

GROUP 2

SUZUKI

Samurai

SUPPLEMENTARY SERVICE MANUAL
FOR 2WD MODEL ■

FOREWORD

This supplementary service manual has been prepared for the 1991 and 1992 SAMURAI 2WD MODEL.

It describes different service information of 2WD MODEL as compared with 4WD MODEL.

Therefore, whenever servicing 2WD MODEL, consult GROUP 2 first. And for any section, item or description not found in GROUP 2, refer to GROUP 1.

All information, illustrations and specifications contained in this literature are based on the latest product information available at the time of publication approval. And used as the main subject of description is the vehicle of standard specifications among others. Therefore, note that illustrations may differ from the vehicle being actually serviced. The right is reserved to make changes at any time without notice.

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GROUP 2**GROUP 2**

SUZUKI MOTOR CORPORATION

*TECHNICAL DEPARTMENT
AUTOMOBILE SERVICE DIVISION*

SECTION 0

GENERAL, SPECIAL TOOLS AND SERVICE MATERIALS

NOTE:

For the items not found in this section, refer to the same section in GROUP 1.

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0-1. IDENTIFICATION NUMBER

VEHICLE IDENTIFICATION NUMBER

The vehicle identification number is on the instrument panel left side.
Refer to below figure for detailed VIN cord information and its location.

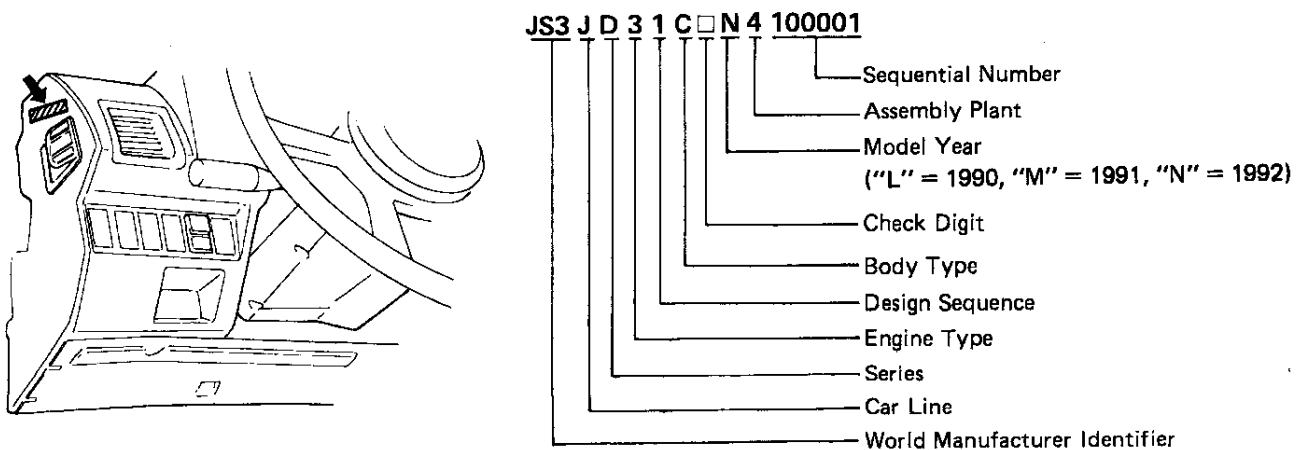


Fig. 0-1

0-2. STANDARD SHOP PRACTICES

When using the garage jack, be sure to place it against the center of the axle housing to raise the front vehicle end and against the differential portion of the axle housing to raise the rear end.

NOTE:

Don't get on the vehicle, get under it or service it in this state.

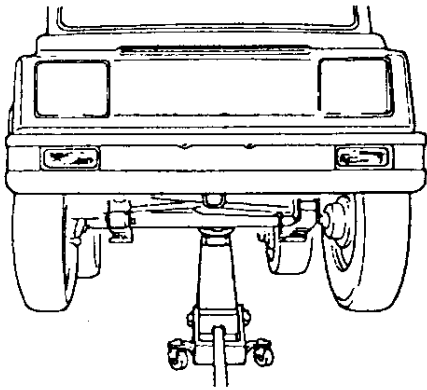


Fig. 0-2 Front Side

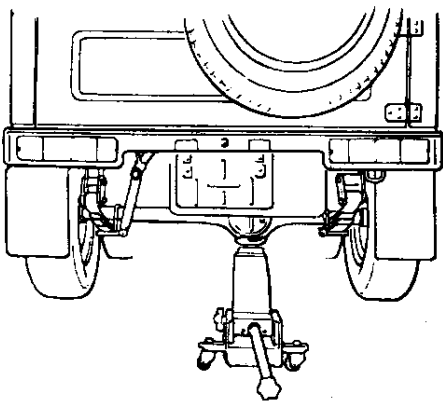


Fig. 0-3 Rear Side

SECTION 1

PERIODIC MAINTENANCE SERVICE

NOTE:

For the items not found in this section, refer to the same section in GROUP 1.

CHASSIS AND BODY

- Refer to page 17-18 in SECTION 17 in GROUP 2 for replacement of the steering knuckle oil seal.
- For servicing procedures such as inspection of the front wheel bearing, disassembly and assembly of the front wheel hub, refer to SECTION 17 in GROUP 2.

SECTION 5

EMISSION CONTROL SYSTEM

NOTE:

For the items not found in this section, refer to the same section in GROUP 1.

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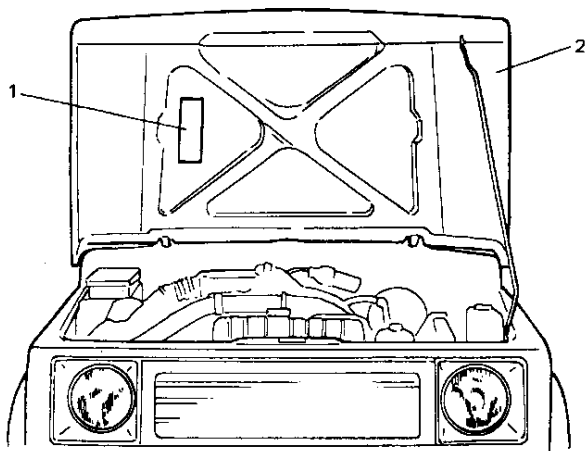
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GENERAL DESCRIPTION

VEHICLE EMISSION CONTROL INFORMATION LABEL

The Vehicle Emission Control Information Label is located under hood. The label contains important emission specifications and setting procedures, as well as a vacuum hose schematic with emission components identified.

When servicing the engine or emission systems, the Vehicle Emission Control Information Label should be checked for up-to-date information.



- 1. Vehicle emission control information label
- 2. Hood

Fig. 5-1 Vehicle Emission Control Information Label

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

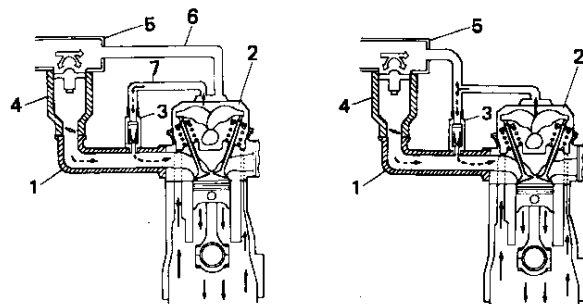
The term "blow-by gas" stands for the compressed gas and exploded gas which blow through cylinder-to-piston clearance, which contain a large amount of unburned gases such as CO and HC. The PCV (Positive Crankcase Ventilation) system is provided to prevent the blow-by gas from being emitted into atmosphere and it operates as follows.

When the vacuum in the intake manifold is low (throttle valve open), the PCV valve is wide open due to its spring force. Thus a large amount of the blow-by gas is drawn into the intake manifold.

On the other hand, when the vacuum in the manifold is high, the PCV valve opening is limited due to the high vacuum. Thus the amount of the blow-by gas drawn into the intake manifold is small.

For '91, '92 model

For '90 model



- ← 8
- ← 9
- ← - - 10

- | | |
|------------------------|---------------------------------------|
| 1. Intake manifold | 7. PCV hose |
| 2. Cylinder head cover | 8. Blow-by gas |
| 3. PCV valve | 9. Fresh air |
| 4. Throttle body | 10. Blow-by gas and fresh air mixture |
| 5. Air intake case | |
| 6. Breather hose | |

Fig. 5-2 PCV System Operation

5-2. ON VEHICLE SERVICE

GENERAL

When the emission control hoses are disconnected and the system's component is removed for service, reinstall the component properly, and route and connect hoses correctly after service. Refer to Vehicle Emission Control Information Label for proper routing of hoses.

PCV SYSTEM

NOTE:

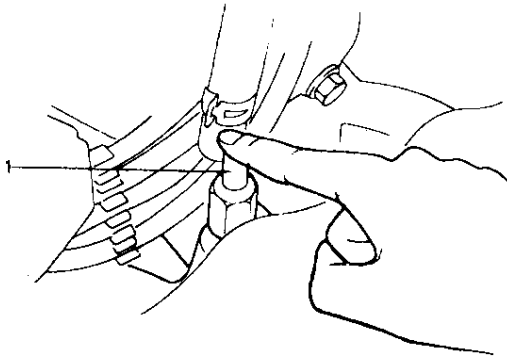
Be sure to check that there is no obstruction in PCV valve or its hoses before adjusting engine idle speed, for obstructed PCV valve or hose hampers its accurate adjustment.

PCV Hose & Breather Hose

Check hoses for connection, leakage, clog, and deterioration. Replace as necessary.

PCV Valve

1. Disconnect PCV hose from PCV valve.
2. Run engine at idle.
3. Place your finger over end of PCV valve to check for vacuum. If there is no vacuum, check for clogged valve. Replace as necessary.



1. PCV valve

Fig. 5-2 Checking Vacuum

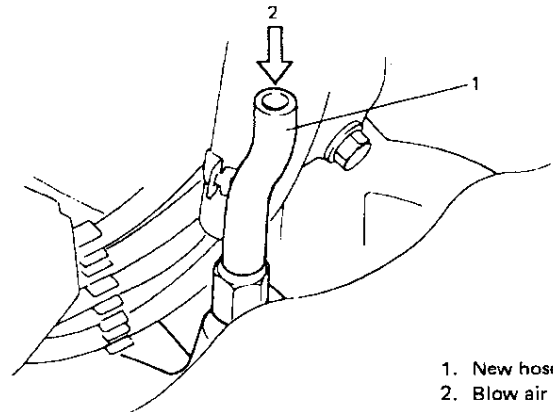
4. After checking vacuum, stop engine and check PCV valve for sticking.

With engine stopped, connect a new hose to PCV valve.

Blow air into new hose and check that air flows with difficulty from cylinder head side to intake manifold side. If air flows without difficulty, valve is stuck in "Open" position. Replace PCV valve.

WARNING:

Do not suck air through PCV valve. Petroleum substances inside the valve and fuel vapor inside the intake manifold are harmful.



1. New hose
2. Blow air

Fig. 5-3 Checking PCV Valve for Sticking

5. Connect PCV hose and clamp securely.

SECTION 14

TRANSFER GEAR BOX

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14-1. GENERAL DESCRIPTION

Shown in figure below are component parts included in the transfer gear box. Main parts are 3 shafts and 3 gears. Among those 3 gears, the one on input and output shafts is incorporated with shafts as one unit.

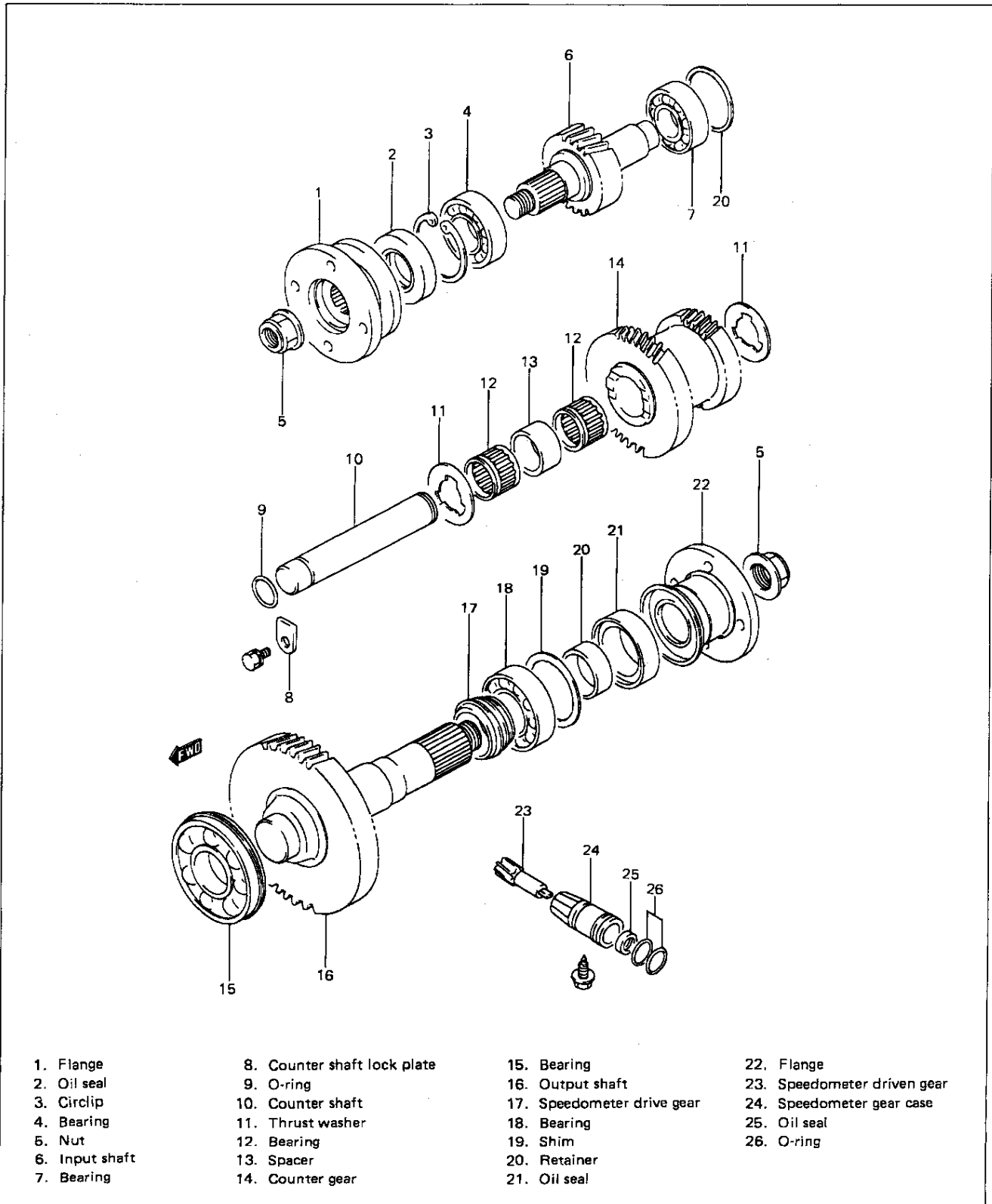


Fig. 14-1

14-2. POWER FLOW OF TRANSFER

The drive force is transmitted from the transmission through the input shaft of the transfer and the gear of the counter shaft to the output shaft. Then from the output shaft, it is transmitted through the propeller shaft to the differential.

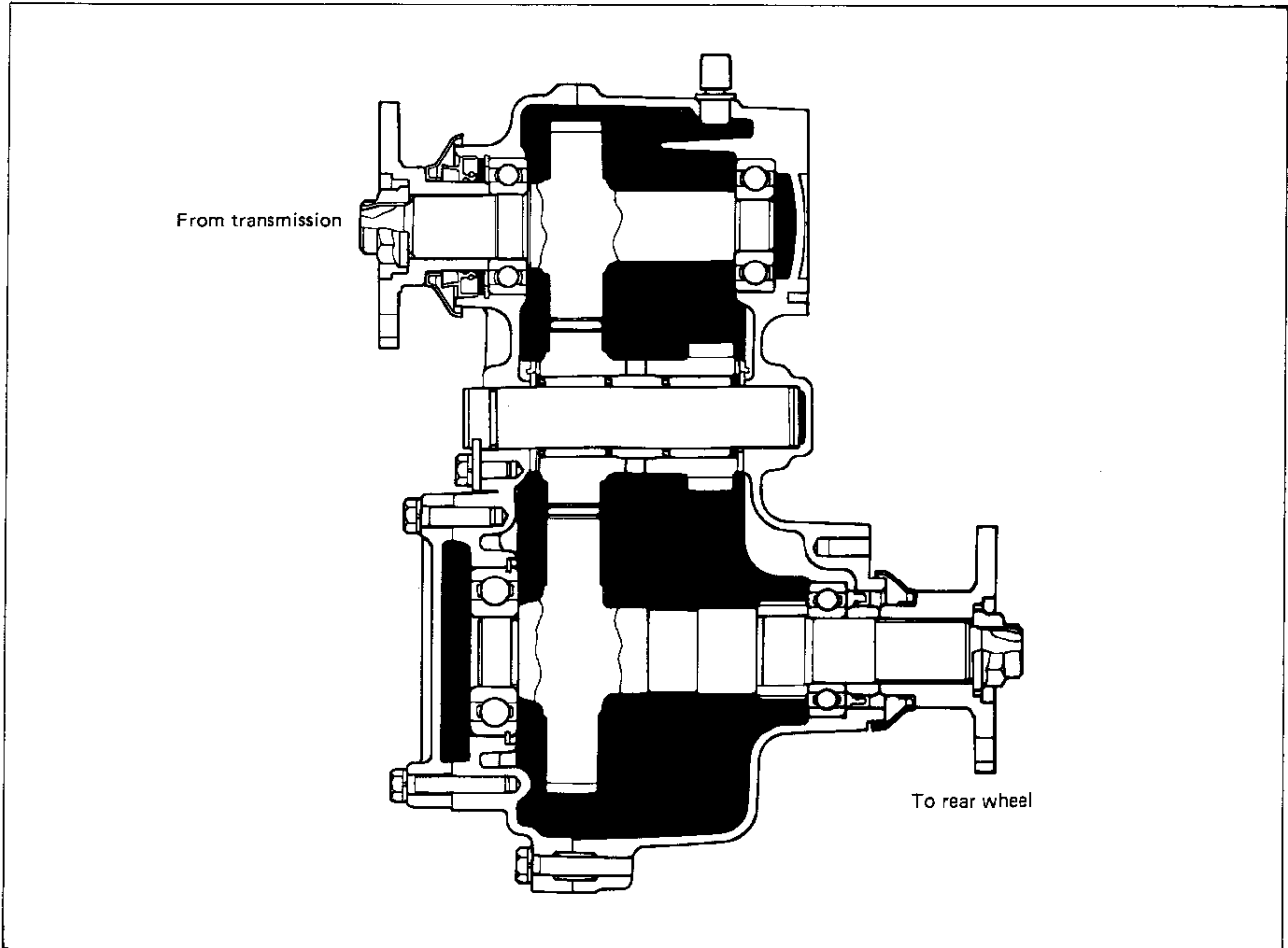


Fig. 14-2

14-3. GEAR RATIO DATA

	Gear ratio	Reduction ratio
Rear-wheel drive	$41/44 \cdot 62/41$	1.409

14-4. TRANSFER SERVICES NOT REQUIRING TRANSFER REMOVAL

Following parts or components do not require transfer removal to receive services (replacement, inspection):

Part or Component	Nature of Service
1. Universal-joint yoke flanges	Replacement or inspection
2. Transfer output shaft front case	Replacement
3. Transfer input shaft oil seal	Replacement
4. Speedometer driven gear	Replacement or inspection

14-5. REMOVAL

- 1) Lift up vehicle and remove securing bolts from each universal-joint flange connection to sever 2 propeller shafts from transfer gear box.

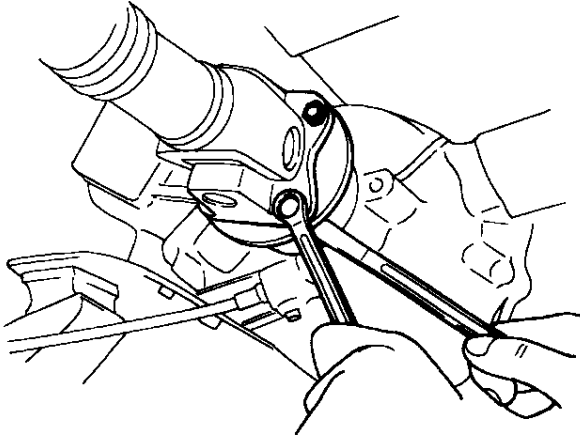


Fig. 14-3

- 2) Drain out oil from gear box by loosening its drain plug.

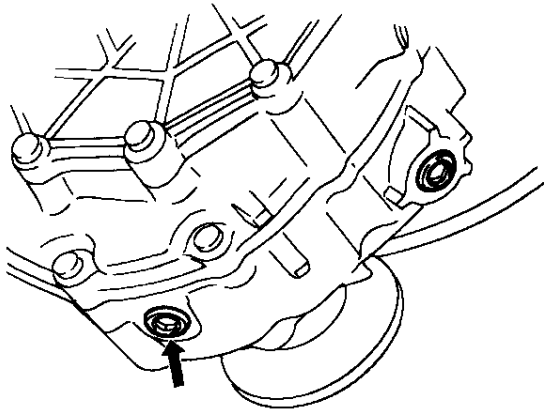


Fig. 14-4

- 3) Disconnect speedometer drive cable from transfer gear box.

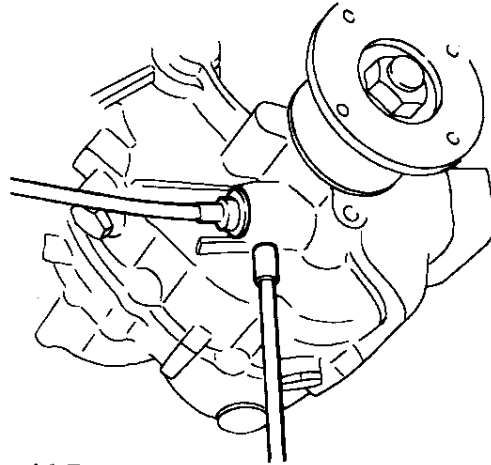


Fig. 14-5

- 4) Remove mounting nuts securing gear box to chassis, and take down gear box.

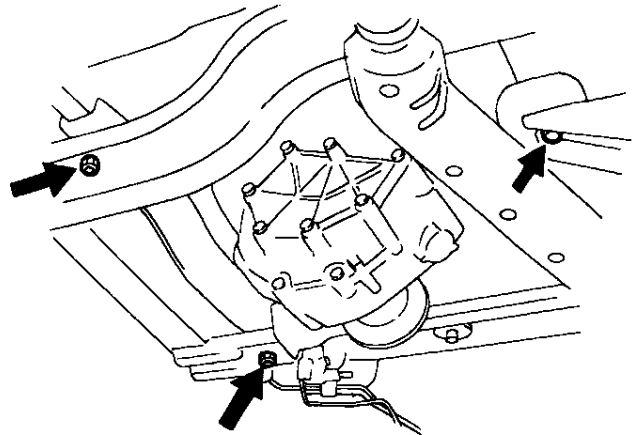


Fig. 14-6

14-6. DISASSEMBLY

Universal-Joint Yoke Flanges

There are 2 flanges to be removed: one from input shaft and other from output shaft. Lock flange so that it will not turn, and loosen and remove nut holding flange to the shaft. Draw off flange.

(A) Special tool (09922-66020)

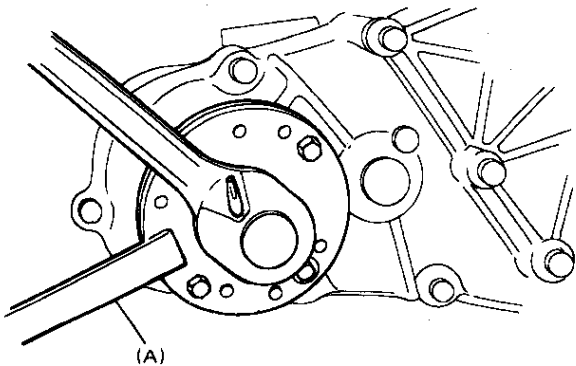


Fig. 14-7

Speedometer Driven Gear

Loosen speedometer driven gear case bolt and remove speedometer driven gear case with gear.

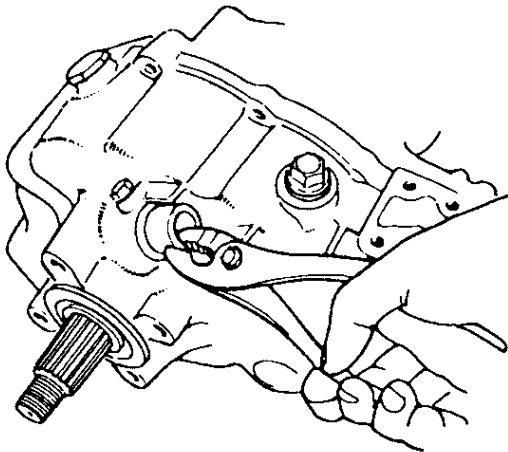


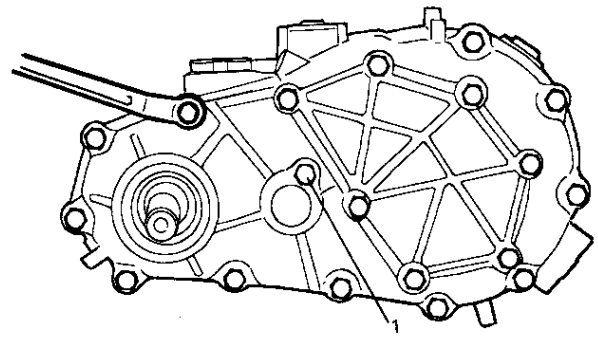
Fig. 14-8

Transfer Center Case

Remove bolts fastening center case, output shaft front case and rear case together.

NOTE:

Do not loosen lock plate bolt at this point.



1. Counter shaft lock plate bolt

Fig. 14-9

By tapping rear case and output shaft with a plastic hammer, separate center and rear case.

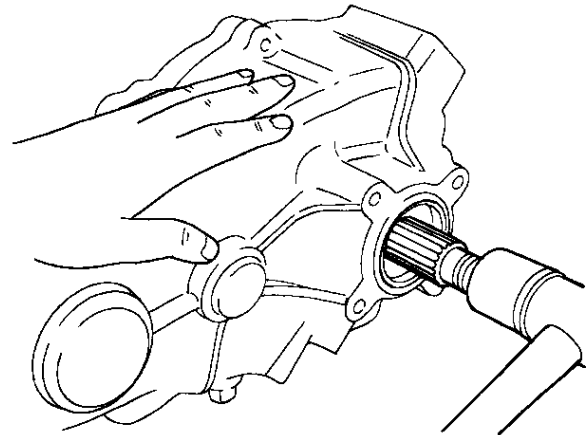


Fig. 14-10

Given below are procedures for disassembling component parts of center case as separated from rear case.

- 1) Pull out counter gear, bearings and spacer.
- 2) Hammer output rear shaft with a plastic hammer to drive it out of center case.

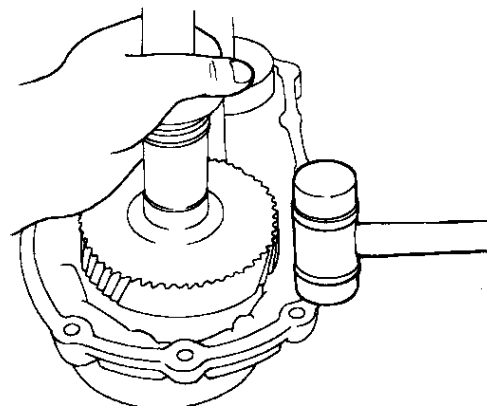


Fig. 14-11

3) Remove counter shaft from center case by loosening counter shaft lock plate bolt.

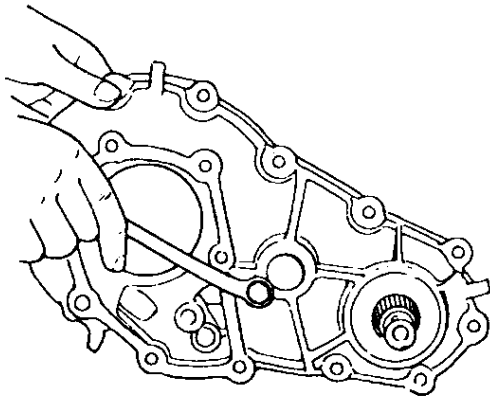


Fig. 14-12

4) Remove input shaft from center case by hammering thick part of case or input shaft center with a plastic hammer.

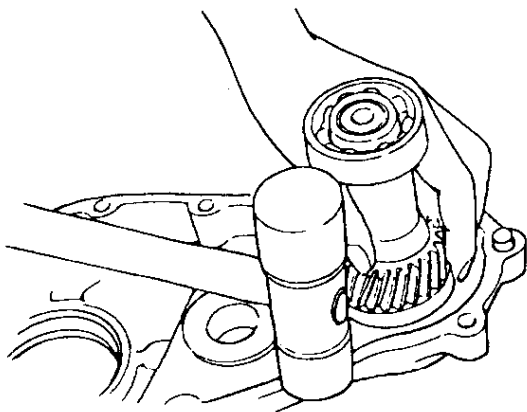


Fig. 14-13

5) Remove output shaft rear bearing and retainer together by using bearing puller.

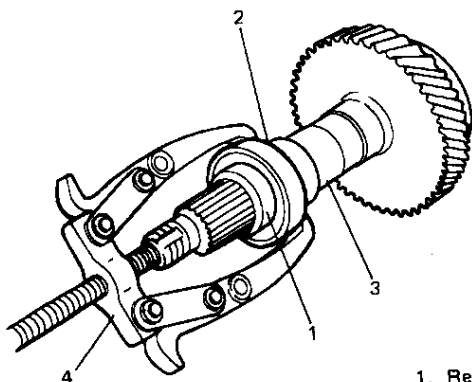


Fig. 14-14

1. Retainer
2. Bearing
3. Output shaft
4. Bearing puller

6) Remove speedometer drive gear by using bearing puller and press.

CAUTION:

When doing this work, be careful not to damage speedometer drive gear.

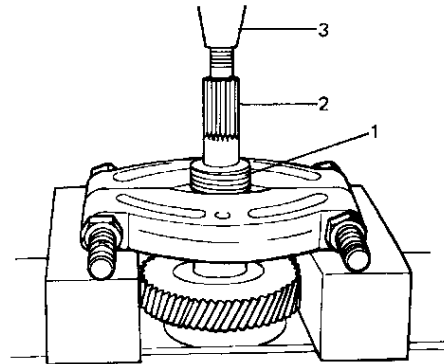


Fig. 14-15

1. Speedometer drive gear
2. Output shaft
3. Press

7) Remove output shaft front bearing by using bearing puller and puller attachment (special tool).

Puller attachment (B) 09926-58010

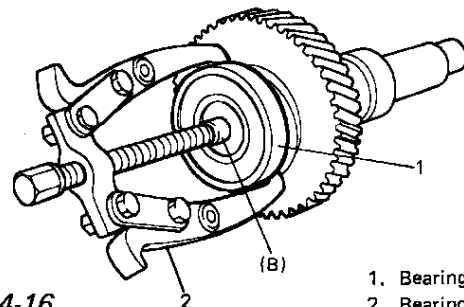


Fig. 14-16

1. Bearing
2. Bearing puller

8) When input shaft is removed or center case and rear case are separated, input shaft bearings may come off. In such a case, bearings can be removed from shaft by using bearing puller.

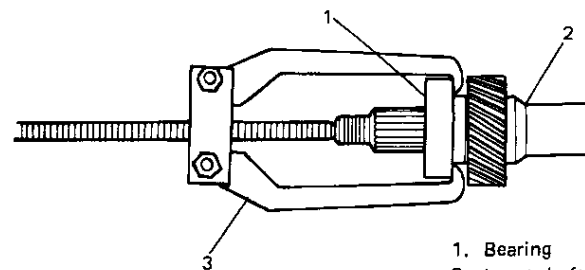


Fig. 14-17

1. Bearing
2. Input shaft
3. Bearing puller

9) When input shaft is removed, front bearing may be left in case. In this case, after removing oil seal and circlip, bearing can be taken out of case by using bearing installer (special tool). Bearing installer (C) : (09913-75810)

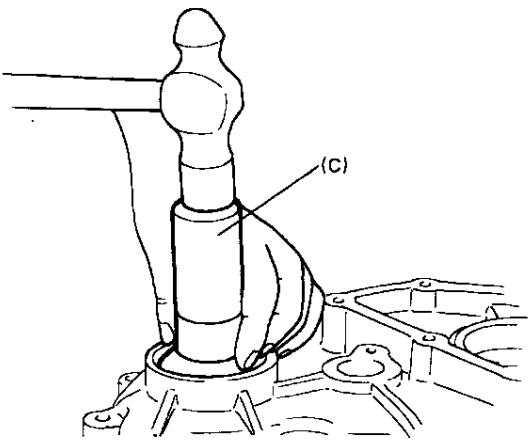
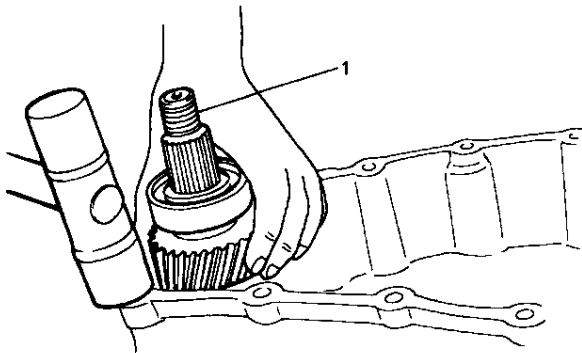


Fig. 14-18

Transfer Rear Case

When center case and rear case are separated, input shaft may be left in rear case. In this case, remove input shaft from rear case by hammering thick part of case with a plastic hammer.



1. Input shaft

Fig. 14-19

14-7. INSPECTION OF COMPONENTS

Gear Teeth

Inspect gear teeth, for wear, cracking, chipping and other malcondition. Replace gear as necessary.

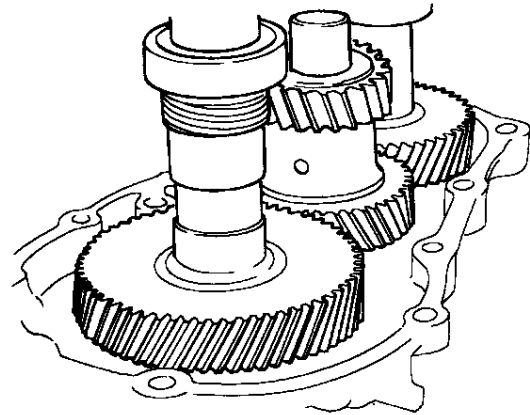


Fig. 14-20

Bearings

Check each bearing by spinning its outer race by hand to "feel" smoothness of rotation. Replace bearing if noted to exhibit sticking, resistance or abnormal noise when spun or rotated by hand.

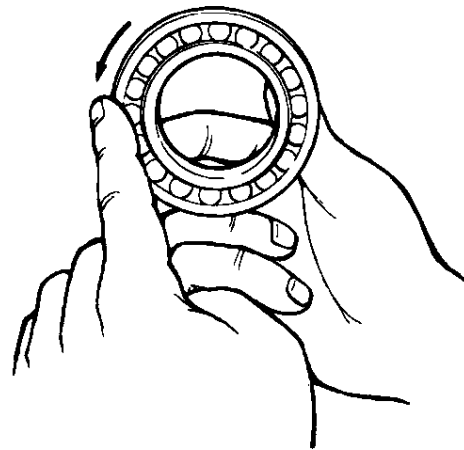


Fig. 14-21

14-8. REASSEMBLY

NOTE:

- All parts to be used in reassembly must be perfectly clean.
- Oil or grease sliding and rubbing surfaces of transfer components just before using them in reassembly with gear oil and SUZUKI SUPER GREASE A (99000-25010).
- Oil seals, "O" rings, gaskets and similar sealing members must be in perfect condition. For these members, use replacement parts in stock.
- Tightening torque is specified for important fasteners — mainly bolts — of transfer and other components. Use torque wrenches and constantly refer to specified data given in P. 14-15.

Input Shaft

Press-fit bearings onto both sides of input shaft by using bearing installer (special tool).

Bearing installer (A) : (09913-84510)

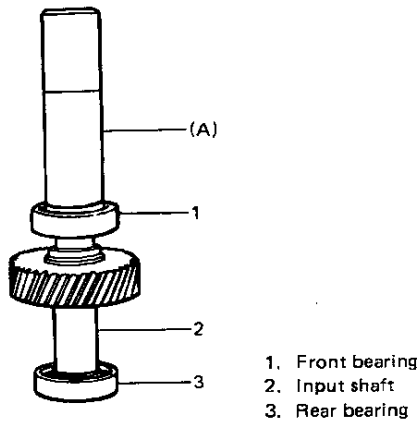


Fig. 14-22

Output Shaft

Install following parts onto shaft in such order and directions as prescribed in the figure.

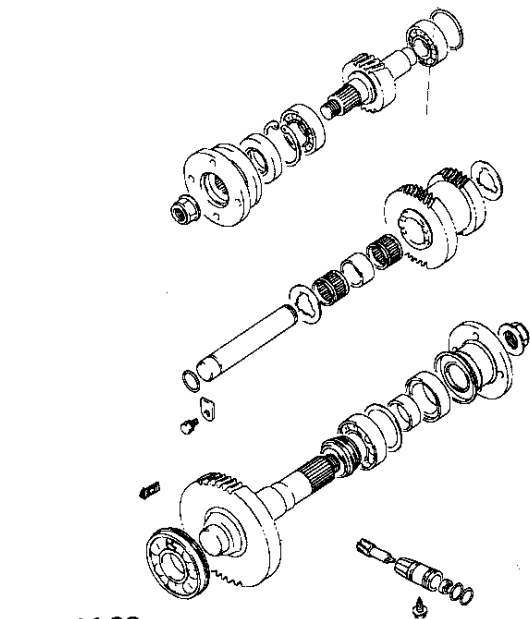


Fig. 14-23

- 1) Press-fit speedometer drive gear by using bearing installer (special tool).

Bearing installer (A) : (09913-84510)

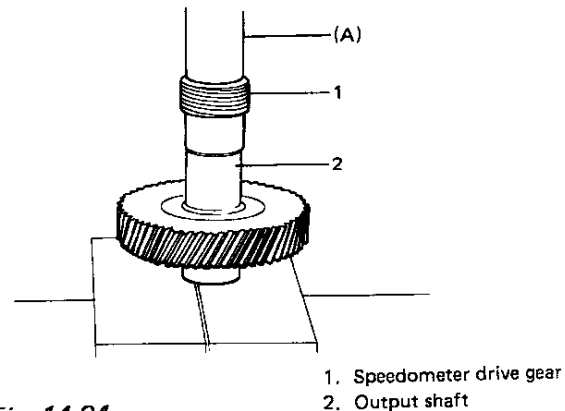


Fig. 14-24

- 2) Press-fit bearings and the retainer by using bearing installer (special tool).

Bearing installer (A) : (09913-84510)

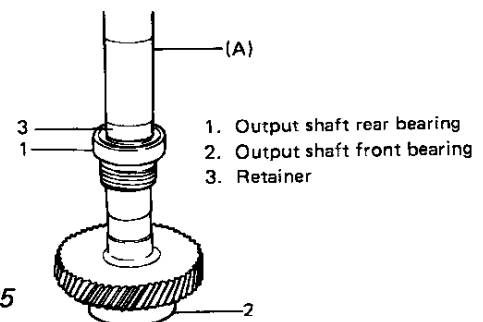


Fig. 14-25

- 3) Fit circlip securely into groove in out put shaft front bearing.

Shim Adjustment of Input and Output Shaft

Clearance in thrust direction of both input and output shafts is adjusted by putting shims between input shaft rear bearing and rear case for input shaft and between output shaft rear bearing and rear case for output shaft.

As thrust clearance is specified as follows, determine shim thickness to meet specification according to the following procedures.

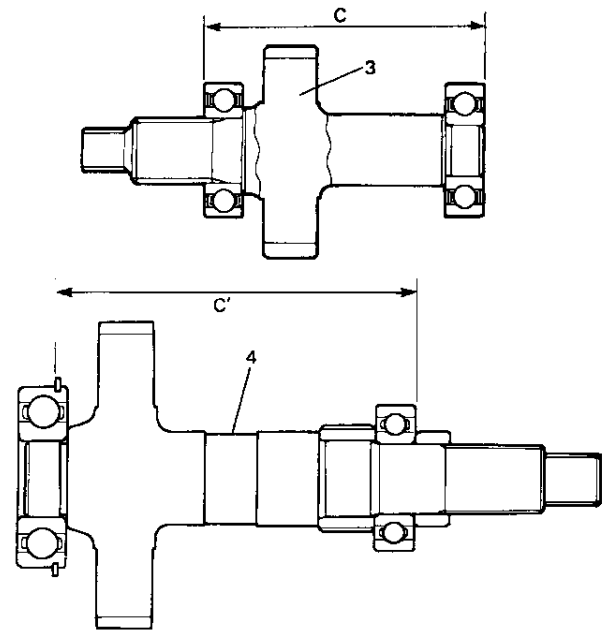
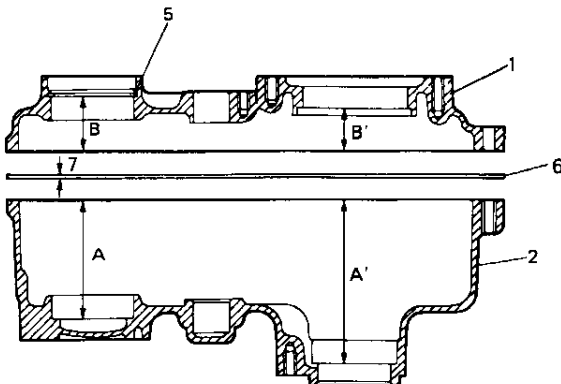
Thrust clearance Specification	0.05 – 0.15 mm (0.002 – 0.006 in.)
--------------------------------	---------------------------------------

[Input shaft]

- 1) Take measurement "A" of rear case as shown in figure below by using depth gauge.
- 2) Take measurement "B" of center case with bearing circlip installed.
- 3) Take measurement "C" (between bearing inner races) of input shaft with bearings installed, by using micrometer.

NOTE:

- Before measuring, make sure that each bearing is free from abnormal noise or resistance by spinning its outer race.
- Each measurement in above steps 1) to 3) must be taken accurately in careful manner. If shim thickness is determined based on rough measurement, clearance of each shaft in thrust direction will not satisfy specification. And improper clearance may cause oil leakage, broken bearing and abnormal noise.
- Take the same measurement at 3 to 4 different positions and use their mean.



1. Center case
2. Rear case
3. Input shaft
4. Output shaft
5. Bearing circlip
6. Gasket
7. Gasket thickness (0.3 mm or 0.012 in)

Fig. 14-26

- 4) Using measurements obtained in steps 1) to 3) and equation described below, calculate shim thickness which is necessary for proper thrust clearance.

$$\text{Thrust clearance} = ("A" + "B" + \text{Gasket thickness}) - "C"$$

As the above equation holds for thrust clearance and gasket thickness is specified as 0.3 mm and thrust clearance as 0.05 to 0.15 mm, shim thickness is calculated by the following equation.

$$\text{Shim thickness} = ("A" + "B" + 0.3) - ("C" + 0.05 \sim 0.15)$$

[Example]

Supposing A, B and C are as follows;

$$A = 81.35 \text{ mm (3.203 in.)}$$

$$B = 35.70 \text{ mm (1.405 in.)}$$

$$C = 117.05 \text{ mm (4.608 in.)}$$

$$\begin{aligned} \text{Shim thickness} &= (81.35 + 35.70 + 0.3) - \\ &\quad (117.05 + 0.05 \sim 0.15) \\ &= 117.35 - 117.10 \sim 117.20 \\ &= 0.25 \sim 0.15 \end{aligned}$$

In this case, use of 0.15 to 0.25 mm (0.006 to 0.009 in) thick shim(s) will ensure specified thrust clearance which is 0.05 to 0.15 mm (0.002 to 0.006 in). Therefore 2 pieces of 0.1 mm (0.004 in) thick shim should be selected in available shims below to satisfy thickness.

5) When shim thickness is determined, select proper shim(s) from among the following shims and use it (them) between input shaft rear bearing and rear case when matching center case and rear case.

Available shim size (thickness)	0.1, 0.3, 0.5 mm (0.004, 0.012, 0.020 in.)
---------------------------------	-----------------------------------------------

[Output shaft]

Just as with input shaft, take measurements of "A", "B" and "C" as indicated in Fig. 14-26, calculate shim thickness and install proper shim(s) between output shaft rear bearing and rear case when matching center case and rear case.

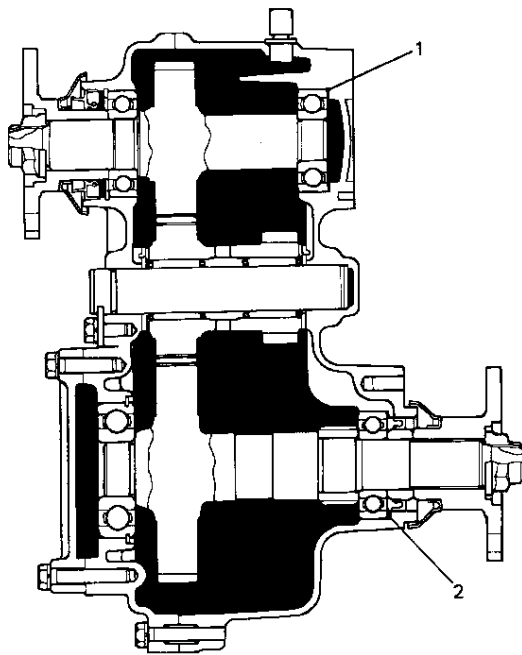


Fig. 14-27

- 1. Shim for input shaft
- 2. Shim for output shaft

Rear Case

1) Install oil seal in rear case and apply grease to oil seal lip.

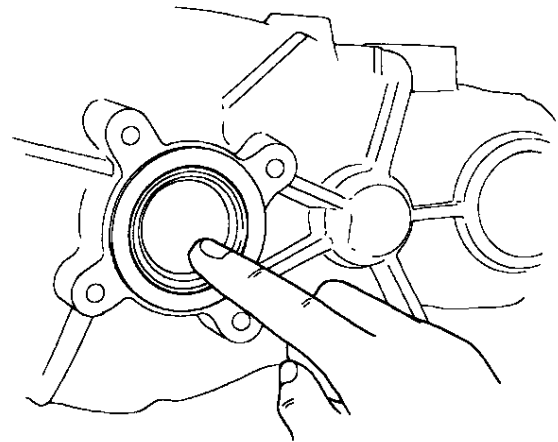


Fig. 14-28

2) Install counter shaft thrust washer to rear case, bringing its face without depressions against case and fit its bent portion securely into groove in case.

NOTE:

Apply ample amount of grease to both surfaces of washer so as to lubricate sliding surfaces and prevent washer from moving out of place or slipping off.

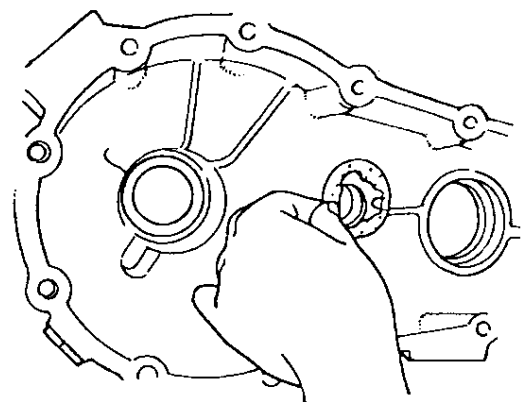


Fig. 14-29

Center Case

- 1) Install input shaft front bearing circlip and oil seal in center case.

Snap ring pliers (A) : (09900-06108)

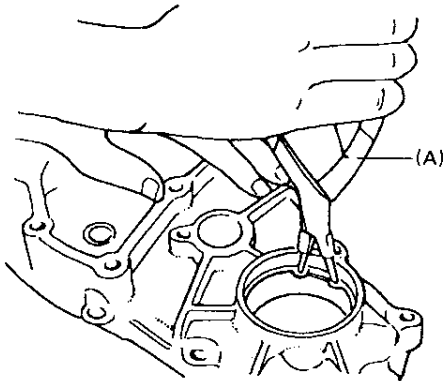
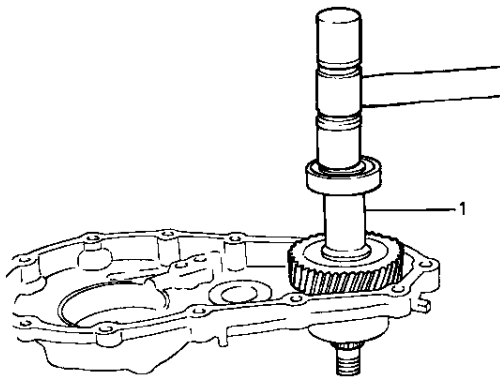


Fig. 14-30

- 2) Install input shaft to center case.



1. Input shaft

Fig. 14-31

- 3) After greasing O ring on counter shaft, insert shaft into center case and secure shaft with lock plate and bolt.

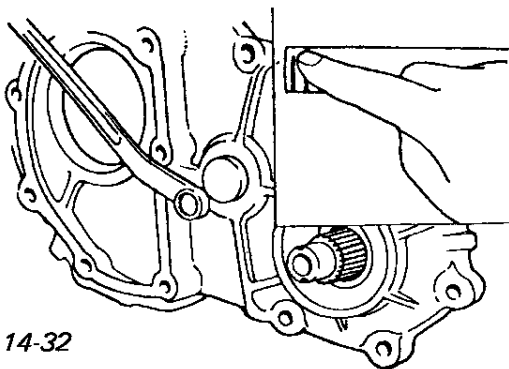


Fig. 14-32

Counter shaft lock plate bolt	N·m	kg·m	lb·ft
	9 - 17	0.9 - 1.7	7.0 - 12.0

- 4) Install the counter shaft thrust washer to center case. For installation, apply ample amount of grease to both faces of the washer so as to lubricate sliding surfaces and prevent it from moving out of place or slipping off and bring its face without depressions against center case, and fit its bent portion into groove in case securely.

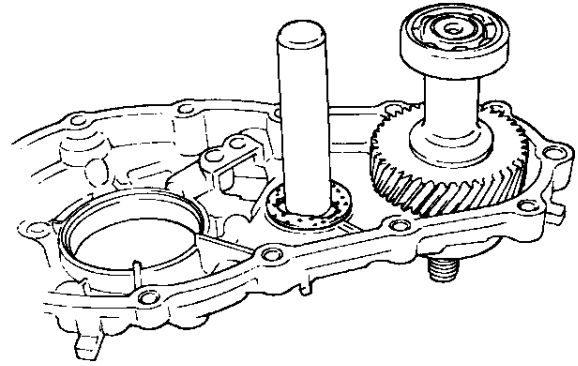


Fig. 14-33

- 5) Install needle roller bearings, spacer and counter gear on counter shaft.

1. Needle roller bearing
2. Spacer
3. Counter gear

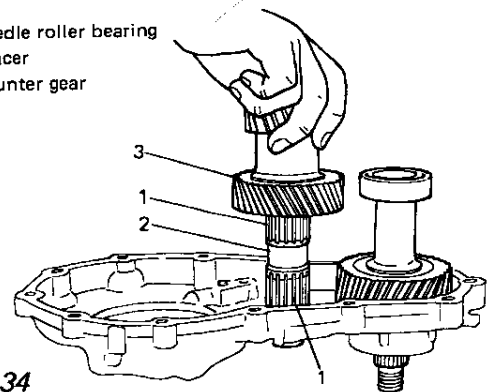
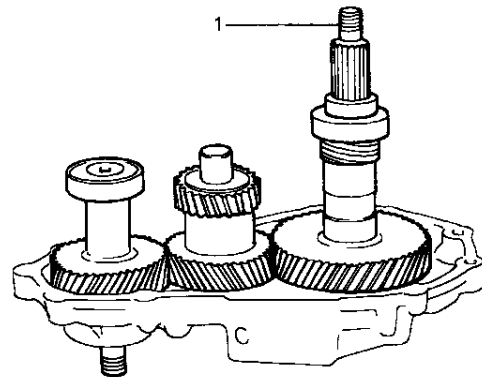


Fig. 14-34

- 6) Install output shaft assembly to center case.



1. Output shaft

Fig. 14-35

Center and Rear Cases

- 1) Check center case (or rear case) to ensure that it is provided with 2 dowel pins 1.

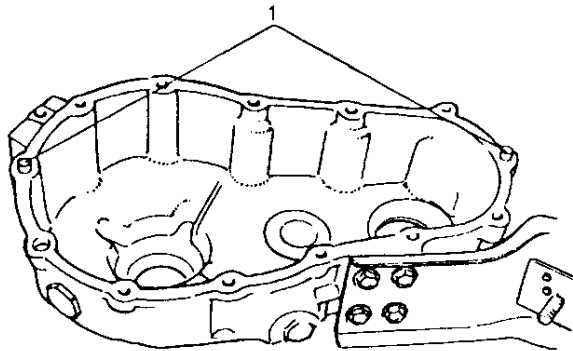


Fig. 14-36

1. Dowel pins

NOTE:

- Matching must be made carefully so as not to move countershaft thrust washers out of place.
- Be sure to install shims determined in previous item "Shim Adjustment of Input and Output Shafts" between input shaft rear bearing and rear case and between output shaft rear bearing and rear case.

- 2) Put gasket on center case. Bring rear case and center case into match and apply uniform force gradually all around rear case with a plastic hammer.

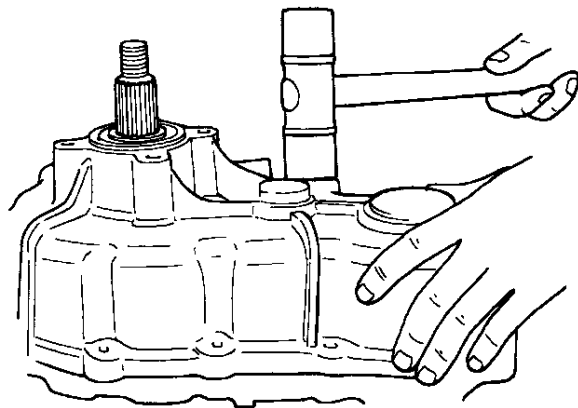


Fig. 14-37

- 3) Put gasket on center case.
- 4) Install front case to center case.
- 5) Tighten center case and output shaft front case securing bolts to specified torque.

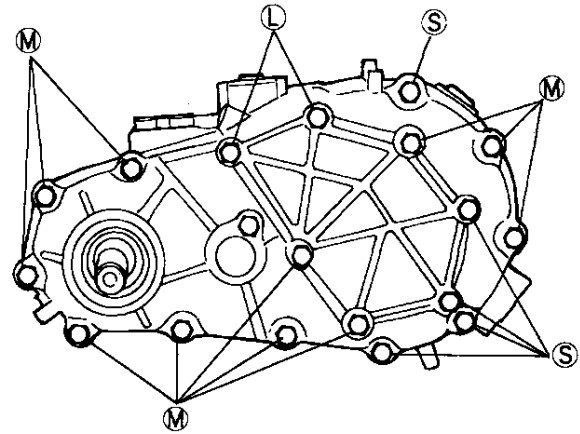


Fig. 14-38

Bolt	Length	Pieces
Ⓛ	85 mm (3.35 in)	2
Ⓜ	47 mm (1.85 in)	11
Ⓢ	35 mm (1.38 in)	5

Tightening torque for center case and retainer bolts	N·m	kg·m	lb·ft
	13 – 23	1.3 – 2.3	9.5 – 16.5

- 6) When installing speedometer driven gear and its gear case in rear case, apply grease to O ring and oil seal lip, and align bolt hoses in rear case and driven gear case.

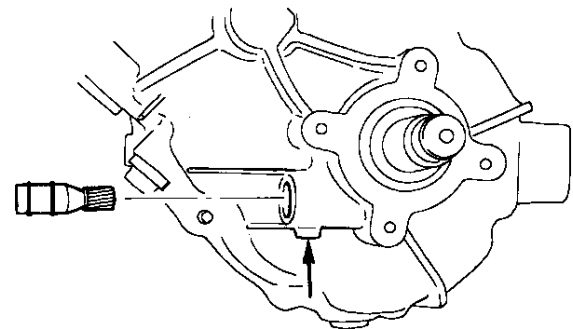


Fig. 14-39

- 7) Install propeller shaft flanges and tighten nuts to specified torque and calk the nuts.

Tightening torque for universal joint flange nuts	N·m	kg·m	lb·ft
	110–150	11.0–15.0	80–108.0

8) Upon completion of entire assembly work, install transfer in chassis body in reverse sequence of removal. Pour gear oil into transfer gear box. Refer to information given in next oil and oil capacity for oil to be used and specified amount.

NOTE:

When installing oil filler and drain plugs to transfer case, apply sealant (SUZUKI BOND No. 1215, 99000-31110) to thread part of plug.

14-9. MAINTENANCE SERVICES

Oil Level

Oil level must be checked with vehicle held in horizontal position in both front to rear and side to side directions.

Oil level plug and oil filler plug are one and the same as shown in figure.

If oil flows out of filler plug hole or if oil level is found up to hole when plug is removed, amount of oil is appropriate. Replenish oil if noted as insufficient.

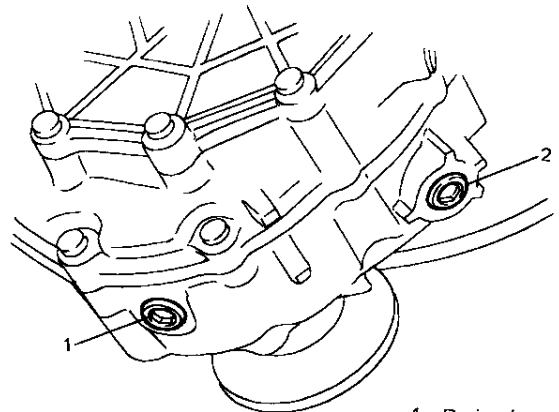
Oil and Oil Capacity

Whenever vehicle is lifted up for any service including oil change, make sure to check around transfer gear box for oil leakage. Correct defects, if any, and change or refill oil.

Transfer oil capacity	0.8 litre (1.7/1.4 US/Imp. pt)
Transfer oil specification	Gear oil SAE 80W-90, 75W-80 or 75W-90

It is highly recommended to use SAE 75W-90 gear oil.

For viscosity chart, refer to '88 MODEL SERVICE MANUAL at the page 1-20.



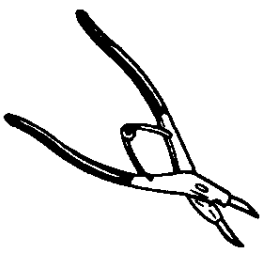
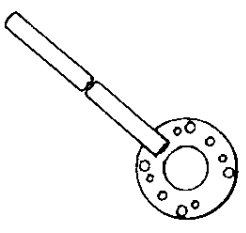
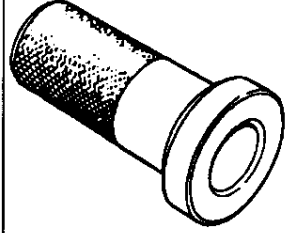

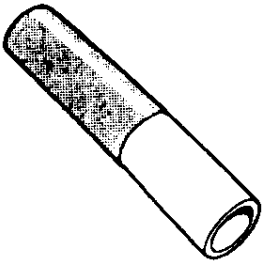
- 1. Drain plug
- 2. Oil level and oil filler plug

Fig. 14-40

14-10. TIGHTENING TORQUE

Fastening parts	N-m	lb-ft
	kg-m	
Output shaft front case bolt	13 – 23	9.5 – 16.5
	1.3 – 2.3	
Center case bolt	13 – 23	9.5 – 16.5
	1.3 – 2.3	
Counter shaft lock plate bolt	9 – 17	7.0 – 12.0
	0.9 – 1.7	
Universal joint flange nut	110 – 150	80.0 – 108.0
	11.0 – 15.0	
Transfer mounting bracket bolt	18 – 28	13.5 – 20.0
	1.8 – 2.8	
Transfer mounting nut	25 – 35	18.5 – 25.0
	2.5 – 3.5	
Cross joint bolt & nut	50 – 60	36.5 – 43.0
	5.0 – 6.0	
Oil filler and drain plug	18 – 28	13.5 – 20.0
	1.8 – 2.8	

14-11. SPECIAL TOOLS

 <p>09900-06108 Snap ring pliers (closing type)</p>	 <p>09922-66020 Flange holder</p>
 <p>09913-75810 Transfer bearing installer</p>	 <p>09926-58010 Bearing puller attachment (transfer)</p>
 <p>09913-84510 Transfer bearing installer</p>	

14-12. REQUIRED SERVICE MATERIALS

MATERIALS	RECOMMENDED SUZUKI PRODUCT	USE
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	<ul style="list-style-type: none"> Sliding and rubbing surface of components where application is instructed in this manual. Both surfaces of counter shaft thrust washer. Oil seal lips.
Sealant	SUZUKI BOND No. 1215 (99000-31110)	<ul style="list-style-type: none"> Oil filler and drain plugs.

SECTION 15

PROPELLER SHAFTS

NOTE:

This model uses only No. 1 and No. 3 of the propeller shafts used for the 4WD Model. No. 1 propeller shaft transmits drive from the transmission to the transfer gear box. No. 3 shaft extends from the transfer gear box to the rear axle.

Also, dimensions and other details of these propeller shafts are the same as those of the 4WD Model. Therefore, for the removal and installation of propeller shafts and disassembly and assembly of universal joint, refer to the same section in GROUP 1.

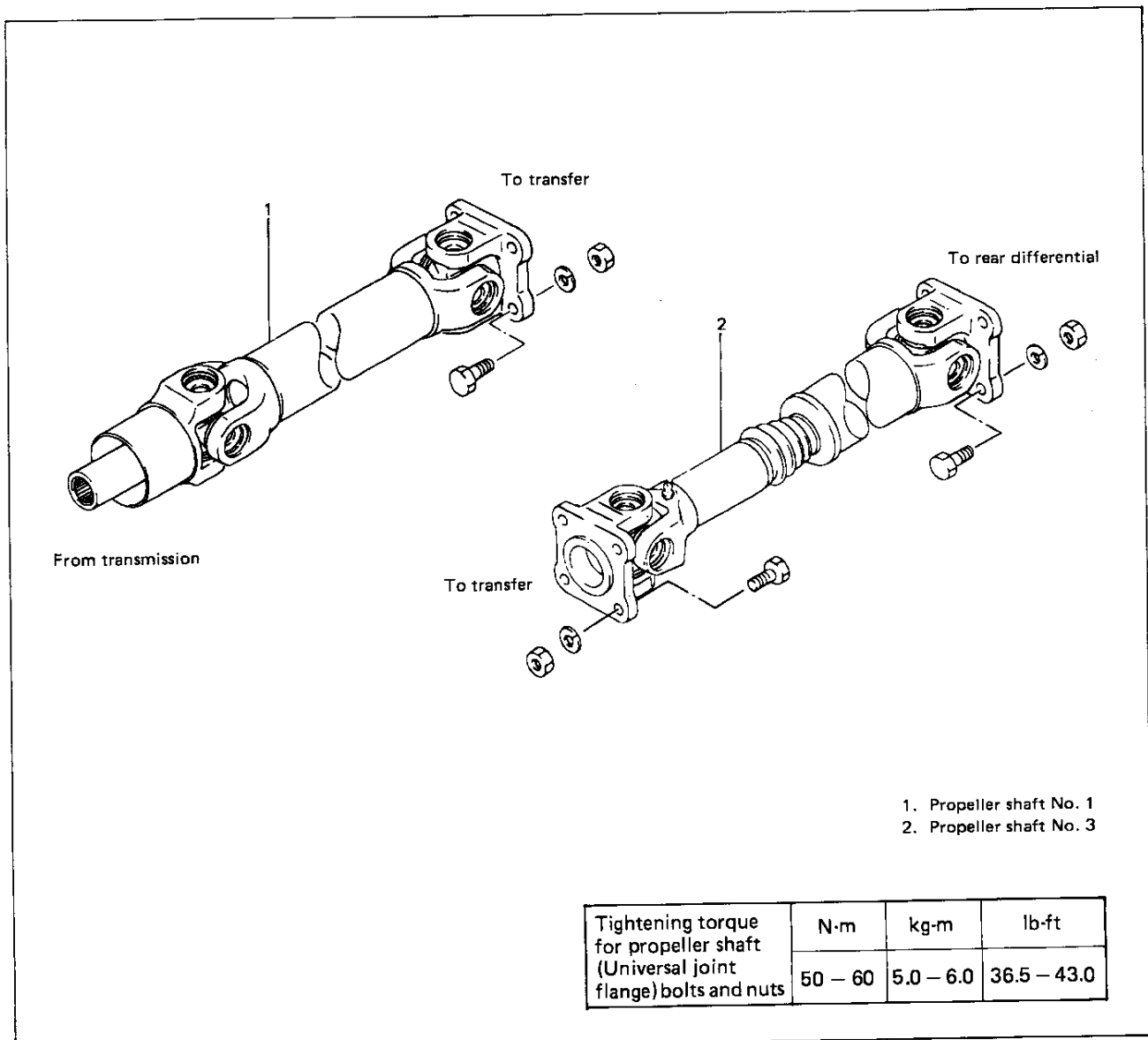


Fig. 15-1

SECTION 16

DIFFERENTIAL

NOTE:

This 2WD Model is equipped with the rear differential only and not the front differential. For servicing procedures of the rear differential including its removal, installation, disassembly, assembly, inspection and adjustment, refer to the same section in GROUP 1.



SECTION 17

SUSPENSION

CONTENTS

17-1. FRONT SUSPENSION	17- 2
17-2. REAR SUSPENSION	17-13
17-3. MAINTENANCE SERVICES	17-14
17-4. RECOMMENDED TORQUE SPECIFICATIONS	17-19
17-5. REQUIRED SERVICE MATERIALS	17-20

NOTE:

- All suspension fasteners are an important attaching part in that it could affect the performance of vital parts and systems, and/or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.
- Never attempt to heat, quench or straighten any suspension part. Replace it with a new part, or damage to the part may result.
- The leaf spring number or shape shown in this manual may differ from the vehicle being actually serviced, depending on specification.

17-1. FRONT SUSPENSION

GENERAL DESCRIPTION

The front suspension consists of the double-acting shock absorbers, stabilizer bar, semi-elliptical leaf springs, axle housing, etc. as shown below.

The end of the dead axle sleeve is in the shape of dish. This dish is rotatably fitted into the knuckle structure to form a flexible connection, the sliding clearance between the two being sealed with a felt packing (against road dust and mud) and also with an oil seal (against the oil inside). The upper and lower kingpins, bolted to the knuckle and, inside, are held by the dish-like inner case through tapered roller bearings.

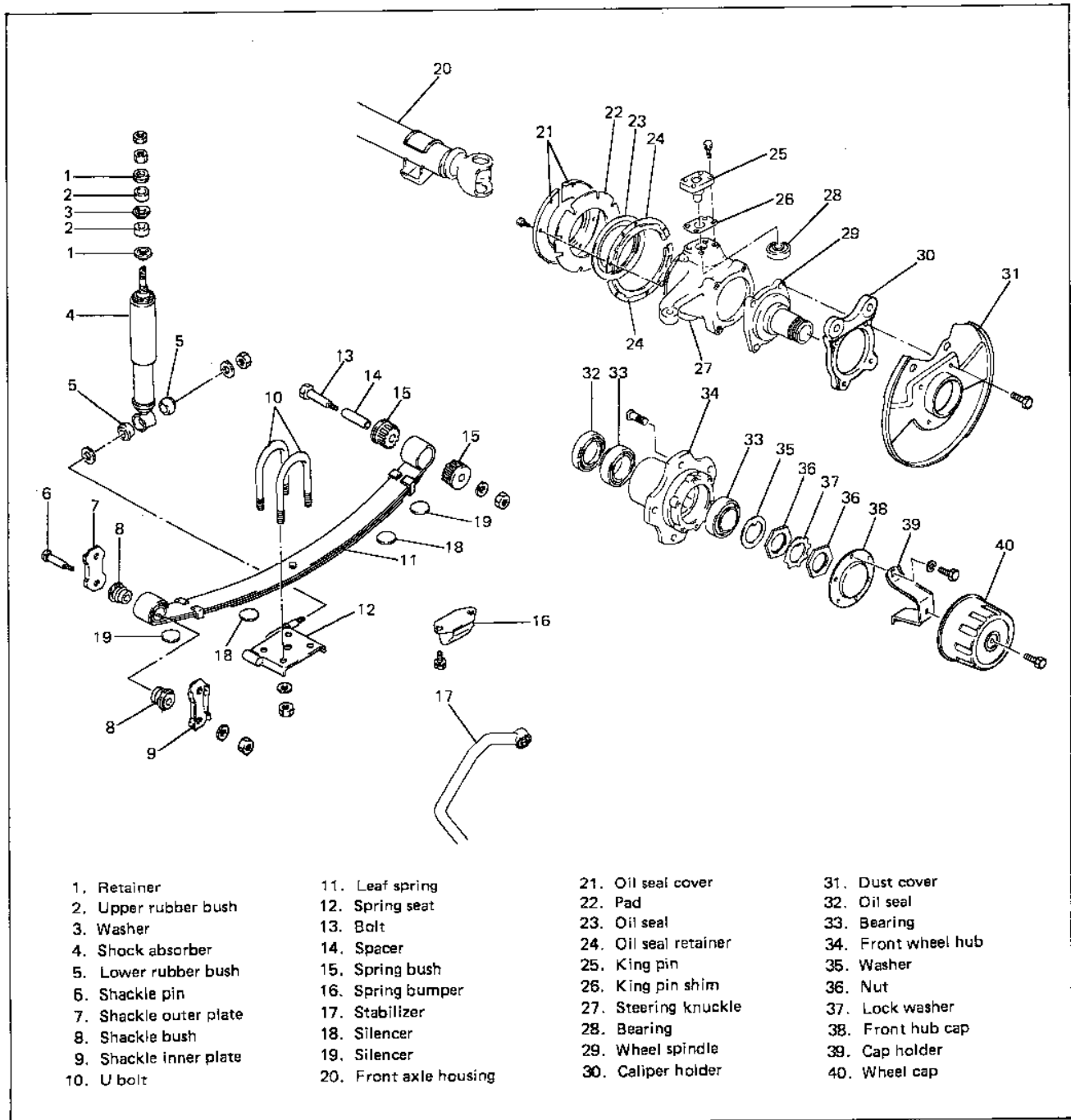
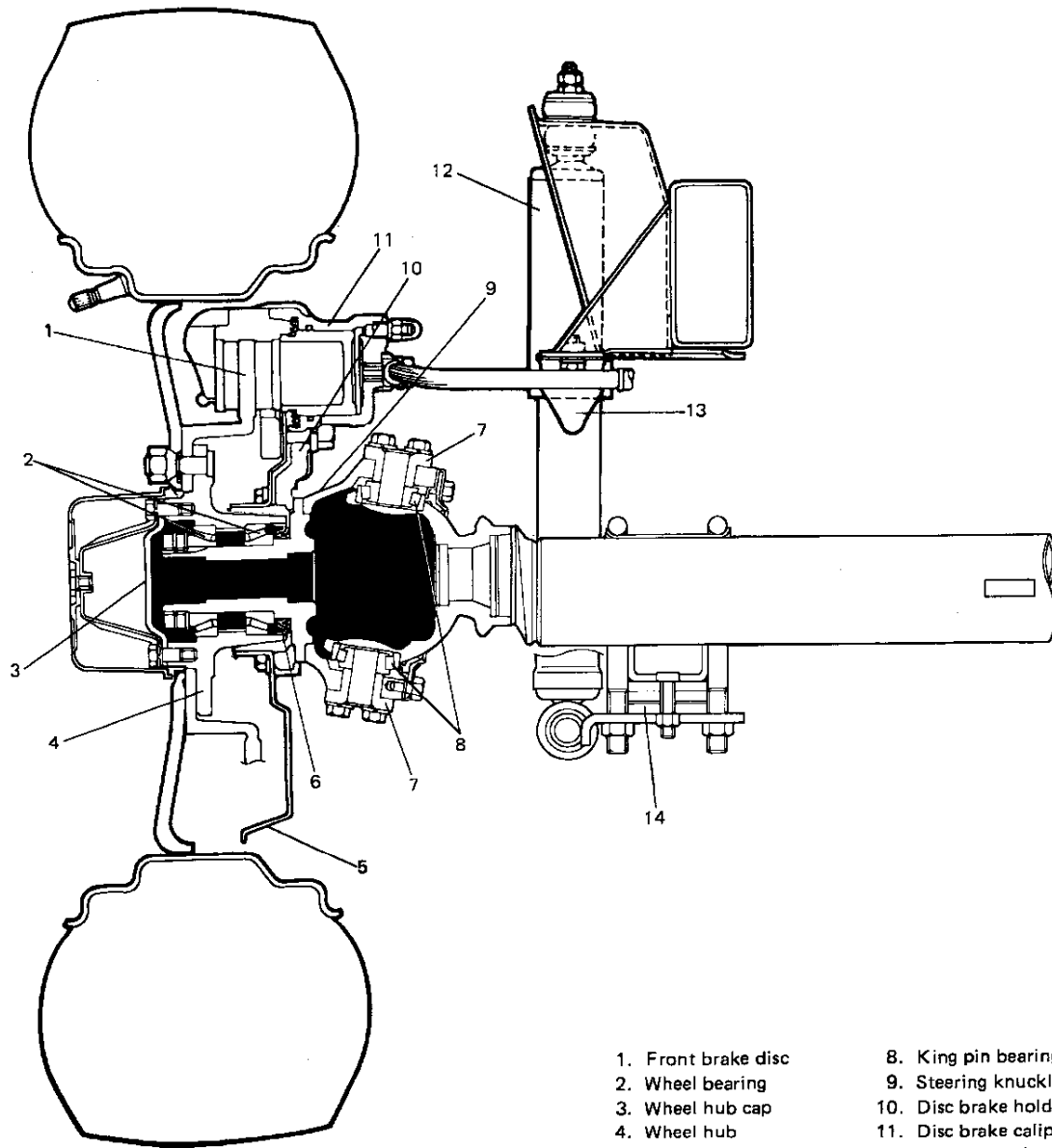


Fig. 17-1-1



- | | |
|---------------------|------------------------|
| 1. Front brake disc | 8. King pin bearing |
| 2. Wheel bearing | 9. Steering knuckle |
| 3. Wheel hub cap | 10. Disc brake holder |
| 4. Wheel hub | 11. Disc brake caliper |
| 5. Dust cover | 12. Shock absorber |
| 6. Oil seal | 13. Spring bumper |
| 7. King pin | 14. Leaf spring |

Fig. 17-1-2

REMOVAL

Shock Absorber

The shock absorber is non-adjustable, non-refillable, and cannot be disassembled.

The only service the shock absorber requires is replacement when it has lost its resistance, is damaged, or leaking fluid.

- 1) Hoist vehicle.
- 2) Loosen lower and upper mounting nuts and remove shock absorber.

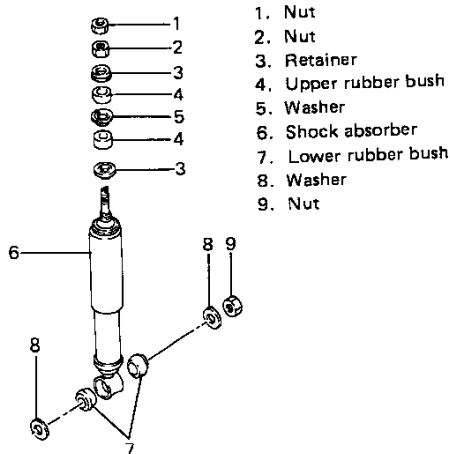


Fig. 17-1-3

Leaf Spring

- 1) Raise vehicle. In this operation, garage jack or hoist must not be positioned against front suspension related parts. When garage jack is used, place safety stands under chassis to support raised body.
- 2) Remove front wheel.
- 3) Remove stabilizer bolt.
- 4) Remove U-bolt nuts.
- 5) Remove shackle nuts and leaf spring nut.

NOTE:

Removal of leaf spring causes axle housing to hang. Support it with safety stand to prevent it from damaging universal joint of propeller shaft and others.

- 6) Pull out leaf spring bolt and remove leaf spring from shackle pin.

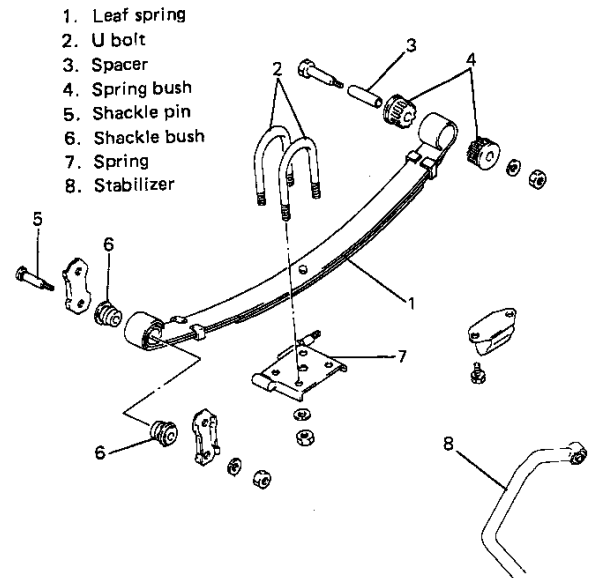


Fig. 17-1-4

Stabilizer

- 1) Hoist vehicle.
- 2) Remove stabilizer bolts.
- 3) After removing stabilizer mount bush bracket bolts, remove stabilizer.

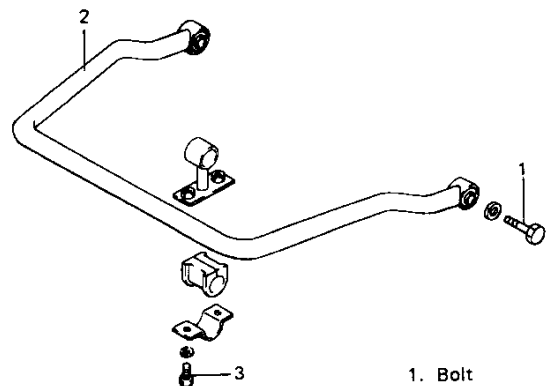


Fig. 17-1-5

Front Wheel Hub & Bearing

- 1) Remove wheel center cap.
- 2) Loosen the five nuts securing the wheel.
Raise the front end by jacking.
Rest the machine steady on safety stands.
- 3) Remove the five nuts and take off the wheel.

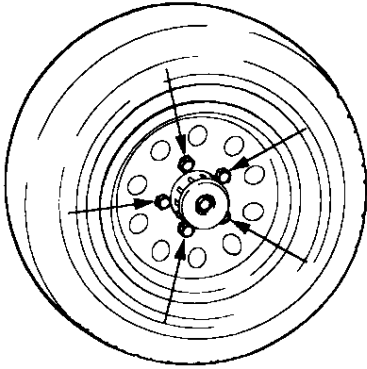


Fig. 17-1-6

- 4) Remove front wheel center cap holder and front wheel hub cap.

NOTE:

When loosening front wheel hub cap, hold front wheel by depressing footbrake pedal. This will facilitate the work.

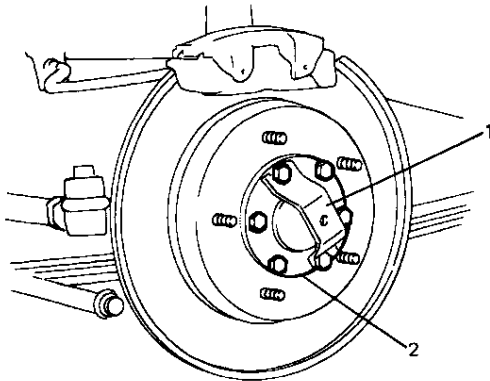


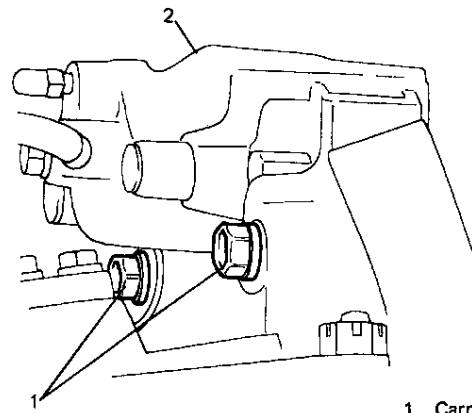
Fig. 17-1-7

1. Center cap holder
2. Axle shaft cap

- 5) Remove the caliper with carrier by loosening carrier bolts.

NOTE:

Hang removed caliper with a wire hook or the like so as to prevent brake hose from bending and twisting excessively or being pulled. Don't operate brake pedal with caliper removed.



1. Carrier bolts
2. Caliper

Fig. 17-1-8

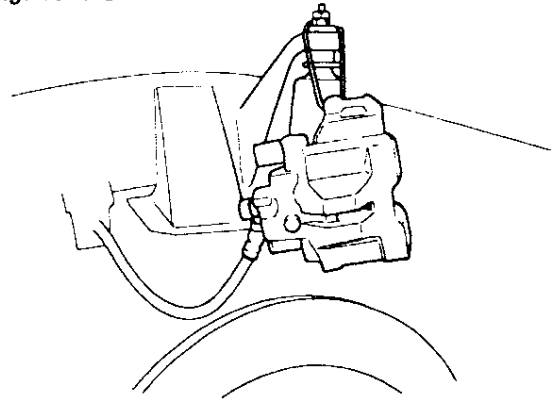
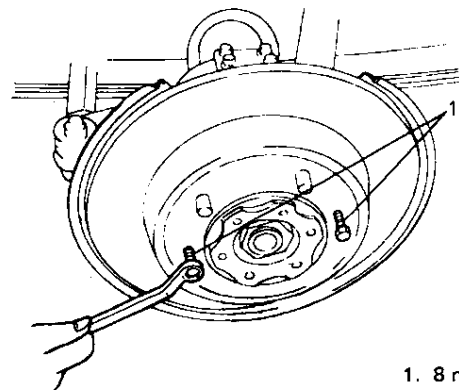


Fig. 17-1-9

- 6) Remove brake disc.

NOTE:

If brake disc can not be removed by hand, use 8 mm bolts as shown below.



1. 8 mm bolt

Fig. 17-1-10

- 7) Straighten bent part of lock washer and remove wheel bearing lock nut with special tool (B). Then remove lock washer.

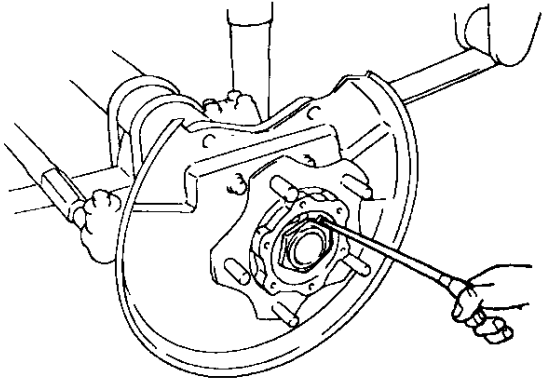


Fig. 17-1-11

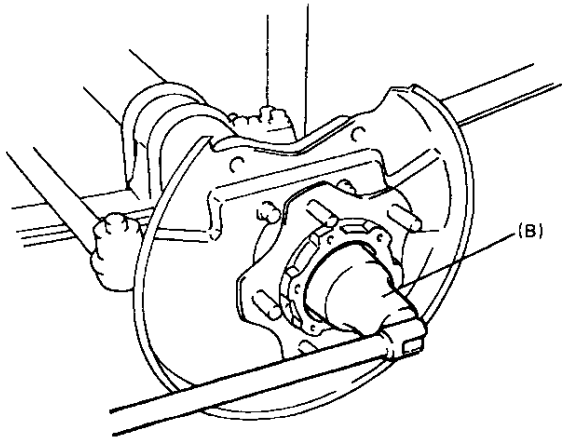


Fig. 17-1-12 Special Tool (B)
(Front Wheel Bearing Nut Socket Wrench 09941-58010)

- 8) After loosening front wheel bearing nut with the same special tool (B), take nut off the front wheel spindle.

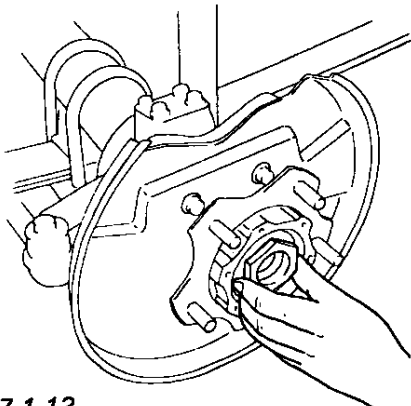


Fig. 17-1-13

- 9) Pull front wheel hub off the front wheel spindle.

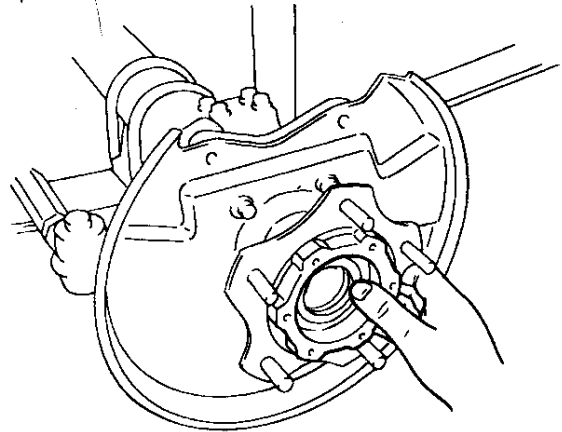


Fig. 17-1-14

- 10) Remove oil seal and outer race of inner bearing or outer bearing from wheel hub.

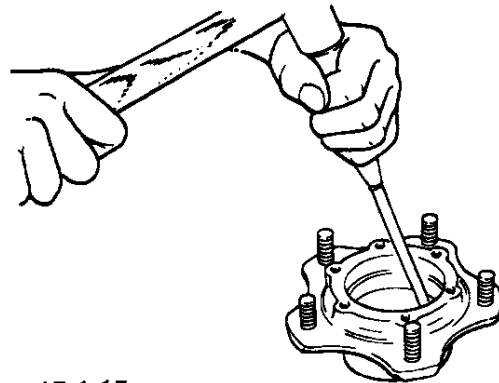


Fig. 17-1-15

Steering Knuckle

- 1) Remove front wheel hub, referring to steps 1 to 9 of foregoing front wheel hub and bearing removal.
- 2) Loosen bolts securing kingpins (upper & lower). At this point, king pins mustn't be removed.

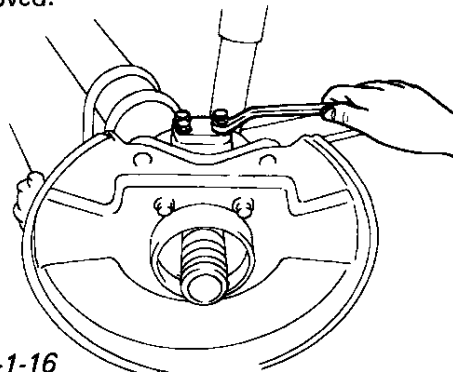


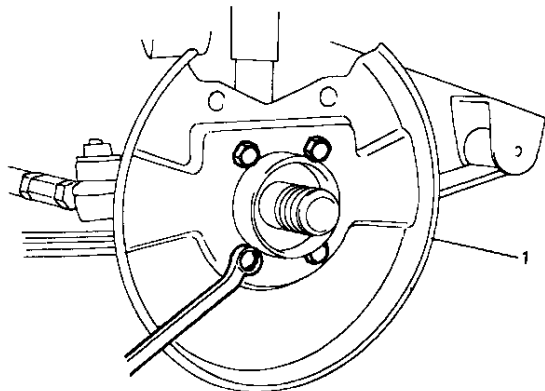
Fig. 17-1-16

3) Remove disc dust cover, caliper holder and wheel spindle.

NOTE:

Wheel spindle can be removed by tapping it with a plastic hammer.

If it does not come off easily, remove steering knuckle and then tap on inside of steering knuckle.



1. Dust cover

Fig. 17-1-17

4) Remove tie rod end castle nut and disconnect tie rod end from steering knuckle with special tool (A).

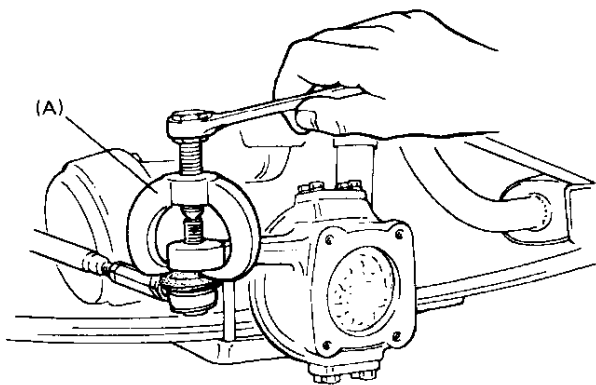


Fig. 17-1-18 Special Tool (A) (Tie Rod End Remover 09913-65210)

5) Remove joint seal bolts. Then remove oil seal cover, pad, oil seal and retainer from knuckle.

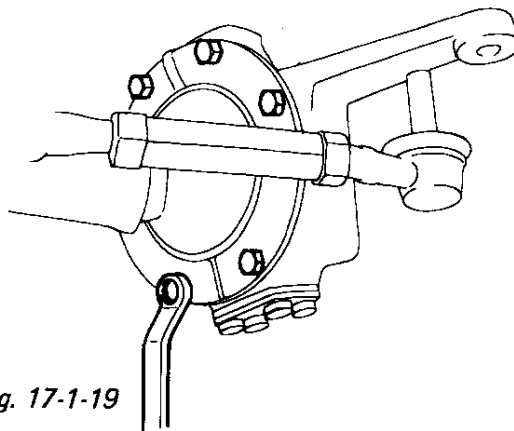
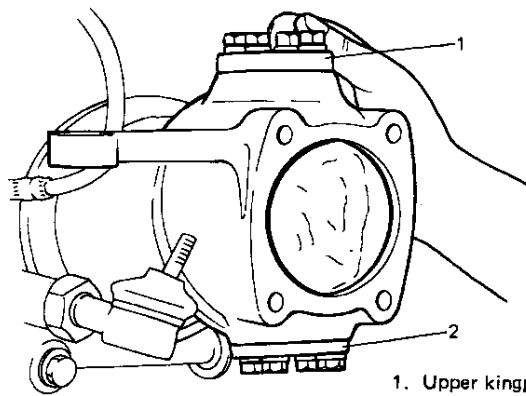


Fig. 17-1-19

6) Remove lower and upper kingpins.

NOTE:

- Upper and lower kingpins, when removed, must be marked off one from the other.
- Also make sure to check the number of kingpin shims that were fitted on each side.



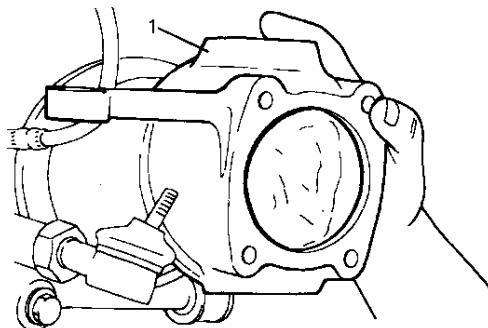
1. Upper kingpins
2. Lower kingpins

Fig. 17-1-20

7) Pull off steering knuckle.

NOTE:

- When steering knuckle is pulled, lower kingpin bearing sometimes falls off. So remove bearing while pulling off the knuckle gradually.
- Upper and lower kingpin bearings must be also marked off one from the other.



1. Steering knuckle

Fig. 17-1-21

INSPECTION OF COMPONENT

Stabilizer and its Bush

Inspect stabilizer for damage or deformation. If defective, replace.

Inspect bushes for damage, wear or deterioration. If defective, replace.

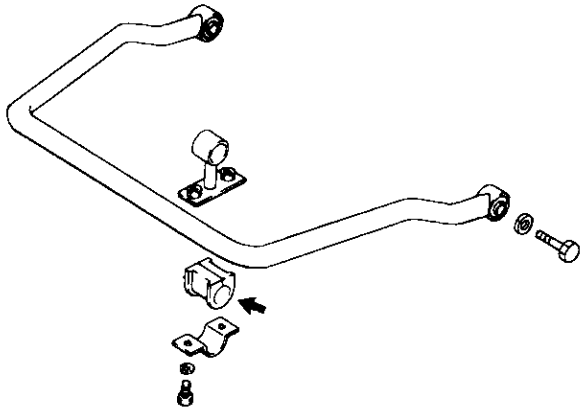


Fig. 17-1-22

Leaf Spring Bushes

Inspect for wear and breakage. If found defective, replace.

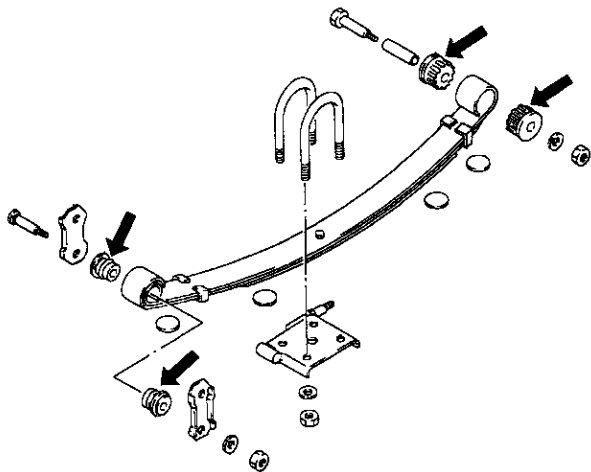


Fig. 17-1-23

Front Wheel Bearing

Check front wheel bearing rollers for damage. If anything is found wrong, replace bearing with a new one.

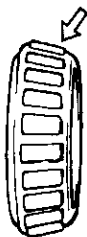


Fig. 17-1-24

Kingpins and Bearings

Inspect each kingpin closely for dents, signs of cracking, distortion or any other damage. Replace the kingpins found in defective condition.

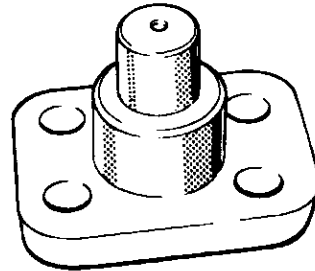


Fig. 17-1-25

Check the kingpin bearings for damage. If anything is found wrong, replace the bearing with new one.



Fig. 17-1-26

Steering Knuckle Oil Seal

The oil seal used at the spherical sliding joint between the knuckle and the inner case accomplishes the additional purposes of keeping out road dust and of acting as the damper for the steering handwheel. As the wear of this seal advances, its damping effect decreases and thus make the front wheel develop a tendency to "shimmy" not only that road dust begins to creep into the sliding clearance to promote the wear of the spherical sliding surfaces.

Check the oil seal for wear or damage. If defective, replace with new one.

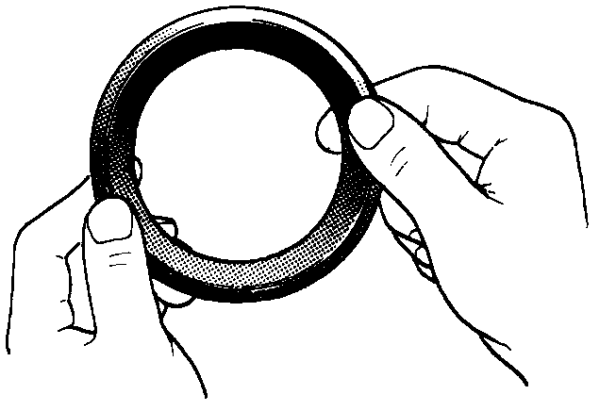


Fig. 17-1-27

INSTALLATION

Reverse removal procedure observing each precaution.

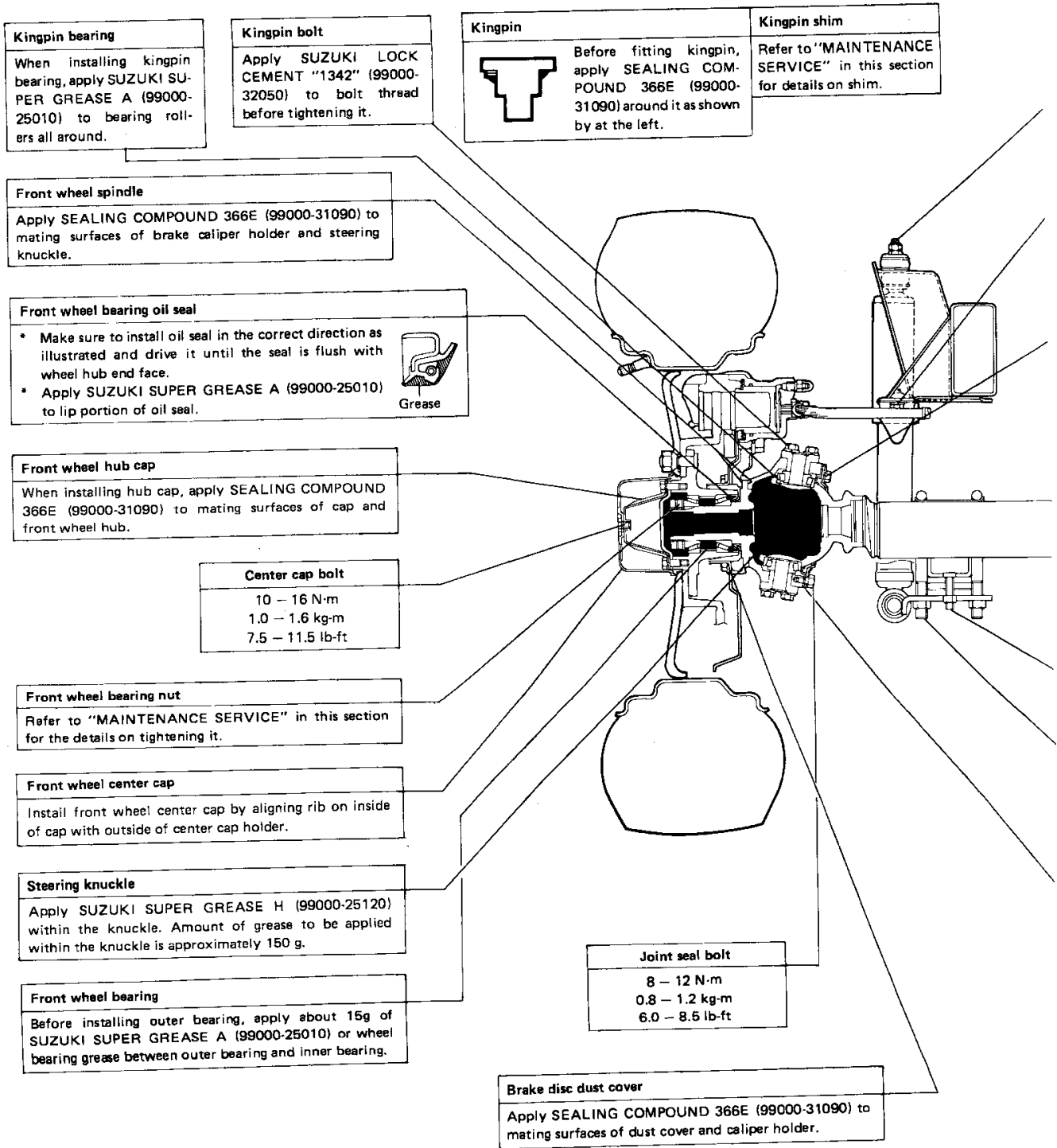



Fig. 17-1-28

Shock absorber lock nut
 22 – 35 N·m
 2.2 – 3.5 kg·m
 (16.0 – 25.0 lb-ft)

Spring bumper bolt
 18 – 28 N·m
 1.8 – 2.8 kg·m
 (13.5 – 20.0 lb-ft)

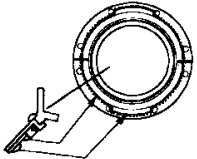
Steering knuckle oil seal

 Before installing oil seal, apply SUZUKI SUPER GREASE H (99000-25120) to its lip portion.

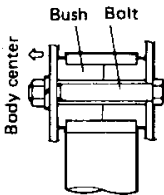
When installing front axle housing, position it in such way that vehicle manufacturing date stamp on it faces vehicle front.

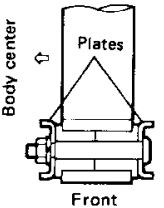


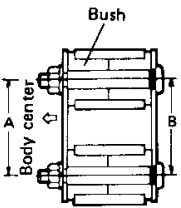
Leaf spring center bolt & nut
 Insert bolt and nut securely into holes of axle housing seat and spring seat.

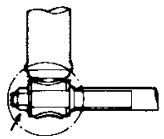
Front spring U bolt
 When securing U bolt, tighten its front and rear nuts evenly.

Oil seal retainer

 When installing retainer, apply SEALING COMPOUND 366E (99000-31090) all around it.

Front leaf spring bush & spring bolt

 * Either water or household type detergent may be used to press-fit the bush onto spring. But oil of any kind is strictly prohibited.
 * Insert both right and left bolts from the outside into the inside of body.

Front leaf spring shackle plate

 Install plates with their backs directed to each other.

Front leaf spring shackle pins & bush

 * Insert both right and left pins from outside into inside of body.
 * Tighten nuts to specified torque in unloaded state.
 * When pins are inserted, make sure that the difference (A – B) is within –0.3 ~ +0.3 mm (–0.024 ~ +0.024 in).
 * Either water or household type detergent may be used to press-fit bush onto spring. But oil of any kind is strictly prohibited.

Shock absorber & nut

 For correct installing direction of absorber washer, refer to the figure.
 35 – 55 N·m
 3.5 – 5.5 kg·m
 (25.5 – 39.5 lb-ft)

NOTE:
 Torque specifications of other bolts and nuts are given under "RECOMMENDED TORQUE SPECIFICATIONS" of this section.

Stabilizer

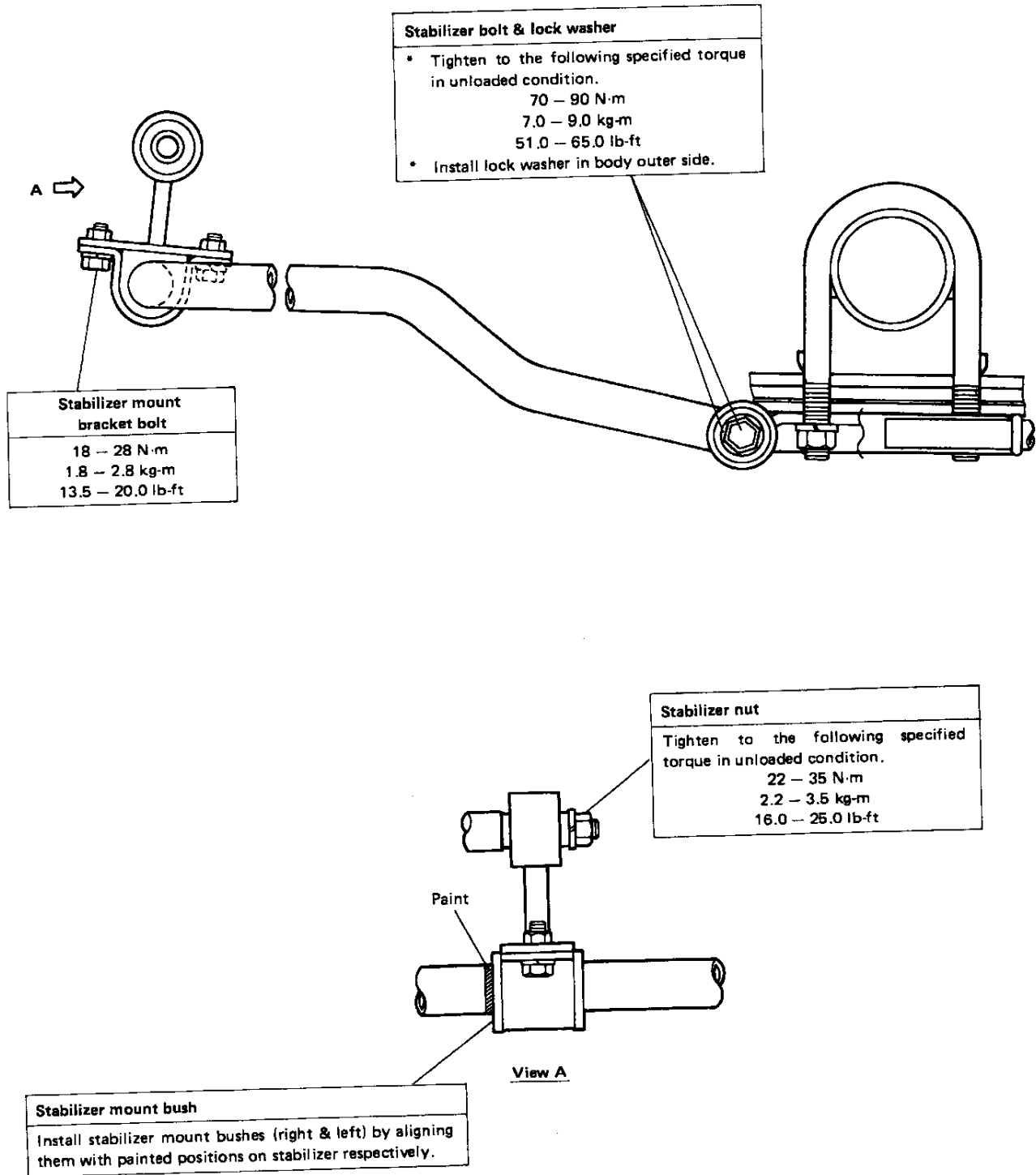


Fig. 17-1-29

17-2. REAR SUSPENSION

GENERAL DESCRIPTION

The rear suspension consists of leaf springs, axle housing, axle shafts and shock absorbers as shown below. The leaf springs are attached to the chassis frame through rubber bushes located at their both ends as shown. The axle housing is installed on the right and left leaf springs by means of spring seats and U bolts. The two shock absorbers (right & left) are installed with their lower ends attached to the spring seats and the upper ends to the chassis frame, all through rubber bushes.

NOTE:

The structure of this rear suspension is the same as that of the 4WD Model except the spring rate of the rear leaf spring.

Also, servicing procedures of the rear suspension, such as removal, installation and maintenance, are the same as the 4WD Model. Therefore, refer to the same section in GROUP 1.

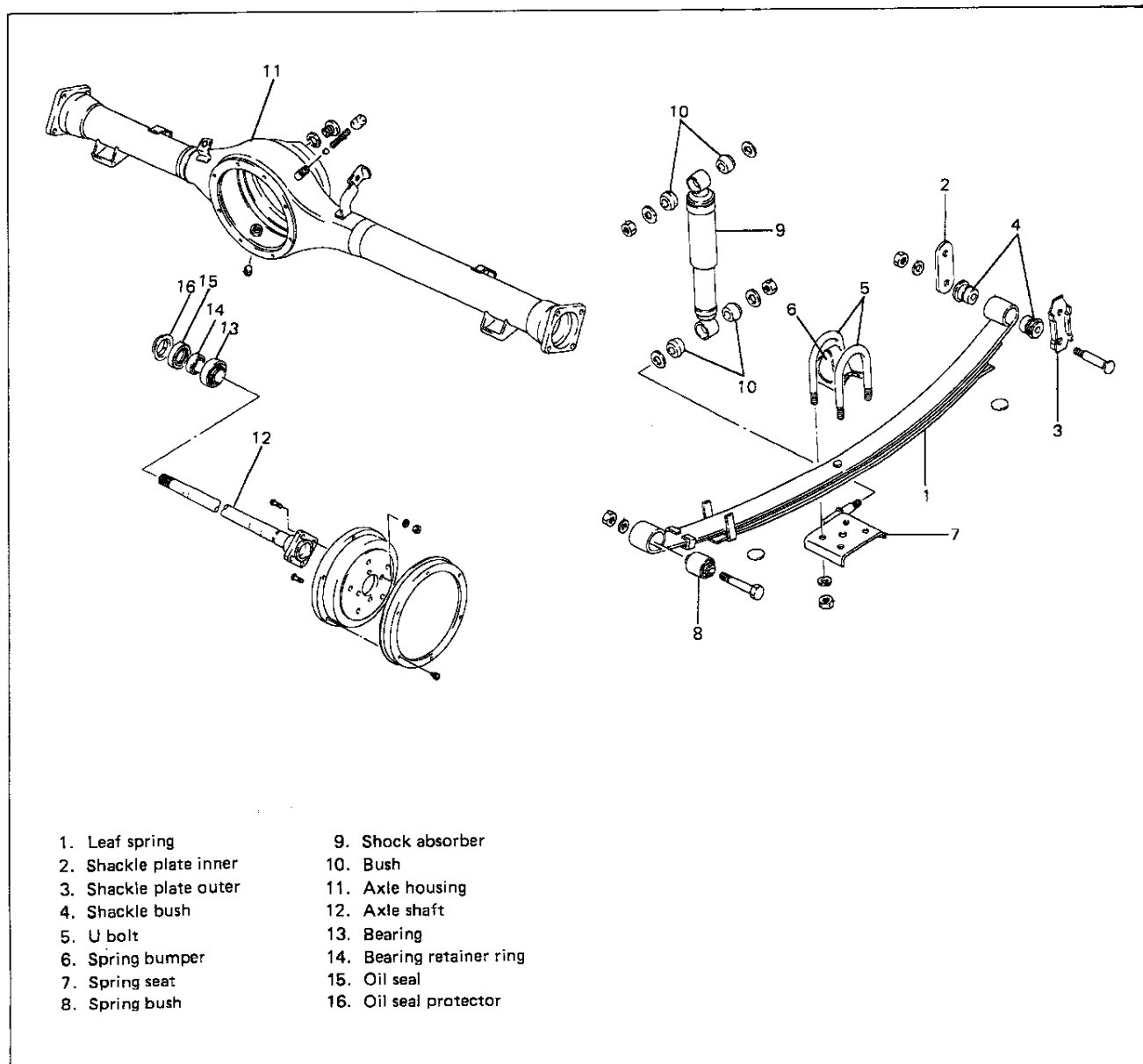


Fig. 17-2-1

17-3. MAINTENANCE SERVICES

Shock Absorber

- 1) Inspect for deformation or damage.
- 2) Inspect bushings for wear or damage.
- 3) Inspect for evidence of oil leakage.

Replace any defective part.

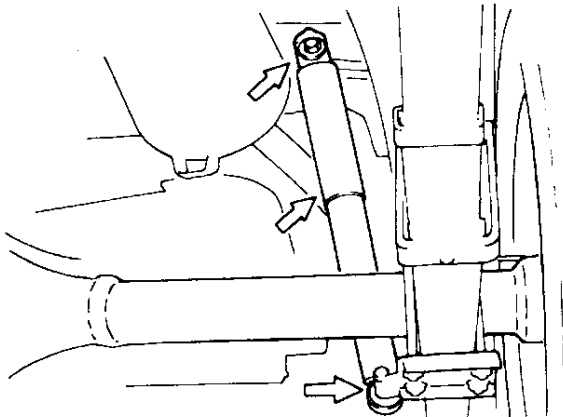


Fig. 17-3-1

WARNING:

When handling rear shock absorber in which high-pressure gas is sealed, make sure to observe the following precautions.

- 1) Don't disassemble it.
- 2) Don't put it into the fire.
- 3) Don't store it where it gets hot.
- 4) Before disposing it, be sure to drill a hole in it where shown by an arrow in the figure below and let gas and oil out. Lay it down sideways for this work.

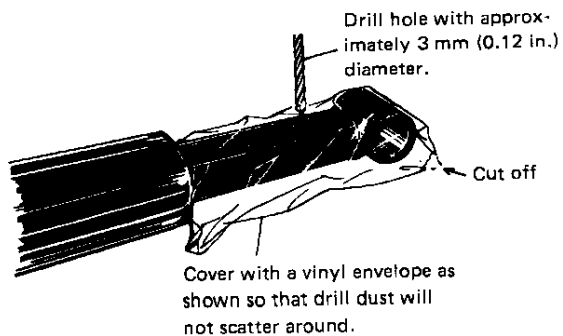


Fig. 17-3-2

Leaf Spring and Bumper

- 1) Inspect leaf spring for crack, wear and damage.

NOTE:

Special attention must be paid to that part as indicated by "A" in figure below (where each end of the shorter leaf contacts).

- 2) Inspect bumper for damage.
If found defective, replace.

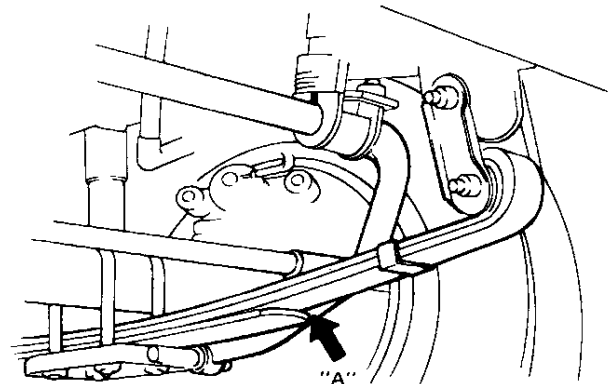


Fig. 17-3-3

Rear Wheel Bearing

- 1) Check wheel bearings for wear. When measuring thrust play, apply a dial gauge to drum center.

Thrust play Limit	Rear	0.8 mm (0.03 in.)
-------------------	------	-------------------

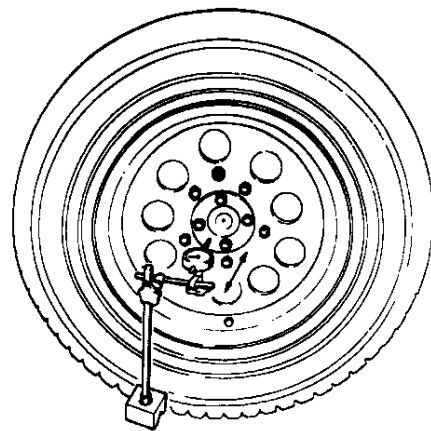


Fig. 17-3-4

When measurement exceeds limit, replace bearing.

- 2) By rotating wheel actually, check wheel bearing for noise and smooth rotation. If it is defective, replace bearing.

Front Wheel Bearing

[Inspection]

1) To check wheel bearings, jack up front end. Spin wheel and check if it is spun smoothly and is free from abnormal noise. If it isn't, replace wheel bearing.

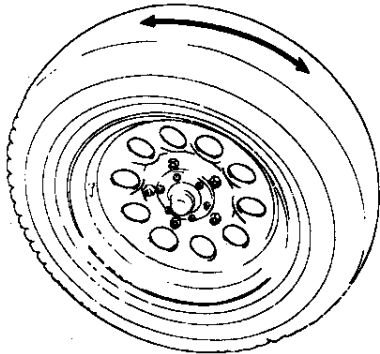


Fig. 17-3-5

2) Upon completion of the check in above 1), check each joint of steering system for tightness, each ball stud of the steering link as well as each kingpin for rattle. Then check bearing as described below.

3) Shake wheel in the direction indicated by an arrow in figure below to see if bearing rattles.

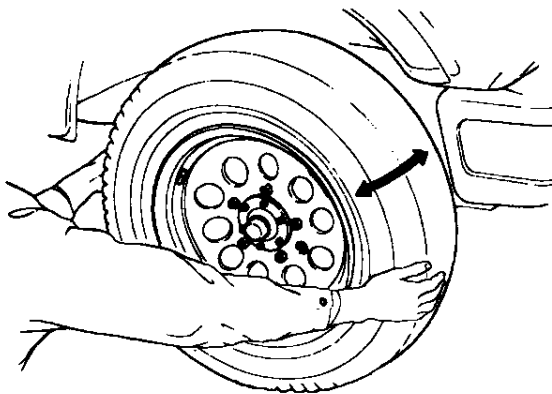


Fig. 17-3-6

4) Shake wheel in the direction indicated by an arrow in figure below to see if bearing rattles.

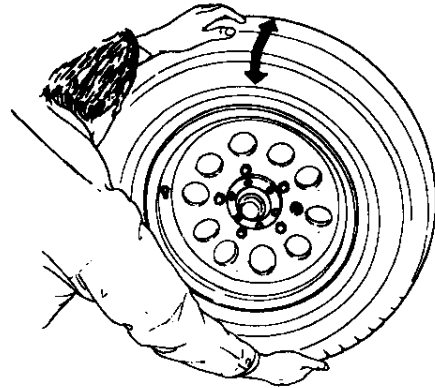


Fig. 17-3-7

5) If bearing rattles, check bearing preload with wheel and brake caliper & holder removed as shown in figure below.

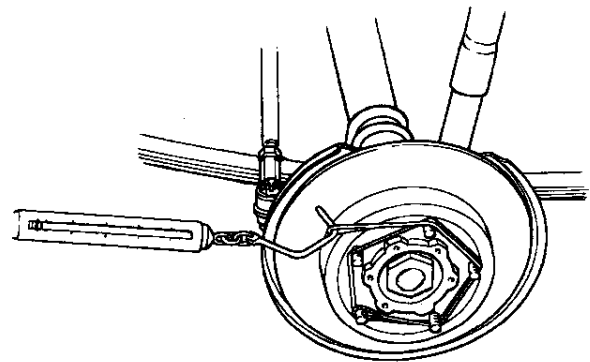


Fig. 17-3-8

Wheel bearing starting preload	2.0 – 3.0 kg (4.4 – 6.6 lb)
--------------------------------	--------------------------------

If preload is not within the above specification, adjust bearing preload according to following "adjustment".

[Adjustment]

1) After removing wheel bearing lock nut and lock washer, tighten bearing nut ① to the torque of 80 N·m (8.0 kg-m, 57.5 lb-ft) while spinning hub by hand. Next, loosen the nut until the torque becomes 0 N·m (0. kg-m, 0 lb-ft) and then tighten it again to tightening torque specified below.

In this way, an appropriate bearing preload is obtained.

Wheel bearing nut ① tightening torque	10.0 – 15.0 N·m 1.0 – 1.5 kg-m (7.5 – 10.5 lb-ft)
------------------------------------------	---------------------------------------------------------

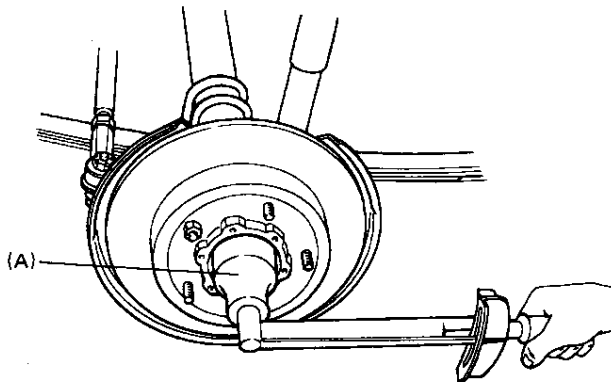
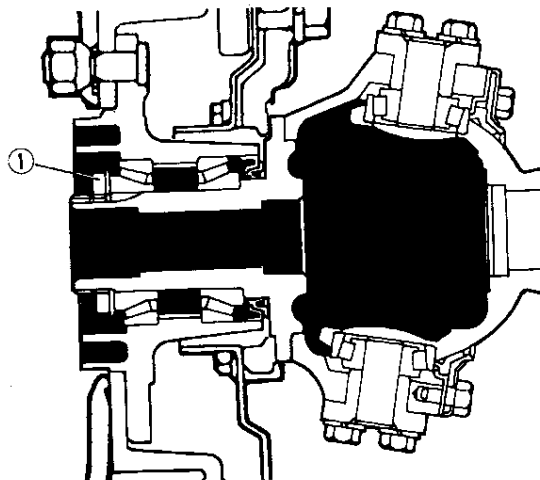


Fig. 17-3-9 Special Tool (A) (Front Wheel Bearing Nut Socket Wrench 09941-58010)

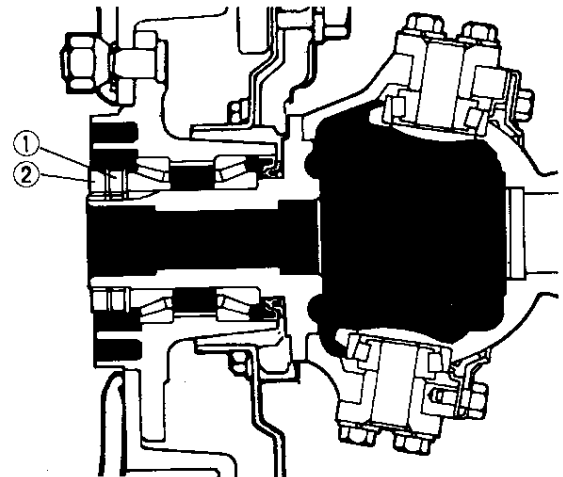


1. Wheel bearing lock nut

Fig. 17-3-10

2) Be sure to insert lock washer after adjustment and tighten lock nut ② to specified torque. Then bend a part of lock washer toward bearing nut (body side) and another part toward lock nut (outside) so that these 2 nuts are locked.

Wheel bearing lock nut ② tightening torque	60 – 90 N·m 6.0 – 9.0 kg-m (43.5 – 65.0 lb-ft)
--------------------------------------------	------------------------------------------------------



① Wheel bearing nut
② Wheel bearing lock nut

Fig. 17-3-11

- 3) Recheck that bearing starting preload is within specification.
- 4) Upon completion of adjustment, be sure to install wheel hub cap, disc brake caliper & holder and wheel. Refer to "INSTALLATION" in this section.

King Pin

[Inspection and adjustment]

Where tapered roller bearings holding 2 kingpins at each front wheel are in good and properly preloaded (tightened) condition, there will be no appreciable rattle of wheel. To check kingpins and their tapered roller bearings, jack up the front end and shake wheel to feel any rattle, as shown in figure. If rattle is felt, eliminate it by properly decreasing the shim thickness. The shim is located between flanged part of kingpin and knuckle.

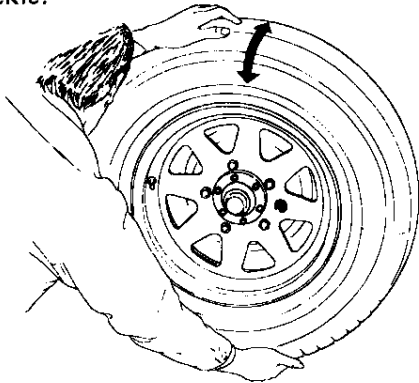


Fig. 17-3-12

The above-mentioned method of making a shim adjustment demands a high degree of skill on the part of the serviceman. The alternative method is to adjust shim thickness by referring to the torque resistance which knuckle arm offers when pulled in the condition shown in figure. For this method, the reference torque value is established as indicated below, and you are to increase or decrease shim thickness to produce this torque value.

NOTE:

After removing wheel and steering knuckle oil seal and disconnecting tie rod end, this checking and adjustment should be carried out.

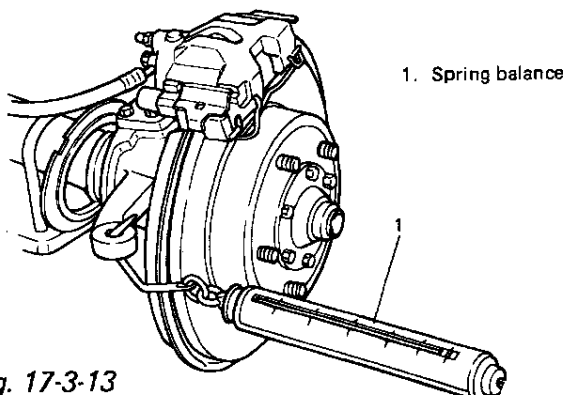


Fig. 17-3-13

Before giving a test pull to knuckle arm with a spring balance in the alternative method, install a large amount of shims on each kingpin to lighten preload on tapered roller bearing. Keep on reading the torque, each time decreasing shim thickness a little, and continue this process until specified torque value is obtained. (This process protects kingpins because it ensure that no excessive pull will be applied to bearings at the onset.) If the process fails to produce specified torque, that is, if desired torque resistance does not occur even when shim thickness has been reduced to zero on each kingpin, it means that bearings or kingpins are excessively worn and need replacement.

NOTE:

- Read spring balance indication when knuckle arm begins to turn. In other words, you are to read "starting torque."
- When checking knuckle arm starting torque, be sure to have axle hub oil seal removed and tighten kingpin bolts to specified torque.

Knuckle arm starting torque (force)	1.0 – 1.8 kg (2.20 – 3.96 lb) without oil seal
Available sizes of shim fork kingpins	0.1, 0.5 mm (0.004, 0.02 in.)

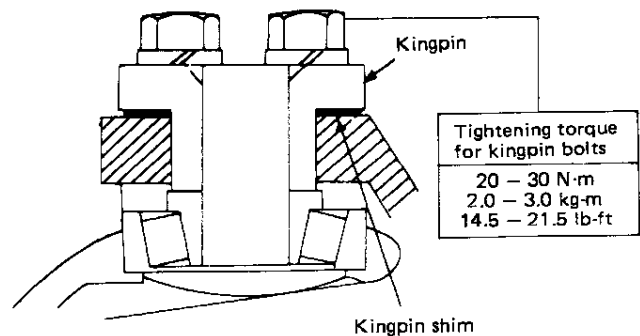


Fig. 17-3-14

Upon completion of this check and/or adjustment, be sure to connect tie rod end to steering knuckle and install oil seal retainer, oil seal, felt packing oil seal cover and wheel. Refer to "INSTALLATION" in this section.

Steering Knuckle Oil Seal

The oil seal used at the spherical sliding joint between knuckle and inner case accomplishes additional purposes of keeping out road dust and of acting as the damper for steering hand-wheel. As wear of this seal advances, its damping effect decreases and thus makes front wheel develop a tendency to "shimmy" not only that road dust begins to creep into sliding clearance to promote wear of spherical sliding surfaces.

The oil seal is an expendable item, and must be replaced at regular intervals.

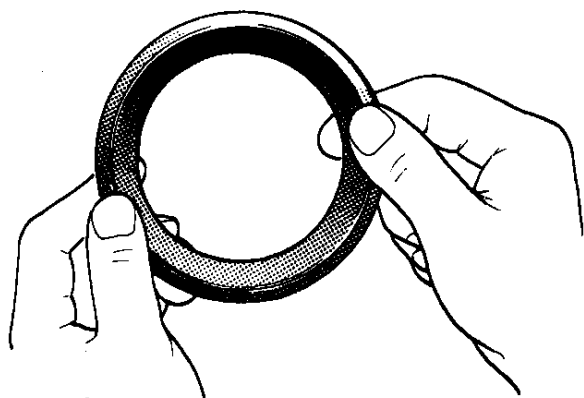


Fig. 17-3-15

[How to replace oil seal]

1) Remove 8 bolts securing joint seat, and displace oil seal cover and felt packing inward.

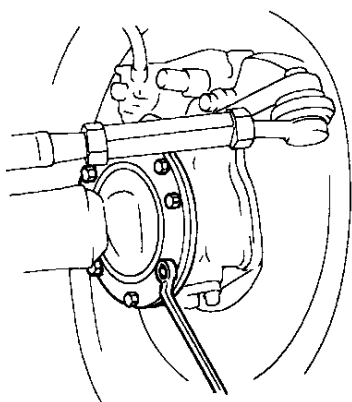


Fig. 17-3-16

- 2) Cut oil seal in place with scissors or a knife, and take it off.
- 3) Cut replacement oil seal at one place with scissors or a knife as shown in figure below.
- 4) Install the seat in oil seal retainer, bringing the cut portion to top side and locating it about 30 degrees off the matching face of oil seal retainer.

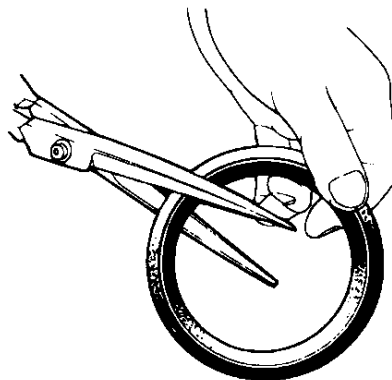


Fig. 17-3-17

- 5) Apply grease to inside of oil seal. Apply sealing compound to mating face all around: this is for preventing entry of water.

- SEALING COMPOUND "CEMEDINE" 366E (99000-31090)
- SUZUKI SUPER GREASE H (99000-25120)

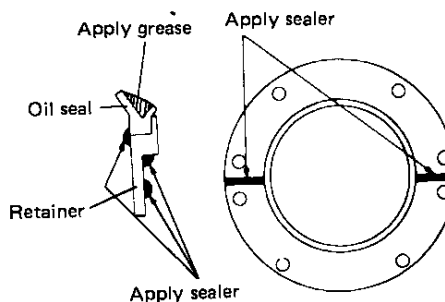


Fig. 17-3-18

- 6) Tighten joint seat securing bolts to specified torque.

17.4. RECOMMENDED TORQUE SPECIFICATIONS

Fastening parts	Tightening torque		
	N·m	kg·m	lb·ft
Schackle pin nut	30 – 55	3.0 – 5.5	22.0 – 39.5
Leaf spring nut	60 – 85	6.0 – 8.5	43.5 – 61.0
Leaf spring U bolt nut	60 – 80	6.0 – 8.0	43.5 – 57.5
Wheel nut	80 – 110	8.0 – 11.0	57.5 – 79.5
Front wheel hub cap	10 – 16	1.0 – 1.6	7.5 – 11.5
Kingpin upper & lower bolts	20 – 30	2.0 – 3.0	14.5 – 21.5
Joint seal bolt	8 – 12	0.8 – 1.2	6.0 – 8.5
Front & rear shock absorber lower nut	35 – 55	3.5 – 5.5	22.5 – 39.5
Front shock absorber upper lock nut	22 – 35	2.2 – 3.5	16.0 – 25.0
Front leaf spring bumper bolt	18 – 28	1.8 – 2.8	13.5 – 20.0
Stabilizer bolt	70 – 90	7.0 – 9.0	51.0 – 65.0
Stabilizer nut	22 – 35	2.2 – 3.5	16.0 – 25.0
Stabilizer mount bracket bolt	18 – 28	1.8 – 2.8	13.5 – 20.0
Front wheel bearing nut	10 – 15	1.0 – 1.5	7.5 – 10.5
Front wheel bearing lock nut	60 – 90	6.0 – 9.0	43.5 – 65.0
Rear differential oil drain plug	18 – 25	1.8 – 2.5	13.5 – 18.0
Rear differential oil filler & level plug	35 – 50	3.5 – 5.0	25.5 – 36.0
Wheel center cap bolt	10 – 16	1.0 – 1.6	7.5 – 11.5

17-5. REQUIRED SERVICE MATERIALS

MATERIALS	RECOMMENDED SUZUKI PRODUCT	USE
Lithium grease	SUZUKI SUPER GREASE (A) (99000-25010)	<ul style="list-style-type: none"> ● Kingpin bearing. ● Front wheel bearing. ● Lip portion of front wheel bearing oil seal.
Lithium soap grease containing molybdenum disulfide	SUZUKI SUPER GREASE (H) (99000-25120)	<ul style="list-style-type: none"> ● Steering knuckle. ● Lip portion of steering knuckle oil seal.
Thread lock cement	SUZUKI LOCK CEMENT "1342" (09900-32050)	<ul style="list-style-type: none"> ● Kingpin bolt.
Sealing compound	SUZUKI SEALING COMPOUND 366E (99000-31090)	<ul style="list-style-type: none"> ● Kingpin. ● To matching surfaces of steering knuckle, brake caliper holder, wheel spindle, and dust cover. ● Steering knuckle oil seal retainer. ● Wheel hub cap.

SECTION 18

STEERING SYSTEM

NOTE:

The same description of steering system structure and operation as well as its service information applies to the 2WD Model as the 4WD Model except the shape of the differential housing of the front axle housing. Therefore, when servicing the steering system of the 2WD Model, refer to the same section in GROUP 1.

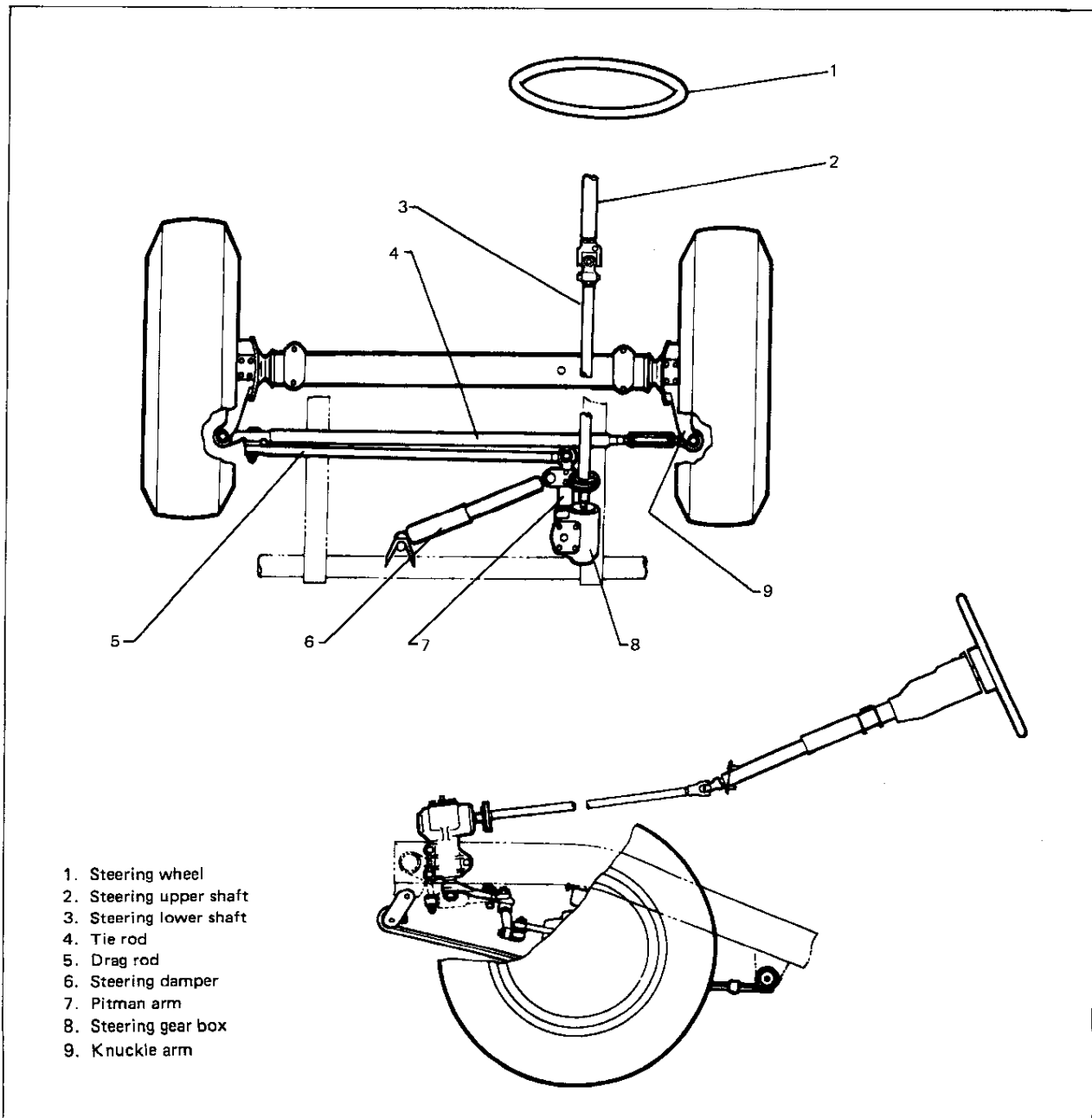


Fig. 18-1

SECTION 22

SERVICE DATA

NOTE:

For the items not found in this section, refer to the same section in GROUP 1.

CONTENTS

22-1. SPECIFICATIONS	22-1
22-2. SERVICE DATA	22-2

22-1. SPECIFICATIONS

	Models	Convertible/Hard Top
POWER TRANSMISSION		
Clutch type	Dry, single disc	
Transmission type	5-forward all synchromesh, 1 reverse	
Final reduction ratio (Differential)	3.727	
Transmission gear ratios	low	3.652
	2nd	1.947
	3rd	1.423
	4th	1.000
	5th	0.864
	reverse	3.466
Transfer gear ratios	1.409	
Overall reduction ratios	low	19.177
	2nd	10.224
	3rd	7.472
	4th	5.251
	5th	4.537
	reverse	18.201
WHEEL AND SUSPENSION		
Tire size: front and rear	P195/75 R15	
Tire pressure	front	140 kPa (1.40 kg/cm ² , 20 psi)
	rear	140 kPa (1.40 kg/cm ² , 20 psi)-unladen
		180 kPa (1.80 kg/cm ² , 26 psi)-laden

22-2. SERVICE DATA

SUSPENSION

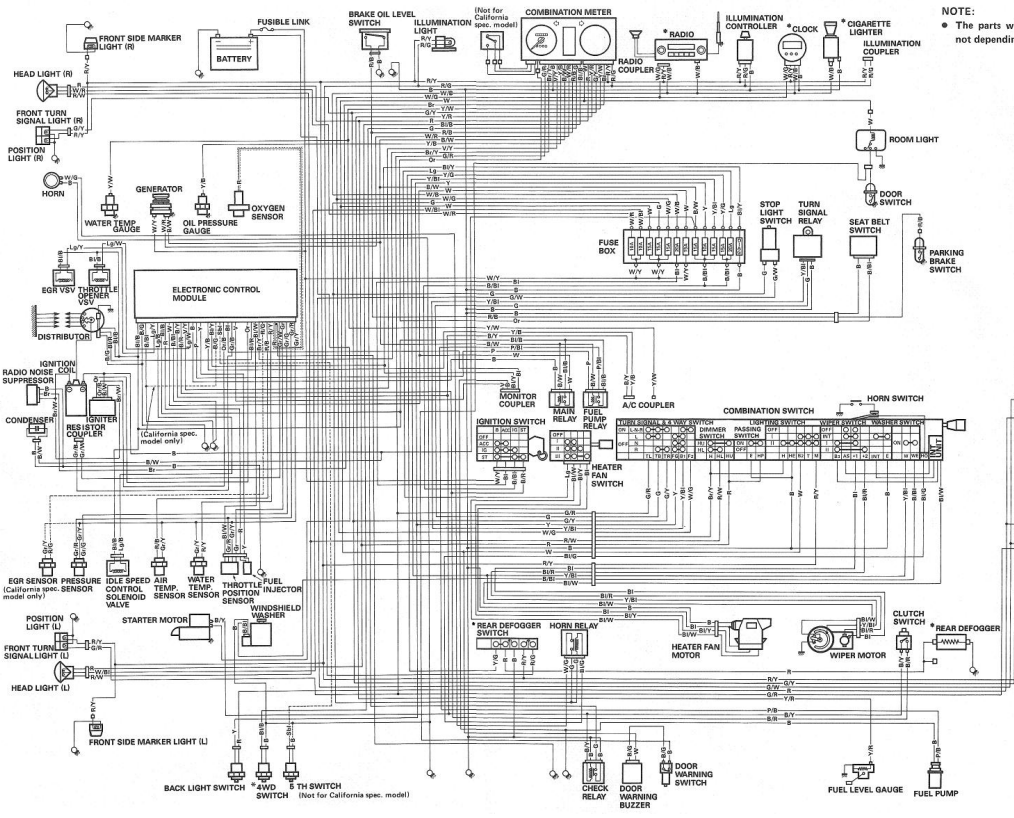
	Item	Standard	Service Limit
Suspension	Front wheel bearing starting preload	2.0 ~ 3.0 kg (4.4 ~ 6.6 lbs.)	_____
	Rear wheel bearing thrust play	_____	0.8 mm (0.03 in.)
	Knuckle arm starting torque (without oil seal)	1.0 ~ 1.8 kg (2.20 ~ 3.96 lbs.)	_____

WIRING DIAGRAM From the Samurai 1990, 1991 and 1992 Supplementary Service Manual

For USA

WIRE COLOR

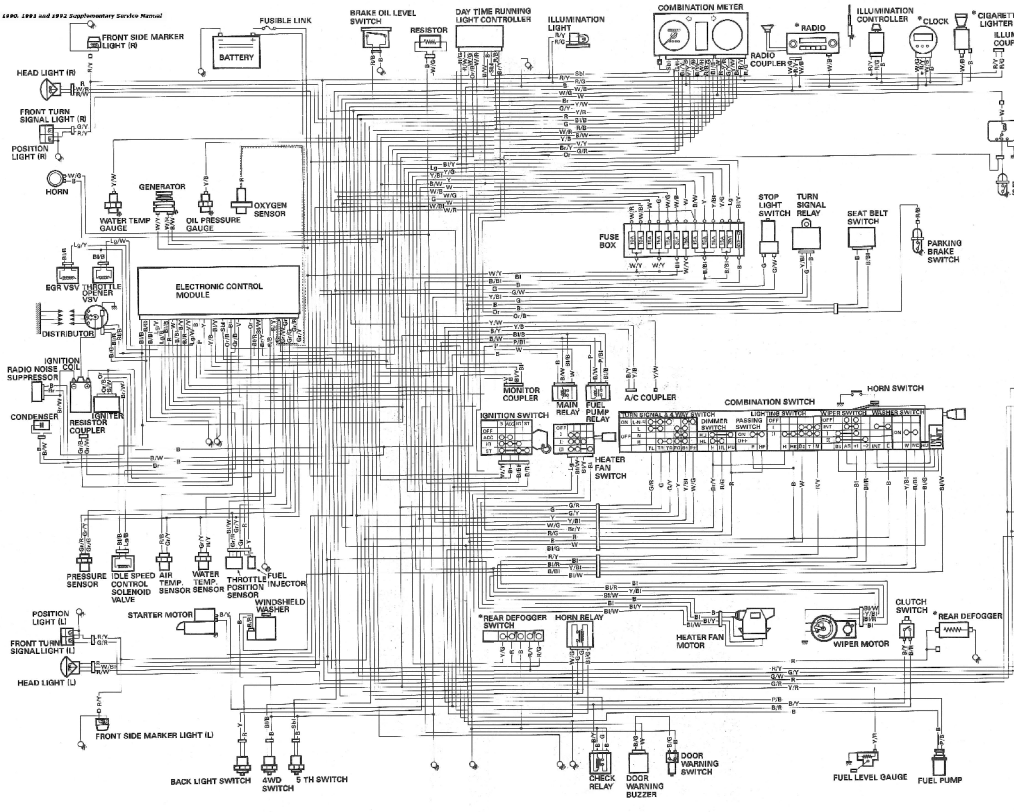
B	.....	Black
Bl	.....	Blue
Br	.....	Brown
G	.....	Green
Gr	.....	Gray
Sbl	.....	Sky blue
Lg	.....	Light green
Or	.....	Orange
R	.....	Red
W	.....	White
Y	.....	Yellow
P	.....	Pink
V	.....	Violet
B/Bl	.....	Black with Blue tracer
B/G	.....	Black with Green tracer
B/R	.....	Black with Red tracer
B/W	.....	Black with White tracer
B/Y	.....	Black with Yellow tracer
Bl/B	.....	Blue with Black tracer
Bl/G	.....	Blue with Green tracer
Bl/R	.....	Blue with Red tracer
Bl/W	.....	Blue with White tracer
Bl/Y	.....	Blue with Yellow tracer
Br/B	.....	Brown with Black tracer
Br/W	.....	Brown with White tracer
Br/Y	.....	Brown with Yellow tracer
G/B	.....	Green with Black tracer
G/R	.....	Green with Red tracer
G/W	.....	Green with White tracer
G/Y	.....	Green with Yellow tracer
Gr/B	.....	Gray with Black tracer
Gr/W	.....	Gray with White tracer
Gr/Y	.....	Gray with Yellow tracer
Lg/B	.....	Light green with Black tracer
Lg/W	.....	Light green with White tracer
Lg/Y	.....	Light green with Yellow tracer
Or/B	.....	Orange with Black tracer
P/B	.....	Pink with Black tracer
P/Bl	.....	Pink with Blue tracer
V/B	.....	Violet with Black tracer
R/B	.....	Red with Black tracer
R/G	.....	Red with Green tracer
R/W	.....	Red with White tracer
R/Y	.....	Red with Yellow tracer
W/B	.....	White with Black tracer
W/Bl	.....	White with Blue tracer
W/R	.....	White with Red tracer
W/W	.....	White with White tracer
W/Y	.....	White with Yellow tracer
Y/B	.....	Yellow with Black tracer
Y/Bl	.....	Yellow with Blue tracer
Y/G	.....	Yellow with Green tracer
Y/R	.....	Yellow with Red tracer
Y/W	.....	Yellow with White tracer



For CANADA

WIRE COLOR

B	.....	Black
Bl	.....	Blue
Br	.....	Brown
G	.....	Green
Gr	.....	Gray
Sbl	.....	Sky blue
Lg	.....	Light green
Or	.....	Orange
R	.....	Red
W	.....	White
Y	.....	Yellow
P	.....	Pink
V	.....	Violet
B/Bl	.....	Black with Blue tracer
B/G	.....	Black with Green tracer
B/R	.....	Black with Red tracer
B/W	.....	Black with White tracer
B/Y	.....	Black with Yellow tracer
Bl/B	.....	Blue with Black tracer
Bl/G	.....	Blue with Green tracer
Bl/R	.....	Blue with Red tracer
Bl/W	.....	Blue with White tracer
Bl/Y	.....	Blue with Yellow tracer
Br/B	.....	Brown with Black tracer
Br/W	.....	Brown with White tracer
Br/Y	.....	Brown with Yellow tracer
G/R	.....	Green with Red tracer
G/W	.....	Green with White tracer
G/Y	.....	Green with Yellow tracer
Gr/B	.....	Gray with Black tracer
Gr/W	.....	Gray with White tracer
Gr/Y	.....	Gray with Yellow tracer
Lg/B	.....	Light green with Black tracer
Lg/W	.....	Light green with White tracer
Lg/Y	.....	Light green with Yellow tracer
Or/B	.....	Orange with Black tracer
P/B	.....	Pink with Black tracer
P/Bl	.....	Pink with Blue tracer
V/B	.....	Violet with Black tracer
R/B	.....	Red with Black tracer
R/G	.....	Red with Green tracer
R/W	.....	Red with White tracer
R/Y	.....	Red with Yellow tracer
W/B	.....	White with Black tracer
W/Bl	.....	White with Blue tracer
W/R	.....	White with Red tracer
W/W	.....	White with White tracer
W/Y	.....	White with Yellow tracer
Y/B	.....	Yellow with Black tracer
Y/Bl	.....	Yellow with Blue tracer
Y/G	.....	Yellow with Green tracer
Y/R	.....	Yellow with Red tracer
Y/W	.....	Yellow with White tracer



Note: the above diagrams are available separately in a larger format on the same webpage as this document at Ack's FAQ. <http://www.acksfaq.com>