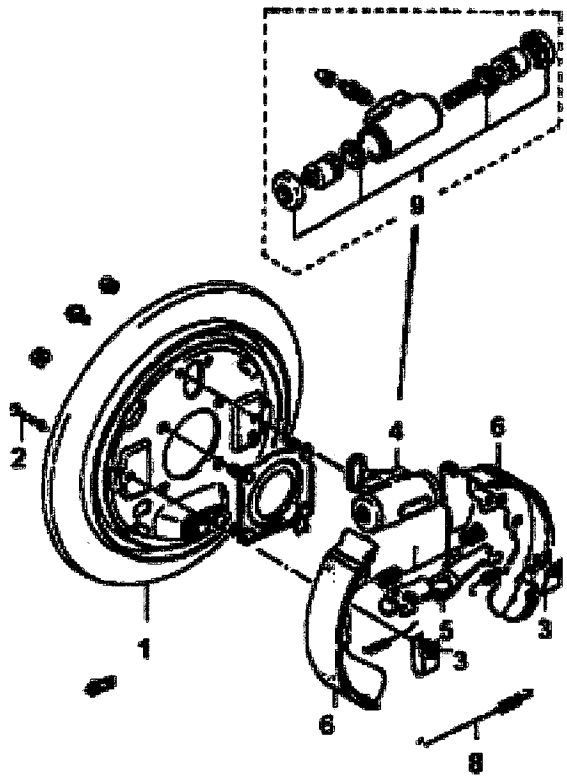


Note: Front Drums are only available on 11 Inch and smaller rimed vehicles.

Components

1. Baking Plate
2. Shoe Hold Down Pin
3. Shoe Hold Down Spring
4. Brake Line
5. Front Wheel Cylinder (2)
6. Brake Shoes
7. Shoe Return Spring
8. Adjust Lever
9. Piston Cup Boots
10. Adjustment Screw

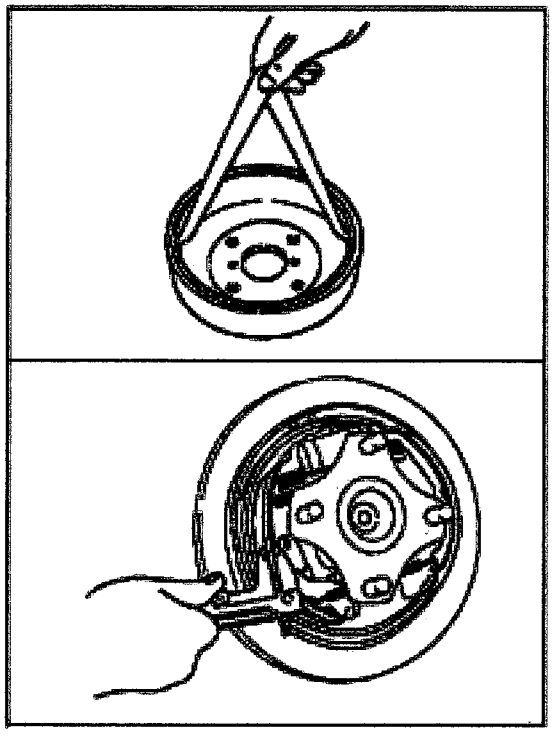
Rear Drum Brakes



Components

1. Baking Plate
2. Shoe Hold Down Pin
3. Shoe Hold Down Spring
4. Rear Wheel Cylinder (1)
5. Strut Bar
6. Brake Shoes
7. Shoe Return Spring
8. NA
9. Wheel Cylinder Overhaul Kit

Drum Specifications



Brake Drum Diameter

Measure the Drum as shown. Use the Chart below for Vehicle Specific Limits.

Drum Brake Shoe Thickness Inspection

Measure the Drum Shoe as shown. Use the Chart below for Vehicle Specific Limits.

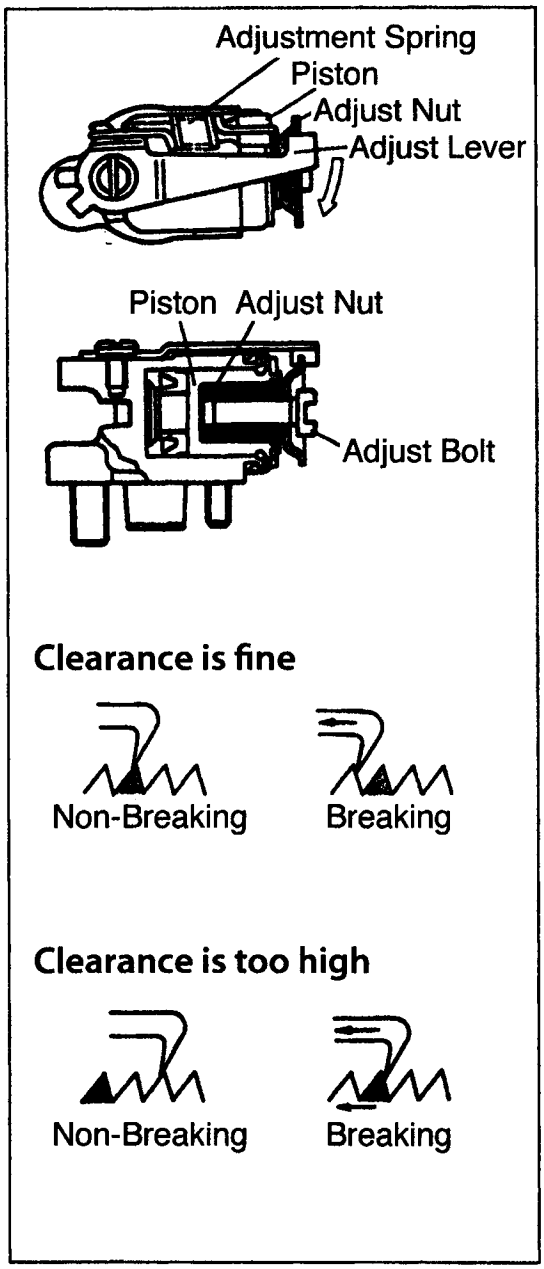
Brake Drum Diameter

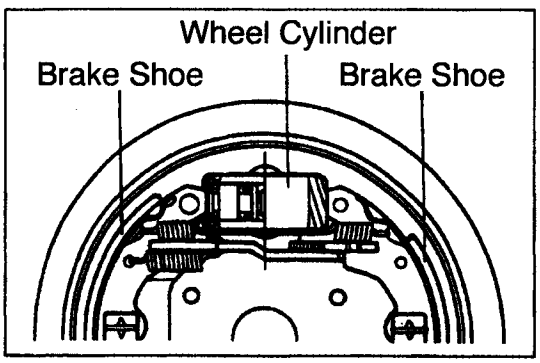
Type	New Parts	Replace
Truck: 10 Inch Front/Rear	180mm	182mm
Truck: 12 Inch Rear	180mm	182mm
Panel Van: Rear	220mm	222mm
Van: Rear	220mm	222mm

Drum Brake Shoe Thickness Inspection

Vehicle Type	New Parts	Replace
Truck	5.0mm	1.0mm
Panel Van	4.5mm	1.0mm
Van	4.5mm	1.0mm

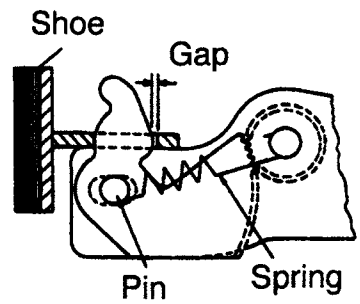
Drum Brake Shoe Settings



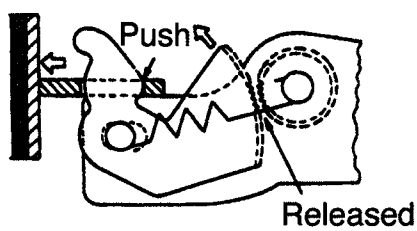


Drum Brake Shoe Settings

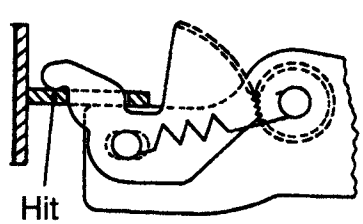
Clearance is fine



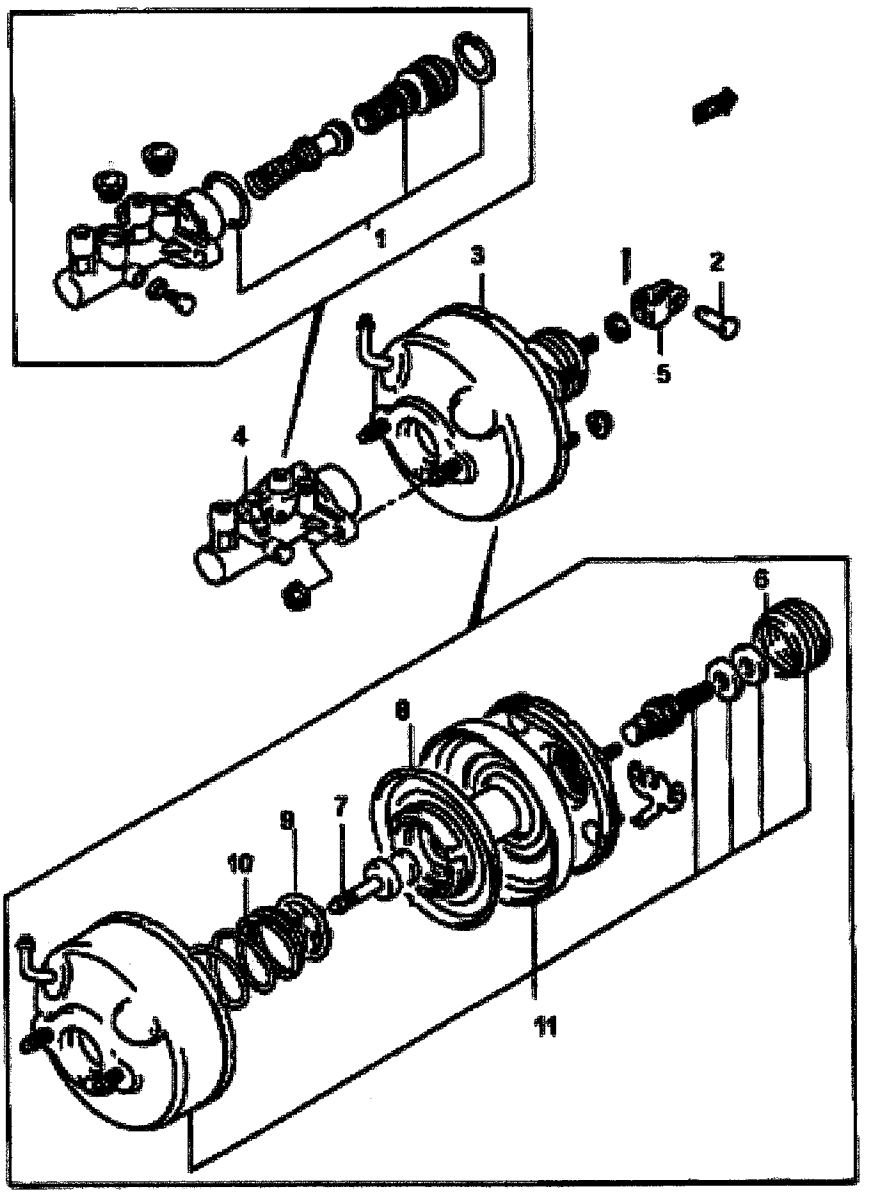
Clearance is too high



Shoe is worn-out



Master Cylinder



Note: See Parts Catalogue for complete Parts availability list. Brake Booster internal Parts may not be available separately.

1. Master Cylinder Rebuild Kit Contents
2. Yoke Pin
3. Booster Assembly
4. Master Cylinder Assembly
5. Yoke
6. Dust Boot
7. Piston Rod
8. Piston
9. Piston Rod Stopper
10. Piston Spring
11. Booster Assembly

Master Cylinder Diagram

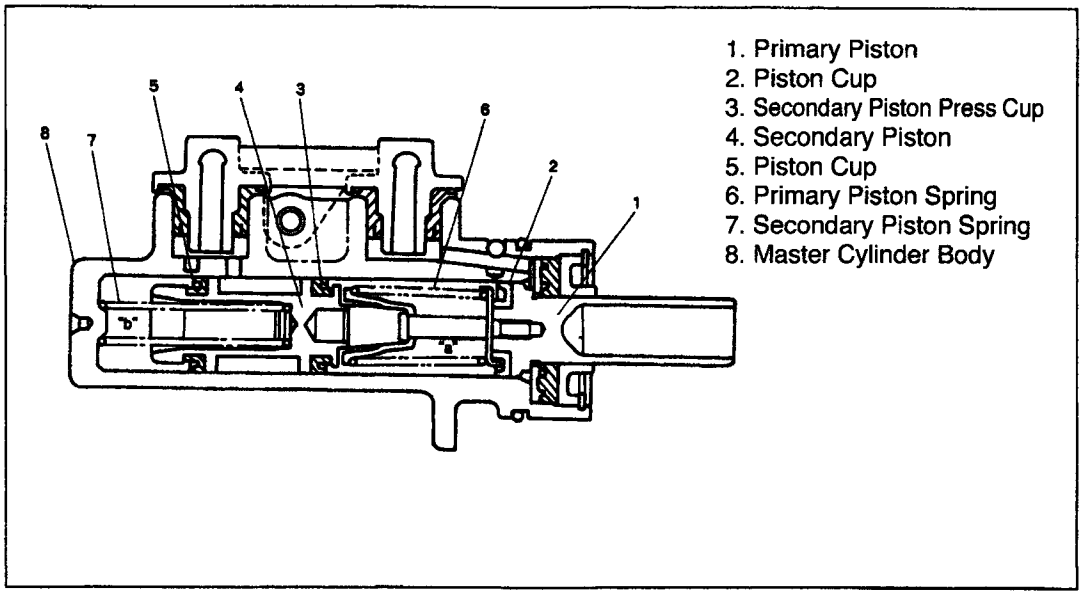
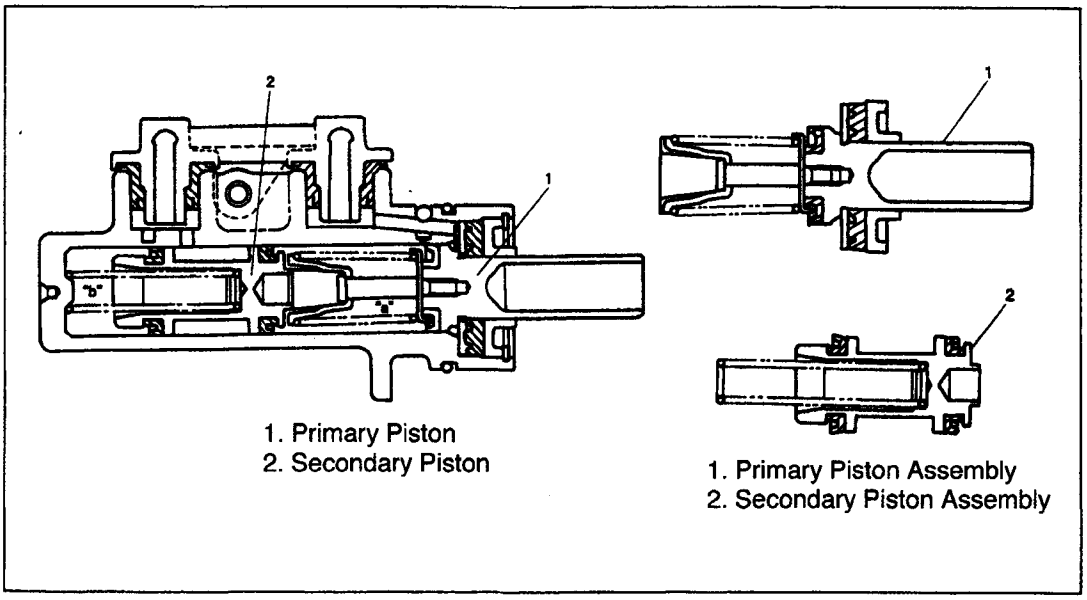


Diagram #2



CONVERSION OF TORQUE					
Convert			Convert		
From	To	Multiply	From	To	Multiply
lb.in.	oz.in.	16	oz.in.	lb.in.	.0625
lb.in.	lb.ft.	.08333	lb.ft.	lb.in.	12
lb.in.	kg.cm.	1.1519	kg.cm.	lb.in.	.8681
lb.in.	kg.m.	.011519	kg.m.	lb.in.	86.81
lb.in.	Nm	.133	Nm	lb.in.	8.85
lb.in.	dNm	1.13	dNm	lb.in.	.885
lb.ft.	kg.m.	.1382	kg.m.	lb.ft.	7.236
lb.ft.	Nm	1.356	Nm	lb.ft.	.7376
Nm	dNm	10	dNm	Nm	.10
Nm	kg.cm.	10.2	kg.cm.	Nm	.09807
Nm	kg.m.	.102	kg.m.	Nm	9.807

Thank you!

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