WORKSHOP MANUAL

DAIHATSU
4 WHEEL DRIVE

DAIHATSU MOTOR CO., LTD.
NO. F-8303-W3

SECTION INDEX

DAIHATSU
4 WHEEL DRIVE

SECTION 1
CLUTCH

DESCRIPTION

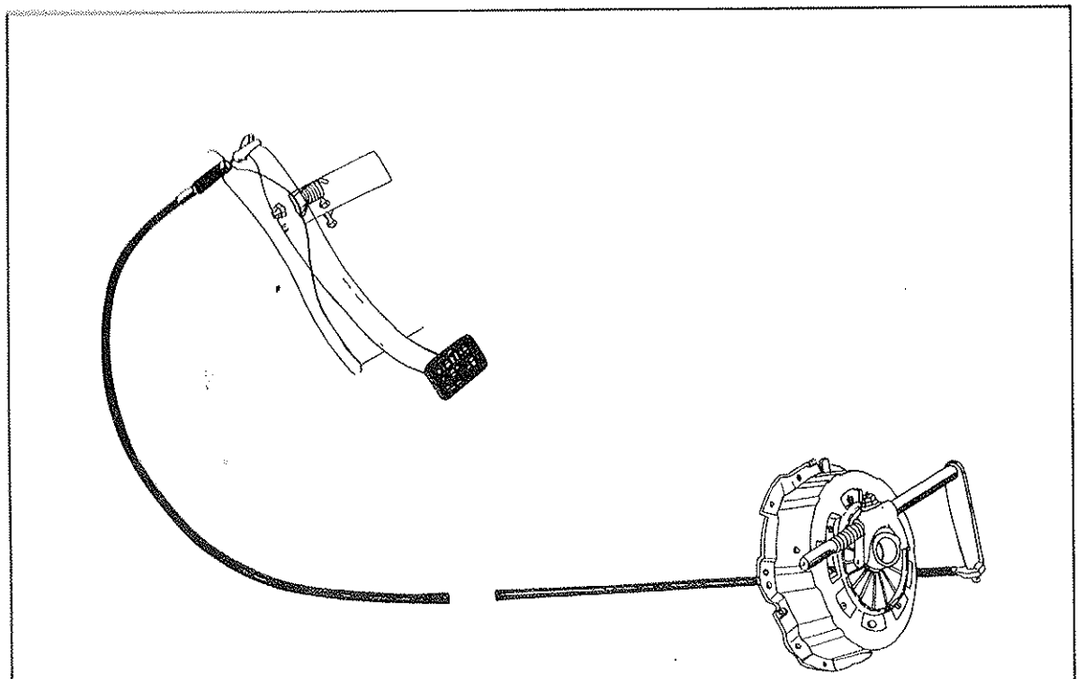


Fig. 1-1 Clutch Schematic Diagram

The clutch is of the dry, single disc, diaphragm spring type which has easy-to-operate, low operating effort features. The clutch is operated by a flexible cable.

The diaphragm type clutch cover employs the CHORDAL strap drive method that is aptly suitable for heavy-duty application.

Table 1-1 Clutch Specifications

Model		F-20 Series	F-50 Series
Clutch type		Dry, single disc, diaphragm spring type	←
Clutch disc surface dimensions (Outer dia. x inner dia. x thickness)	mm	212 x 140 x 3.5	240 x 160 x 3.5
Clutch disc surface area	cm^2	199	251

CLUTCH ADJUSTMENT

1. Clutch Pedal Height Adjustment
   Adjust the distance between the upper edge of the clutch pedal and the floor. This clutch pedal height can be adjusted to specification, using the bolt and nut of the pedal support.

Clutch Pedal	
Height:	177 to 192 mm
Stroke:	149 mm
Free Travel:	15 to 30 mm

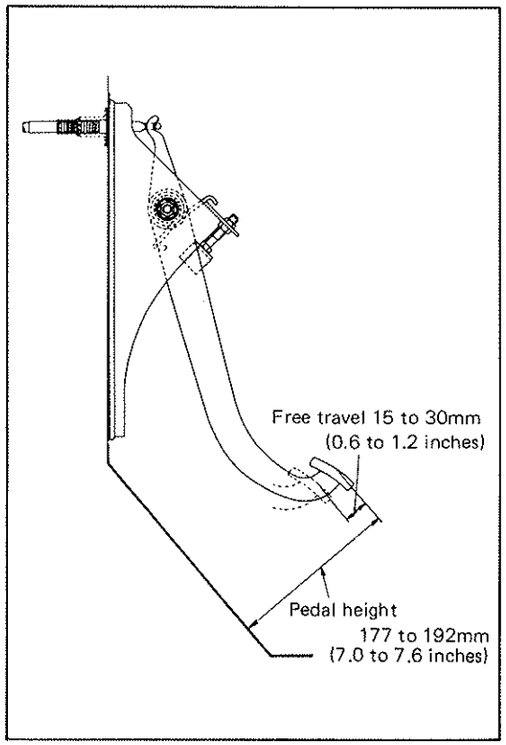


Fig. 1-2 Clutch Pedal Height Adjustment

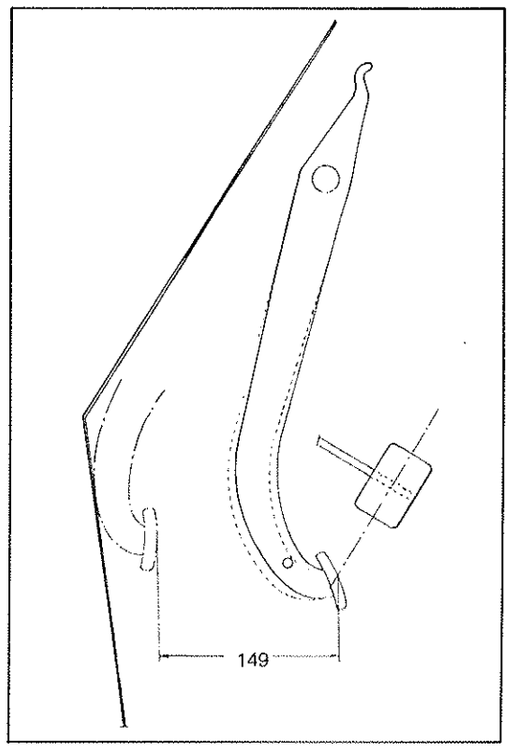


Fig. 1-3 Clutch Pedal Stroke

2. Clutch Pedal Free Travel Adjustment

The clutch pedal free travel can be adjusted to specification by changing the location of the E ring. This E ring has been inserted into one of the 14 grooves provided at the outer cap that is located at the upper end of the outer wire of the clutch release cable. Carry out the adjustment as follows:

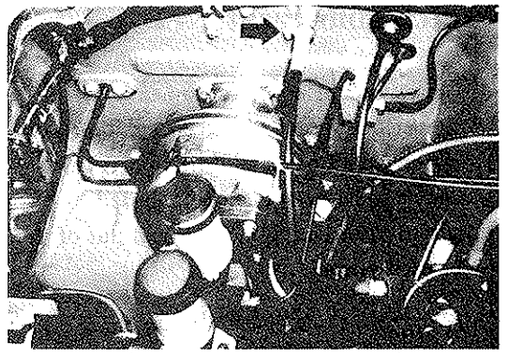


Fig. 1-4 Clutch Pedal Free Travel Adjustment (1)

(1) Working from the engine compartment, pull the upper end of the clutch release cable by your hand, until a resistance is felt (i.e. until the front part of the radial ball bearing of the clutch release hub contacts the clutch diaphragm spring.)

(2) Count the sum of the grooves and crests that are seen between the E ring inserted into the cable outer cap and the edge of the clutch wire support flange at the dash panel. The clutch pedal free travel adjustment is correct, if this sum of grooves and crests ranges from five (5) to six (6). If the adjustment is incorrect, change the location of the E ring so as to obtain the specified total number of five (5) to six (6).

(3) Sitting at the driver's seat, depress the clutch pedal several times. Check to see if the clutch pedal free travel conforms to specification.

Specified Free Travel:
15 to 30 mm

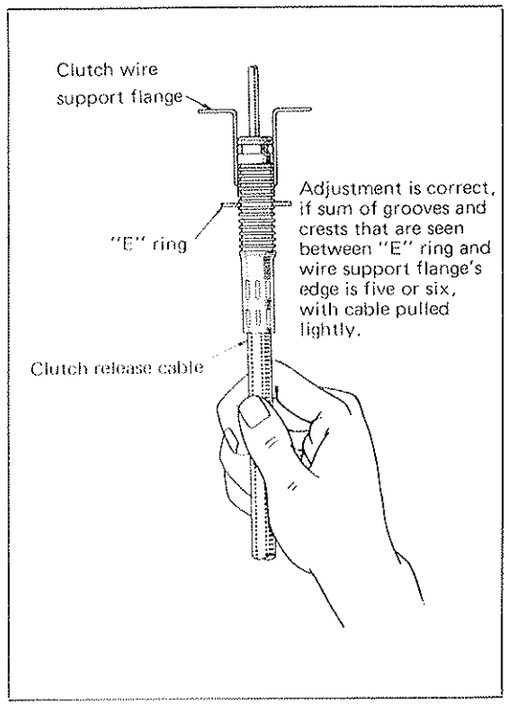
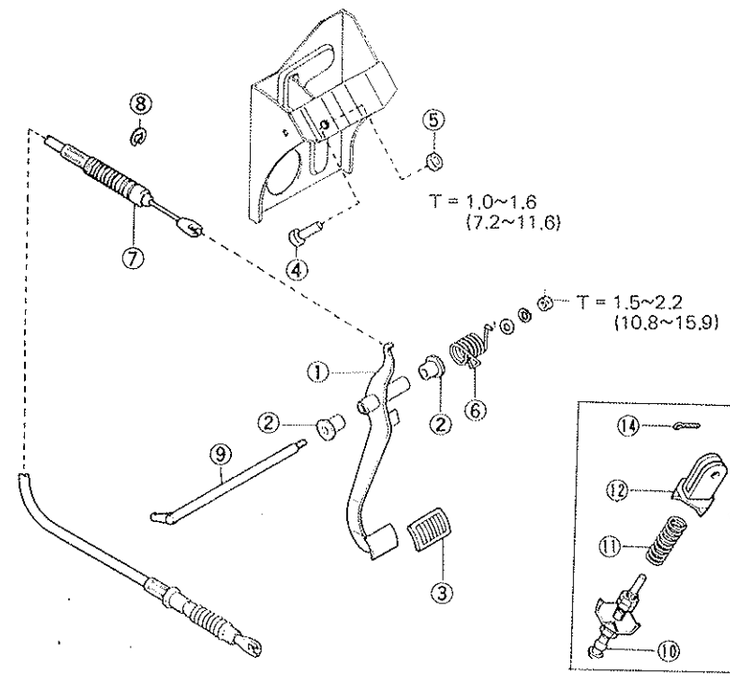


Fig. 1-5 Clutch Pedal Free Travel Adjustment (2)

CLUTCH PEDAL



① Clutch pedal
② Bush
③ Pedal pad
④ Bolt
⑤ Nut
⑥ Torsion spring (F20)
⑦ Clutch release cable
⑧ E ring
⑨ Pdal shaft
⑩ Clutch return spring holder (F50)
⑪ Compression spring (F50)
⑫ Clevis (F50)
⑬ Pin (F50)
⑭ Cotter pin (F50)

T: Tightening Turque Unit : kg-m (ft-lb)

Fig. 1-6 Clutch Pedal Components

Removal

1. Working from the engine compartment, remove the E ring inserted into the outer cap of the clutch release cable.
2. Working from the interior of the cab, remove the fitting provided at the end of the clutch release cable inner wire, from the end of the clutch pedal.

Note

Care should be exercised so as not to bend or twist the inner wire.

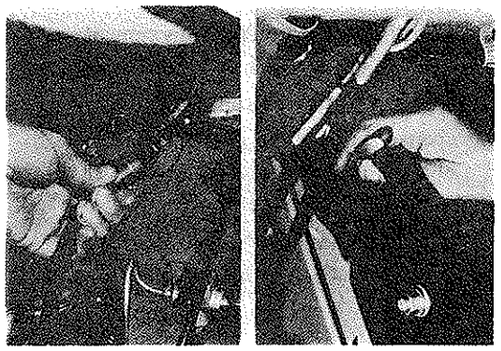


Fig. 1-7 Clutch Cable Removal

3. Remove the pedal shaft nut. Pull the pedal shaft to the right until about half part of the shaft is out.
4. Remove the clutch pedal.

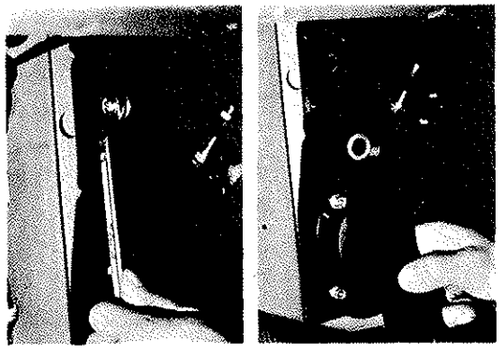


Fig. 1-8 Clutch Pedal Removal

Inspection and Adjustment

Inspect the thus-removed parts as follows.
Repair or replace defective parts, as required.

1. Check the pedal pad ① for damage or wear.
2. Check the pedal ② for damage or wear.
3. Check the pedal bush ③ for damage or wear.
4. Check the torsion spring ④ for deterioration.

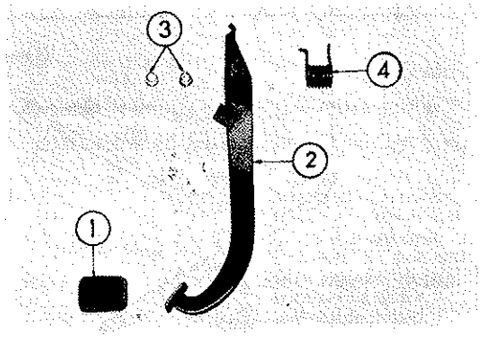


Fig. 1-9 Clutch Pedal Check

Installation

1. Coat the pedal shaft ① and bush ② with chassis grease. Place the clutch pedal together with the torsion spring in the pedal bracket. Install the pedal shaft into position.

> Note
> Before the shaft is installed into place, attach the end of the torsion spring to the clutch pedal bracket.

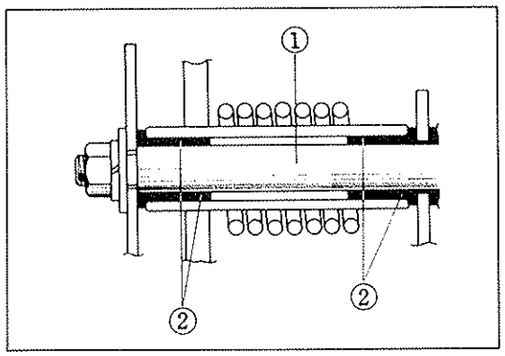


Fig. 1-10 Clutch Pedal Installation (1)

2. Slacken the pedal stopper.
3. Attach the other end of the torsion spring to the clutch pedal.
4. Apply lithium grease to the fitting of the clutch release cable. Attach the fitting to the end of the clutch pedal.

> NOTE: Care should be taken so as not to bend or twist the inner wire.

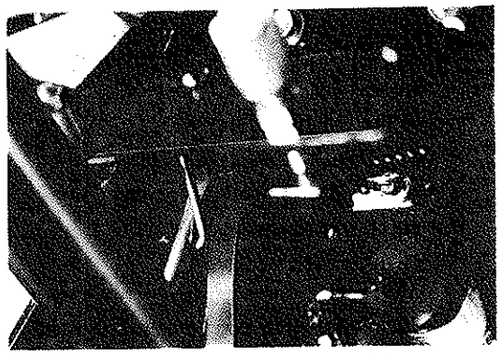


Fig. 1-11 Clutch Pedal Installation (2)

5. Tighten the pedal shaft nut.
   Tightening Torque: 1.5 to 2.2 Kg-m
6. Adjust the pedal height.
7. Adjust the clutch and attach the E ring onto the outer cap section of the clutch release cable.

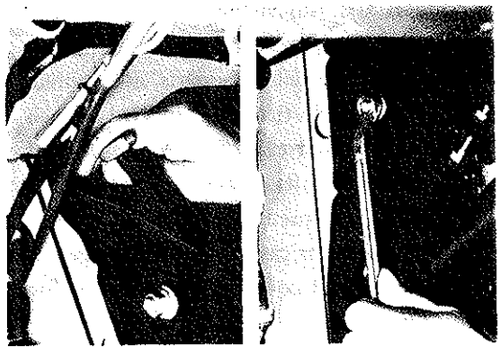


Fig. 1-12 Clutch Pedal Installation (3)

CLUTCH RELEASE CABLE

Removal

1. Working from the engine compartment, remove the E ring inserted into the outer cap of the clutch release cable. Working from the interior of the cab, remove the cable fitting provided at the end of the clutch release cable, from the clutch pedal.

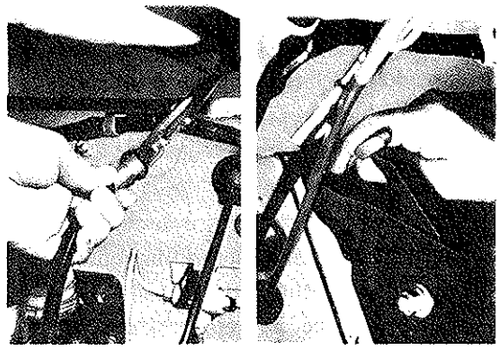


Fig. 1-13 Clutch Release Cable Removal (1)

2. Working at the underside of the vehicle, detach the cable fitting from the lever, by pushing the clutch release lever toward the front side.
3. Disconnect the clutch release cable from the clamp.
4. Pull the cable out toward the engine compartment.

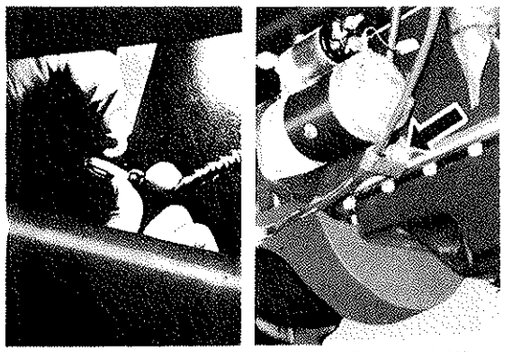


Fig. 1-14 Clutch Release Cable Removal (2)

Inspection and Adjustment

Inspect the thus-removed parts as follows.
Repair or replace defective parts, as required.

1. Check the cable fitting ① located at each end of the inner cable for damage or wear. Check to see if its press-staked section ② exhibits any looseness.
2. Check the outer casing ③ for damage.
3. Check the dust cover ④ and boot ⑤ for damage.

Installation

1. Coat the cable fitting, pedal and lever sliding sections with lithium grease.
2. Insert the boot side of the clutch release cable into position until the cable flange contacts the hole provided at the transmission.

Note

Care should be exercised to ensure that the boot may not come off from the outer casing, or it may not be damaged.

3. Clamp the clutch release cable, by attaching the cable fitting to the clutch release lever.
4. Place the clutch release cable in the clutch release cable support. Working from the interior of the cab, attach the cable fitting to the tip-end of the clutch pedal.

When installing the cable fitting onto the tip-end of the clutch pedal, make sure to slacken the pedal stopper. Upon completion of the installation, adjust the pedal height.

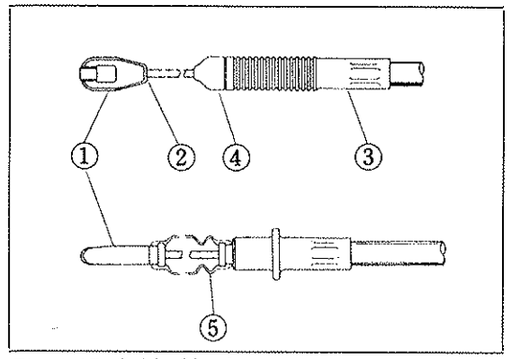


Fig. 1-15 Cable Check

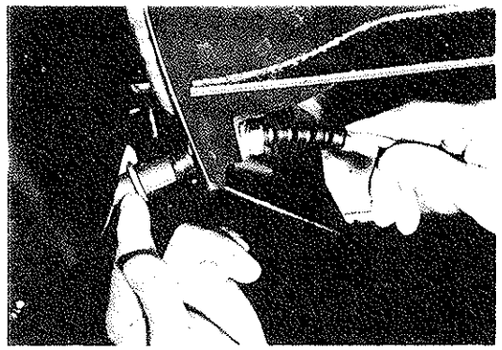


Fig. 1-16 Clutch Release Cable Installation (1)

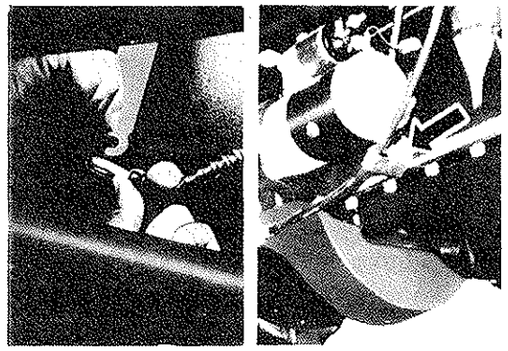


Fig. 1-17 Clutch Release Cable Installation (2)

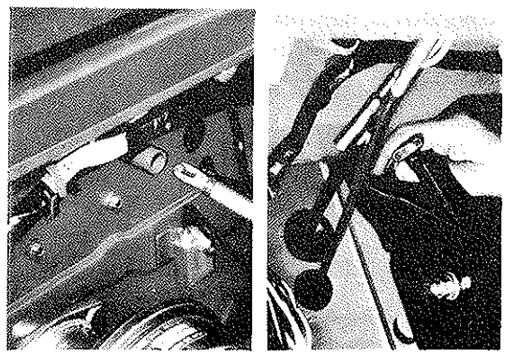
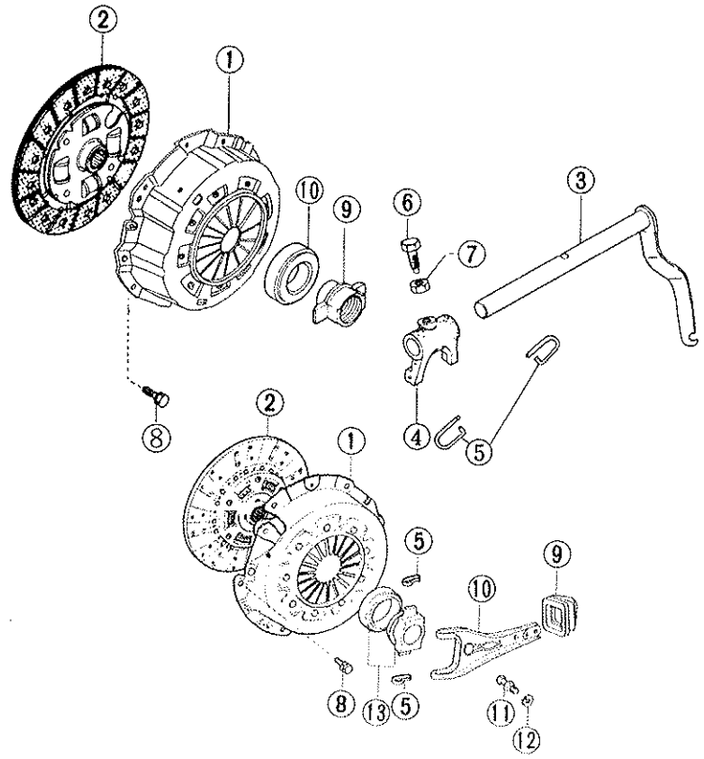


Fig. 1-18 Clutch Release Cable Installation (3)

THE CLUTCH PROPER



① Clutch cover
② Clutch disc
③ Clutch release lever
④ Release lever yoke
⑤ Release bearing hub clip
⑥ Setting bolt
⑦ Lock nut
⑧ Bolt with washer
⑨ Release fork boot
⑩ Release fork assy
⑪ Release fork support
⑫ Wave washer
⑬ Release bearing S/A

Fig. 1-19 The Clutch Proper Components

Removal

1. Remove the transmission from the vehicle.
2. Remove the clutch cover and clutch disc from the flywheel.

Note

Make sure that the removed clutch disc won't be contaminated with grease, oil, or the like.

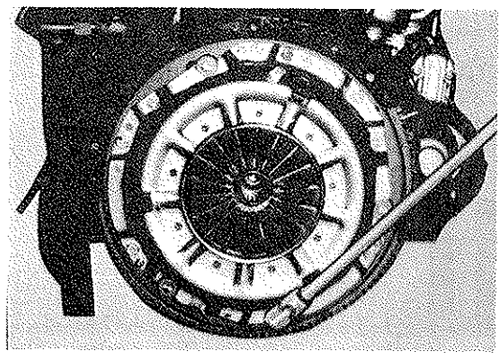


Fig. 1-20 Clutch Cover Removal

3. Detach the release bearing hub clip at the transmission side. Take out the release bearing hub together with the radial ball bearing.

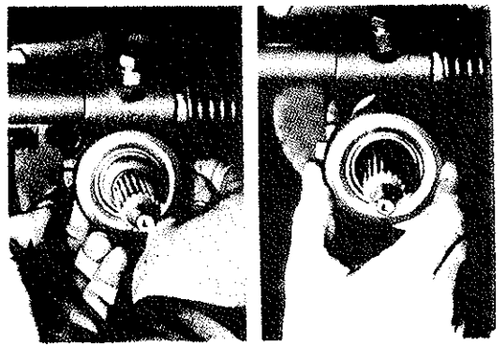


Fig. 1-21 Release Bearing Hub Removal

4. Slacken the nut and the turn-preventing bolt for the release lever yoke. Pull the clutch release lever shaft out from the clutch housing. Take out the release lever yoke and torsion spring.

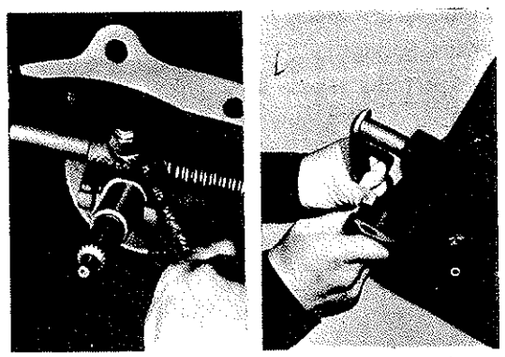


Fig. 1-22 Removing Release Lever Yoke and Spring

Inspection

Clutch Disc

1. Inspect the surfaces of the clutch disc linings (1) for oil contamination or hardened condition.
2. Check the clutch linings for wear or damage. Allowable limit of wear: The clutch disc is serviceable as long as grooves can be seen on the lining surfaces.
3. Check the torsion rubbers (2) for damage or deterioration.
4. Check the spline (3) for damage or wear. The wear of the hub spline can be determined by inserting the transmission.

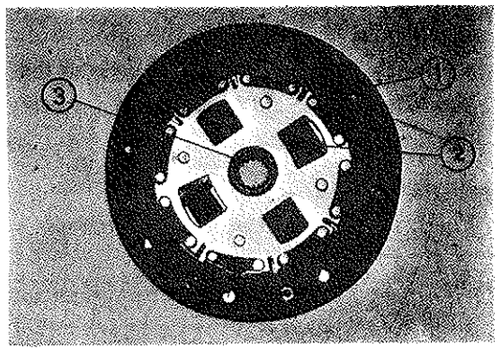


Fig. 1-23 Clutch Disc Check

5. Measure the disc runout.

Allowable Limit of Clutch Disc Runout: 0.5 mm (0.0197 inch)

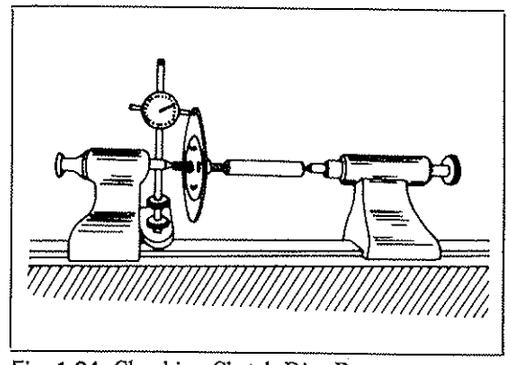


Fig. 1-24 Checking Clutch Disc Runout

Release Lever Yoke, Bearing Hub and Torsion Spring

1. Inspect the release lever yoke and clutch release bearing hub to see if any wear is present at the contact area of these components.

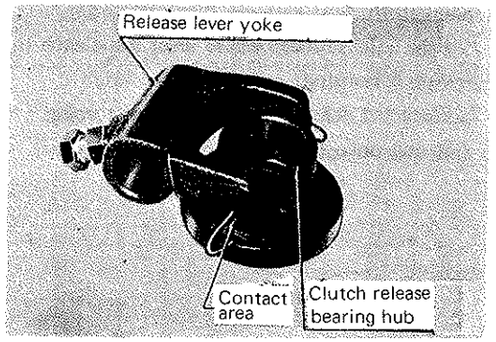


Fig. 1-25 Checking of Yoke and Hub

2. Turn the radial bearing by your hand, while a force is being applied in the thrust direction. Check to see whether the bearing runs without any binding or without emitting any unusual noise.
   If the radial bearing is defective, press it off the release bearing hub, using a press or the like. Replace the old bearing with a new one.

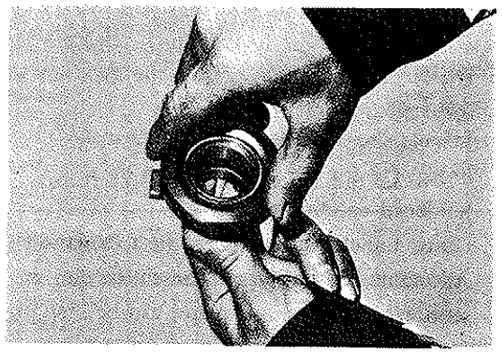


Fig. 1-26 Radial Ball Bearing Check

3. Check the torsion spring for deterioration.

Clutch Cover

Check the clutch cover to see whether the plate-to-disc contact area exhibits excessive wear or damage. If so, replace the pressure plate. However, if the contact surface shows only slight wear or scores, correct the surface, using abrasive paper (approximate grade #180 or equivalent).

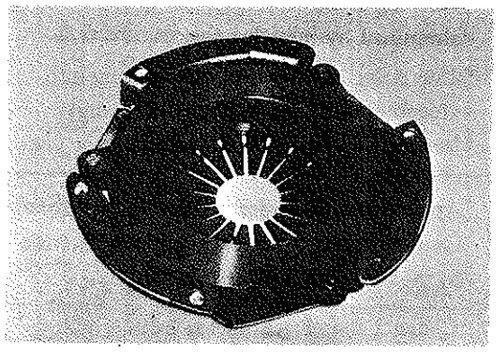


Fig. 1-27 Pressure Plate Check

Flywheel

Check the flywheel to see if any crack or excessive wear is present at the clutch disc contact area. If so, replace the flywheel. However, if the contact surface shows only slight wear or scores, correct the surface with abrasive paper (approximate grade #180 or equivalent).

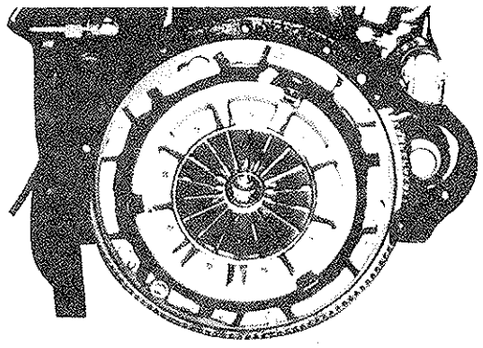


Fig. 1-28 Flywheel Check

Installation

1. Insert the clutch release lever shaft into the clutch housing.
2. Place the release lever yoke and torsion spring onto the clutch release lever shaft.

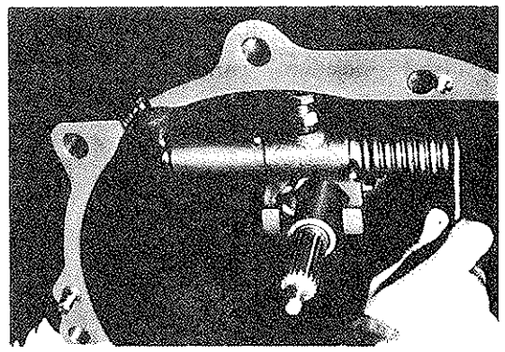


Fig. 1-29 Installing Yoke and Lever

3. Tighten the setting bolt that attaches the release lever yoke to the clutch release lever shaft. Furthermore, tighten the lock nut to prevent the bolt from turning.

   Lock Nut Tightening Torque:
   3.5 to 5.0 Kg-m (25.3 to 36.2 ft-lbs)

> Note
> Ensure that the tip-end of the setting bolt comes exactly to the recessed section at the lever shaft.

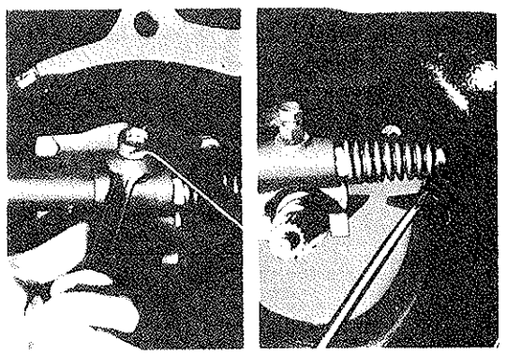


Fig. 1-30 Installing Release Lever Yoke and Spring

4. Install the torsion spring in such a way that the longer leg of the torsion spring rests on the rib of the clutch housing.
5. Interpose the clutch release bearing hub (together with the radial ball bearing) between the arms of the release lever yoke.

> Note
> Apply lithium grease to the hub-to-yoke contact areas. Moreover, coat the interior of the hub with a film of grease.

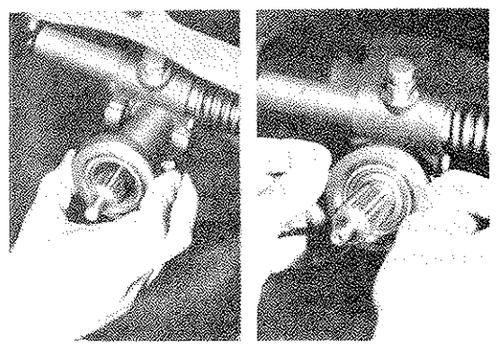


Fig. 1-31 Installing Bearing Hub with Clip

6. Connect the clutch release bearing hub to the release lever yoke, using the clip.

7. Install the clutch disc and clutch cover.
   (1) Wipe the surfaces of the flywheel and clutch pressure plate, with a clean cloth. If these surfaces should be contaminated with grease, oil, etc., clean them from the surfaces with abrasive paper.
   (2) While the clutch disc is centered with the input shaft, mount the clutch cover to the flywheel.

   Tightening Torque: 1.5 to 2.5 Kg-m
   (10.8 to 18.1 ft-lbs)

> Note
> Be sure to install the clutch disc in a correct direction. Furthermore, while installing the clutch cover, make sure to line up with the locating pin.

8. Mount the transmission to the vehicle.

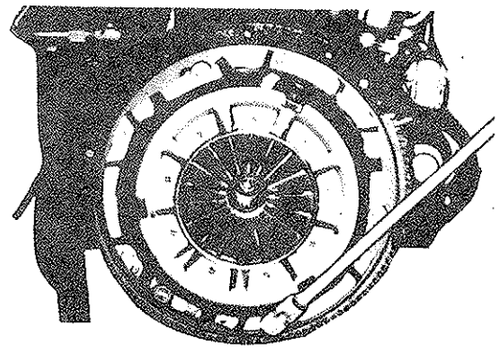


Fig. 1-32 Clutch Cover Installation

DAIHATSU
4 WHEEL DRIVE

SECTION 2
TRANSMISSION & TRANSFER

TRANSMISSION AND TRANSFER

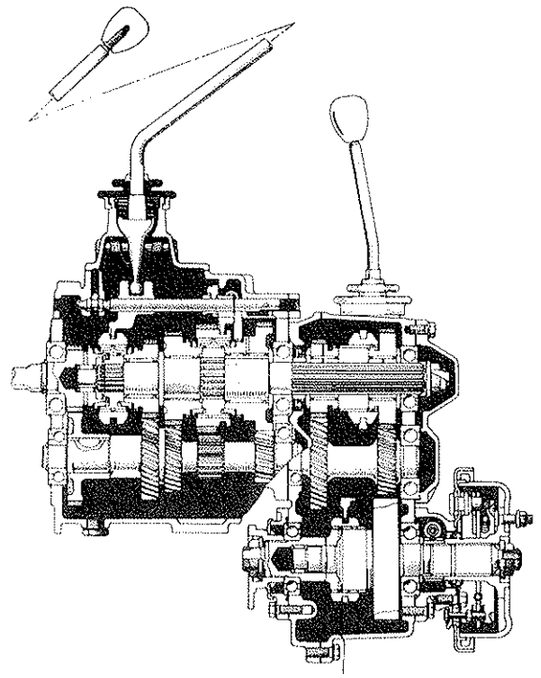


Fig. 2-1 Sectional View of Transmission and Transfer (Power Train)

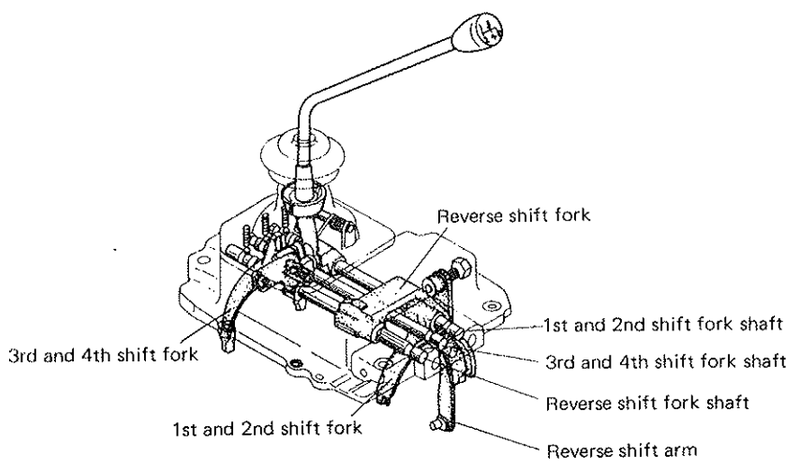


Fig. 2-2 Transmission Shift Mechanism

DESCRIPTION

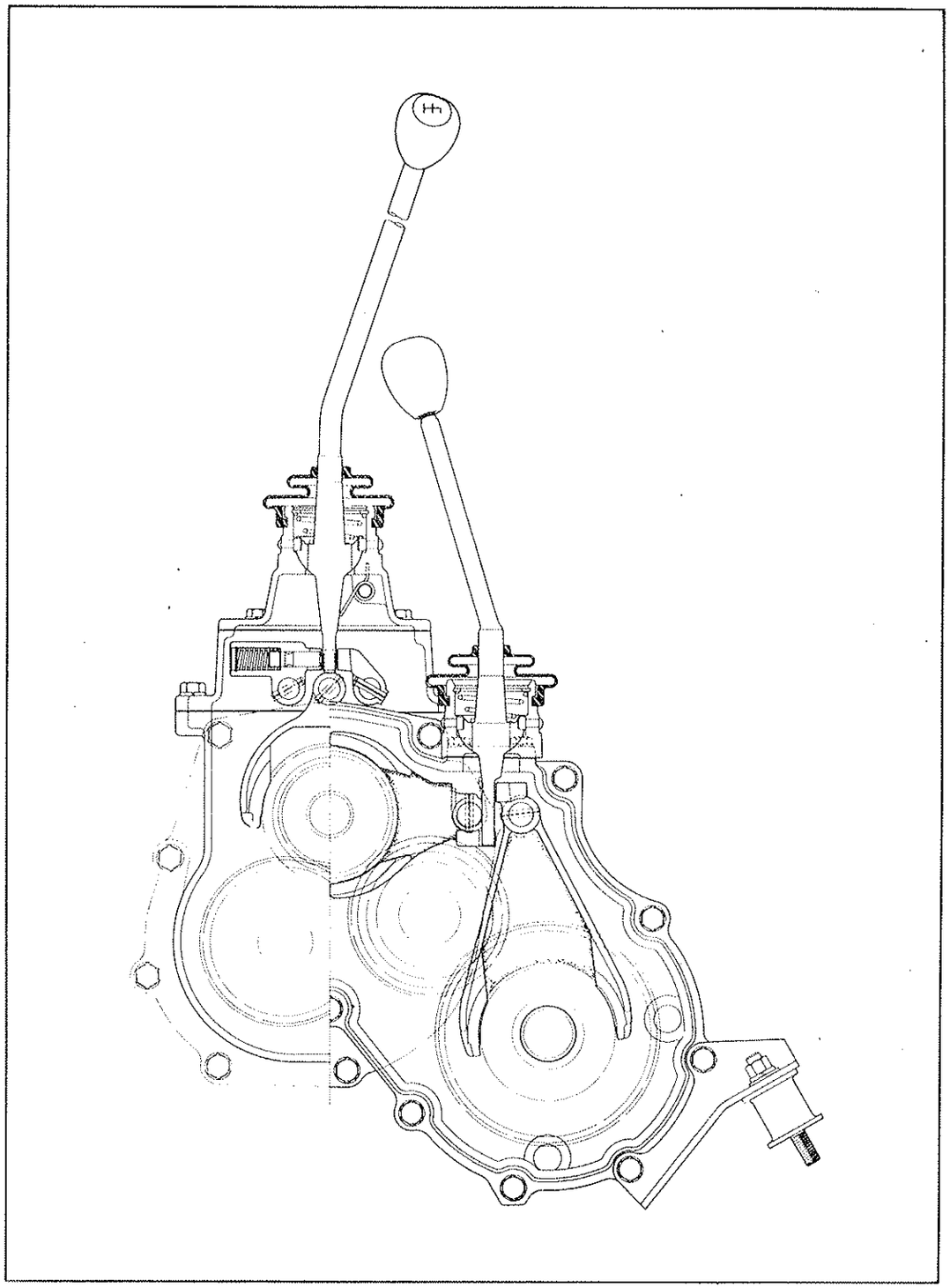


Fig. 2-3 Transmission and Transfer Shift Mechanism

Transmission and Transfer

The skillfully designed, robust transmission and transfer enable the DAIHATSU 4-WHEEL DRIVE vehicle to satisfactorily develop all performance required for a 4-wheel drive unit. The transmission has four forward and one reverse speeds. All forward gears are full-synchromeshed type, whereas the reverse gear is the select sliding type. Each gear ratio has been designed most suitably for respective operating condition.

The transfer is a device necessary for a 4-wheel drive vehicle. It makes it possible to divide the power flow from the engine to the front and rear wheels, respectively. It plays a vital role in operating vehicle under adverse conditions, such as climbing up or down a steep grade, negotiating sandy, muddy off-road terrain and snowy region.

The transfer has been designed such that you can control the two gear ranges (high range or low range) as well as the 4-wheel drive (rear wheel drive or 4-wheel drive), simply by operating one shift lever.

As for the gear train of the transfer, you may consider it as a full-synchromeshed transmission without synchronizer rings, but with constant-mesh mechanism instead. You can disassemble/assemble in the same manner as with the transmission.

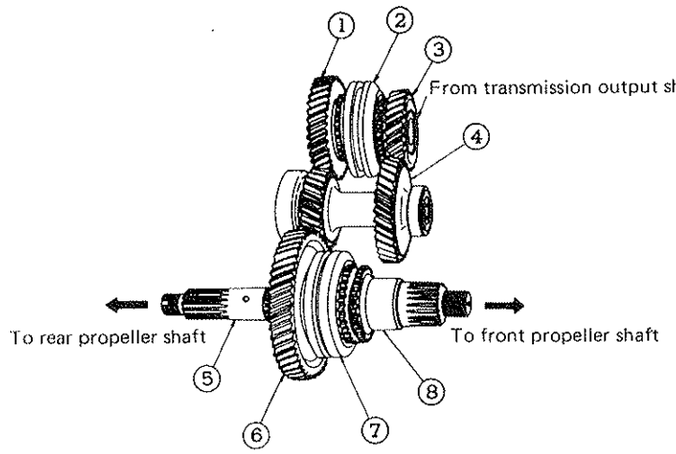


Fig. 2-4 Transfer Gear Train

Operation of Transfer

The engine power via the transmission flows in the transfer case as follows: The transmission output shaft, transfer input gear (high- and low-speeds), transfer idler gear, transfer output gear, and front and rear propeller shafts. The switching between the rear 2-wheel drive or the 4-wheel drive can be made by engaging/disengaging the clutch on the transfer output shaft.

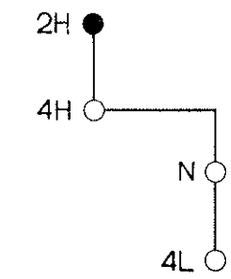
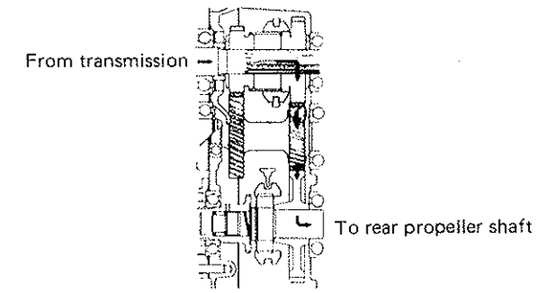
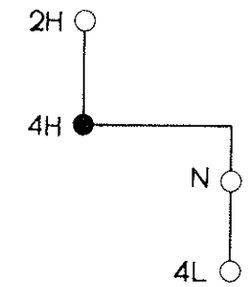
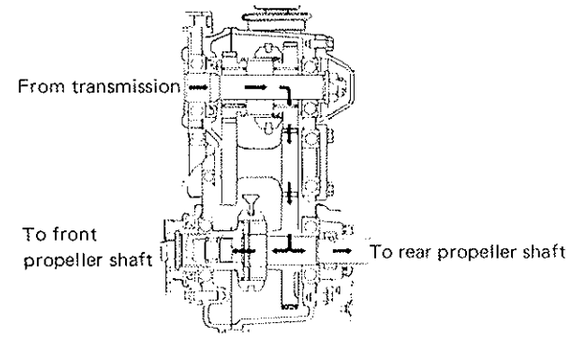
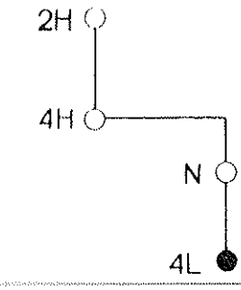
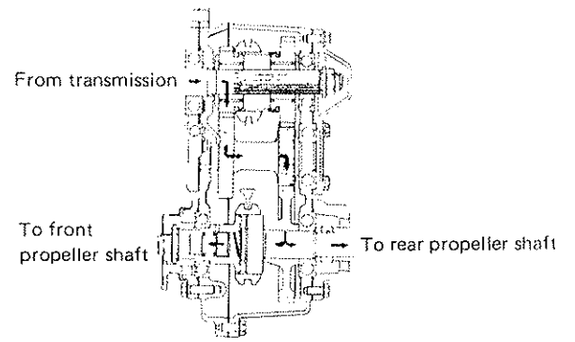
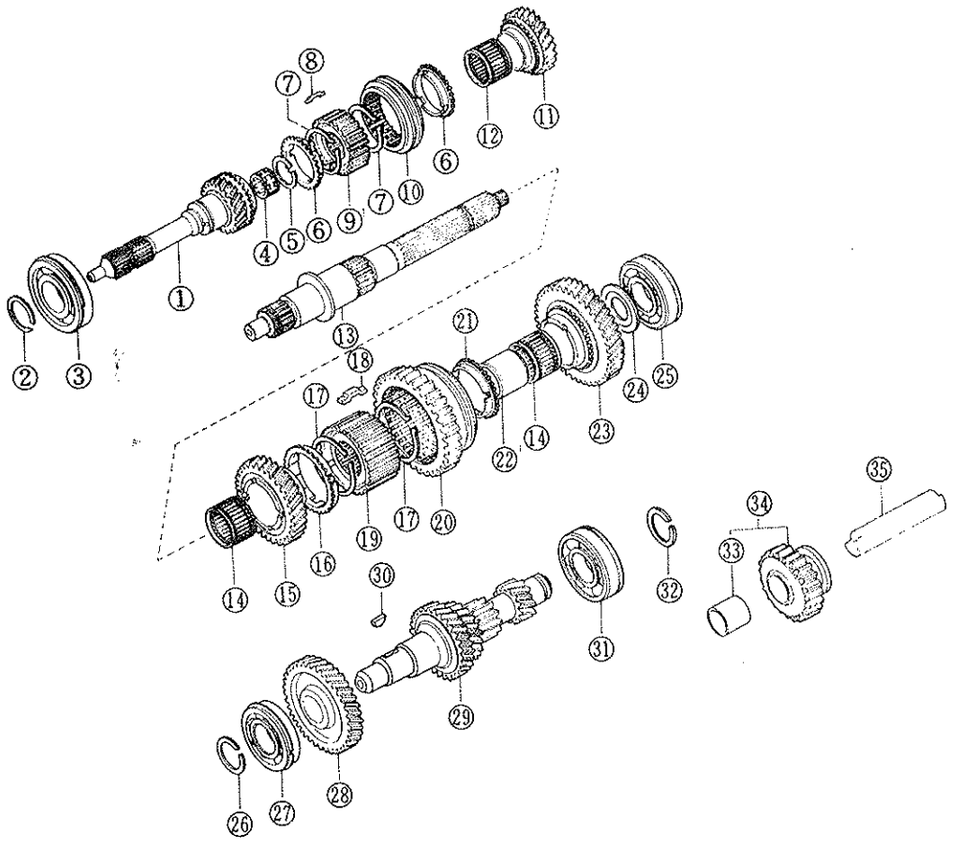
2H (Rear 2-wheel drive, high-range) Use this position for operation on ordinary roads 	
4H (4-wheel drive, high-range) Use this position for operation on snowy roads, etc. 	
4L (4-wheel drive, low-range) Use this position when vehicle must climb up or down steep grades, or negotiate muddy, sandy, or off-road terrain. 	

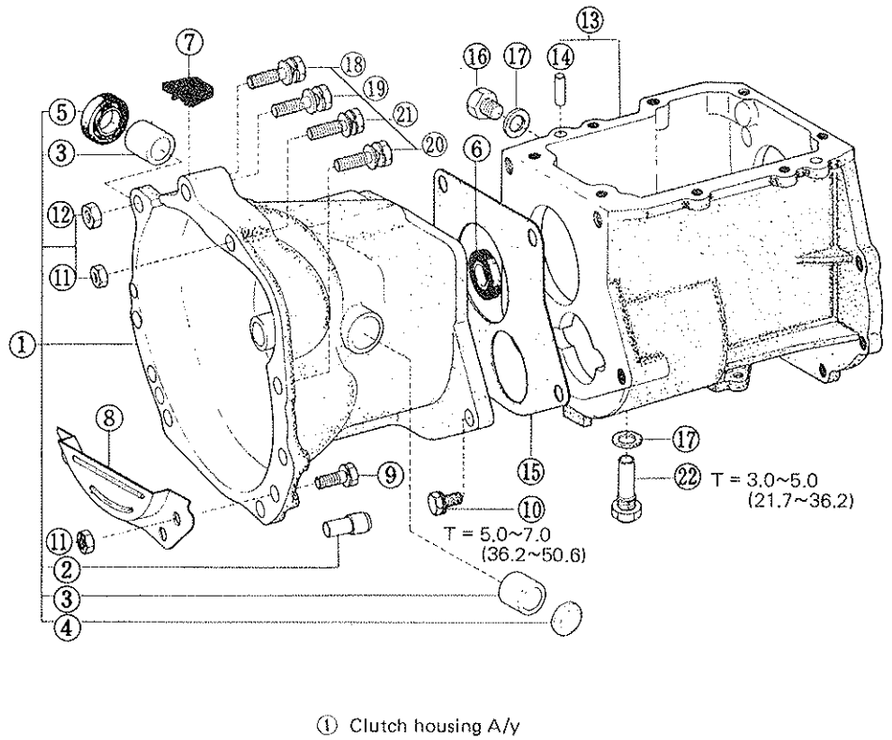
Fig. 2-5 Operation of Transfer

TRANSMISSION AND TRANSFER COMPONENTS



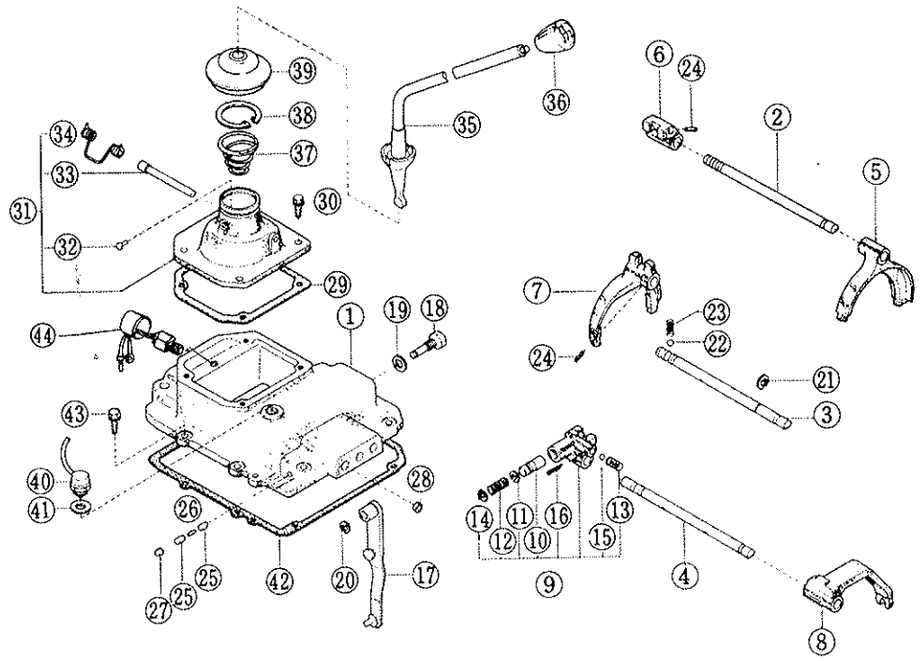
① Input shaft
② Shaft snap ring
③ Radial ball bearing
④ Needle roller bearing
⑤ Shaft snap ring
⑥ Synchronizer ring No.3
⑦ Synchromesh shifting key spring No.1
⑧ Synchromesh shifting key No.1
⑨ Transmission clutch hub No.1
⑩ Transmission hub sleeve No.1
⑪ 3rd gear
⑫ Needle roller bearing
⑬ Output shaft
⑭ Needle roller bearing
⑮ 2nd gear
⑯ Synchronizer ring No.2
⑰ Synchromesh shifting key spring No.2
⑱ Synchromesh shifting key No.2
⑲ Transmission clutch hub No.2
⑳ Reverse gear
㉑ Synchronizer ring No.1
㉒ 1st gear bearing inner race
㉓ 1st gear
㉔ 1st gear thrust washer
㉕ Radial ball bearing
㉖ Shaft snap ring
㉗ Radial ball bearing (front)
㉘ Counter shaft drive gear
㉙ Counter shaft
㉚ Woodruff key
㉛ Radial ball bearing (rear)
㉜ Shaft snap ring
㉝ Bimetal formed bush
㉞ Reverse idler gear
㉟ Reverse idler gear shaft

Fig. 2-6 Transmission Components (1)



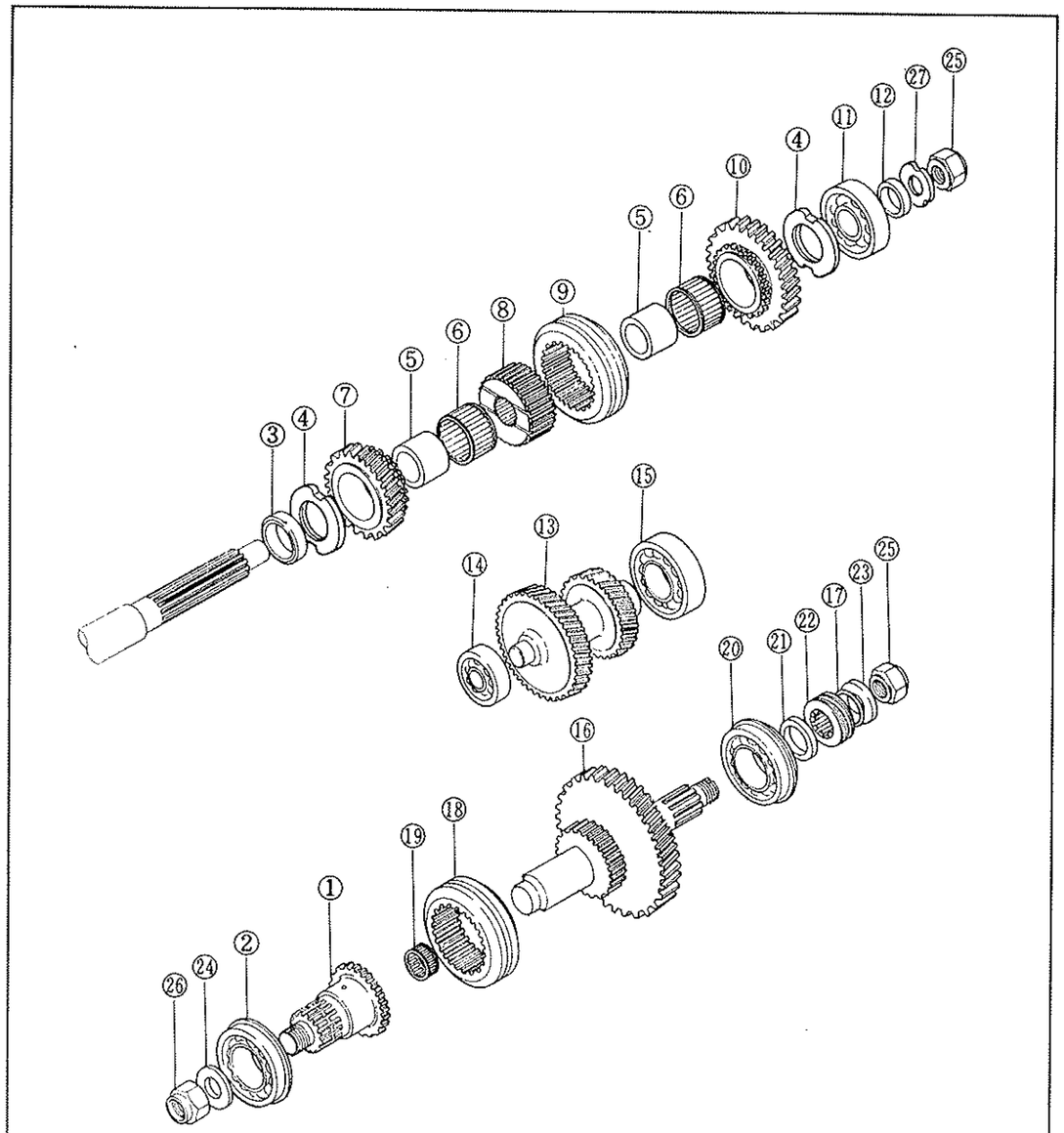
① Clutch housing A/y
② Straight pin
③ Bimetal formed bush
④ Expansion plug
⑤ Type "T" oil seal
⑥ Type "S" oil seal
⑦ Cover
⑧ Clutch housing under cover
⑨⑩⑱⑲⑳㉑ Bolt with washer
⑪⑫ Nut
⑬ Transmission case
⑭ Straight pin
⑮ Transmission case front gasket
⑯ With-head straight screw plug
⑰ Gasket
㉒ Plug

Fig. 2-7 Transmission Components (2)



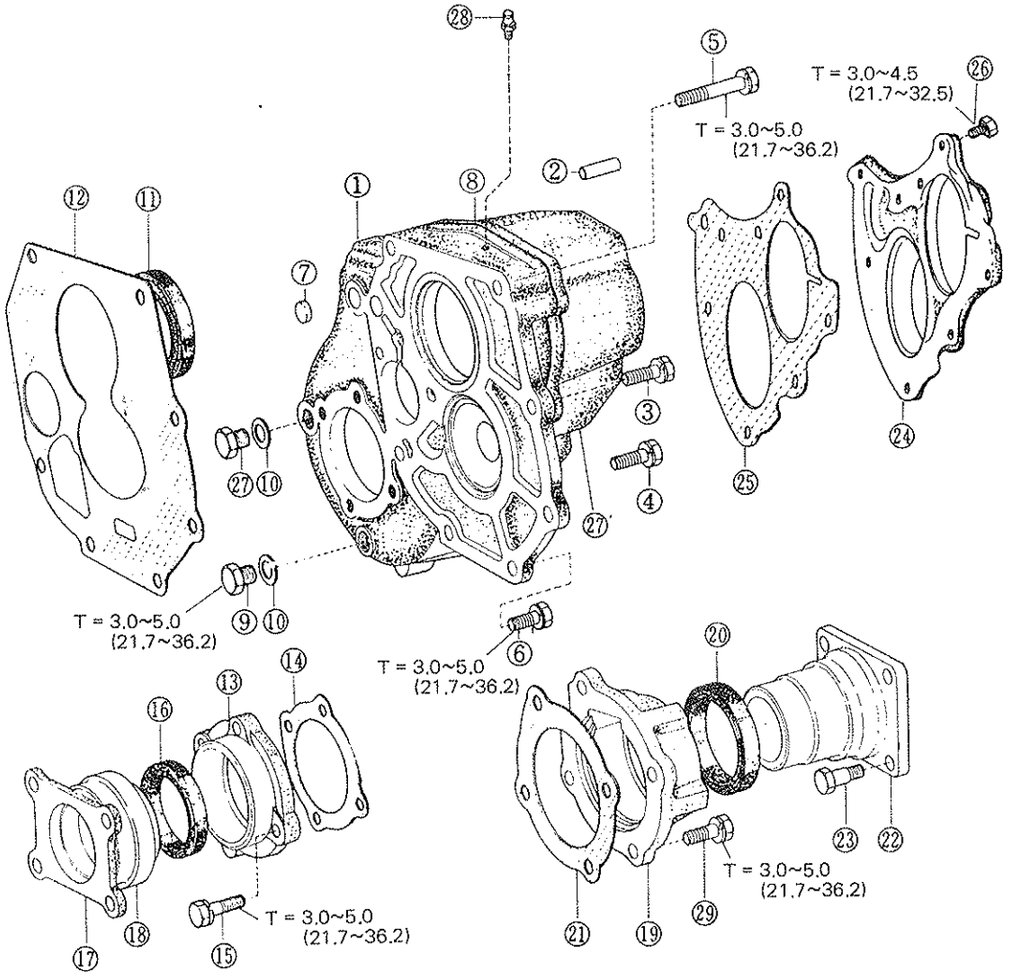
① Transmission case cover
② 1st and 2nd shift fork shaft
③ 3rd and 4th shift fork shaft
④ Reverse shift fork shaft
⑤ 1st and 2nd shift fork
⑥ 1st and 2nd shift head
⑦ 3rd and 4th shift fork
⑧ Reverse shift fork
⑨ Reverse shift head sub-assembly
⑩ Reverse shift return plunger
⑪⑳㉑ "E" ring
⑫⑬ Compression spring
⑭ Snap ring
⑮ Ball
⑯ Cotter pin
⑰ Reverse shift arm
⑱ Shift arm pivot
⑲ Gasket
㉒ Ball
㉓ Compression spring
㉔ Slotted spring pin
㉕㉖ Roller
㉗ Straight plug
㉘ Tight plug
㉙ Control shift lever retainer gasket
㉚ With-washer bolt
㉛ Control shaft lever retainer sub-assembly
㉜ Pin
㉝ Shift lever stop pin
㉞ Torsion spring
㉟ Shift lever
㊱ Shift lever knob
㊲ Conical spring
㊳ Hole snap ring
㊴ Shift lever boot
㊵ Back-up lamp switch assembly
㊶ Gasket
㊷ Transmission case cover gasket
㊸ With-washer bolt
㊹ Switch assembly

Fig. 2-8 Transmission Components (3)



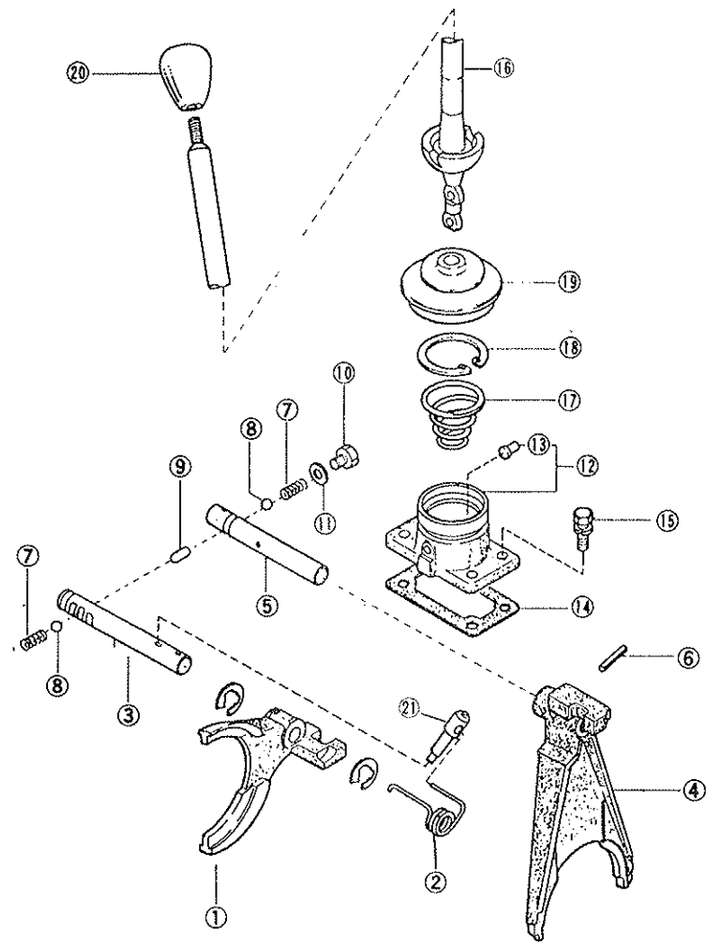
① Transfer front output shaft
② Radial ball bearing
③ Transfer input shaft spacer No.1
④ Transfer input gear thrust washer
⑤ Transfer input bearing inner race
⑥ Needle roller bearing
⑦ Transfer low speed input gear
⑧ Transfer high & low clutch hub
⑨ Hub sileve
⑩ Transfer high speed input gear
⑪⑭⑮⑳ Radial ball bearing
⑫ Spacer
⑬ Transfer idler gear
⑭ Transfer input shaft spacer No.2
⑯ Transfer rear output shaft
⑰ Transfer output gear
⑱ Hub sleeve
⑲ Needle roller bearing
㉑ Transfer rear output shaft spacer
㉒ Speedometer drive gear
㉓㉔ Plate washer
㉕㉖ Lock nut

Fig. 2-9 Transfer Gear



① Transfer case sub-assembly
② Straight pin
③④⑤⑥ With-washer bolt
⑦ Tight plug
⑧ Transfer case gasket
⑨ With-head straight screw plug
⑩ Gasket
⑪ Type "S" oil seal
⑫ Transfer case front gasket
⑬ Output shaft bearing front retainer
⑭ Output shaft bearing front retainer gasket
⑮ With-washer bolt
⑯⑳ Type "D" oil seal
⑰ Transfer output shaft flange front sub-assembly
⑱ Dust deflector
⑲ Output shaft bearing rear retainer
㉑ Output shaft bearing rear retainer gasket
㉒ Universal joint flange
㉓ Hexagon bolt
㉔ Transfer case cover No.1
㉕ Gasket
㉖ With-washer bolt
㉗ Transfer rear case
㉘ Bleeder plug

Fig. 2-10 Transfer Case and Flange



① Transfer high and low shift fork
② Torsion spring
③ Transfer high and low shift fork shaft
④ Transfer front drive shift fork
⑤ Transfer front drive shift fork shaft
⑥ Slotted spring pin
⑦ Compression spring
⑧ Ball
⑨ Roller
⑩ Hexagon bolt
⑪ Gasket
⑫ Transfer shift lever retainer sub-assembly
⑬ Pin
⑭ Transfer shift lever retainer gasket
⑮ With-washer bolt
⑯ Transfer shift lever
⑰ Conical spring
⑱ Hole snap ring
⑲ Shift lever boot
⑳ Shift lever knob
㉑ Pin

Fig. 2-11 Transfer Shift Lever and Shift Forks

IN-VEHICLE-REPAIRS

Transfer Output Shaft Rear Oil Seal Replacement

1. Jack up the vehicle and support it with rigid racks. Drain the transfer case oil.
2. Remove the parking brake protector and rear propeller shaft.
3. Using a 30-mm socket, remove the universal joint flange lock nut.

> Note
> A drive pinion flange holding tool (Special Tool No.09330-87301) should be used for this operation above.

4. Remove the parking brake drum and universal joint flange.
5. Remove the parking brake setting bolts and detach the parking brake sub-assembly.
6. Remove the rear oil seal, using an oil seal puller (Special Tool No.09308-87301).

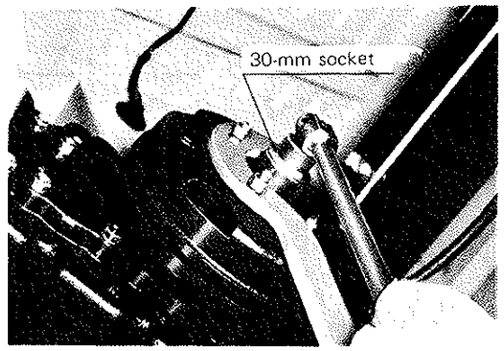


Fig. 2-12 Lock Nut Removal

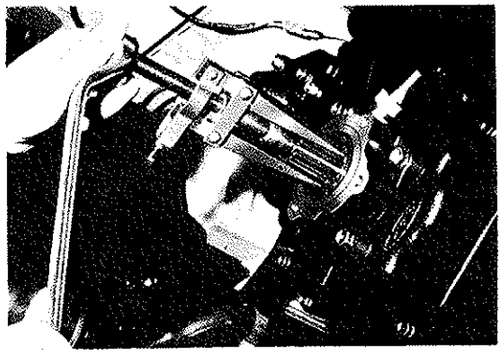


Fig. 2-13 Removing Oil Seal

7. Drive the oil seal into position. Apply lithium grease to the lip section of the oil seal. Use a counter shaft front bearing replacer (Special Tool No.09310-87301) for this press-fitting operation.
8. Mount the parking brake sub-assembly.
   Tightening Torque: 3.0 to 5.0 Kg-m
   (21.7 to 36.2 ft-lbs)

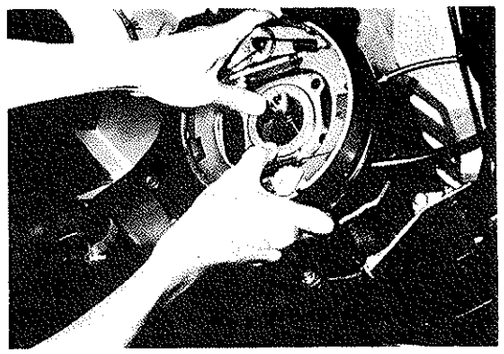


Fig. 2-14 Parking Brake Sub-Assembly Installation

9. Install the universal joint flange lock nut, using the same special tool as with Step 3. Make sure to use a new lock nut. Stake the lock nut after it has been tightened to specification.
   Tightening Torque: 15.0 to 20.0 Kg-m
   (108.5 to 144.7 ft-lbs)
10. Install the propeller shaft.
    The sleeve yoke side of the propeller shaft should be attached to the transfer.
    Tightening Torque: 6.0 to 8.0 Kg-m
    (43.4 to 57.9 ft-lbs)
11. Check the working travel of the parking brake.
    Specified Working Travel: 3 to 5 notches
12. Refill the transfer case with the gear oil.
    As the first step, remove the plug from the oil-filling port. Then, the gear oil should be filled until it begins to overflow from the oil-filling port.
    Transfer Oil Capacity: 1.4 liters
13. Remove the rigid racks from the vehicle, using a jack.

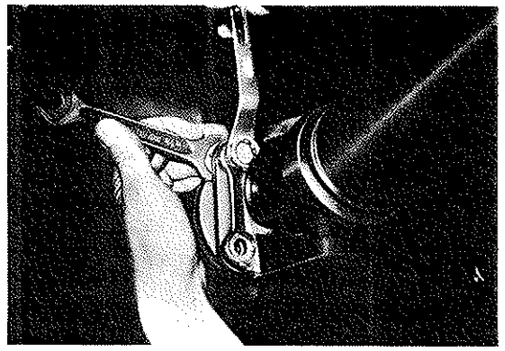


Fig. 2-15 Installing Propeller Shaft

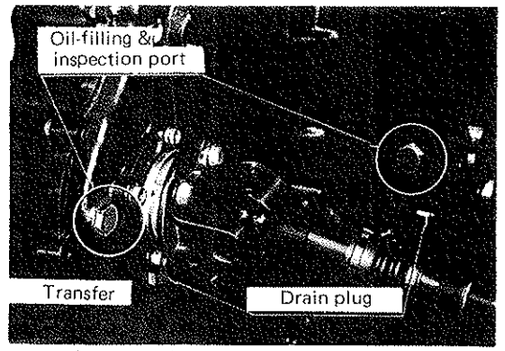


Fig. 2-16 Transfer Case Oil-Filling & Inspection Ports

TRANSFER GEAR REMOVAL

1. Working at the interior of the cab, place the transfer shift lever in the "4H" position. Remove the lever boot cover as well as large and small boots. Using a snap ring puller, remove the hole snap ring to detach the shift lever.

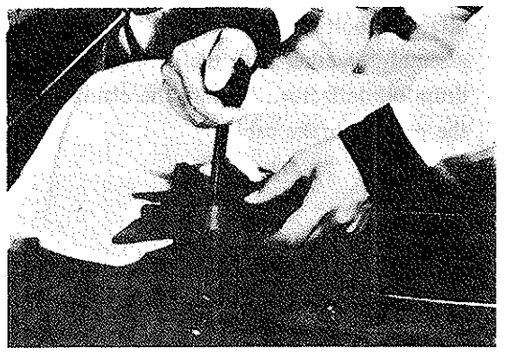


Fig. 2-17 Shift Lever Removal

2. Place a chock at the front wheel and jack up the rear part of the vehicle. Support the frame with rigid racks.
3. Remove the drain plugs located at the bottoms of the transfer case and transmission case so as to drain gear oils.

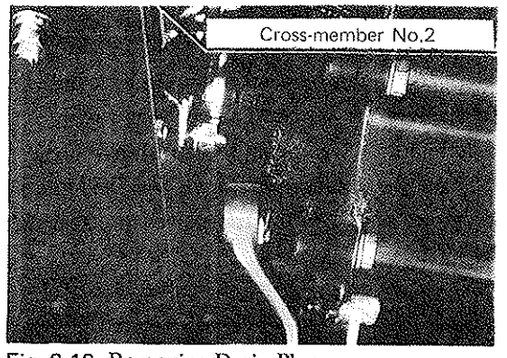


Fig. 2-18 Removing Drain Plugs

4. Remove all of the propeller shaft retaining bolts to take the front and rear propeller shafts out.
5. Remove the universal joint flange lock nut as follows:

(1) Place either a drive pinion flange holding tool (Special Tool No.09330-87301) or a brake drum stopper (Special Tool No. 09511-87301) onto the universal joint flange.

(2) Unlock the lock nut. Remove the lock nut, with a 30 mm socket.

6. Remove the parking brake drum.
7. Remove the lock nut of the transfer output front shaft as follows:

(1) Use one of the same special tools described in Step 5 under the "universal joint flange lock nut removal." Unlock and remove the lock nut, with a 36 mm socket.

Note

It should be noted that this lock nut is left-hand threaded.

8. Remove the parking brake assembly attaching bolts so as to detach the brake assembly together with the parking brake drum oil deflector. Release the clamp of the parking brake cable.

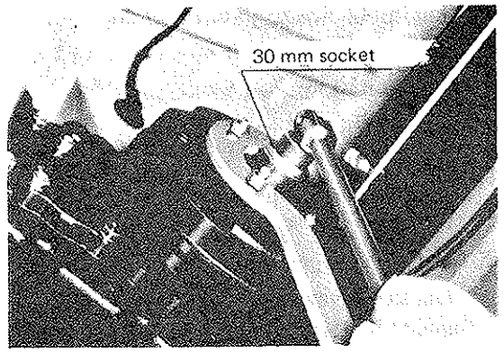


Fig. 2-19 Lock Nut Removal

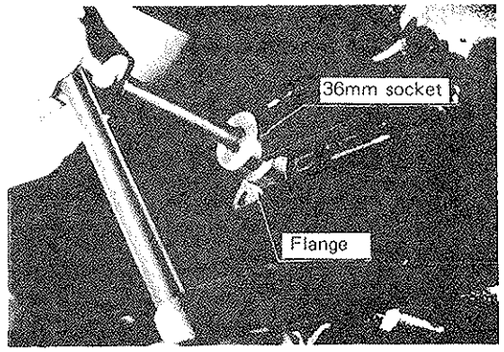


Fig. 2-20 Lock Nut Removal

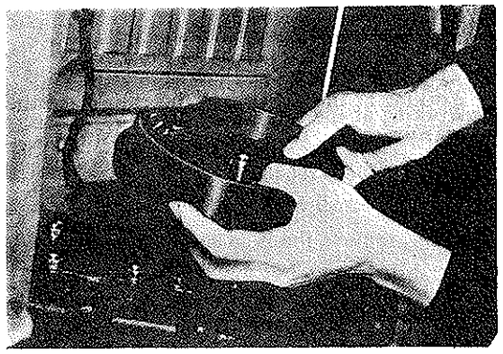


Fig. 2-21 Removing Parking Brake Assembly

9. Remove the speedometer driven gear assembly from the output shaft bearing rear retainer, first by slackening the lock bolt.
10. Remove the output shaft bearing rear retainer, by removing the attaching bolts. Take the speedometer drive gear, ball and spacer out from the transfer output rear shaft.

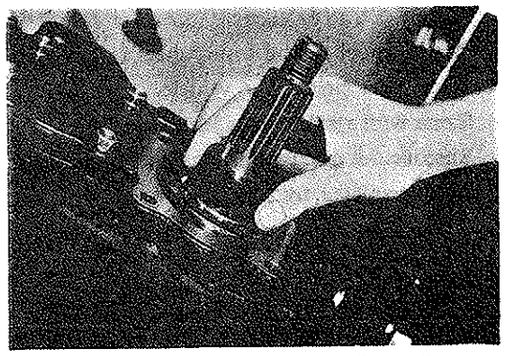


Fig. 2-22 Removing Speedometer Drive Gear

11. Remove the transfer case cover, first by removing their attaching bolts.
12. Unlock the lock nut of the output shaft. Remove the lock nut, with a 30 mm socket. Take the plate washer and transfer input shaft No.2 spacer out from the output shaft.

Note

For the above-descrided operation, a special tool No.90330-87301 should be used in conjunction with the universal joint flange that is to be installed to the transfer output shaft.

13. Remove the transfer rear case, by removing the 10 attaching bolts.

Note

1. If any difficulty should be encountered in removing the transfer case, evenly and lightly tap the transfer case at the outside, using a plastic hammer.
2. It is unnecessary to remove various bearings at this stage. Nonetheless, some of the bearings may remain at the shaft side.

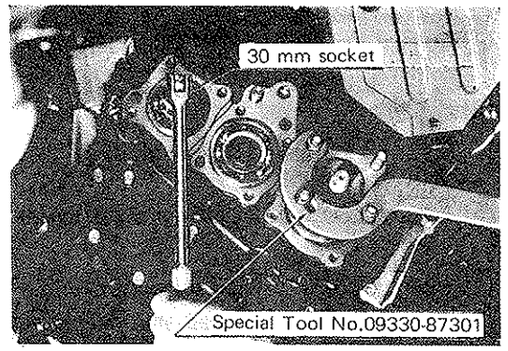


Fig. 2-23 Lock Nut Removal

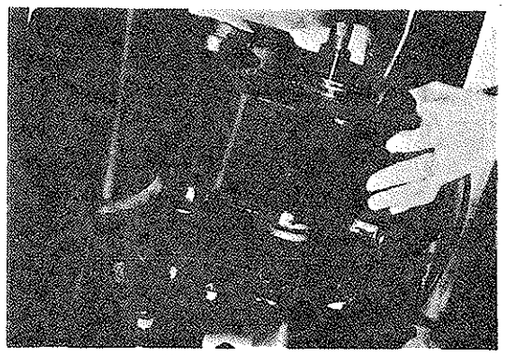
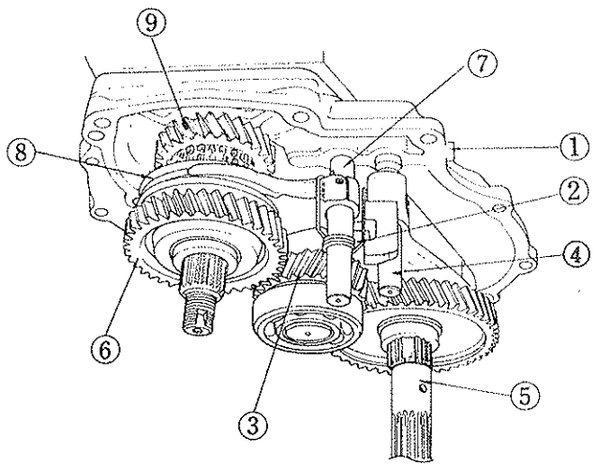


Fig. 2-24 Transfer Case Removal

14. Remove the transfer gears and shift fork shafts as follows:



① Hexagon bolt
② Torsion spring
③ Transfer idler gear
④ Transfer front drive shift fork shaft
⑤ Transfer output rear shaft
⑥ Transfer high-speed input gear
⑦ Transfer high and low shift fork shaft
⑧ Transfer high and low clutch hub sub-assembly
⑨ Transfer low-speed input gear

Fig. 2-25 Removal of Gears and Shift Fork Shafts

Removal procedure:

(1) Slacken the hexagon bolt ① to remove the compression spring and ball.
(2) Remove the torsion spring ② mounted onto the transfer high and low shift fork shaft.
(3) Take out the transfer idler gear ③ together with the bearing.
(4) While the transfer front drive shift fork shaft ④ is being removed, pull out the transfer output rear shaft ⑤, too.

Note
1. The transfer output gear and transfer front drive clutch hab sub-assembly should be removed together with the shaft.
2. The shift fork shaft should be taken out with the shift fork mounted on it.

TRANSFER GEAR INSTALLATION

1. Install the following parts given below onto the output shaft ①: the transfer input shaft No.1 spacer ②, thrust washer ③, transfer input bearing inner race ④, needle roller bearing ⑤, low-speed input gear ⑥, and transfer high and low clutch hub sub-assembly ⑦.

(5) Remove the transfer output front shaft.
(6) Remove the following parts from the transmission output shaft: the transfer input gear thrust washer, transfer high speed input gear ⑥, needle roller bearing and inner race.
(7) Pull out the transfer high and low shift fork shaft ⑦. Block the case hole with your finger in order to prevent the roller and ball from jumping out from the place.
(8) Proceed to remove the following parts given below: the transfer high and low clutch hub sub-assembly ⑧, transfer low-speed input gear ⑨, needle roller bearing, inner race, thrust washer, and transfer input shaft No.1 spacer.
(9) Using a piece of wire or the like, pull the compression spring that still remains inside the case out from the hole provided at the side of the case.

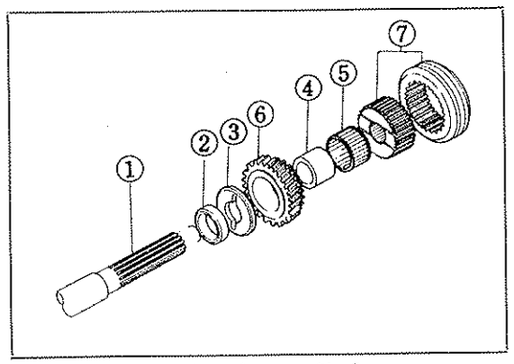


Fig. 2-26 Assembling Output Shaft

2. Remove the transfer front case attaching bolts. Slightly pull out the case and tilt it to the right. Place the compression spring into the case, through the hole provided at the side of the case. Apply a small amount of grease to the ball and insert it into position. Strongly depress the ball, using a screw driver with its tip-end flattened. While the ball is being depressed, install the high and low shift fork shaft.

Note
1. Make sure to drain the transmission oil, before the front case is removed.
2. Be sure to move the exhaust pipe support bracket slightly, after removing its attaching bolts.
3. Make sure to install the shift fork and shaft as a complete set.

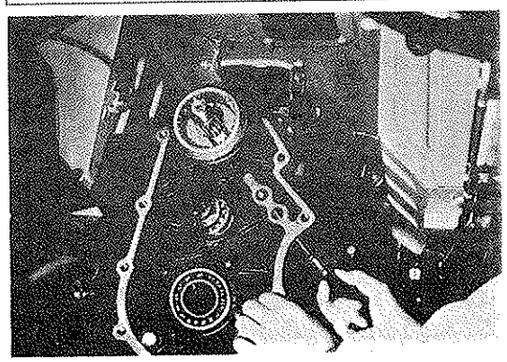


Fig. 2-27 Installing Spring and Ball

3. Insert the roller into place through the hole provided at the side of the transfer case. Mount the transfer case. Mount the transfer front case to the transmission case. Install the high-speed input gear and thrust washer onto the output shaft.

Note
While installing the case, ensure that the gasket is correctly in place.

4. Install the needle roller bearing in the transfer output front shaft. Then, install the output front shaft in the transfer front case.

5. With the clutch hub sub-assembly and transfer output gear mounted onto the transfer output rear shaft, assemble the transfer front drive shift fork in place.

6. Install the transfer idler gear with the bearing. If the bearing should interfere with the gear, move the gear slightly toward you.
7. Insert the ball and compression spring into the case through the hole provided at the side of the case. Tighten the hexagon bolt to retain the ball and spring in place.
8. Mount the torsion spring onto the transfer high and low shift fork shaft.

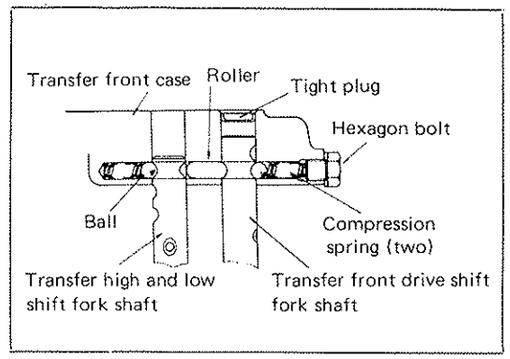


Fig. 2-28 Interlocking Mechanism

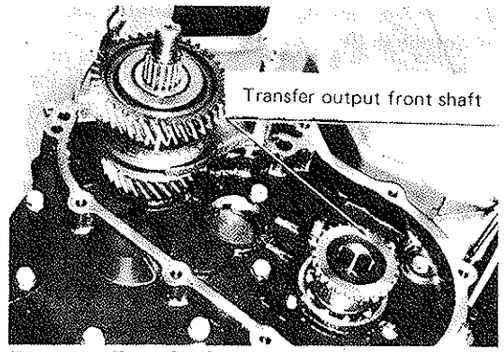


Fig. 2-29 Transfer Output Front Shaft Installation

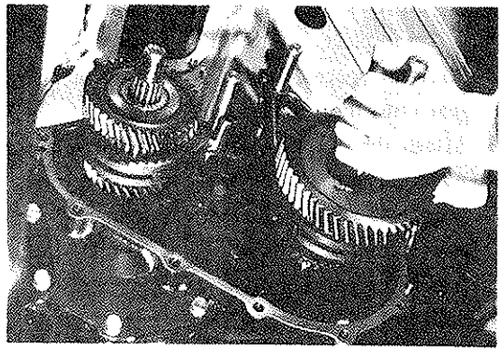


Fig. 2-30 Assembling Shift Fork Shaft

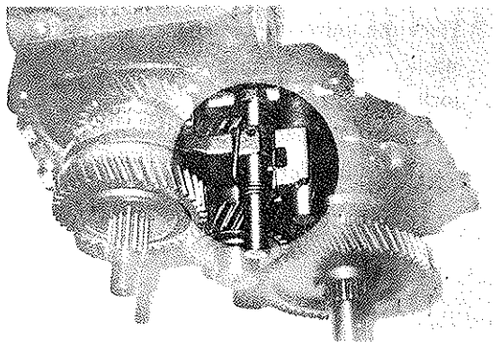


Fig. 2-31 Torsion Spring Installation

9. With the transfer case gasket interposed, attach the transfer case cover into position.

Note

1. Ensure that no binding occurs while the transfer case is being attached. Be careful that the locating pin and shift fork shaft are lined-up correctly.
   Tightening Torque: 3.0 to 4.5 Kg-m (21.7 to 32.5 ft-lbs)

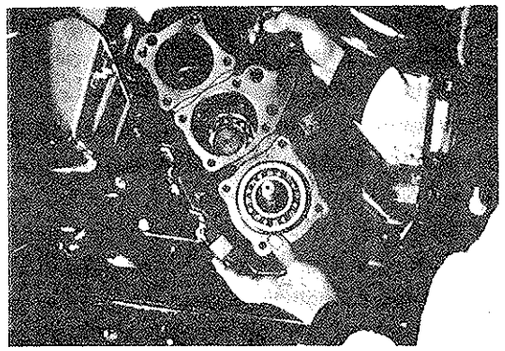


Fig. 2-32 Installing Transfer Case

10. Press the bearing onto the transmission output shaft.
11. Place the spacer and plate washer onto the transmission output shaft. Secure them by tightening a new lock nut.
    Special Tool to be Used: No.09330-87301
    Tightening Torque: 10.0 to 14.0 Kg-m (72.3 to 101.3 ft-lbs)

Note

After the lock nut has been tightened, make sure to stake it in position.

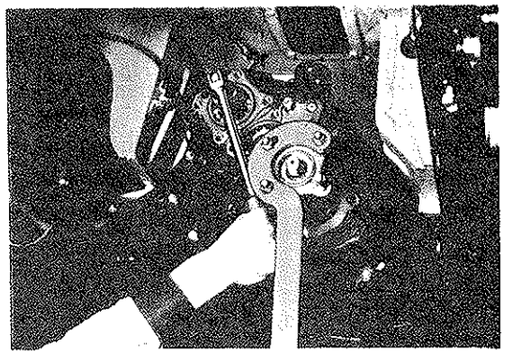


Fig. 2-33 Tightening Lock Nut

12. Mount the transfer case covers, with the gasket in place.
13. Place the spacer, ball, and speedometer drive gear onto the transfer output rear shaft.
14. Attach the output shaft bearing rear retainer.
15. While the output rear shaft is being rotated, install the speedometer driven gear sub-assembly.
16. Install the parking brake assembly and deflector.
    Tightening Torque: 3.0 to 5.0 Kg-m (21.7 to 36.2 ft-lbs)
17. Place the universal joint flange and plate washer. Secure them by tightening a new lock nut.
    Special Tool to be Used: No.09330-87301
    Tightening Torque: 10.0 to 14.0 Kg-m (72.3 to 101.3 ft-lbs)

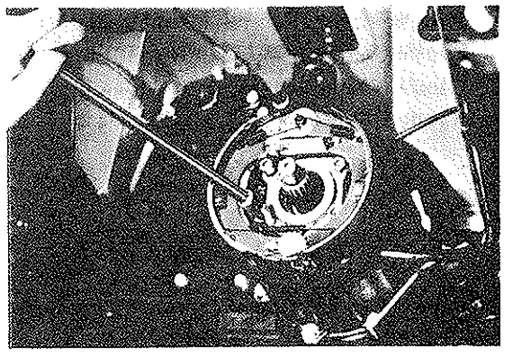


Fig. 2-34 Parking Brake Installation

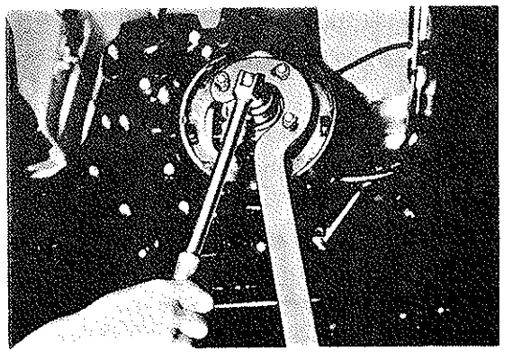


Fig. 2-35 Tightening Lock Nut

18. After the parking brake drum has been attached, install the front flange onto the transfer output front shaft. Proceed to place the plate washer. . Lock them, with a lock nut.
    Special Tool to be Used: No.09330-87301
    Tightening Torque: 15.0 to 20.0 Kg-m (108.5 to 144.7 ft-lbs)

Note

It should be noted that this lock nut is left-hand threaded. After the lock nut has been tightened, make sure to stake it in position.

19. Connect the front and rear propeller shafts.
    Tightening Torque: 6.0 to 8.0 Kg-m (43.4 to 57.9 ft-lbs)

Note

On both the front and rear propeller shafts, the sleeve yoke side should be attached to the transfer side.

20. Install the drain plug (brush sleeve) with the gasket in place.
    Tightening Torque: 3.0 to 5.0 Kg-m (21.7 to 36.2 ft-lbs)
21. Refill the transfer and transmission cases with gear oil as follows:

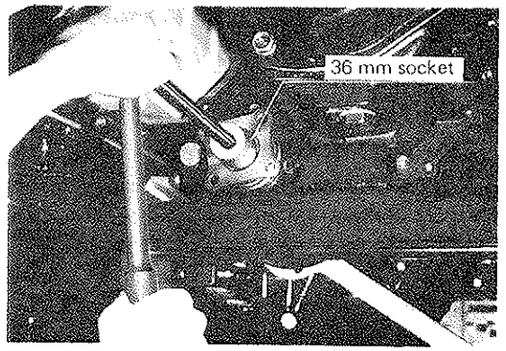


Fig. 2-36 Tightening Lock Nut

As the first step, remove the drain plug located at each bottom of the transfer and transmission cases. Then, the gear oil should be filled until it begins to overflow from the oil-filling port.

Transmission Oil Capacity:	2.0 liters
Transfer Oil Capacity:	1.4 liters

22. Install the parking brake protector on the cross-menber second.
23. Remove the rigid racks, using a jack. Working at the interior of the cab, install the transfer shift lever.

TRANSMISSION & TRANSFER REMOVAL

1. Slide the front seat forward. Disconnect the battery negative ⊖ terminal.
2. Drain the cooling water. Disconnect the radiator inlet hose ① at the engine side.
   NOTE: The cooling water containing antifreeze fluid should be kept for reuse.

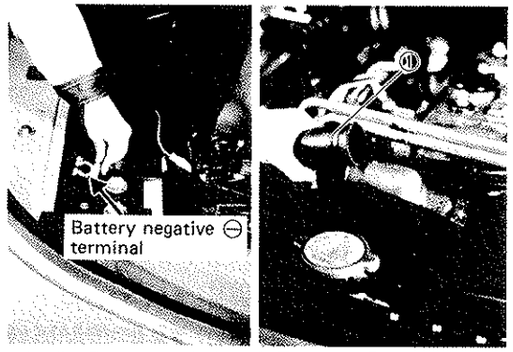


Fig. 2-37 Transmission & Transfer Removal (1)

3. Disconnect the starter wiring connections ②.
4. Remove the water outlet & inlet hoses ③ and exhaust pipe heat insulator ④.

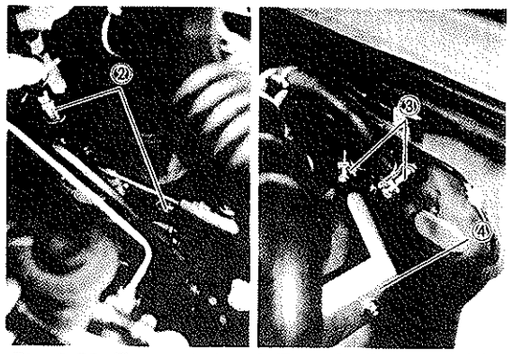


Fig. 2-38 Transmission & Transfer Removal (2)

5. Jack up the front and rear differentials and support them with rigid racks.
6. Remove the following parts from the underside of the vehicle.
   (1) Transmission undercover
   (2) Parking brake cable
   (3) Speedometer cable
   (4) Clutch release cable
   (5) Engine mounting rear insulator No.2
   (6) Exhaust pipe support bracket
   (7) Separate the exhaust pipe from the exhaust manifold.
   (8) Disconnect the front and rear propeller shafts at the respective differentials.
   NOTE: Make sure that the mate marks (arrow-headed marks) have been aligned properly.
7. Lift the engine hanger section by means of a chain block.
8. Detach the covers and boots from the transmission and transfer shift levers, respectively.
   NOTE: Place the shift levers of the transmission and transfer in the "Neutral" and "4H" positions, respectively.

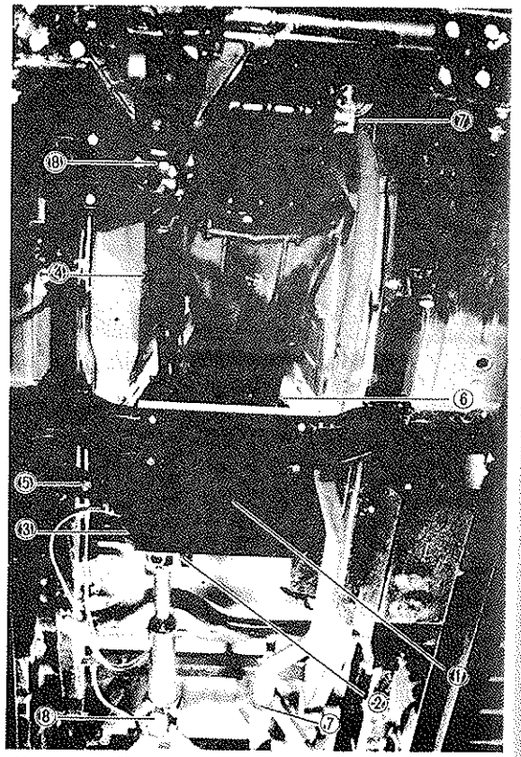


Fig. 2-39 Transmission & Transfer Removal (3)

9. Remove the shift levers of the transmission and transfer.
   NOTE: After the shift levers have been removed, be certain to plug the openings with a clean cloth in order that no foreign substance, such as dirt or dust, may enter into the transmission or the transfer.

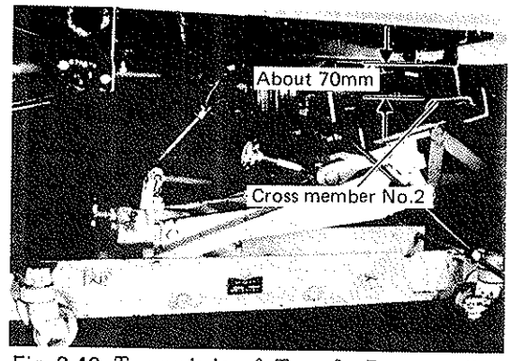


Fig. 2-40 Transmission & Transfer Removal (1)

10. Disconnect the ground cable and back-up lamp switch wire.
11. Support the cross member No.2 by means of a transmission jack. Remove the bolts that attach the cross member No.2 to the frame. Lower the whole transmission slightly.
12. Remove the bolts that attach the clutch housing to the engine.
    NOTE:
    1. The above connecting bolts should be removed from the rear side of the transmission, using an intermediate joint for ratchet use.
    2. Prior to starting the operation, be certain to remove the starter first.

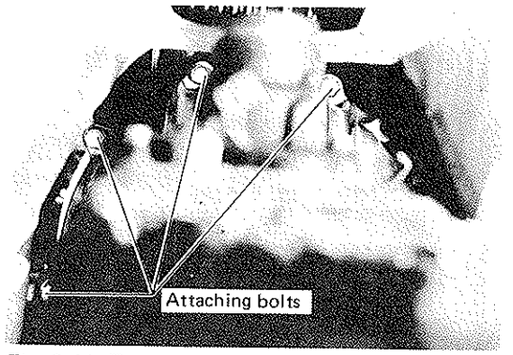


Fig. 2-41 Transmission & Transfer Removal (2)

13. Slowly separate the transmission & transfer from the engine. Proceed to roll the transmission & transfer toward the vehicle's side from under the vehicle.
    NOTE: Utmost care must be exercised as to the stability of the transmission & transfer during the removal operation, since these components are very heavy.

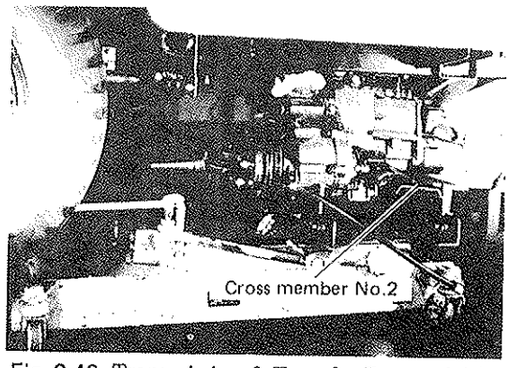


Fig. 2-42 Transmission & Transfer Removal (3)

TRANSMISSION AND TRANSFER DISASSEMBLY

Note

1. Prior to transmission disassembly, be sure to clean dirt or mud from the exterior of the transmission and transfer.
2. Be certain to put together removed bolts and nuts in one place so as not to lose any of them.
3. Make sure to remove the cross-member and propeller shafts in advance.

Disassemble the transmission and transfer.

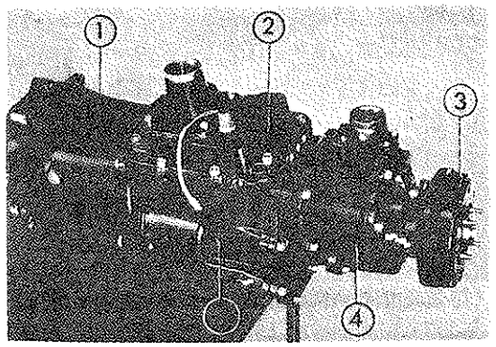


Fig. 2-43 Disassembly Sequence of Transmission and Transfer

1. Drain the gear oil from the transmission and transfer, by removing each drain plug located at their respective bottom. Care should be exercised so as not to lose the counter brush sleeve and spring that have been incorporated inside the transmission drain plug.
2. Remove the clutch release lever as follows:

(1) Detach the clutch release bearing hub clip ① and clutch release bearing hub assembly ②.

(2) Remove the setting bolt of the release lever yoke ④ mounted on the clutch release lever shaft ③. Pull out the release lever to remove the yoke and torsion spring ⑤.

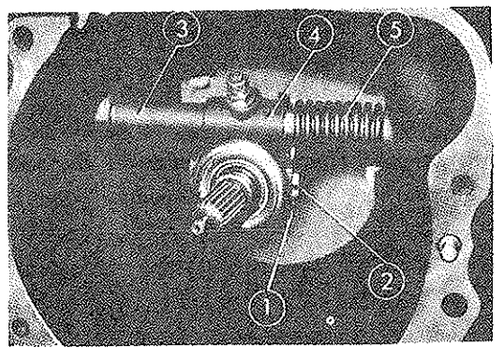


Fig. 2-44 Release Lever Removal

3. Separate the clutch housing from the transmission.
4. Remove the transmission case cover assembly, by removing the eight (8) attaching bolts.

Fig. 2-45 Removing Transmission Case Cover

5. Remove the parking brake drum.
6. Remove the universal joint flanges as follows:

(1) Move the clutch hub No.1 and No.2 in such a way that the two gears may be engaged at the same time, thus preventing the output shaft from being rotated.

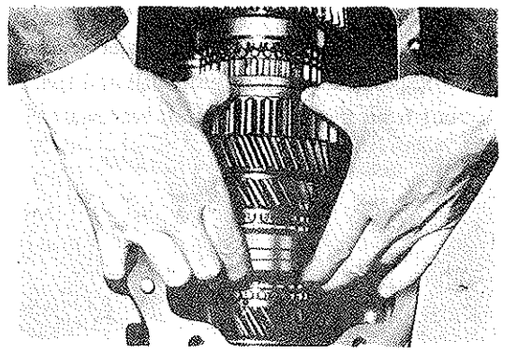


Fig. 2-46 Interlocking Two Gears

(2) Using a 30 mm socket, remove the lock nut of the transfer output rear shaft.

(3) Also, remove the lock nut of the transfer output front shaft.

Note

It should be noted that this lock nut is left-hand threaded.

(4) Remove each flange.

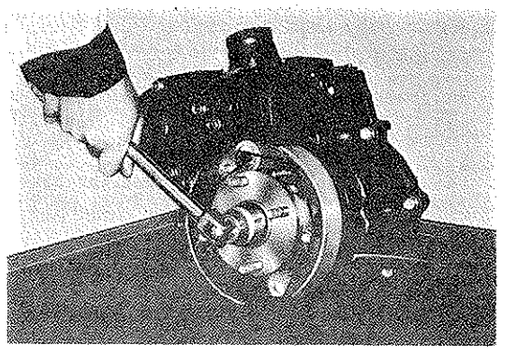


Fig. 2-47 Lock Nut Removal

7. Remove the four (4) socket-head cap bolts attaching the parking brake. Proceed to take the parking brake assembly out. To remove the upper attaching bolts, it is advisable to employ a hollow setting bit which is available commercially.

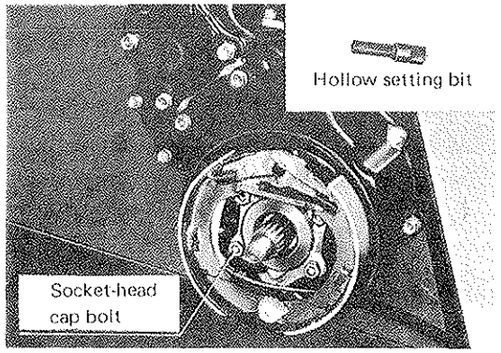


Fig. 2-48 Removing Parking Brake

8. Unfasten the speedometer sleeve lock plate. Remove it together with the speedometer shaft sleeve ① and speedometer driven gear sub-assembly ② from the output shaft bearing rear retainer.

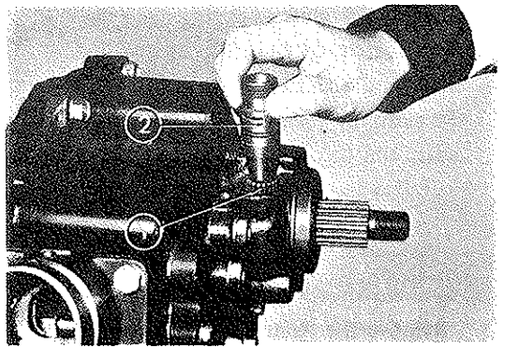


Fig. 2-49 Removing Speedometer Shaft Sleeve

9. Remove the output shaft bearing rear retainer attaching bolts (four pieces). Take the speedometer drive gear, ball and spacer out from the transfer output rear shaft.

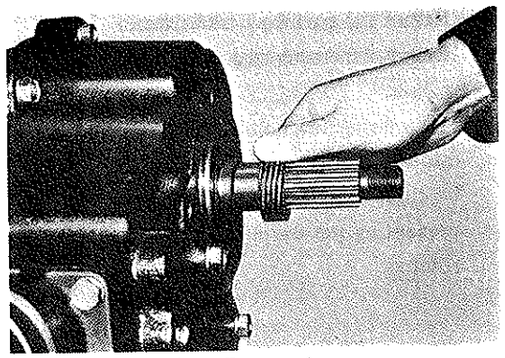


Fig. 2-50 Drive Gear Removal

10. Remove the transfer case cover, and removing their attaching bolts. Using a 30 mm socket, remove the output shaft lock nut.

Note

Make sure to move the clutch hub No.1 and No.2 in such a way that the two gears may be engaged at the same time, thus preventing the output shaft from being rotated.

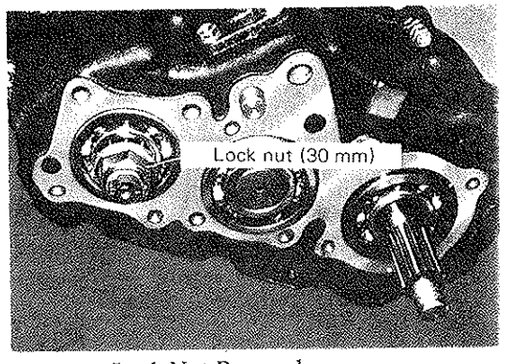


Fig. 2-51 Lock Nut Removal

11. Remove the transfer rear case, by removing the 10 attaching bolts.

Note

If any difficulty should be encountered in removing the transfer case, evenly and lightly tap the transfer case at the outside, using a plastic hammer.

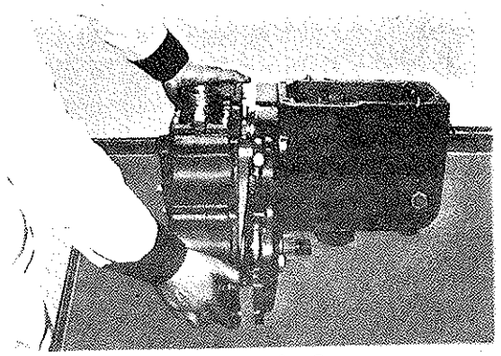


Fig. 2-52 Removing Transfer Case

12. Remove the idler gear with the radial bearing at each end. Proceed to the following operations.
13. Remove the transfer front drive shift fork shaft and the high and low shift fork shaft as follows:

(1) Remove the hexagon bolt located at the side of the transfer front case. Proceed to pull the compression spring and ball out. Remove the front drive shift fork shaft together with the transfer output rear shaft.

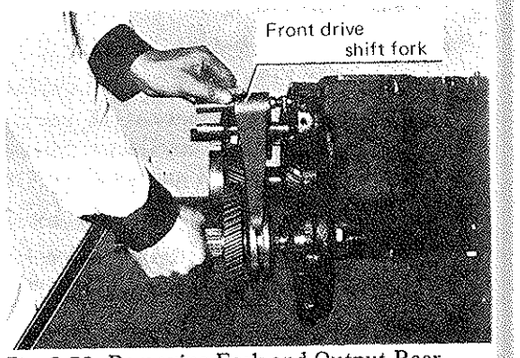


Fig. 2-53 Removing Fork and Output Rear Shaft

(2) Remove the roller located inside the transfer case. Pull the high and low shift fork shaft out. Proceed to the following operations.

Note

When removing the shaft, care should be taken as to the ball which tends to jump out from the position.

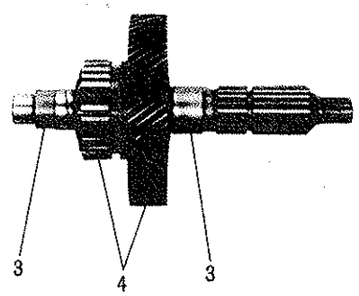


Fig. 2-54 Taking Output Rear Shaft Out

14. Remove the following parts from the output shaft: the transfer input shaft No.2 spacer, thrust washer, high-speed input gear, needle roller bearing, inner race, high and low clutch hub sub-assembly, low-speed input gear, and spacer.

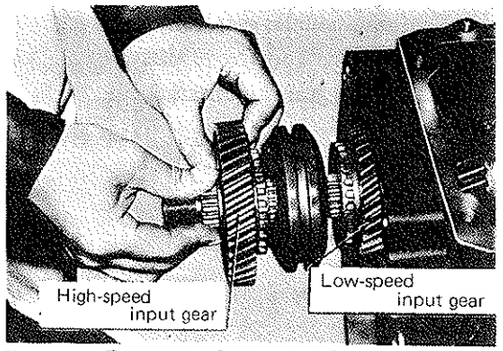


Fig. 2-55 Removing Output Shaft Related Parts

15. Remove the transfer front case, removing the six (6) attaching bolts.

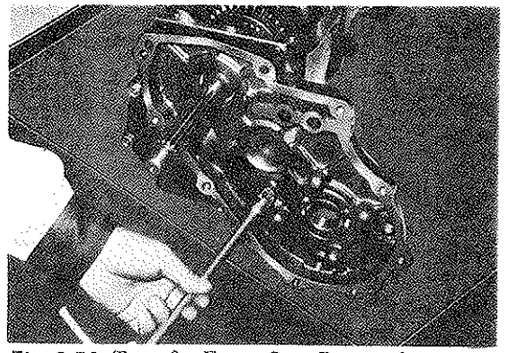


Fig. 2-56 Transfer Front Case Removal

16. Remove the transfer front case bearing.
17. Measure the end play of each gear.

Note

Before the gears are removed, make sure to measure and record the observed end play for each gear for later reference at the time of inspection.

1st Gear:	0.12 to 0.28 mm (0.0047 to 0.0110 inch)
2nd Gear:	0.10 to 0.30 mm (0.0039 to 0.0118 inch)
3rd Gear:	0.13 to 0.57 mm (0.0051 to 0.0224 inch)

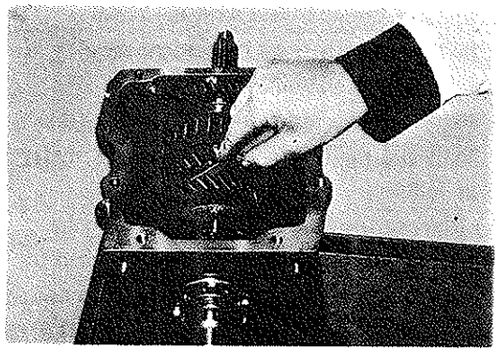


Fig. 2-57 Measuring Gear End Play

18. Measure the backlash of each transmission gear. Record the observed backlashes for later reference at the time of inspection.

Note

The plunger of the dial gauge must contact at right angles to the gear tooth, when measuring each gear on the output shaft.

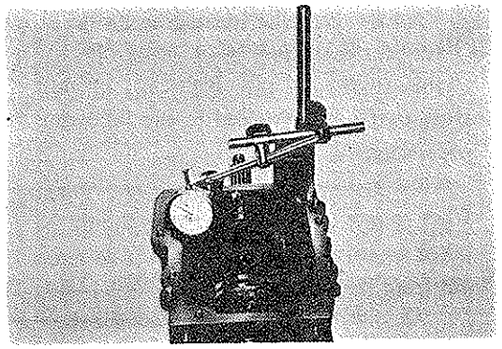


Fig. 2-58 Measuring Gear Backlash

19. Removing counter gear front bearing.
Using Special Tool (No. 09602-87302), Pull the counter gear front bearing out.

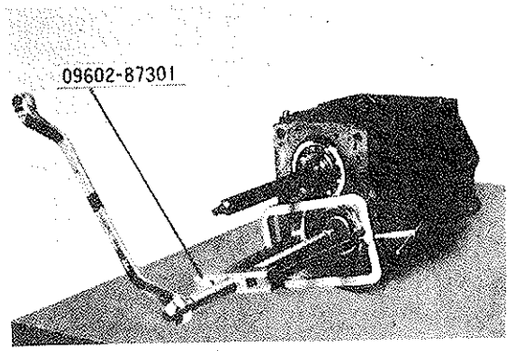


Fig. 2-59 Removing Counter Gear Front Bearing

20. Remove the counter gear rear bearing as follows:

(1) Using snap ring pliers, remove the shaft snap ring mounted at the rear end of the counter gear.

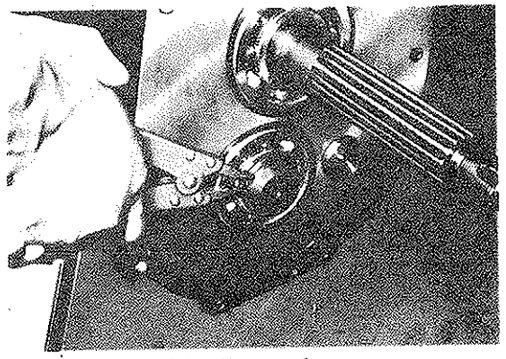


Fig. 2-60 Snap Ring Removal

(2) Using Special Tool (No. 09602-87301), Pull the bearing out.
The counter shaft can now be lowered to the bottom of the case.

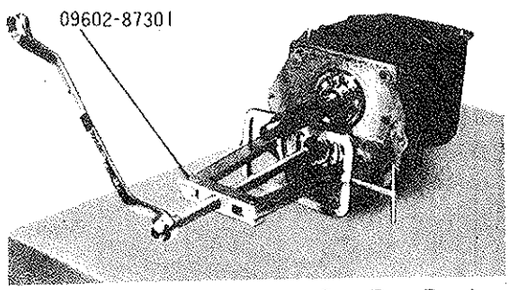


Fig. 2-61 Removing Counter Gear Rear Bearing

21. Pull the reverse idler gear shaft toward the rear. The reverse idler gear can now be lowered to the bottom of the case.

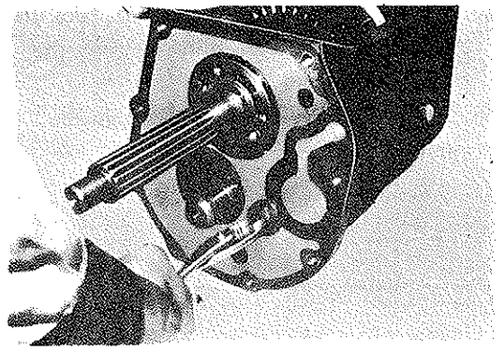


Fig. 2-62 Removing Reverse Idler Gear

22. Remove the input shaft.
Using Special Tool (No. 09312-36010), remove the input shaft bearing.

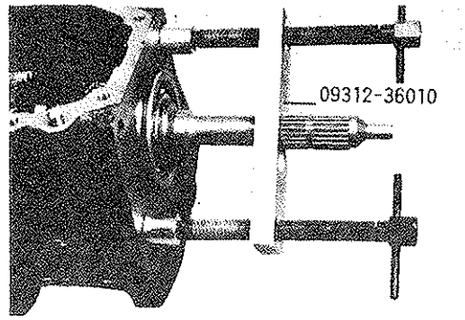


Fig. 2-63 Input Shaft Removal

23. Remove the output shaft bearing.
Using Special Tool (No. 09602-87301, 09314-87301), Pull the output shaft bearing out.

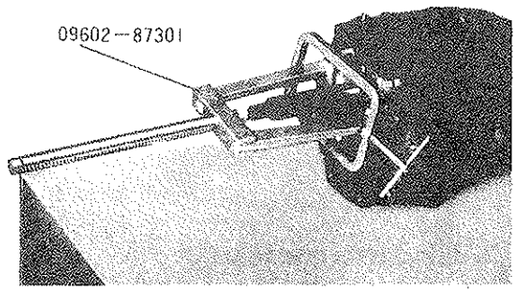


Fig. 2-64 Output Shaft Bearing Removal

24. Take the output shaft with the gears clustered onto the shaft out from the transmission case.

Note

When taking the output shaft out, hold the gears by your hands, so that the low gear won't come off.

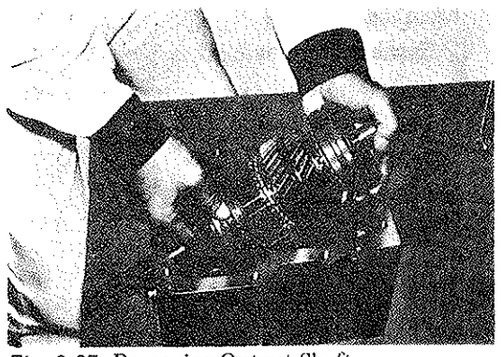


Fig. 2-65 Removing Output Shaft

25. Working from the drive gear side, take the counter shaft sub-assembly out from the transmission case.
26. Remove the reverse idler gear from the transmission case.

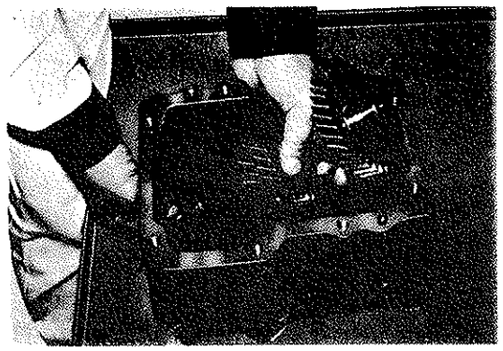


Fig. 2-66 Counter Shaft Removal

27. Disassemble further the gears clustered onto the output shaft as follows:
    (1) From the rear side
        ① Thrust washer
        ② 1st gear
        ③ Needle roller bearing
        ④ Inner race
        ⑤ Synchronizer ring
        ⑥ Reverse gear
        ⑦ 2nd gear

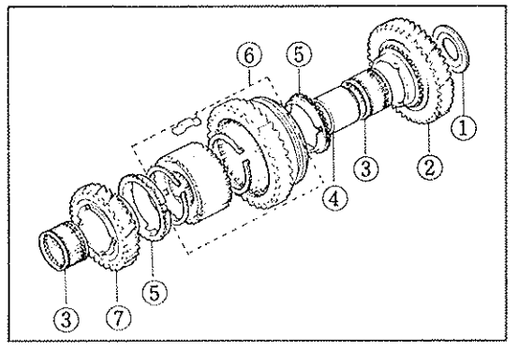


Fig. 2-67 Removing Gears

    (2) Using snap ring pliers, remove the snap ring mounted at the front end of the output shaft.

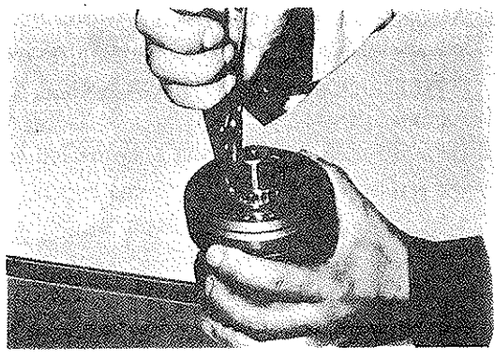


Fig. 2-68 Removing Gears

28. From the front side
    ① Synchronizer ring
    ② Hub sleeve No.1
    ③ Needle roller bearing
    ④ 3rd gear

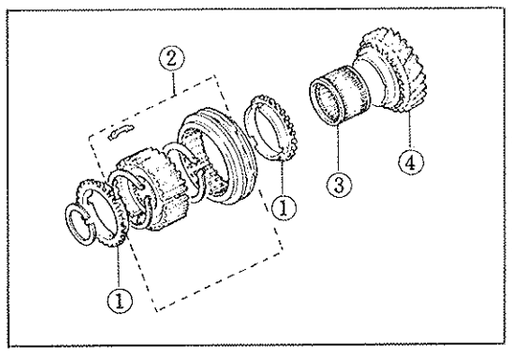


Fig. 2-69 Removing Gears

29. Disassemble the clutch hub and hub sleeve as follows:
    (1) Pull the clutch hub No.1 ② off the reverse gear ①. Detach the shifting keys ③ and key springs ④.

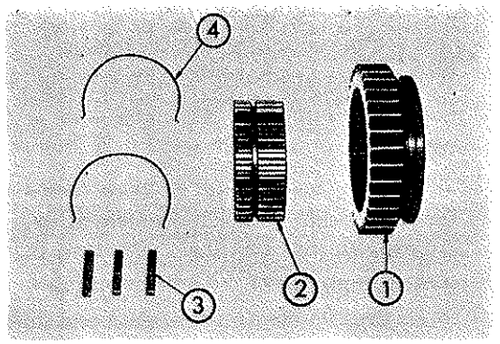


Fig. 2-70 Clutch Hub Disassembly (1)

    (2) Pull the clutch hub No.2 ⑥ off the hub sleeve ⑤. Detach the shifting keys ⑦ and key springs ⑧.

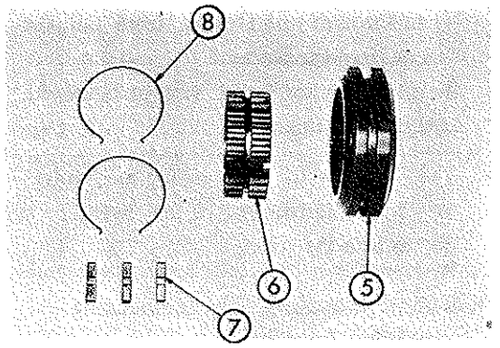


Fig. 2-71 Clutch Hub Disassembly (2)

CASE COVER DISASSEMBLY

1. Remove the control shift lever retainer sub-assembly attaching bolts. Invert the case cover and proceed to disassemble it as follows.
2. Drive off each slotted spring pin provided at the reverse shift head sub-assembly as well as at the reverse shift fork. Remove the shift fork shafts.

> Note
>
> 1. Make sure to block the case hole by your finger in order to prevent the ball and compression spring from jumping out from the place.
> 2. When the shift fork shaft is removed, also the tight plug comes off. Care should be exercised so as not to lose it.

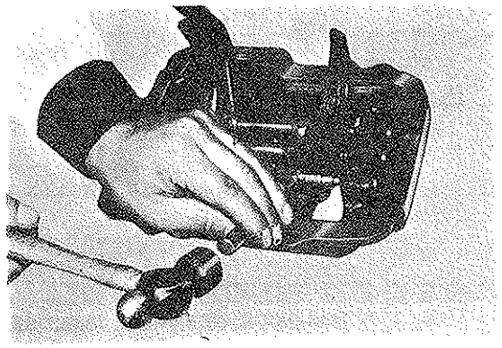


Fig. 2-72 Driving Slotted Spring Pin Off

3. Remove the reverse shift head sub-assembly.
4. Remove the roller of the interlocking mechanism from the case.

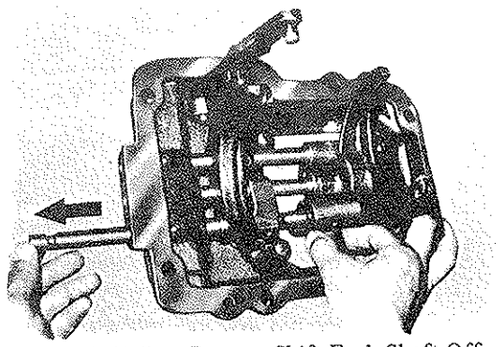


Fig. 2-73 Pulling Reverse Shift Fork Shaft Off

5. Using pliers, pull out the "E" ring of the 3rd and 4th shift fork shaft. Drive off the slotted spring pin of the 3rd and 4th shift fork. Remove the shift fork shaft and shift fork.

> Note
>
> When the shift fork shaft is pulled out, the ball and spring also tend to jump out from the place. Hence, make sure to block the hole by your finger.

The roller for the interlocking mechanism is located at the rear end of the shaft. Be sure not to lose the roller.

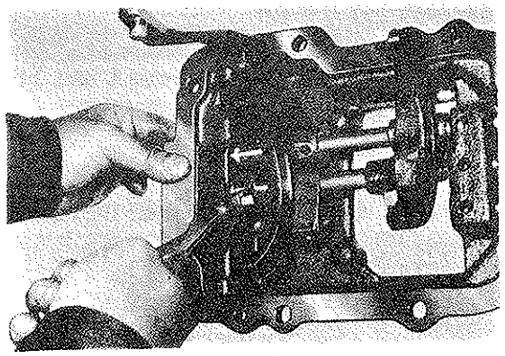


Fig. 2-74 Removing "E" Ring

6. Drive off each slotted spring pin provided at the 1st and 2nd shift head as well as the 1st and 2nd shift fork. Drive the shift fork shafts off the case cover.

> Note
>
> Make sure to block the case hole by your finger in order to prevent the ball and compression spring from jumping out from the place.

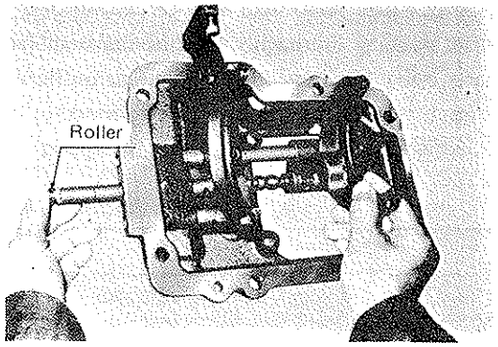


Fig. 2-75 Removing Shift Fork Shaft

7. Remove the roller of the interlocking mechanism that still remains inside the case.

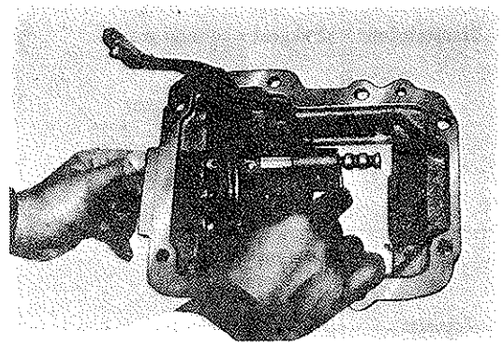


Fig. 2-76 Removing Shift Fork Shaft

INSPECTION AND REPAIR OF COMPONENTS

After washing thoroughly the thus-disassembled parts, carry out inspection of them as outlined in each subsequent section. If they prove to be defective, repair or replace them, as required.

If the backlashes measured at the times of disassembly should exceed the respective allowable limit, establish the causes while carrying out inspection of components.

Table 2-2 Allowable Limit of Gear Backlash

Item			Allowable limit	Specified value
Transmission	Input shaft x counter gear	mm (inch)	0.25 (0.0098)	0.06~0.20 (0.0024~0.0079)
	1st gear x counter gear	mm (inch)	0.25 (0.0098)	0.06~0.20 (0.0024~0.0079)
	2nd gear x counter gear	mm (inch)	0.25 (0.0098)	0.06~0.20 (0.0024~0.0079)
	3rd gear x counter gear	mm (inch)	0.25 (0.0098)	0.06~0.20 (0.0024~0.0079)
	Reverse gear x counter gear	mm (inch)	0.33 (0.0130)	0.08~0.28 (0.0031~0.0110)
Transfer	Low gear x idler gear	mm (inch)	0.25 (0.0098)	0.06~0.20 (0.0024~0.0079)
	High gear x idler gear	mm (inch)	0.25 (0.0098)	0.06~0.20 (0.0024~0.0079)
	Output gear x idler gear	mm (inch)	0.25 (0.0098)	0.06~0.20 (0.0024~0.0079)

If the measured backlash should exceed the allowable limit, make sure to replace the bush, bearing, shaft, or gear, as required.

Output Shaft

1. Check output shaft to see if any damage or wear is present.
   1. Neelde roller bearing contact area ①
   2. Spline ③ ④
   3. Gear contact area ②

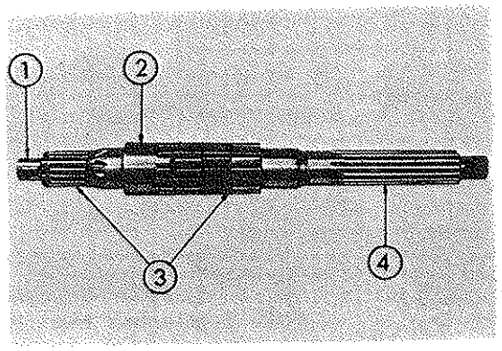


Fig. 2-77 Output Shaft Check

5. Check the output shaft for bend as follows: With both center holes of the output shaft supported, measure the bend of the shaft.
   Allowable Limit: 0.03 mm (0.001 inch)
   (Measured at 2nd Gear Section)

Note

The half of the measured rounout represents the bend for this output shaft.

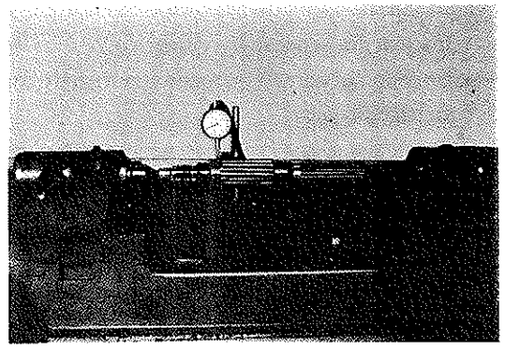


Fig. 2-78 Checking of Output Shaft Bend

Transfer Output Rear Shaft

1. Check the output rear shaft to see whether any damage or wear is present at the needle roller bearing-contact-area ① at the shaft's end.
2. Check the clutch hub-contact-area ② for damage or wear.
3. Inspect the spline ③ for damage or wear.
4. Check the spline ④ provided at the rear end of the output shaft for the following items given below:

(1) Damaged or worn spline.
(2) Excessive looseness or improper fitting,

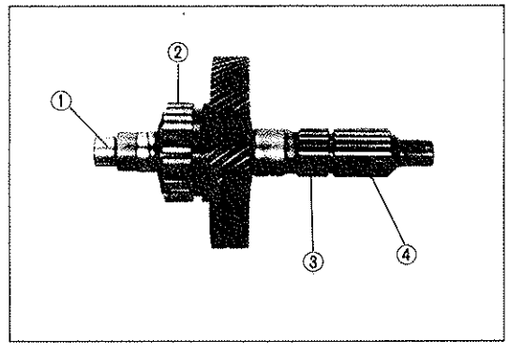


Fig. 2-79 Transfer Output Rear Shaft Check

Transfer Output Front Shaft

1. Check the spline ①, onto which the transfer hub sleeve engages, for damage or wear.
2. Inspect the bore, into which the needle roller bearings are fitted, for damage or wear.
3. Check to see if any damage or wear is present at the area ② where the radial ball bearing contacts.

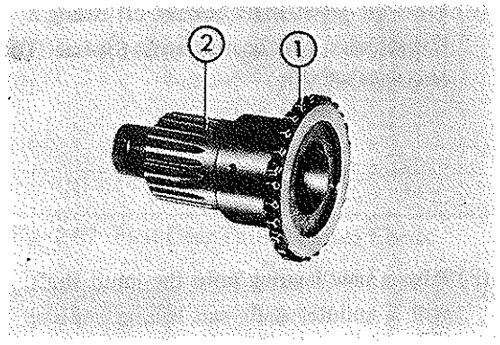


Fig. 2-80 Front Shaft Check

Input Shaft

1. Inspect the synchronizer ring No.2-No.2-contact-area ① of the input shaft for damage or wear.
2. Check the spline ②, onto which the transmission hub sleeve engages, for damage or wear.
3. Inspect the bore ③, into which the needle roller bearings are fitted, for damage or wear.
4. Check the input shaft gear ④ for damage or wear.
5. Inspect to see whether the spline ⑤ exhibits any damage or wear at the area where the clutch disc slides.
   With the clutch disc fitted onto the input shaft, check to see if the disc fits snugly, yet it slides smoothly on the input shaft.
6. Check to see whether the input shaft bearing runs smoothly without any binding or stiff feeling, while it is being turned, with a force applied onto the bearing balls.

   Since a defective bearing emits unusual noise, replace it as follows:

(1) Using snap ring pliers, remove the snap ring located at the front end of the bearing.
(2) Press the input shaft bearing off, using a transmission rear bearing anvil (Special Tool No.09253-87201).

(3) Press a new bearing onto the input shaft, with a counter shaft rear bearing replacer (Special Tool No.09310-87302).

(4) Using snap ring pliers, install the snap ring.

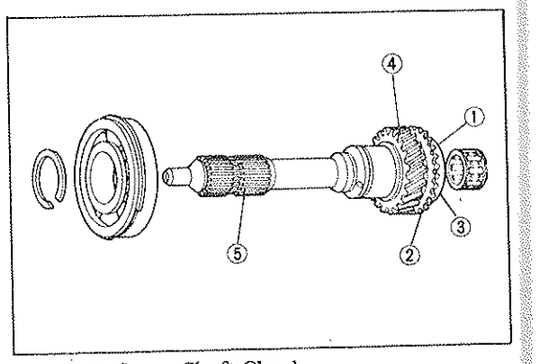


Fig. 2-81 Input Shaft Check

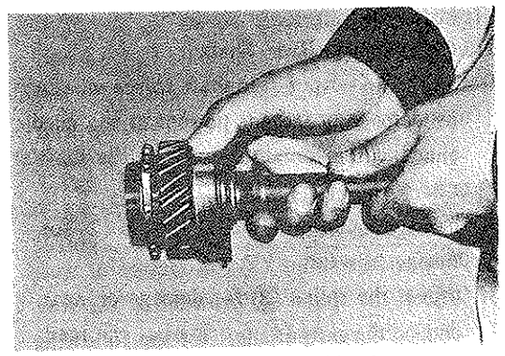


Fig. 2-82 Input Shaft Bearing Check

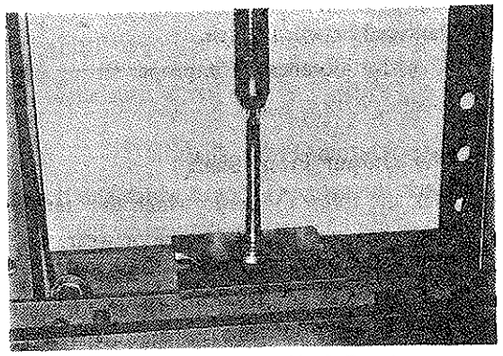


Fig. 2-83 Removing Input Shaft Bearing

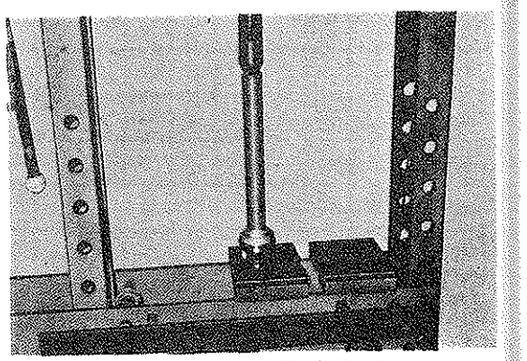


Fig. 2-84 Installing Input Shaft Bearing

Needle Roller Bearing

Check the needle roller bearing for wear or damage.

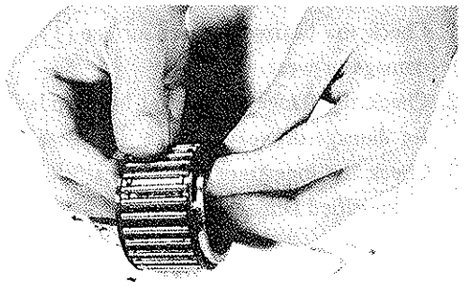


Fig. 2-85 Bearing Check

First Gear

(1) Check for wear or damage.
(2) Measure the inner diameter.
   Allowable limit: 54.050 mm (2.128 inch)
(3) Oil clearance.
   Allowable limit: 0.070 mm (0.0028 inch)

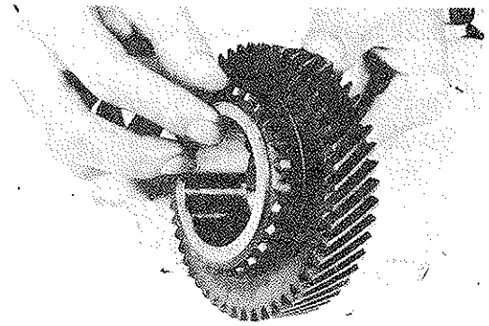


Fig. 2-86 Checking of First Gear

First Gear Thrust Washer

Check the edge ① for damage or wear.

Specified Thickness: 3.90 to 4.10 mm (0.154 to 0.161 inch)
Thickness Wear Limit: 3.85 mm (0.152 inch)

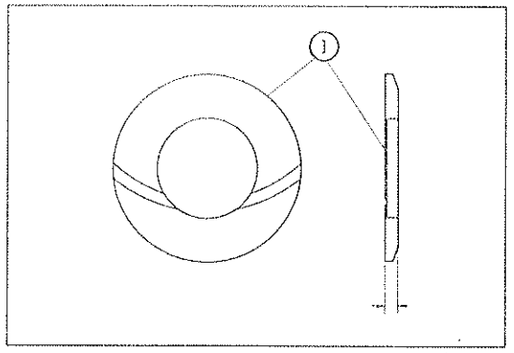


Fig. 2-87 First Gear Thrust Washer Check

Transfer Input Gear Thrust Washer

Check the edge for damage or wear.

Specified Thickness: 3.95 to 4.05 mm (0.156 to 0.159 inch)
Thickness Wear Limit: 3.85 mm (0.152 inch)

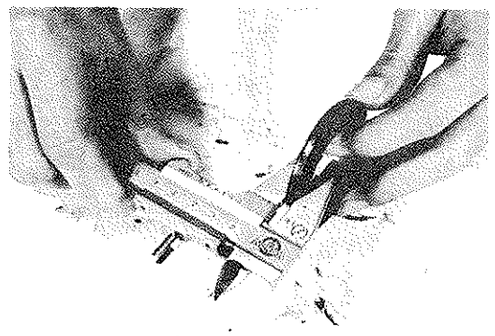


Fig. 2-88 Transfer Input Gear Thrust Washer Check

First Gear Bearing Inner Race

1. Check the bearing-contact surface ① for damage or wear.
2. Check the flange surfaces at both ends ② for damage or wear.
3. Check the inner race dimensions.

Specified Dimension:
47.970 to 47.985 mm
(1.889 to 1.890 inch)
Wear Limit: 47.970 mm
(1.889 inch)

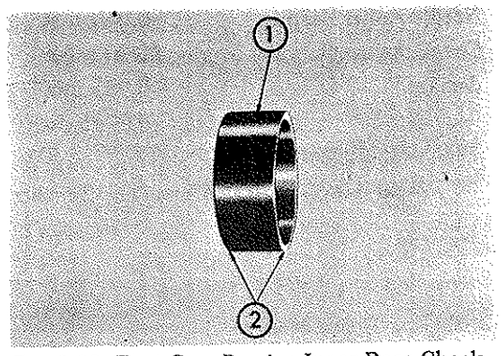


Fig. 2-89 First Gear Bearing Inner Race Check

Transfer Input Bearing Inner Race

1. Check the bearing-contact surface ① for damage or wear.
2. Check the flange surfaces at both ends ② damage or wear.

Specified Dimension:
42.98 to 42.99 mm
(1.692 to 1.693 inch)
Wear Limit: 42.98 mm
(1.692 inch)

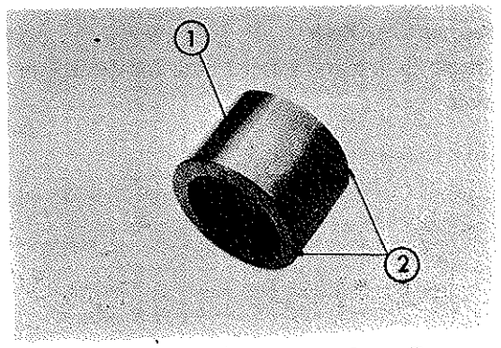


Fig. 2-90 Transfer Input Bearing Inner Race Check

Second and Third Gears

(1) Inspect the synchronizer ring-contact area ① of each gear for damage or wear.
(2) Check the splined section ② of each gear for damage or wear.
(3) Inspect the gear teeth ③ of each gear for damage or wear.
(4) Check to see if any damage or wear is present at the bore inner surface ④ of each gear.

Allowable Limit of Wear in Bore Diameter:
2nd Gear: 54.050 mm (2.123 inch)
3rd Gear: 45.040 mm (1.773 inch)
Allowable Limit of Oil Clearance:
2nd Gear: 0.070 mm (0.0028 inch)
3rd Gear: 0.065 mm (0.0026 inch)

(5) Inspect both edges ⑤ of each gear for damage or wear.

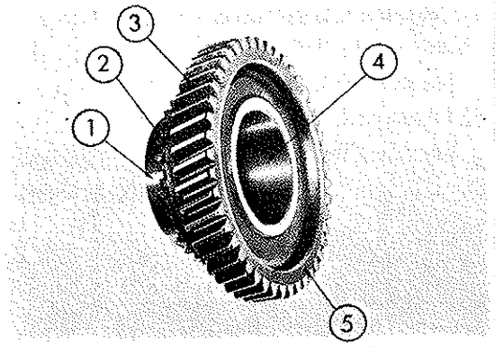


Fig. 2-91 Checking of 2nd and 3rd Gears

Transfer Low Speed and High Speed Gears

1. Inspect the gear teeth ① for damage or wear.
2. Check to see whether any damage or wear is present at the bore inner surface ② of each gear.

Inner Diameter of Low and High Gears
Specified Dimension: 48.00 to 48.02 mm
(1.890 to 1.891 inch)
Wear Limit: 48.04 mm
(1.892 inch)

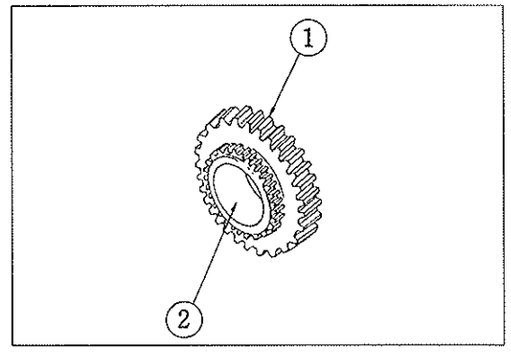


Fig. 2-92 Checking of Low and High Speed Gears

Counter Gear

(1) Check the gear teeth ① for damage or wear.
(2) Inspect to see if any damage is present at the exterior ② of each end which is supported by the bearing.

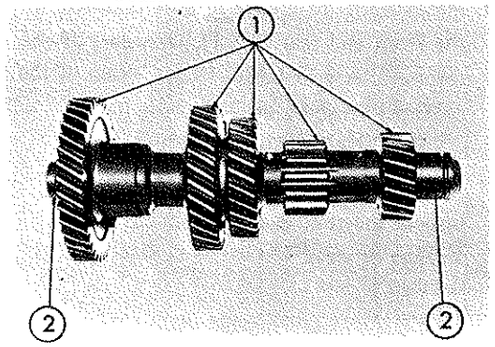


Fig. 2-93 Counter Gear Check

Replace a defective counter shaft drive gear, following the procedure given below:
(1) Using snap ring pliers, remove the snap ring located at the front end of the bearing.
(2) Using a transmission rear bearing anvil (Special Tool No.09334-87301), press the counter shaft drive gear off, with a long socket placed upon the counter gear shaft.

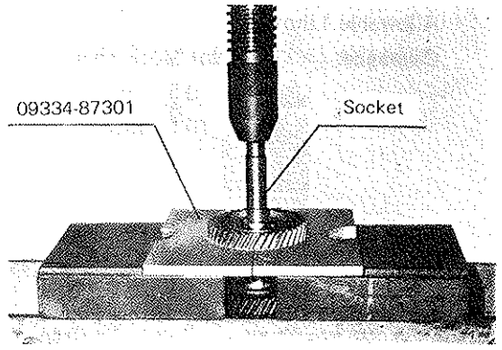


Fig. 2-94 Removing Drive Gear

(3) Place the woodruff key onto the counter gear shaft. With the aid of a press, drive the counter shaft drive gear into position.
(4) Fit the snap ring into place.

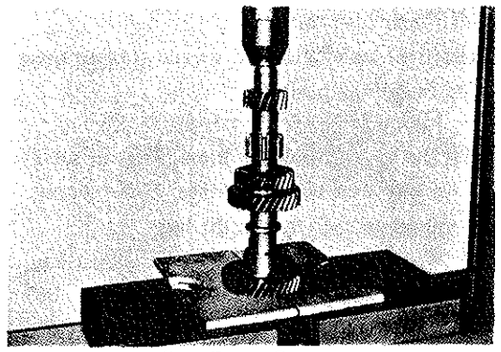


Fig. 2-95 Installing Drive Gear

Reverse Idler Gear and Reverse Idler Gear Shaft

1. Check the teeth section ① of the reverse idler gear for damage or wear.
2. Check the formed bush ② inserted into the interior of the reverse idler gear for damage or wear.
   Reverse Idler Gear Inner Diameter
   Specified Dimension: 32.000 to 32.025 mm (1.260 to 1.261 inch)
   Wear Limit: 32.100 mm (1.264 inch)
3. Measure the difference in bore diameter at the front and rear ends (taper wear) of the reverse idler gear bush.
   Taper Wear Limit: Not More Than 0.05 mm (0.002 inch)
4. Inspect the reverse idler gear shaft ③ for damage or wear.
   Gear Shaft Outer Diameter
   Specified Dimension: 31.90 to 31.92 mm (1.256 to 1.257 inch)
   Wear Limit: 31.89 mm (1.256 inch)

Note
A taper wear exceeding 0.05 mm (0.002 inch) may cause "slipping out of gear."

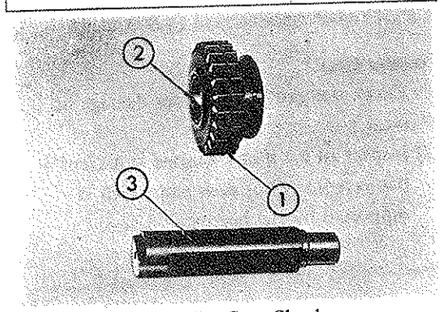


Fig. 2-96 Reverse Idler Gear Check

5. Measure the clearance between the reverse shift pin and idler gear.
   Allowable Limit of Clearance: Not More Than 0.5 mm (0.02 inch)

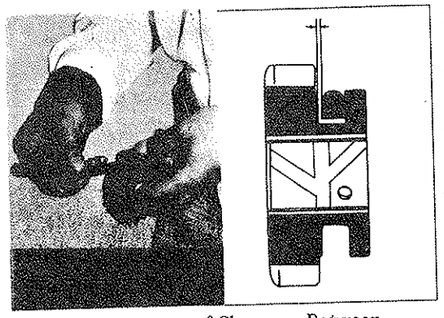


Fig. 2-97 Checking of Clearance Between Reverse Shift Pin and Idler Gear

Reverse Idler Gear Bush Replacement

1. Using a replacer set engine A (Special Tool No.09250-10011), etc., press the reverse idler gear bush off.
2. Use the above-described special tool to press the bush into position.

Note
1. The bush should be press-fitted in such a way that the oil passage in the gear is lined up with that in the bush.
2. When the bush has been press-fitted, each edge of the bush should be recessed one (1) mm (0.039 inch) from the edge of the gear, respectively.

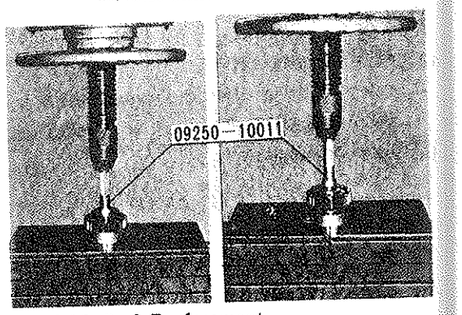


Fig. 2-98 Bush Replacement

Reverse Shift Arm

1. Check the shoe section ① for damage or wear.
2. Check the shift arm to see if its shoe attaching section ② or its pivot attaching section ③ exhibits any damage or wear.
3. Check the shift arm pivot ④ for damage or wear.

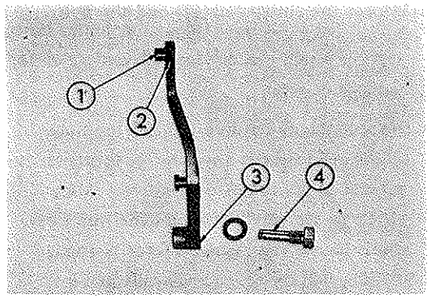


Fig. 2-99 Reverse Shift Arm Check

Transfer Idler Gear

1. Inspect the transfer idler gear to see if its gear teeth ① exhibit any damage or wear.
2. Check the transfer idler gear to see whether any damage or wear is present at the exterior ② of each end that is supported by the radial ball bearing.

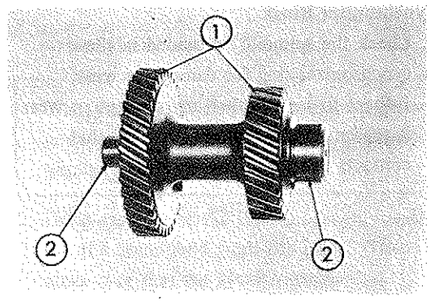


Fig. 2-100 Transfer Idler Gear Check

Transmission Sleeve/Reverse Gear

1. Inspect the internal spline ① for damage or wear.
2. Check the teeth section ② of the reverse gear for damage or wear.
3. Inspect to see whether the reverse gear exhibits any damage or wear at the shift fork-contact-groove ③.

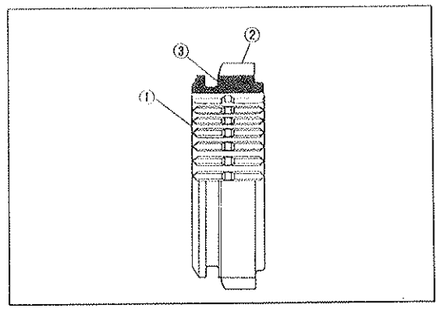


Fig. 2-101 Hub Sleeve Check

Transmission Clutch Hubs No.1 and No.2, Transfer High and Low Clutch Hub, and Transfer Front Drive Clutch Hub

1. Check the external spline ① provided on the exterior of each hub for damage or wear.
2. Inspect the groove ② which accommodates the synchromesh shifting key for damage or wear.
3. Check the both sides ③ of the center boss section which contact the adjacent gears for damage or wear.

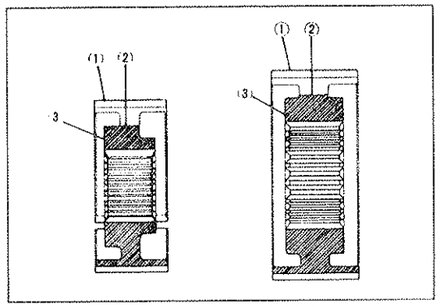


Fig. 2-102 Checking of Clutch Hubs

4. Inspect the clutch hub ② and the hub sleeve ① to see if any wear or looseness is present in an up-down direction. Also, check to see whether or not the hub sleeve slants excessively, when a force is applied as indicated by the arrow-heads in Fig.

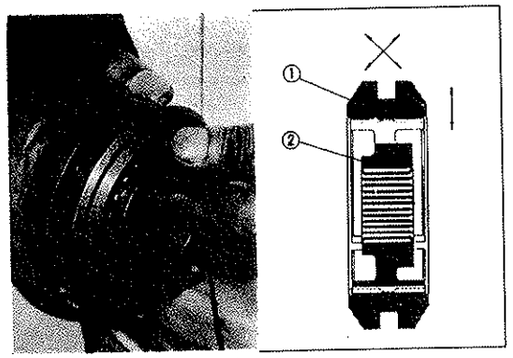


Fig. 2-103 Clutch Hub Check

Synchronizer Rings

1. Check the spline ① provided in the synchronizer ring for damage or wear.
2. Inspect to see whether any damage or wear is present at the taper section ② that contacts the gear.

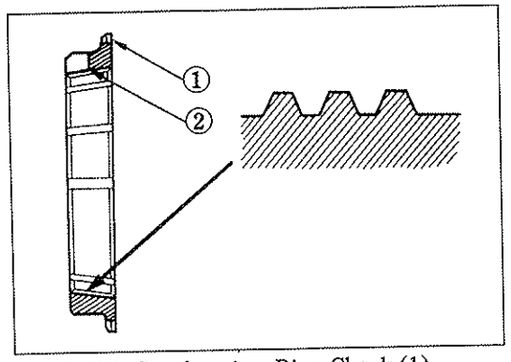


Fig. 2-104 Synchronizer Ring Check (1)

3. Using your hands, press the synchronizer ring against the gear. Measure the clearance existed between the ring and gear. These clearances should conform to the following specifications given table 2-4

Table 2-4 Synchronizer Ring Specification

	Specified clearance mm (inch)	Wear limit mm (inch)
1st gear	1.300 ~ 1.700 (0.051 ~ 0.067)	0.8 (0.032)
2nd gear	1.300 ~ 1.700 (0.051 ~ 0.067)	0.8 (0.032)
3rd gear	1.300 ~ 1.700 (0.051 ~ 0.067)	0.8 (0.032)
Top gear	1.300 ~ 1.700 (0.051 ~ 0.067)	0.8 (0.032)

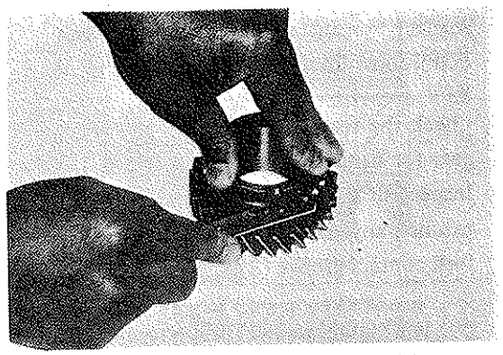


Fig. 2-105 Synchronizer Ring Check (2)

4. Braking action
Check to see if the synchronizing components have a braking effect, when trying to rotate the synchronizer ring which is firmly pressed against the gear by your hands. There must not be any slippage between the synchronizer ring and gear during the check above.

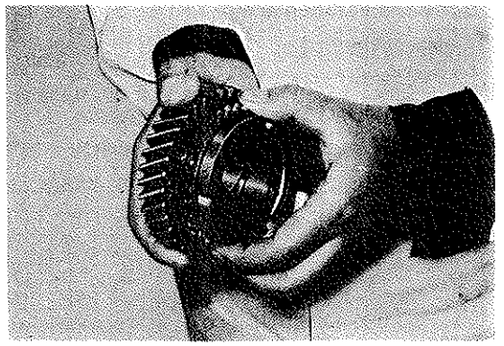


Fig. 2-106 Braking Action Check

Correction of Poor-Contact at Tapered Section
This correction should be made if the synchronizing components indicate poor braking action, or a new synchronizer ring is to be installed. Carry out the correction of poor-contact as follows:

1. Coat the tapered sections of the synchronizer ring and gear with a thin film of fine grade abrasive compound for use in grinding engine valves. Using your hands, rock the ring several times, while the ring is being pressed firmly against the gear.

> Note
> The synchronizer ring and gear must show good contact in more than 80% of the whole tapered section.

2. Using gasoline or the like, thoroughly wash out the compound from the parts. Then, make sure that the synchronizing components consisting of the ring and gear have a proper braking action.

Synchromesh Shifting Keys and Synchronizer Shifting Key Springs

1. Check to see if the shifting key exhibits any wear at the center projected section ①.
2. Inspect the shifting key spring for weak condition. Check also the shifting key-contact-area ② for wear.

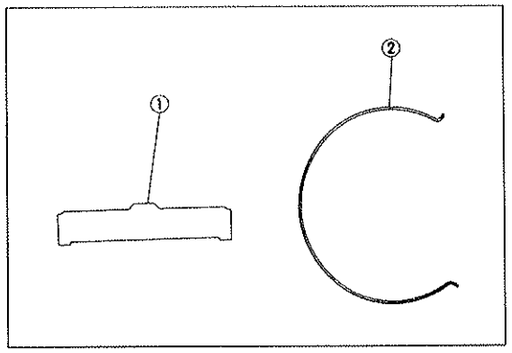


Fig. 2-107 Checking of Shifting Key and Its Spring

Shift Forks (Transmission and Transfer)

1. Inspect the tip-end of each fork for damage or wear.
   Specified Thickness: 6.8 to 6.9 mm (0.268 to 0.272 inch)
   Wear Limit: 6.4 mm (0.252 inch)
2. Measure the clearance between the fork's tip-end and hub sleeve.
   Specified Clearance: 0.100 to 0.258 mm (0.004 to 0.010 inch)
   Allowable Limit of Clearance: 0.800 mm (0.031 inch)

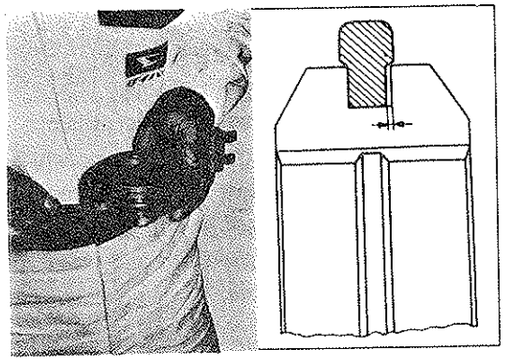


Fig. 2-108 Shift Fork Check

Shift Fork Shafts and Shift Forks

1. Check the shift fork shaft to see if any damage or wear is present at the shift fork sliding section ①.
2. Inspect to see whether any damage or wear is present at the section ② where the ball is inserted.
3. Check also the fork shaft sliding section ③ for signs of wear.

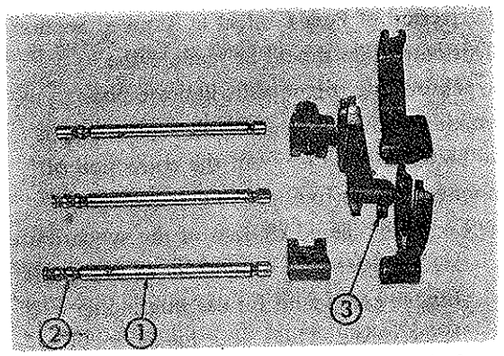


Fig. 2-110 Checking of Shift Forks and Shafts

Shift Levers (Transmission and Transfer)

1. Check the shift lever to see whether the spherical section ① at its tip-end exhibits any damage or wear.

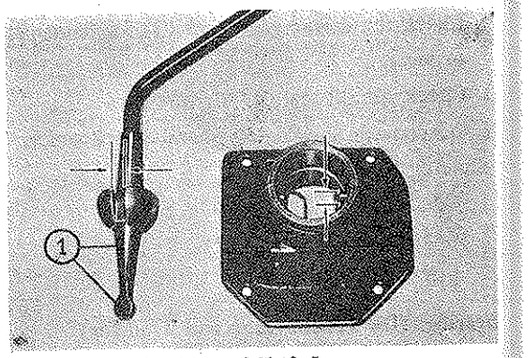


Fig. 2-110 Checking of Shift Lever (Transmission)

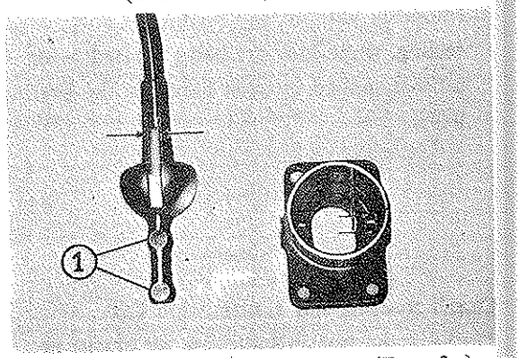


Fig. 2-111 Checking of Shift Lever (Transfer)

Gear Shift Fork Springs and Reverse Shift Head Spring

1. Inspect the springs for weak condition:
(1) Gear shift fork spring dimensions:
Spring for transmission
Specified Free Length:
28.5 ± 0.7 mm
(1.12 ± 0.028 inches)
Minimum Requirement for Free Length:
26 mm (1.024 inches)
Specified Free Length:
24 ± 0.6 mm
(0.945 ± 0.024 inch)
Minimum Requirement for Free Length:
22.5 mm (0.886 inch)
(2) Reverse shift head spring dimensions:
Specified Free Length:
38 mm (1.496 inches)
Minimum Requirement for Free Length:
32 mm (1.260 inches)

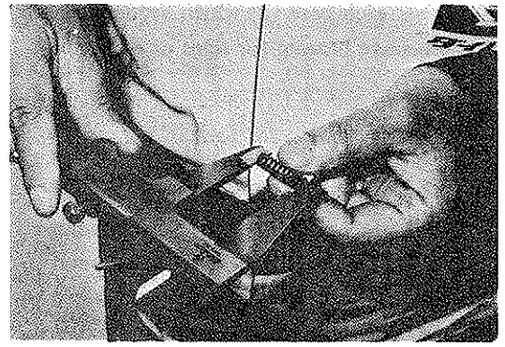


Fig. 2-112 Spring Check

Speedometer Gear

1. Check the drive gear ① and driven gear ② for damage or wear.
2. Check the driven gear shaft ③ for damage or wear.
3. Check the oil seal ④ for wear.

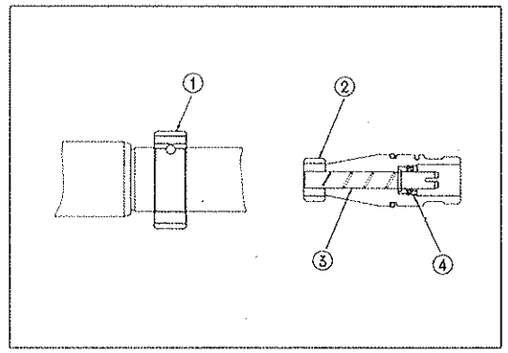


Fig. 2-113 Speedometer Gear Check

Bearings (for Transmission and Transfer)

1. Check the bearings for damage or wear.
2. Inspect to see whether the bearings run smoothly without any binding or stiff feeling, while they are being rotated, with a force applied by your hands to the bearing balls.

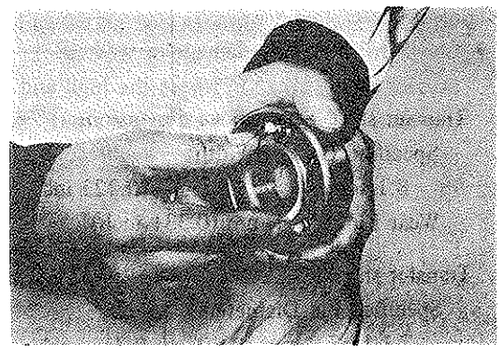


Fig. 2-114 Bearing Check

Clutch Housing and Transmission Case

1. Check the transmission case for cracks or damage.
2. Inspect to see if any deterioration or wear is present at the lip-section of the oil seal ① where the clutch release lever is inserted.
3. Check the clutch release hub sliding section ② for damage or wear.

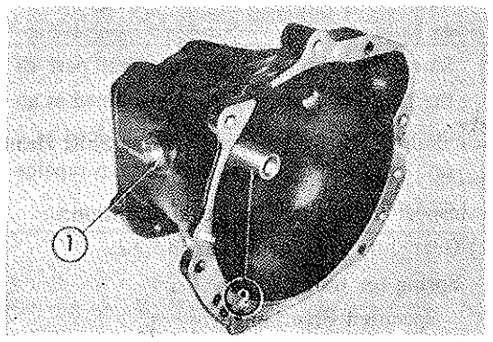


Fig. 2-115 Clutch Housing Check

4. Check each bore ③ which accommodates respective bearing for signs of damage or wear.

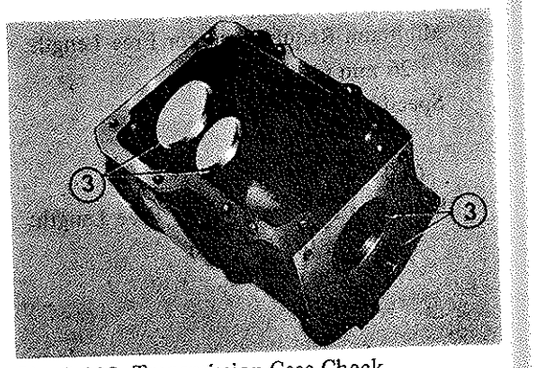


Fig. 2-116 Transmission Case Check

Transmission Case Cover Related Parts

1. Check each sliding surface for the fork shafts and shift head to see whether it shows any signs of damage, wear, or bend.
2. Inspect the case cover-to-shaft-contact area for damage or wear.
3. Check each ball for damage or wear.
4. Inspect each spring for weak condition.

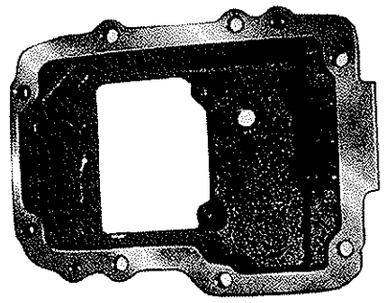


Fig. 2-117 Case Cover Check

Transfer Case

1. Check to see if any damage or wear is present at the area ① where the high and low shift fork shaft as well as the front drive shift fork shaft slides.
2. Check the balls, rollers, and springs for damage or wear.
3. Inspect the transfer case for cracks or damage.
4. Check each bore ② which accommodates respective bearing for signs of damage or wear.

Note

Since the front part and the rear part of the transfer case have been machined as an integral part, they should be repalced as a set, should it become necessary to repalce either one of them.

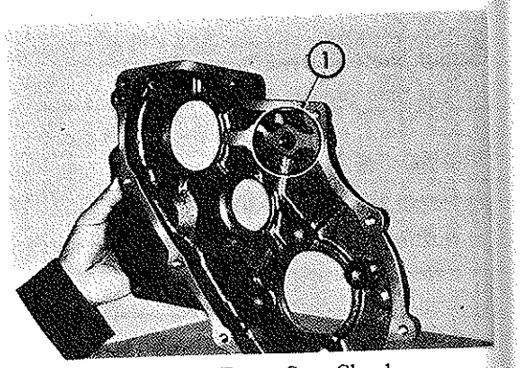


Fig. 2-118 Transfer Front Case Check

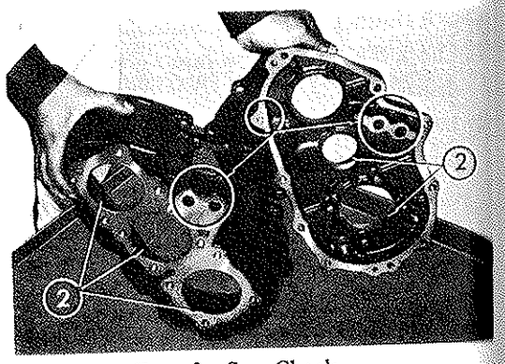


Fig. 2-119 Transfer Case Check

ASSEMBLY OF TRANSMISSION AND TRANSFER

Note

1. Prior to reassembly, thoroughly clean all parts of the transmission and transfer.
2. Discard the snap rings, lock nuts, etc. which have been removed from the transmission and transfer. Make sure to use new snap rings, lock nuts, etc. when reassembling.
3. Be sure that old gaskets are replaced with new ones. Apply the bond sealer to gasket surfaces. However, in instances where the Three Sheet Packing (brownish yellow color) is used, it is unnecessary to coat gasket with the bond sealer.
4. Make sure to apply gear oil to each sliding section of transmission and transfer components before they are reassembled.

Output Shaft Related Parts

1. Assemble the clutch hub No.1 and the clutch hub No.2.

Note

1. The hub and hub sleeve should be assembled in a correct direction.
2. The opening ends of the two key springs, located at the front and rear sides of the clutch hub, must not be positioned in the same direction.
3. Ensure that the hub sleeve slides smoothly on the hub.

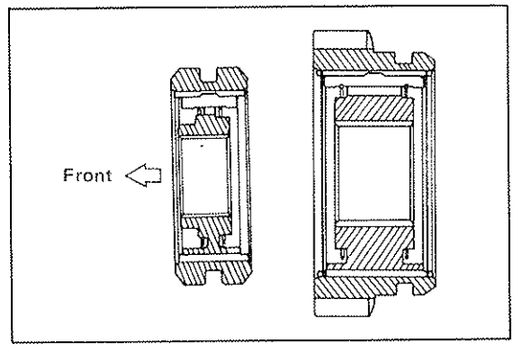


Fig. 2-120 Sub-Assembly of Clutch Hub

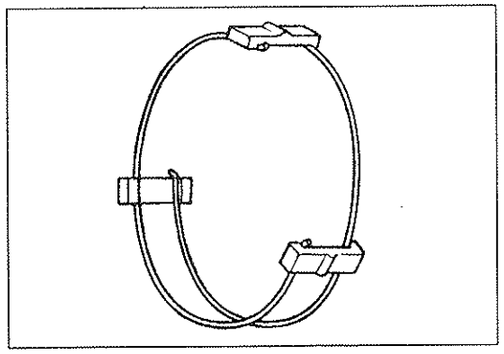


Fig. 2-121 Key Spring Installing Position

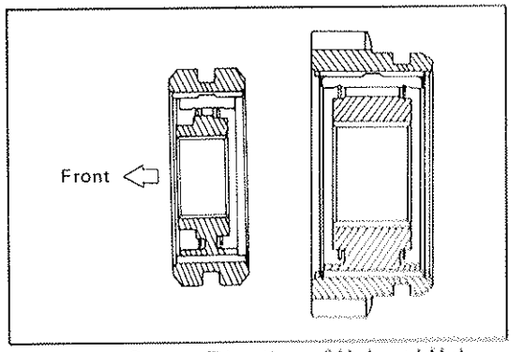


Fig. 2-122 Correct Direction of Hub and Hub Sleeve

2. Install the 3rd gear and clutch hub No.2 on the output shaft.
(1) Apply gear oil to the shaft and needle roller bearing.
(2) Place the synchronizer ring on the gear.
(3) Install the needle roller bearing in 3rd gear.
(4) Install the 3rd gear and clutch hub No.2.
(5) Using snap ring pliers, install the snap ring.

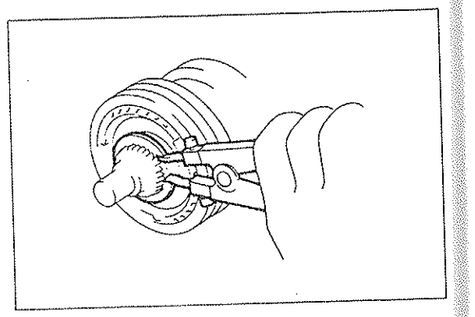


Fig. 2-123

(6) Measure the 3rd gear end play.
Specified End Play: 0.13 to 0.57 mm (0.0051 to 0.0224 inch)
Allowable limit: 0.60 mm (0.024 inch)

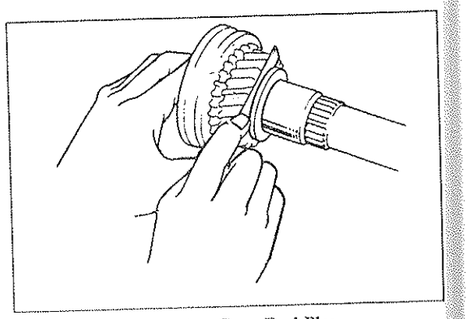


Fig. 2-124 Measuring Gear End Play

3-1. Install the 2nd gear and clutch hub No.1.
(1) Apply gear oil to the shaft and needle roller bearing.
(2) Place the synchronizer ring on the gear
(3) Install the needle roller bearing in the 2nd gear.
(4) Install the 2nd gear and clutch hub No.1.

Note
Care should be exercised to install the synchronizer ring correctly.

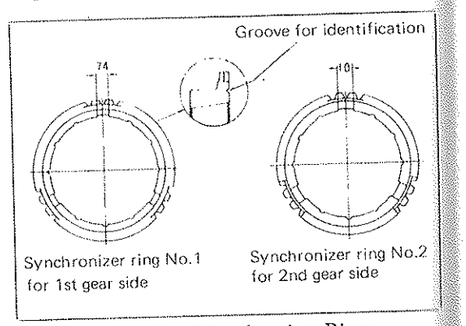


Fig. 2-125 Kinds of Synchronizer Rings

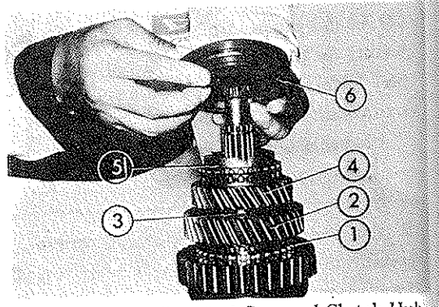


Fig. 2-126 Installing 2nd Gear and Clutch Hub No.1

3-2. Install the 1st gear.
(1) Apply gear oil to the inner race and needle roller bearing.
(2) Assemble the 1st gear, synchronizer ring, needle roller bearing and bearing inner race.
(3) Install the assembly on the output shaft.

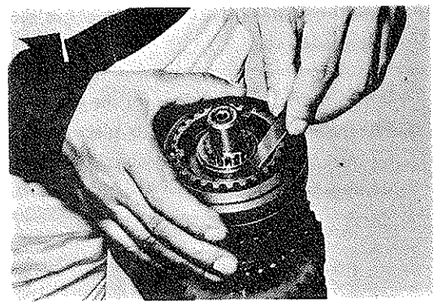


Fig. 2-127 Measuring End Play

3-3. Measure the end play of each gear.
Specified End Play:
1st Gear: 0.12 to 0.28 mm (0.0047 to 0.0110 inch)
2nd Gear: 0.10 to 0.30 mm (0.0039 to 0.0118 inch)
3rd Gear: 0.13 to 0.57 mm (0.0051 to 0.0224 inch)

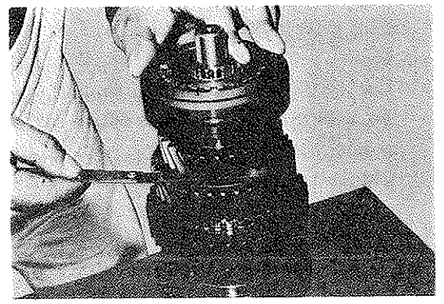


Fig. 2-128 Measuring End Play

Assembly of Transmission Case Related Parts

1. Install the reverse idler gear in the transmission case, by inserting the reverse idler gear shaft from the rear side of the transmission case.

Note
1. The reverse idler gear should be positioned in such a direction that the fork groove comes to the rear side of the case.
2. Assure that the reverse idler gear can slide and turn smoothly.
3. Make sure to set the reverse idler gear shaft in order that the cut-out section assumes the position as shown in Fig.

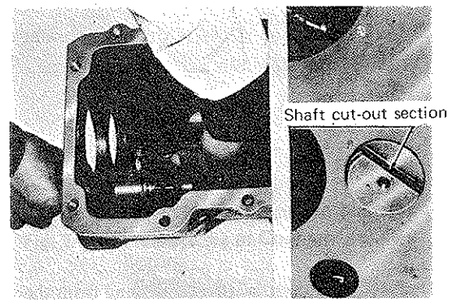


Fig. 2-129 Installing Reverse Idler Gear

4. Place the counter shaft sub-assembly in the transmission case.

> Note
> The front and rear bearings for the counter shaft should be pressed into place, only after the output shaft has been mounted in the transmission case.

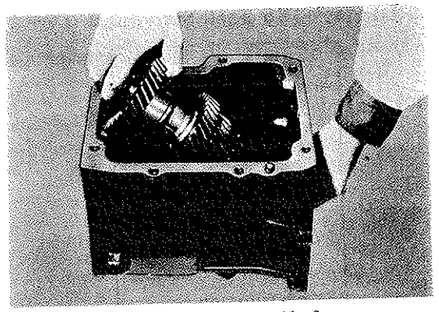


Fig. 2-130 Installing Counter Shaft

5. Install the output shaft clustered with various gears in the transmission case as follows:
(1) Place the output shaft in the transmission case, with the rear end of the output shaft inserted first into the case.
(2) Hold the transmission hub sleeve to prevent it from moving, while the output shaft is being inserted into position.

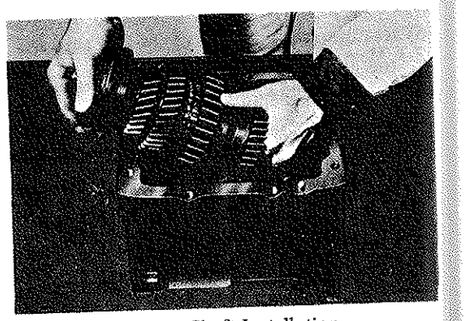


Fig. 2-131 Output Shaft Installation

6. When pressing the output shaft rear bearing into position, insert a synchronizer ring holder (Special Tool No.09338-87301) into the transmission sleeve in order to prevent the transmission hub sleeve from moving.

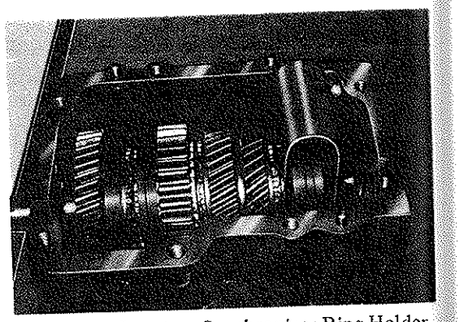


Fig. 2-132 Inserting Synchronizer Ring Holder

7. Place the output shaft rear bearing from the rear end of the transmission case. Proceed to press the bearing into place, Using Special Tool. (Special Tool No. 09314-87304, 09309-87301)

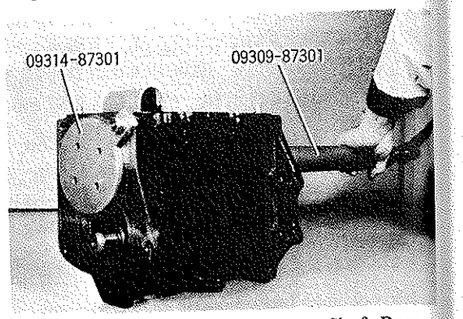


Fig. 2-133 Press-Fitting of Output Shaft Rear Bearing

8. Install the input shaft in the transmission case as follows:
(1) Install the needle roller bearing and synchronizer ring No.2 on the input shaft. Place the input shaft in the transmission case in such a way that the cut-out section provided on the spline faces toward the bottom.
(2) Install the input shaft in position. (Special Tool No. 09310-87302)

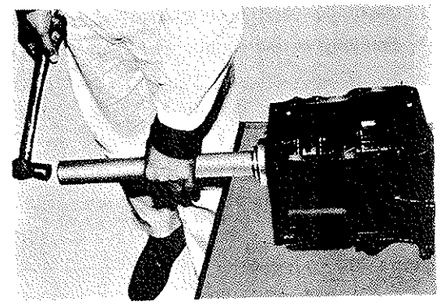


Fig. 2-134 Press-Fitting of Input Shaft

9. Install the counter shaft into position as follows:
(1) Press the counter gear front bearing into place, using a counter shaft front bearing replacer (Special Tool No.09310-87302).

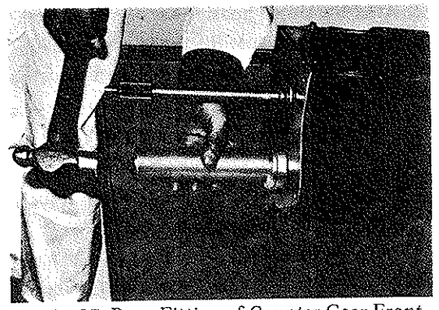


Fig. 2-135 Press-Fitting of Counter Gear Front Bearing

(2) Press the counter gear rear bearing into place, using a counter shaft rear bearing replacer (Special Tool No.09310-87302).

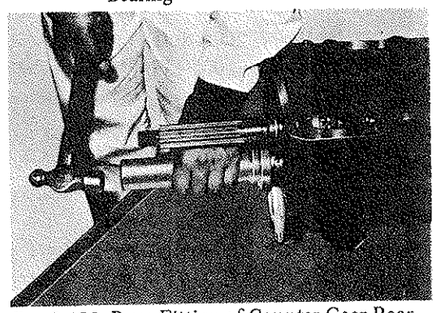


Fig. 2-136 Press-Fitting of Counter Gear Rear Bearing

10. Attach the clutch housing to the transmission case, with the gasket in place.
Tightening Torque: 5.0 to 8.0 Kg-m (36.2 to 57.9 ft-lbs)

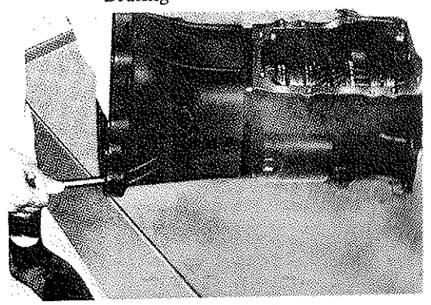


Fig. 2-137 Attaching Clutch Housing

11. Install the snap ring on the rear end of the counter gear shaft.

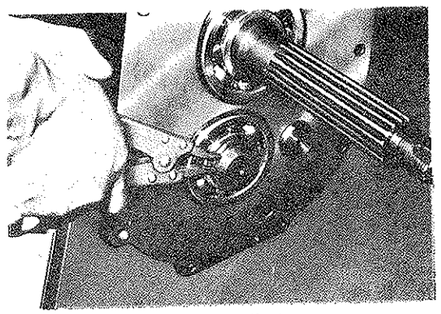


Fig. 2-138 Snap Ring Installation

12. After the clutch housing has been mounted, proceed to measure the thrust clearance of each gear. And check to see if these thrust clearances meet the specifications.

Clutch Housing Tightening Torque:
5.0 to 7.0 Kg-m
(36.2 to 50.6 ft-lbs)

Specified Thrust Clearances
1st Gear: 0.12 to 0.28 mm
(0.0047 to 0.0110 inch)
2nd Gear: 0.10 to 0.30 mm
(0.0039 to 0.0118 inch)
3rd Gear: 0.13 to 0.57 mm
(0.0051 to 0.0224 inch)

Allowable Limit
1st Gear: 0.35 mm (0.0138 inch)
2nd Gear: 0.35 mm (0.0138 inch)
3rd Gear: 0.6 mm (0.0236 inch)

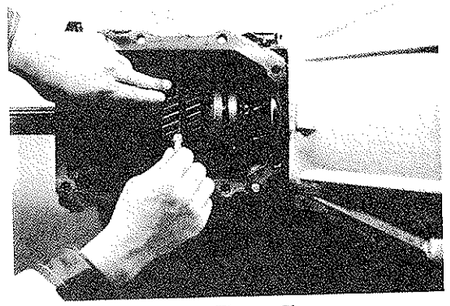


Fig. 2-139 Measuring Thrust Clearances

13. Measure Backlash (Except Reverse Gear)

Specified Backlash (Except Reverse Gear)
0.06 to 0.20 mm
(0.0024 to 0.0079 inch)
Allowable Limit of End Play
(Except Reverse Gear)
0.25 mm (0.0098 inch)
Specified Backlash (Reverse Gear Only)
0.08 to 0.28 mm
(0.0031 to 0.0110 inch)
Allowable Limit of End Play
(Reverse Gear Only)
0.33 mm (0.0130 inch)

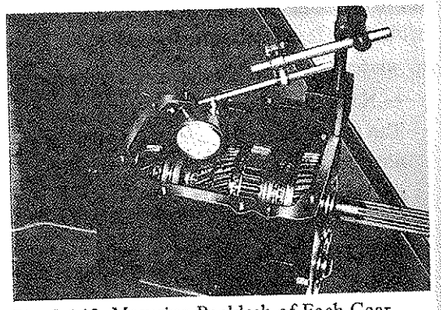


Fig. 2-140 Mesuring Backlash of Each Gear

Assembly of Transfer Related Parts

14. Attach the transfer front case with the gasket placed at the rear end of the transmission case, following the procedure given below:

(1) Install the oil seal and bearing in the transfer front case.

Note
The oil seal should be press-fitted in a correct direction.

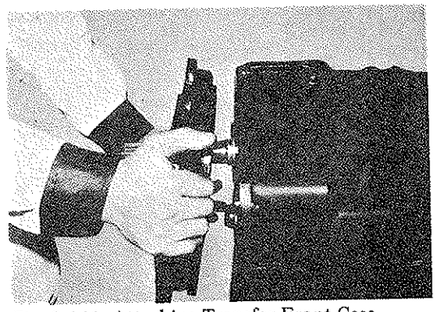


Fig. 2-141 Attaching Transfer Front Case

(2) When the transfer front case is attached to the transmission case, care should be taken to ensure that the gasket stays at a correct position. Tighten the attaching bolts in the sequence indicated in Fig.

Tightening Torque: 3.0 to 5.0 Kg-m
(21.7 to 36.2 ft-lbs)

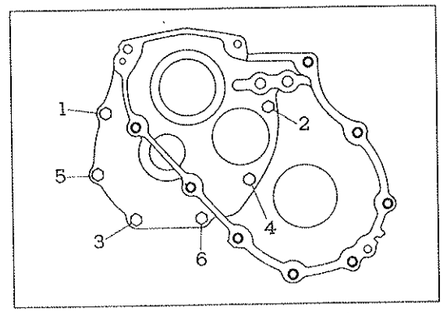


Fig. 2-142 Attaching Transfer Front Case

15. Install various transfer gears on the output shaft as follows:

(1) Mount the low clutch sleeve ② on the transfer high and low clutch hub ①.

Note
The hub and sleeve may be installed in either direction.

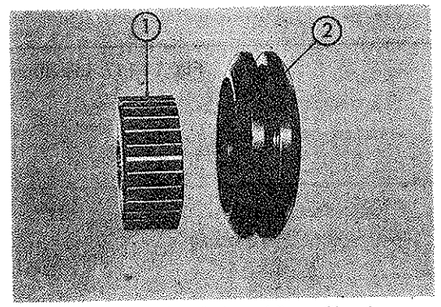


Fig. 2-143 Transfer High and Low Clutch Hub Installation

(2) In the same manner, mount the transmission hub No.2 sleeve (2) on the transfer front drive clutch hub ①.

Note
The sleeve should be installed in a correct direction only. The side which bears a groove for identification purpose must face toward the front.

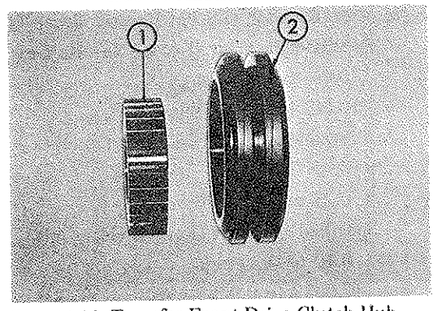


Fig. 2-144 Transfer Front Drive Clutch Hub Installation

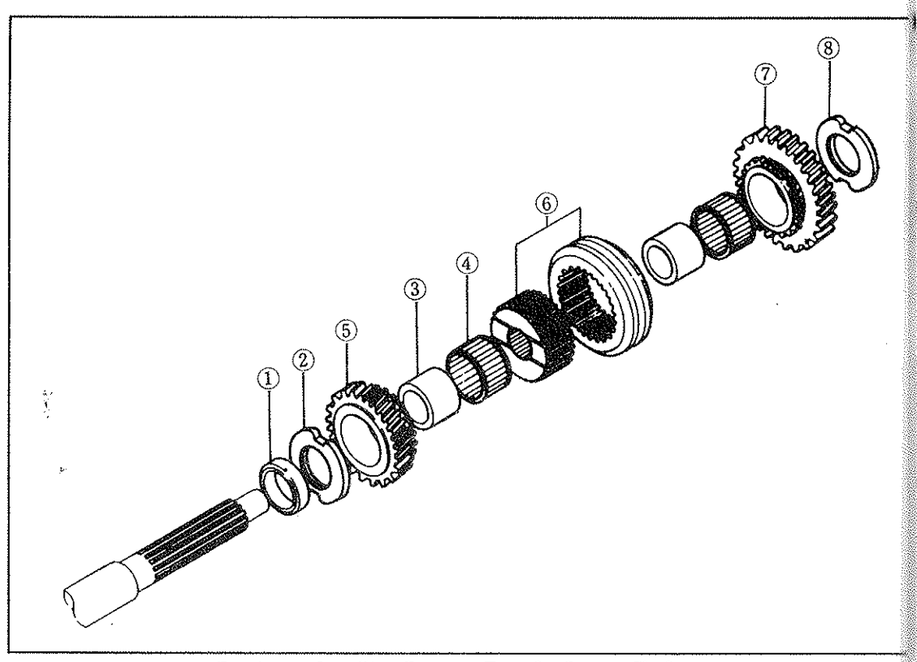


Fig. 2-145 Installing Gears on Transfer Output Shaft

(3) Mount the following parts enumerated below onto the output shaft from its rear end: the transfer input shaft No.1 spacer ①, transfer input gear thrust washer ②, transfer input bearing inner race ③, needle roller bearing ④, transfer low-speed input gear ⑤, transfer high and low clutch hub sub-assembly ⑥, transfer high-speed input gear sub-assembly ⑦, and transfer input gear thrust washer ⑧.

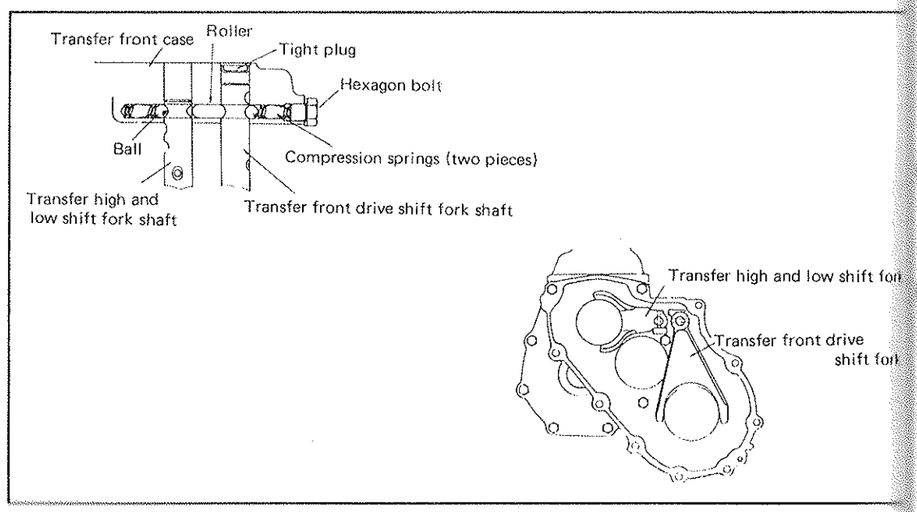


Fig. 2-146 Shift Fork Shaft Installation

(6) To facilitate the assembly operation, turn the transmission and transfer case sideways. Proceed to install the shift fork shafts in the transfer case.

(1) Installation procedure for shift fork shafts:

(a) Install the compression spring into position through the groove provided in the transfer front case. Furthermore, place the ball upon the spring. Fit the transfer high and low shift fork into the groove of the high and low clutch hub. After inserting through the clutch hub, slightly place the shift fork shaft into the transfer case.

(b) While applying a force upon the ball through the groove of the transfer case, insert the shift fork shaft into position.

(c) Mount the transfer idler gear in the case.

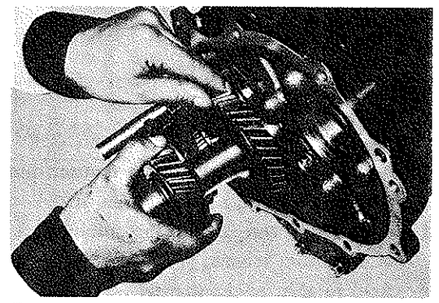


Fig. 2-147 Installing Idler Gear

(d) Install the following parts into the transfer front case.
① Output rear shaft
② Hub sleeve
③ Needle roller bearing
④ Output front shaft

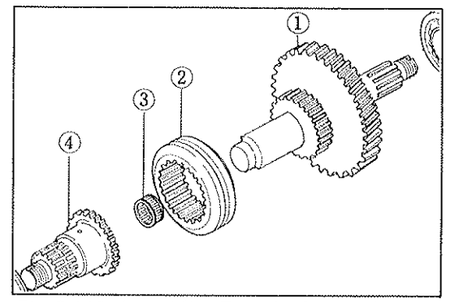


Fig. 2-148 Assembling Transfer Output Rear Shaft

(e) Fit the front drive shift fork into the groove of the clutch hub. After inserting through the clutch hub, install the shift fork shaft into the transfer case.

(f) Install the ball and compression spring into place through the groove of the transfer case. Secure them, by tightening the hexagon bolt.

Tightening Torque: 3.0 to 5.0 Kg-m (21.7 to 36.2 ft-lbs)

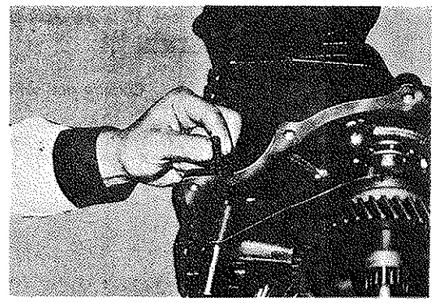


Fig. 2-149 Installing Compression Spring

(g) Drive the slotted spring pin into position in order to lock the shift fork shaft and shift fork.

(h) Fit the torsion spring onto the high and low shift fork shaft, as shown in Fig.

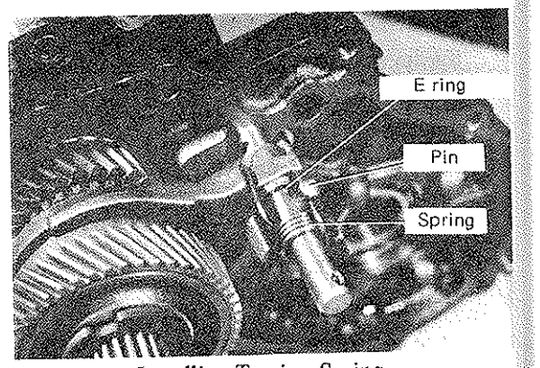


Fig. 2-150 Installing Torsion Spring

17. Assemble the front part of the transfer case as follows:

(1) Press the oil seal ② into the output shaft bearing front retainer ①. Then, attach the front retainer to the transfer front case.

Tightening Torque: 3.0 to 4.5 Kg-m (21.7 to 32.5 ft-lbs)

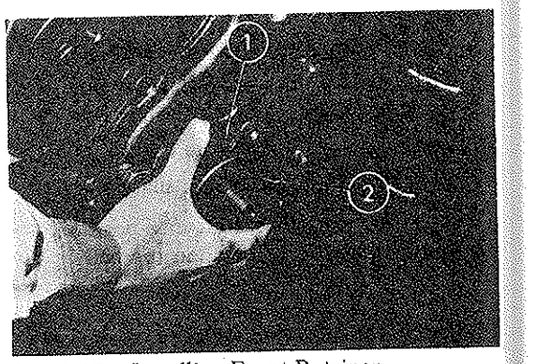


Fig. 2-151 Installing Front Retainer

(2) Install the transfer output shaft front flange sub-assembly onto the transfer output front shaft, by sliding it over the spline located on the output front shaft. Install the plate washer and secure them with the lock nut.

Note

It should be noted that the lock nut is lefthand threaded.

Lock Nut Tightening Torque: 15 to 20 Kg-m (108.5 to 144.7 ft-lbs)

Note

When the lock nut is to be tightened, make sure to engage the two gears at the same time so as to prevent the shaft from being rotated.

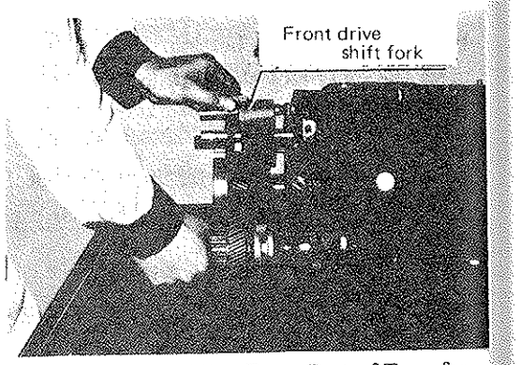


Fig. 2-152 Assembling Front Part of Transfer Case

18. Attach the transfer case to the front case with the case gasket in place, following the procedure given below:

(1) When installing the transfer case into position, line up the shift fork shafts, locating pins and so forth.

(2) As the transfer high and low shift fork shaft is comparatively long, it may protrude out from the case, when it is assembled.

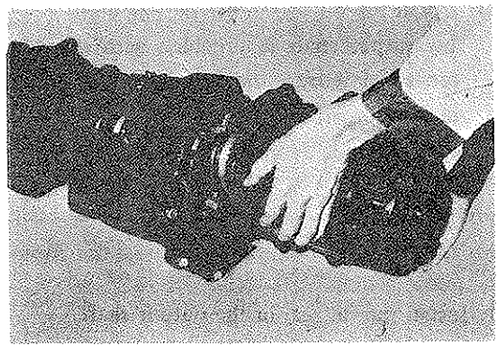


Fig. 2-153 Transfer Case Installation

(3) Torque the transfer case in the sequence shown in Fig.

Tightening Torque: 3.0 to 5.0 Kg-m (21.7 to 36.2 ft-lbs)

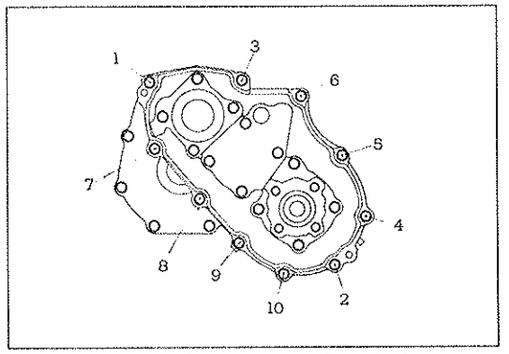


Fig. 2-154 Transfer Case Attaching Bolt Tightening Sequence

19. Install the following bearings in the transfer case.

Note

When installing the bearing, be sure to press the inner race alone. Do not apply a force upon the outer race.

(1) The bearing ① for transfer input rear use.

(2) The bearing ② for transfer output rear use.

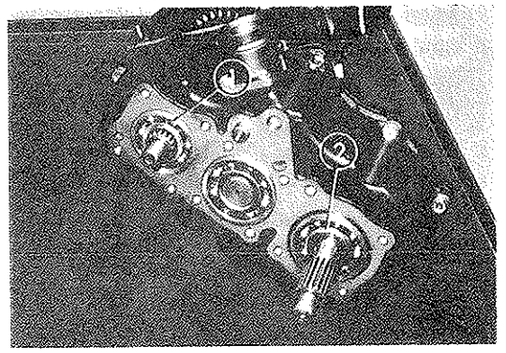


Fig. 2-155 Installing Transfer Case Bearings

20. Install the following parts listed below on the transfer output rear shaft: the spacer ①, speedometer drive gear ②, and "O" ring ③.

Note

The output shaft is provided with a ball groove. Moreover, the speedometer drive gear is provided with a groove which accommodates the ball.

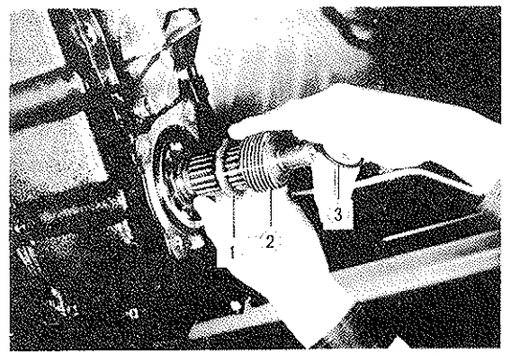


Fig. 2-156 Installing Speedometer Drive Gear

21. Install the oil seal in the output shaft bearing rear retainer. Then, attach the retainer to the transfer case with the gasket in place.
    Tightening Torque: 3.0 to 4.5 Kg-m (21.7 to 32.5 ft-lbs)

> Note
> The sealing bolts should be used for this purpose.

22. While turning the transfer output rear shaft, insert the speedometer driven gear sub-assembly and speedometer shaft sleeve into the output shaft bearing retainer. Secure them by tightening the lock plate setting bolt.
    Tightening Torque: 0.6 to 0.9 Kg-m (4.3 to 6.5 ft-lbs)

> Note
> Be certain to apply grease to the driven gear shaft, the interior of the speedometer shaft sleeve, and its "O" ring.

23. Install the spacer No.2 and No.3 into the input shaft.
    Using Special Tool (No. 09330-87301), Tighten the lock nut.
    Torque: 10.0 to 14.0 Kg-m (72.3 to 101.3 ft-lbs)

24. Attach the transfer case cover, with the gasket in place.
    Torque: 3.0 to 4.5 Kg-m (21.7 to 32.5 ft-lbs)

Fig. 2-157 Installing Output Shaft Bearing Rear Retainer

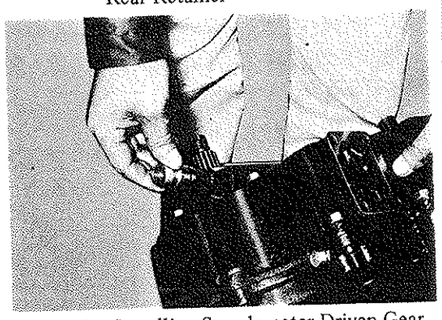


Fig. 2-158 Installing Speedometer Driven Gear

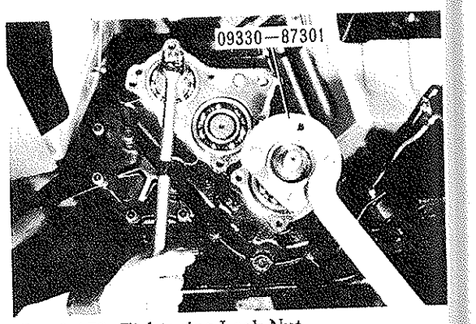


Fig. 2-159 Tightening Lock Nut

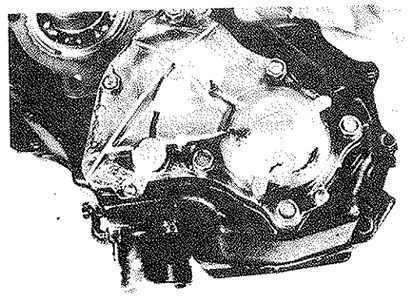


Fig. 2-160 Installing Transfer Case

25. Install the parking brake assembly with four bolts.
    Torque: 3.0 to 5.0 Kg-m (21.7 to 36.2 ft-lbs)

26. Install the companion flange into the parking brake.

> Note
> 1. The deflector should be installed such that the projected side faces downward.
> 2. The haxagon socket head cap bolts should be used here. For this tightening operation, it is recommended to use a hollow setting bit which is available commercially.

27. Mount the parking brake drum in place. Place the plate washer and screw the lock nut. After the lock nut has been tightened securely, stake the lock nut's edge in position.
    Tightening Torque: 10.0 to 14.0 Kg-m (72.3 to 101.3 ft-lbs)

28. Attach the transfer shift lever retainer sub-assembly to the transfer case with the gasket in place.
    Tightening Torque: 1.0 to 1.6 Kg-m (7.2 to 11.6 ft-lbs)

> Note
> The sealing bolts should be used for this purpose.

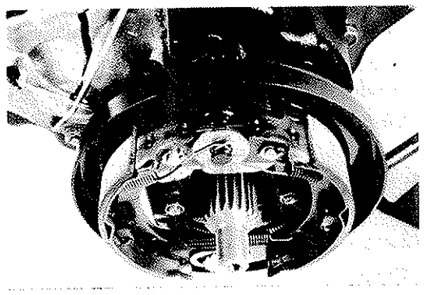


Fig. 2-161 Attaching Parking Brake

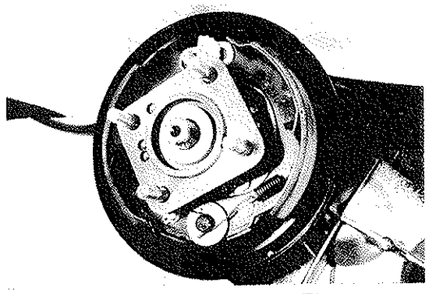


Fig. 2-162 Installing Companion Flange

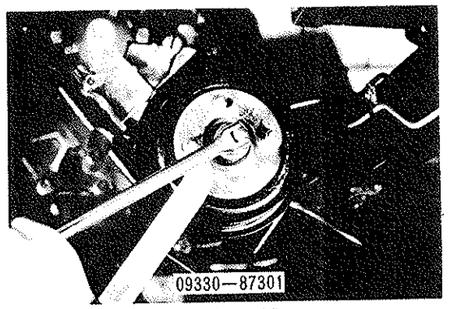


Fig. 2-163 Tightening Lock Nut

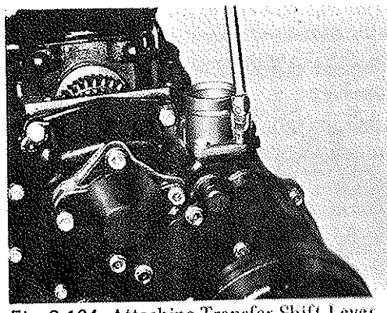


Fig. 2-164 Attaching Transfer Shift Lever Retainer

CASE COVER RELATED PARTS

1. Assemble the reverse shift head as follows:
(1) Fit the E ring to the plunger ①.
(2) Install the compression spring ② in place.
(3) While pressing the compression spring, install the snap ring ③.
(4) Place the ball ④. While pressing the spring ⑤, fit the cotter pin ⑥.

Note
Ensure that the plunger slides smoothly.

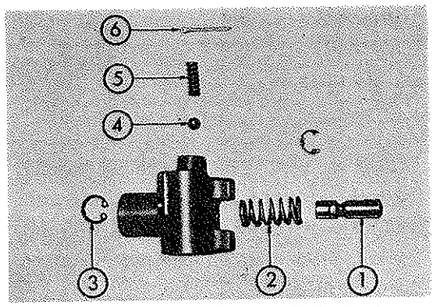
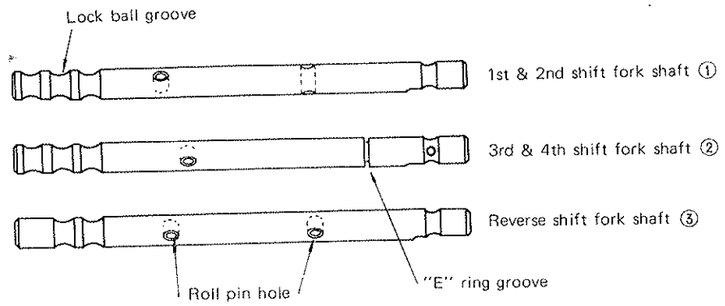


Fig. 2-165 Assembling Reverse Shift Head

2. Install the 1st and 2nd shift fork shaft, following the procedure given below:



Part \ Identification	No. of lock ball groove	Roll pin hole	"E" ring groove
1	3	2	None
2	3	1	Yes
3	2	2	None

(1) Install the reverse shift arm ① and reverse shift fork ② in the case cover.
(2) Install the 1st and 2nd shift fork shaft ③ in the case cover. Then, place the shift fork ④ and shift head ⑤ onto the shift fork shaft.
(3) Install the spring ⑥ and ball ⑦ into position. While pressing them from the above, install the shift fork shaft.
(4) Drive the slotted spring pin into place.

Note
Make sure to install the shift head and shift fork in a correct direction, respecively.

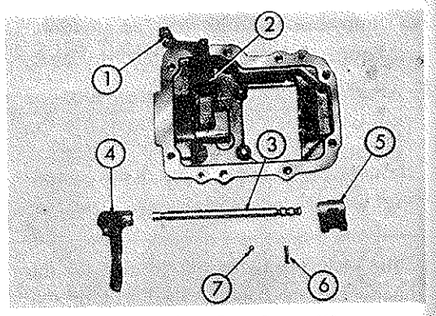


Fig. 2-166 Assembling Case Cover (1)

3. Install the roller into place from the side of the case.
4. Install the 3rd and 4th shift fork shaft, following the procedure given below:
(1) Position the spring ① and ball ② in the case cover.
(2) Install the interlock pin ③ on the shaft.
(3) Install the shaft in the case cover and fit the shift fork ④ on the shaft. Drive the slotted spring pin into place. Further, fit the E ring onto the shaft.
5. Install the reverse shift fork shaft, following the procedure given below:
(1) Insert the reverse shift fork shaft into position from the side of the roller case cover.
(2) Place the spring ① and ball ② in the case cover.
(3) Insert the shaft into the case cover. Place the reverse shift fork ③ and reverse shift head sub-assembly ④ onto the shaft. Drive the slotted spring pin into position.

Note
Be sure to install the reverse shift head in a correct direction only.

6. Drive the tight plug into the case cover.

Note
1. Prior to assembly, be sure to coat the tight plug with the bond sealer.
2. After the three shift fork shafts have been installed, place the 1st and 2nd shift fork shaft in the 2nd position. Ensure that the reverse shift fork shaft is inoperative.

7. Mount the back-up lamp switch ① and shift switch ③ in place. Install the control shift lever retainer sub-assembly ② on the case cover, with the gasket interposed between them.
8. Move each fork to see whether the interlocking mechanism functions properly.
9. Mount the case cover assembly on the transmission case.

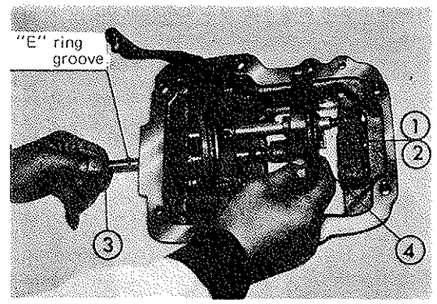


Fig. 2-167 Assembling Case Cover (2)

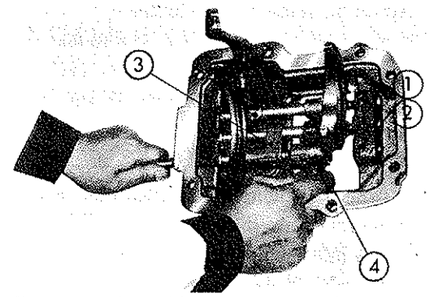


Fig. 2-168 Assembling Case Cover (3)

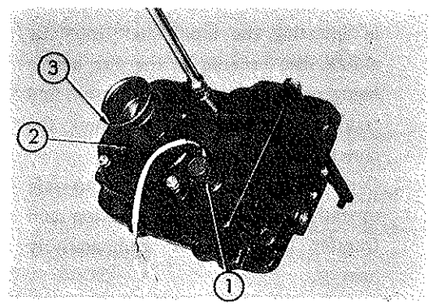


Fig. 2-169 Installing Shift Lever Retainer

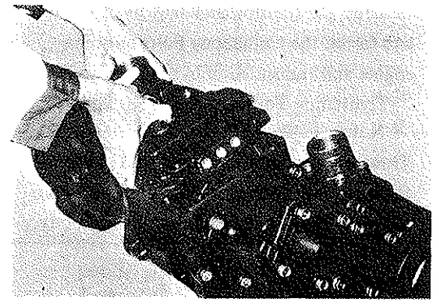


Fig. 2-170 Mounting Case Cover

Transmission and Transfer Installation

1. Prior to installation, refill the transmission and transfer with the gear oil.
   Transmission Oil Capacity: 2.0 liters
   Transfer Oil Capacity: 1.4 liters

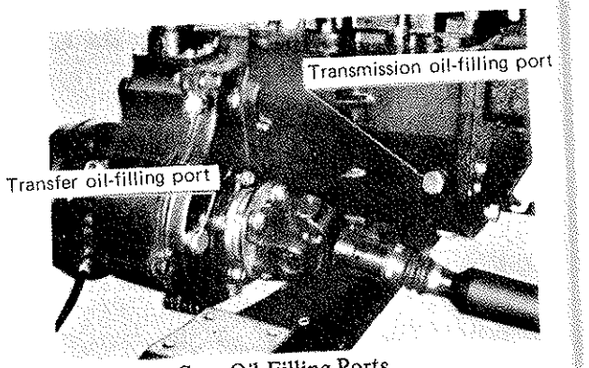


Fig. 2-171 Gear Oil-Filling Ports

2. Attach the transmission with the cross-member No.2 mounted on it to the engine, using a transmission jack and the connecting bolts should be attached and fastened temporarily by hand.

Note
1. While installing the transmission and transfer make sure that the clutch disc is not pried by the input shaft, resulting in the disc being moved to an off-center position.
   If any difficulty should be encountered in inserting the input shaft into the clutch disc because of the disc having being pried, lower the transmission and transfer assembly and remount the clutch disc.
2. Care should be exercised as to safe operation since the transmission and transfer assembly is comparatively heavy.

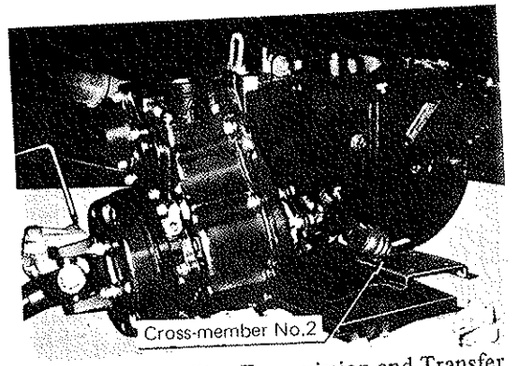


Fig. 2-172 Installing Transmission and Transfer with Transmission Jack

3. Descend the transmission Jack by 120 mm and fasten the connecting bolts between engine and transmission byspecified torque.
   Tightening Torque: 3.0 ~ 5.0 kg-m

Note
Three upper bolts should be fastened though transmission cover hole and two left and right bolts from under the body.

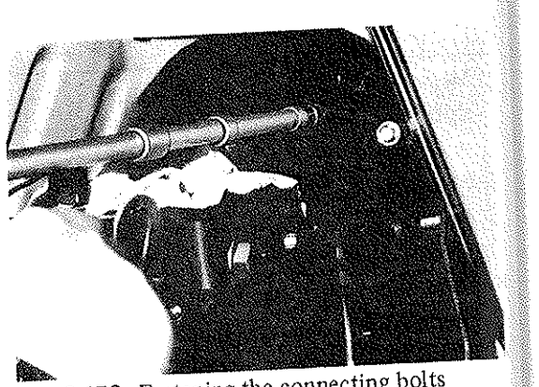


Fig. 2-173 Fastening the connecting bolts between engine and transmission

4. Connect the front and rear propeller shafts. On both the front and rear propeller shafts, the sleeve yoke side should be attached to the transfer side.
   Tightening Torque: 6.0 to 8.0 Kg-m
   (43.4 to 57.9 ft-lbs)

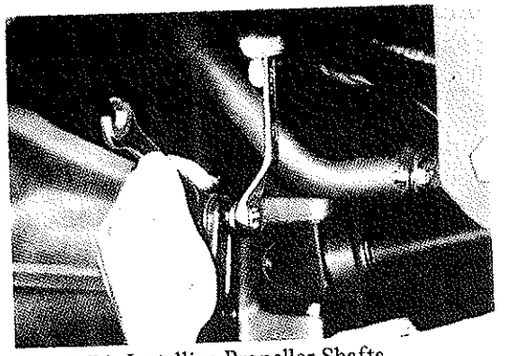


Fig. 2-174 Installing Propeller Shafts

5. Apply grease to the grease fitting at each sleeve yoke of the universal joints.
6. Fit the shift levers for the transmission and transfer.
7. Check the parking brake for proper amount of working travel. Carry out the adjustment, as required.
8. With the vehicle placed on a level floor, recheck the oil levels for the transmission and transfer. If the oil level is low, add the gear oil up to the specified level, respectively. Refer to the paragraph 1 above.
9. Check to see if the back-up lamp switch and shift switch function properly.
10. Check to see whether the clutch disengages the power properly. Furthermore, check the clutch for proper free travel.
11. Take a road test. Ensure that the synchromesh mechanisms function properly. Also, assure that no unusual noise is emitting from the bearings, gears and so forth.
12. Check various parts of the transmission and transfer to ensure that they exhibit no oil leaks.

DAIHATSU
4 WHEEL DRIVE

SECTION 3
PROPELLER SHAFTS

DESCRIPCION

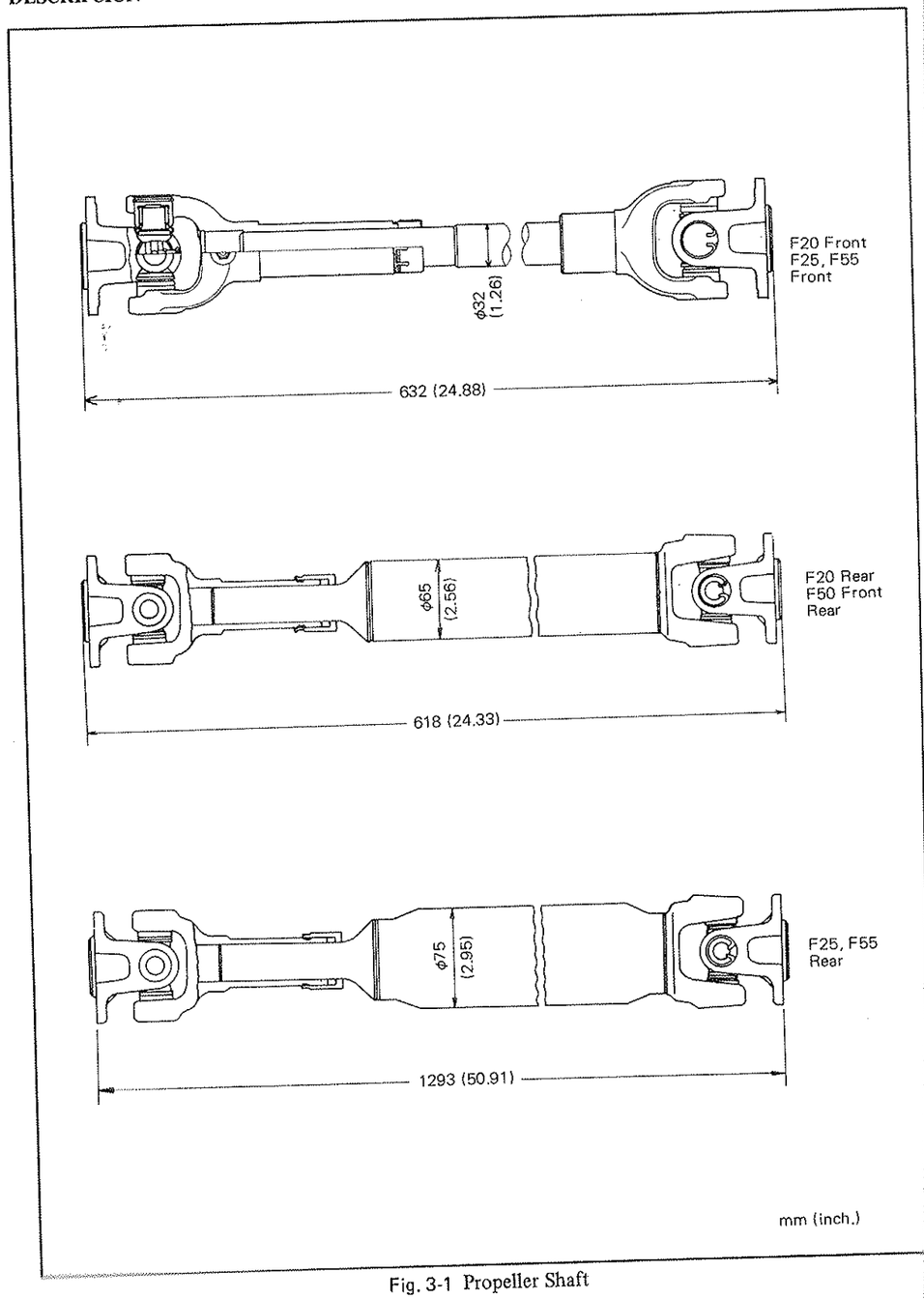


Fig. 3-1 Propeller Shaft

The propeller shaft of Model F 50 and F 20 Series employs a hollow tube made of a carbon steel for use in machinery structure that has high resistance to torsion as well as to bending. A gasket is provided at the sliding section so as to prevent muddy water from entering into the spline section.

Front and rear universal joints are of the spider type which incorporates needle rollers. Those universal joints have been designed such that they are sufficiently capable of withstanding any stress due to change in the transmission-differential relationship that is caused by various fluctuations in torque or revolution speed.

If there should be any unbalance in the rotational weight of the propeller shaft, it would reduce greatly vehicle performance. Therefore, the whole propeller shaft has been balanced dynamically at the factory in its assembled condition.

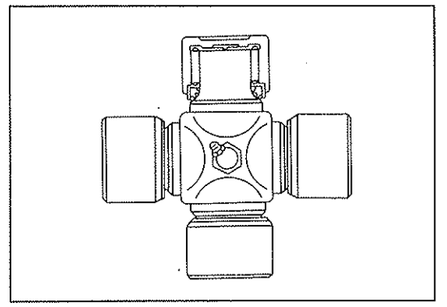


Fig. 3-2 Universal Joint

PROPELLER SHAFTS

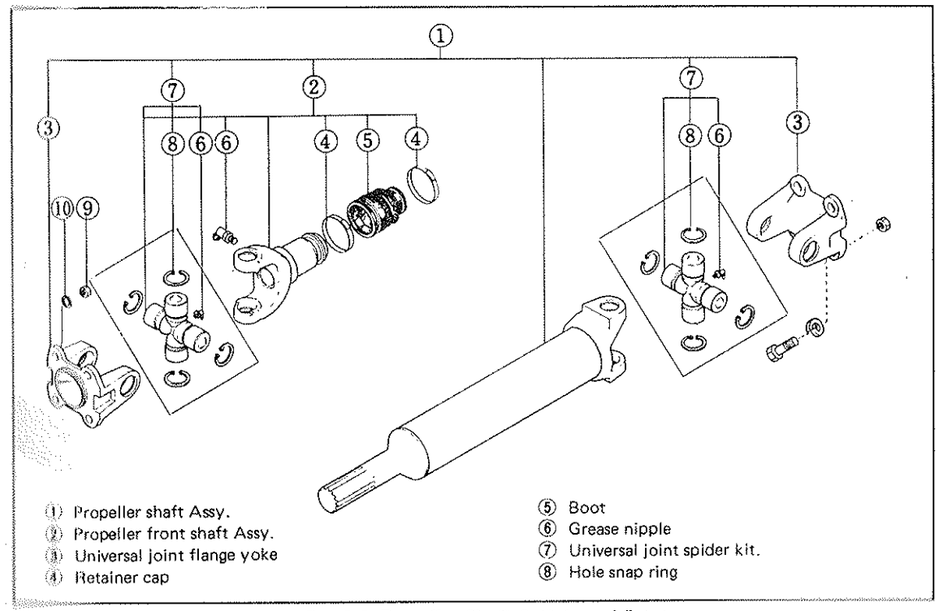


Fig. 3-3 Propeller Shaft & Universal Joint

Removal . . . . Front (Rear) Side

1. Jack up the vehicle at its front (rear) part and support the axle housing with rigid racks.
2. Remove the four bolts that attach the universal joint flange yoke of the propeller shaft to the drive pinion companion flange of the differential.

Fig. 3-4 Front Propeller Shaft Removal (Transfer Side)

3. Remove the four bolts (nuts) that attach the universal joint flange yoke of the propeller shaft to the universal joint flange of the transfer (parking brake drum)

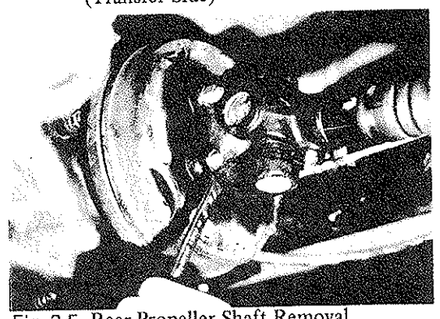


Fig. 3-5 Rear Propeller Shaft Removal (Parking Brake Drum Side)

Disassembly

1. Using a center punch or the like, stamp a mate mark on the universal joint yoke and universal joint flange yoke, respectively.

> Note
> Such mate marks should be stamped so as not to disturb dynamic balance which has been taken as a complete propeller shaft assembly.

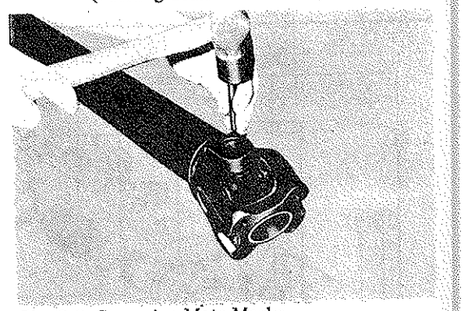


Fig. 3-6 Stamping Mate Marks

2. Remove the universal joint flange yoke from the propeller shaft as follows:

(1) Remove the grease nipple (fitting).

(2) Remove the two snap rings provided at the universal joint yoke of the propeller shaft.

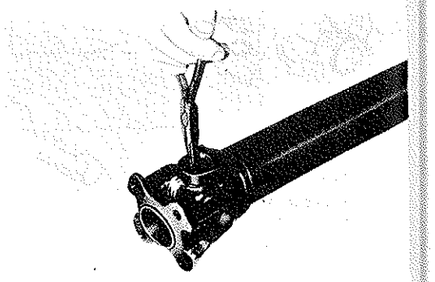


Fig. 3-7 Removing Snap Rings

(3) Prepare a 19 mm socket wrench and a vice. Place the socket wrench. Push the spider bearing cup A at the joint yoke side so that the spider bearing cup B is pressed off through the spider.

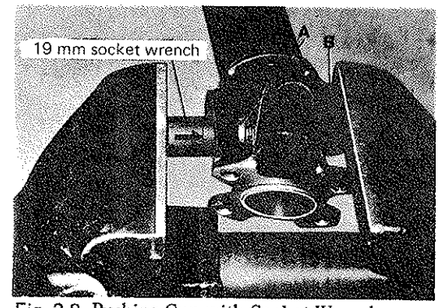


Fig. 3-8 Pushing Cup with Socket Wrench

(4) Lightly tap the spider bearing cup, using a drift rod or the like, until the spider bearing cup is pushed out slightly.

> Note
> Be sure not to drive the cup out too much. The cup should be pushed out only to such extent that it can be still held with the vice.

(5) Clamp the thus-driven-out spider bearing cup in the vice. Using a hammer or the like, lightly tap the propeller shaft so as to drive the spider bearing cup off from the propeller shaft.

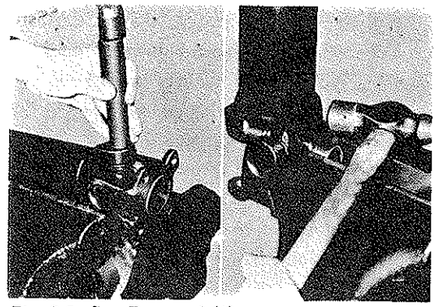


Fig. 3-9 Cup Removal (1)

(6) Using the socket wrench in conjunction with the vice, push the spider so that the spider bearing cup at the other side is pushed out. Then, slightly drive the spider bearing cup with a drift rod or the like. Remove the spider bearing cup, by clamping it in the vice. Proceed to take the universal joint flange yoke out from the propeller shaft.

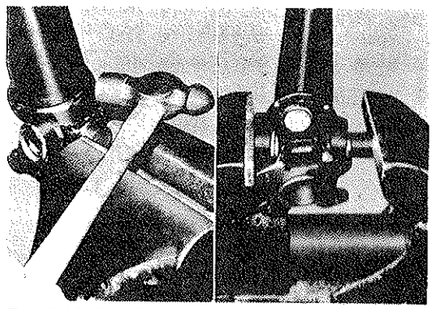


Fig. 3-10 Cup Removal (2)

3. Remove the spider from the universal joint flange yoke as follows:
(1) Remove the two snap rings from the universal joint flange yoke.

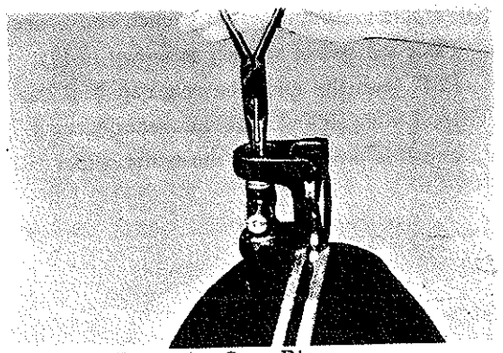


Fig. 3-11 Removing Snap Rings

(2) Push the spider bearing cup C, using 19 mm and 30 mm socket wrenches, one each, in conjunction with a vice. Lightly clamp the pushed-out spider bearing cup at the other side in the vice. Tap the universal joint flange yoke with a hammer in order to drive the spider bearing cup off the universal joint flange yoke.

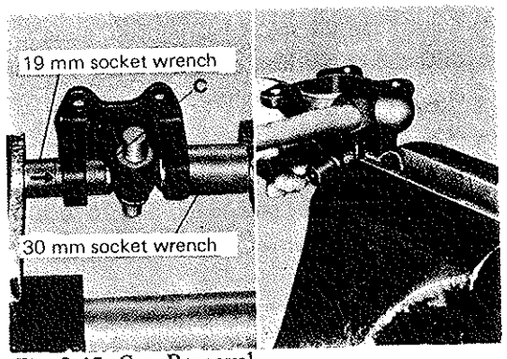


Fig. 3-12 Cup Removal

(3) Push the spider, using 19 mm and 30 mm socket wrenches, one each, in conjunction with a vice. Lightly clamp the pushed-out spider bearing cup D in the vice. Tap the universal joint flange yoke with a hammer in order to drive the spider bearing cup off the universal joint flange yoke.

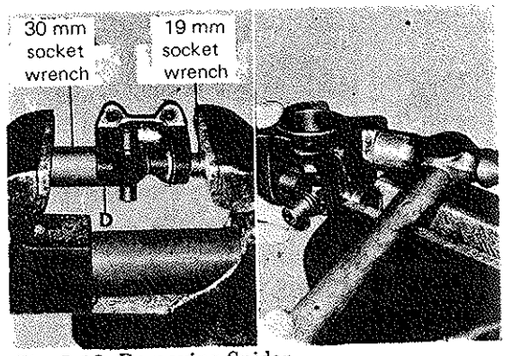


Fig. 3-13 Removing Spider

4. Disassemble the universal joint sleeve side of the propeller shaft, following the same procedure outlined above.

5. Remove the cover from the spider bearing cup. Take out the rollers in the cup.

Inspection and Repair
Inspect the disassembled parts. Replace any defective parts, as required.

Propeller Shaft
1. Check the propeller shaft for damage or bend.
Allowable Limit of Bend: 0.5 mm (0.020 inch)

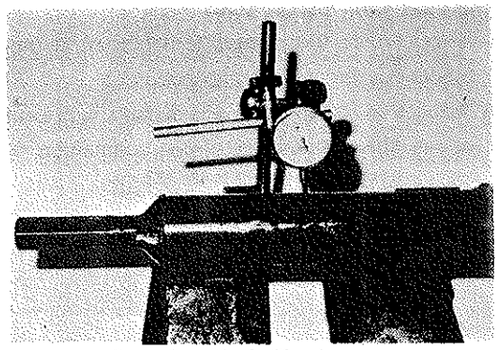


Fig. 3-14 Propeller Shaft Check

2. Inspect the spider bearing cup-fitting section for damage.
3. Check the propeller shaft sliding shaft section to see whether its spline exhibits any damage or wear, as follows:
Fit the universal joint sleeve onto the propeller shaft sliding shaft spline. Ensure that the spline exhibits no looseness in a rotational direction, but the sleeve can slide freely in an axial direction on the spline.

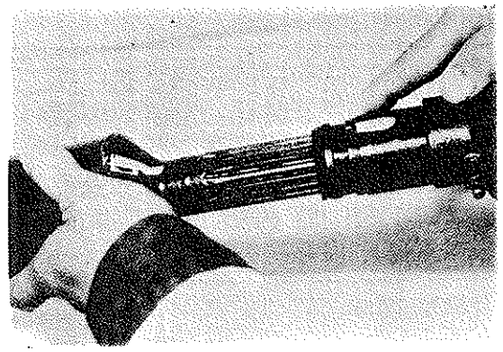


Fig. 3-15 Checking Spline

Spider and Spider Bearing
1. Check the spider journal ① for damage or wear.
2. Check the cover ② for defect.
3. Inspect the rollers ③ for damage or wear.
4. Check the cup ④ for damage or wear.

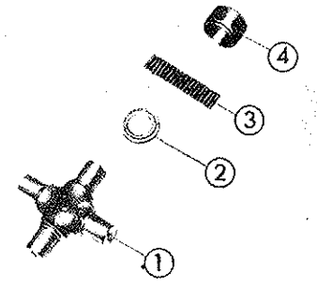


Fig. 3-16 Spider Bearing Check

Universal Joint Sleeve Yoke
1. Check to see if any damage is present at the spider bearing cup fitting section ①.
2. Check the expansion plug ② to see if it is seated properly.

> Note
> To obtain oil sealing, the expansion plug is staked into position, after it has been tapped at the edges around the circumference.

3. Check the retainer cap for proper mounting.

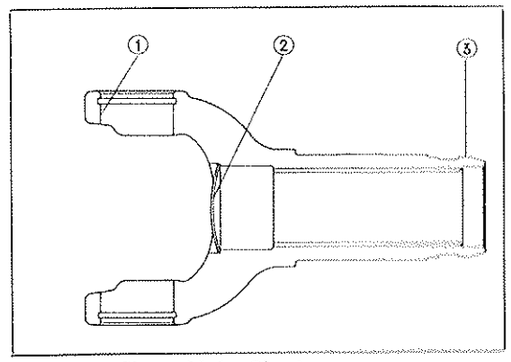


Fig. 3-17 Sleeve Yoke Check

Universal Joint Flange Yoke

1. Check to see if any damage is present at the spider bearing cup fitting section ①.
2. Inspect to see whether any damage is present at the differential drive pinion companion flange-contact-area ②.

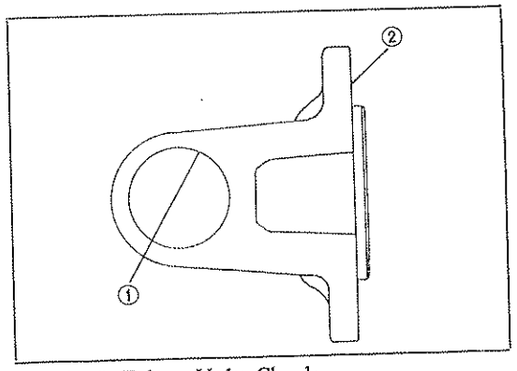


Fig. 3-18 Falnge Yoke Check

Installation

Note
1. When assembling propeller shafts, make sure to use a universal joint spider kit
2. Be sure to assemble spiders in such a way that the grease fittings on them come at the same side.

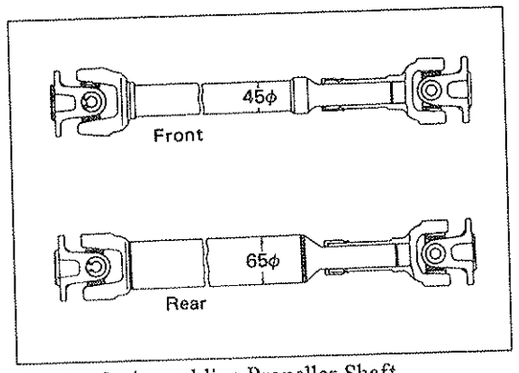


Fig. 3-19 Assembling Propeller Shaft

1. Apply lithium grease to the rollers of the spider bearing as well as to the inside of the cup. Place 25 rollers in each cup. Then, install the cover on the cup.

Note
Be sure to fill the cavity located at the center of the spider journals with lithium grease.

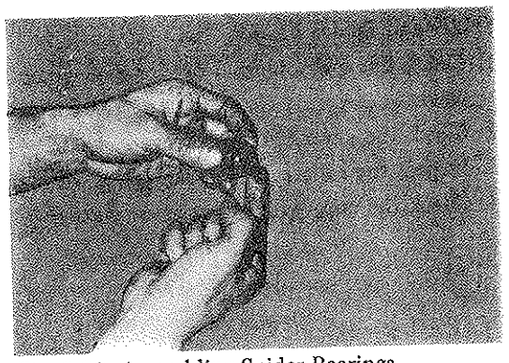


Fig. 3-20 Assembling Spider Bearings

2. Install the spider in the universal joint flange yoke as follows:

(1) Place the spider in the universal joint flange yoke. Using a hammer or the like, lightly tap the spider bearing cup into position as deep as it can go.

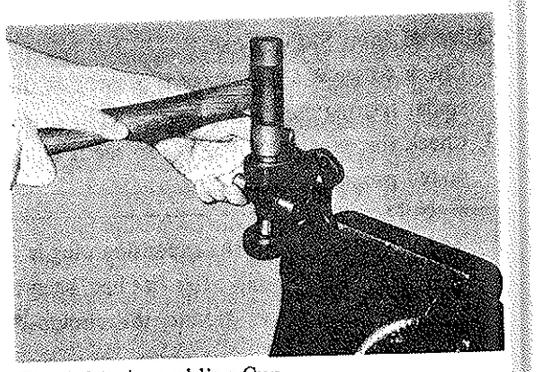


Fig. 3-21 Assembling Cup

(2) Push the spider bearing cup further, using a 19 mm socket wrench in conjunction with a vice.

(3) Continue pushing further the spider bearing cup in the same direction, until it becomes seated nearly at the specified position.

Note
If any difficulty should be encountered in installing the cup, coat it with oil.

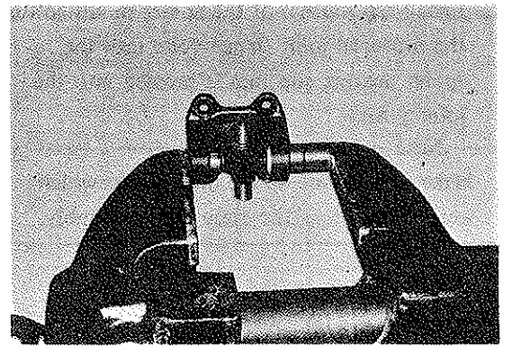


Fig. 3-22 Assembling Spider (1)

(4) Place the spider bearing cup in the other bore of the universal joint flange yoke. Using a hammer or the like, lightly tap the spider bearing cup into position as deep as it can go. Place a nut on the cup which was installed halfway in the step above. Using the 19 mm socket wrench in conjunction with the vice, press the spider until it reaches the center of the universal joint flange yoke.

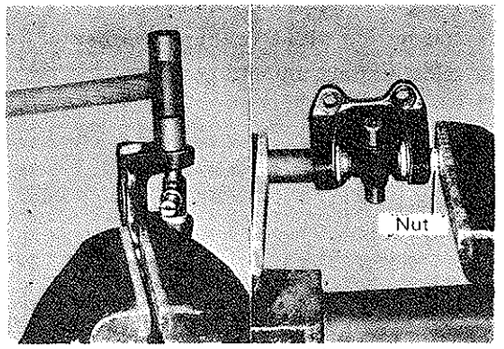


Fig. 3-23 Assembling Spider (2)

(5) Press further the spider bearing cups at both ends so that snap rings can be installed in place. Fit a new snap ring in each groove.

Note
1. Make sure not to use again the old snap rings that were removed at the time of disassembly.
2. After the snap rings have been mounted, ensure that the spider bearings work smoothly.

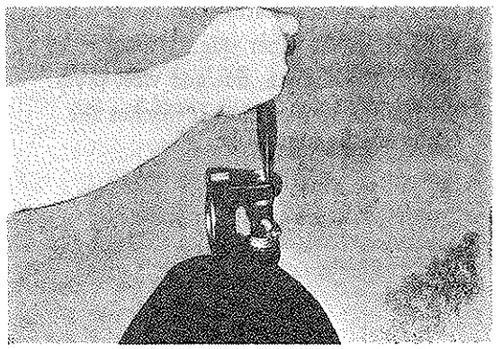


Fig. 3-24 Fitting Snap Rings

3. Install the universal joint flange yoke in the propeller shaft, following the procedure given below:

(1) Using a hammer, lightly press the spider bearing cup halfway into the joint yoke.

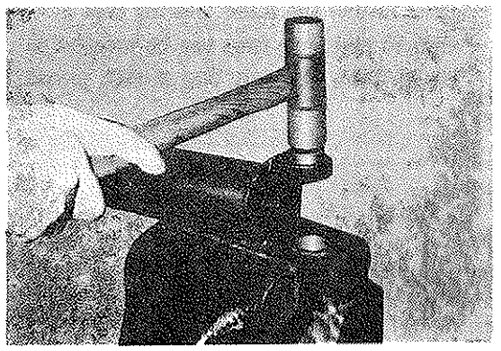


Fig. 3-25 Installing Cup

(2) Install the journal of the spider mounted on the universal joint flange yoke into the spider bearing cup that is pressed into the joint yoke.

Note

Make sure to line up the mate marks which were stamped at the time of disassembly.

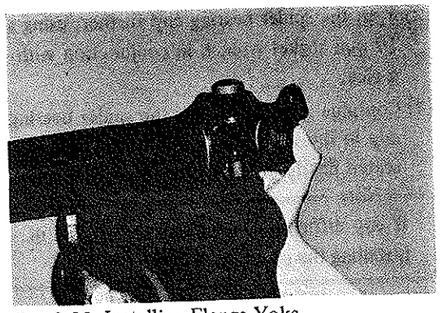


Fig. 3-26 Installing Flange Yoke

(3) Using a 19 mm socket wrench in conjunction with a vice, press further the spider bearing cup into position.

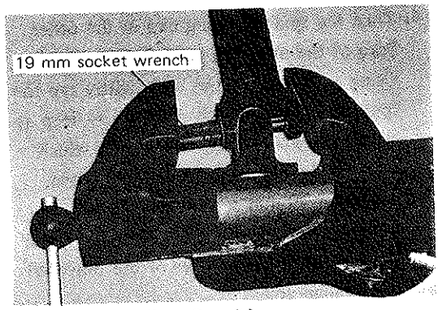


Fig. 3-27 Installing Cup (1)

(4) Place the spider bearing cup in the joint yoke from the other side. Using the 19 mm socket wrench, nut and vice, press further the spider, until it reaches the center of the joint yoke.

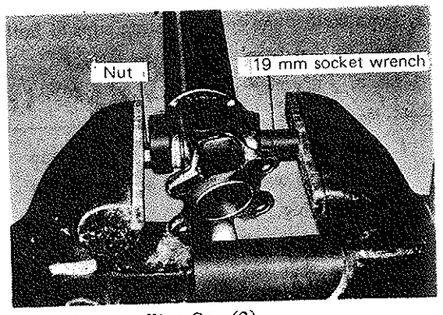


Fig. 3-28 Installing Cup (2)

(5) Press further the spider bearing cups at both ends so that snap rings can be installed in place. Fit a new snap ring in each groove.

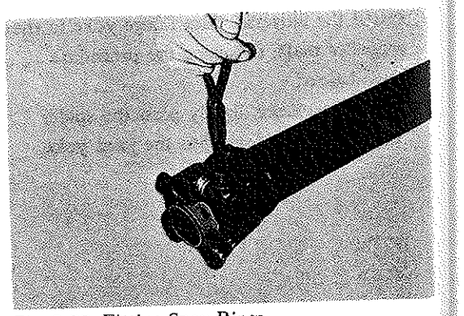


Fig. 3-29 Fitting Snap Rings

(6) After the universal joint has been installed in the propeller shaft, ensure that each part works smoothly, without showing any looseness. Fit the grease fittings.

4. Assemble the universal joint sleeve yoke side, following the same procedure outlined above.

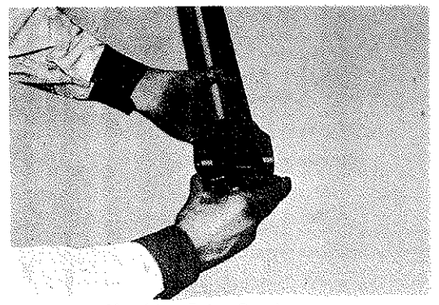


Fig. 3-30 Checking Joint Section

Installation

Reverse the removal procedure to install the propeller shaft.

Note

1. When installing, be sure to line up the mate marks which were stamped on the universal joint sleeve yoke and propeller shaft, repecitively.
2. Be certain to lubricate the grease fitting at the sleeve yoke.
3. The propeller shaft should be installed such that the sleeve yoke (rubber boot side) comes at the transfer side.
4. When the propeller shaft is installed to the parking brake drum, make sure to place the gasket at the mating surface.
5. Ensure that the flange yoke is tightened to specification.

   Tightening Torque: 6.0 to 8.0 Kg-m (43.4 to 57.9 ft-lbs)

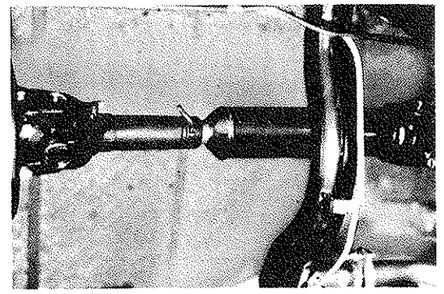


Fig. 3-31 Aligning Mate Marks

DAIHATSU
4 WHEEL DRIVE

SECTION 4
REAR AXLE

DESCRIPTION

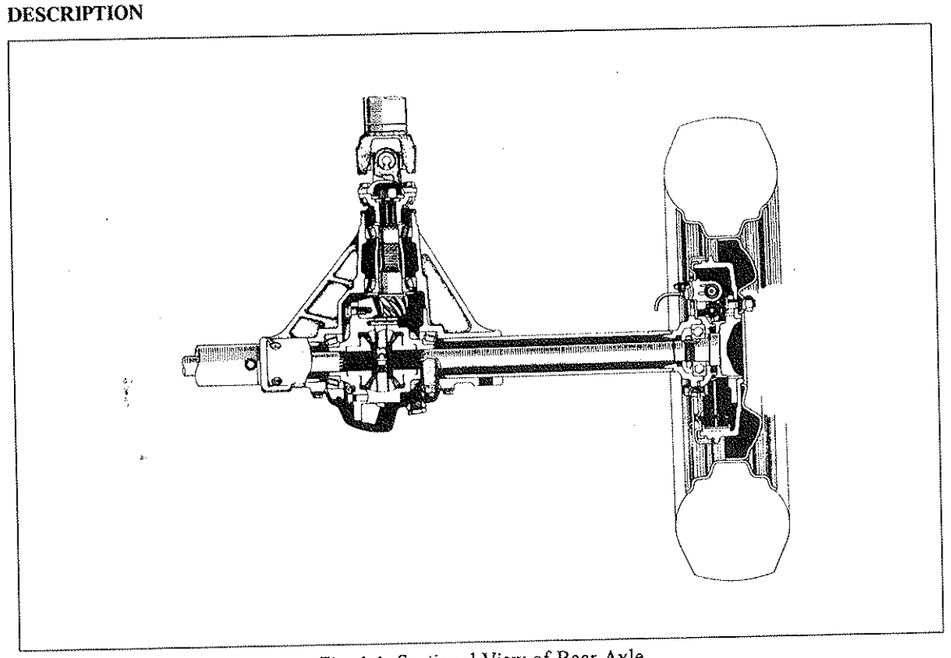


Fig. 4-1 Sectional View of Rear Axle

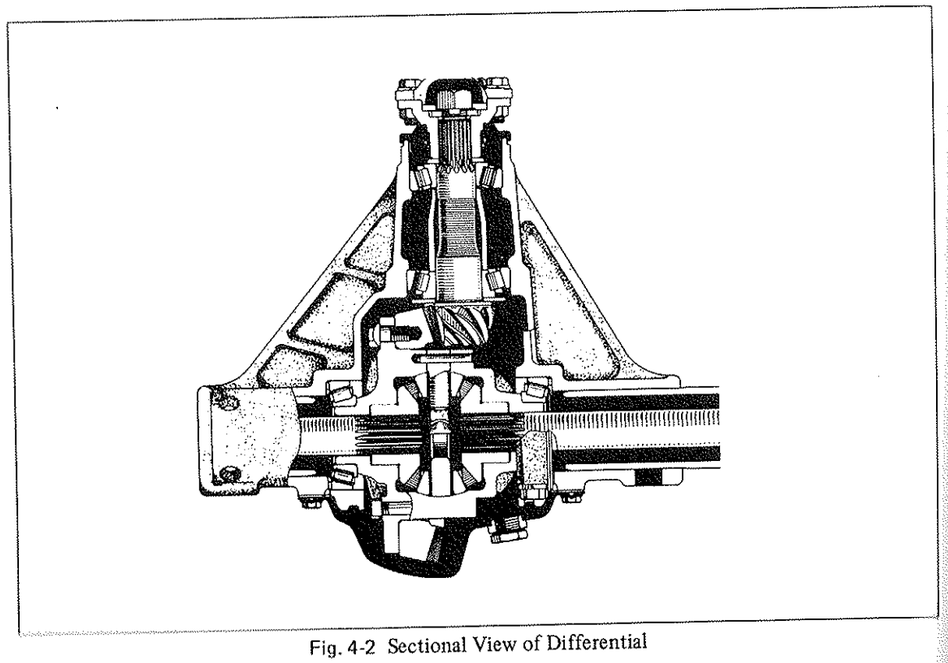


Fig. 4-2 Sectional View of Differential

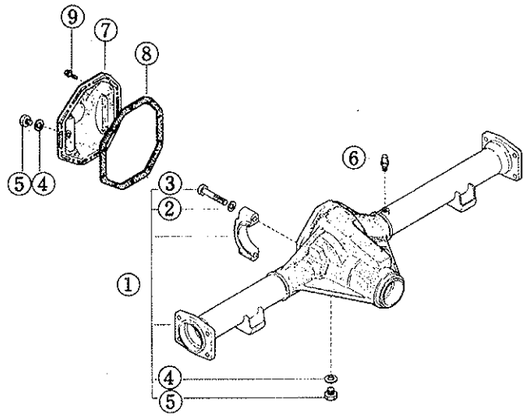
The rear axle for Model F20 and F50 Series is of the semi-floating type with a built-up type housing The differential housing is off-centered toward the right side in relation to the vehicle longitudinal center line. Such arrangement is necessary because the power pickup of the transfer is off from the vehicle longitudinal center line.

The built-up type housing consists of cast iron housing and right and left steel tubes which are plug-welded after they have been press-fitted into position. The reduction gears are mounted directly on the center part of the housing.

The differential changes the direction of the power transmitted from the engine through the propeller shaft at an angle of 90 degrees, and the revolution speed of the propeller shaft at the same time. It also provides the differential action by means of a differential system.

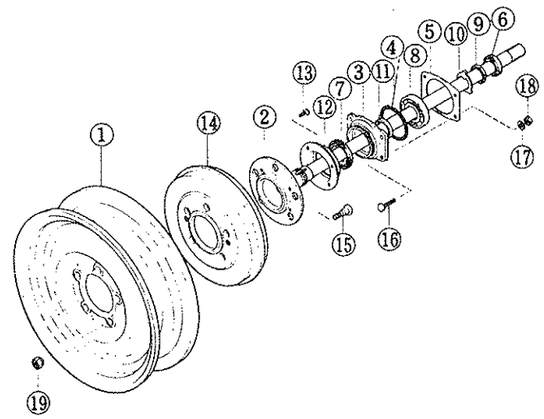
The differential for Model F20 and F50 Series has been so constructed that the pinion's center is located about 20mm (0.8 inch) below the ring gear's center. This hypoid gear has been designed exclusively for these Models.

Furthermore, steel shims are provided at the back sides of the drive pinion rear bearing and the drive pinion, respectively, so that the mounting distance may be adjusted. The front differential employs two pinions, while the rear differential employs four pinions. As for other constructions, the front and rear differentials are identical to each other.



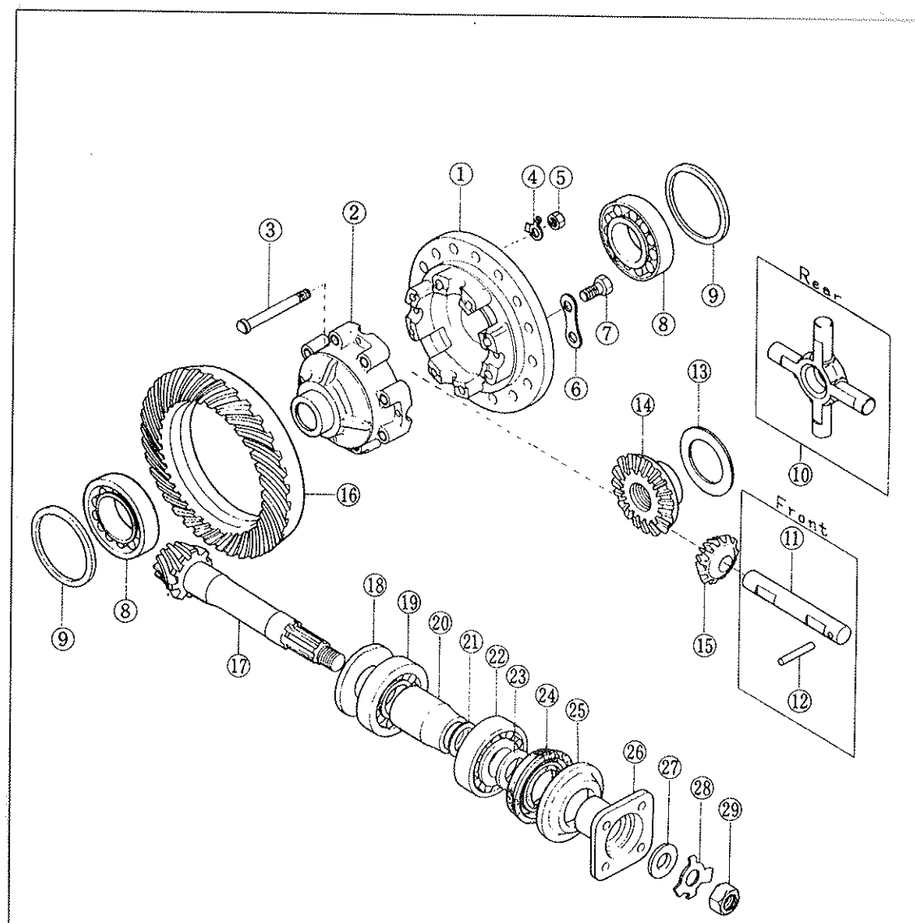
① Rear axle housing assembly
② Spring washer
③ Hexagon bolt
④ Gasket
⑤ Drain plug
⑥ Bleeder plug
⑦ Rear axle housing cover
⑧ Differential carrier gasket
⑨ Flange bolt

Fig. 4-3 Rear Axle Housing Components



① Disc wheel
② Rear axle shaft
③ Rear axle bearing case
④ "O" ring
⑤ Shim (4 kinds)
⑥ Type "S" oil seal
⑦ Type "T" oil seal
⑧ Radial ball bearing
⑨ Rear axle bearing inner lock nut
⑩ Lock washer
⑪ Plate washer
⑫ Brake drum rear oil deflector
⑬ Screw
⑭ Rear brake drum
⑮ Hub bolt
⑯ Serration bolt
⑰ Spring washer
⑱ Nut
⑲ Hub nut

Fig. 4-4 Rear Axle Shaft and Disc Wheel Components



① Differential case (left)
② Differential case (right)
③ Setting bolt
④ ⑥ ㉘ Lock washer
⑤ ㉙ Hexagon nut
⑦ Hexagon bolt
⑧ ⑲ ㉒ Tapered roller bearing
⑨ Shim (18 kinds)
⑩ Differential spider (rear)
⑪ Differential pinion shaft (front)
⑫ Straight pin
⑬ Thrust washer
⑭ Differential side gear
⑮ Differential pinion (Front, two; Rear, four)
⑯ Differential ring gear
⑰ Differential drive pinion
⑱ Shim (7 kinds)
⑳ Differential drive pinion bearing spacer
㉑ Shim (4 kinds)
㉓ ㉗ Plate washer
㉕ Type "T" oil seal
㉖ Dust deflector
㉔ Drive pinion companion flange

Fig. 4-5 Differential Components

REAR AXLE ASSEMBLY

Removal

1. Slightly loosen each hub nut.
2. Jack up the rear end of the vehicle and support the chassis frame with rigid racks.
3. Remove the wheels.
4. Drain the lubricant from the rear axle housing, by removing the drain plug located at the bottom.
5. Disconnect the propeller shaft (rear side) from the companion flange.
6. Disconnect the rear wheel cylinder brake the tube from the 3-way joint.
7. Remove the 3-way joint attaching bolts and take the 3-way joint out from the rear axle housing.

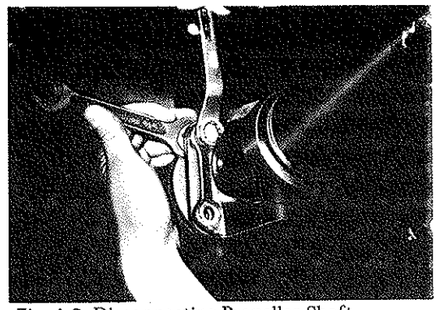


Fig. 4-6 Disconnecting Propeller Shaft

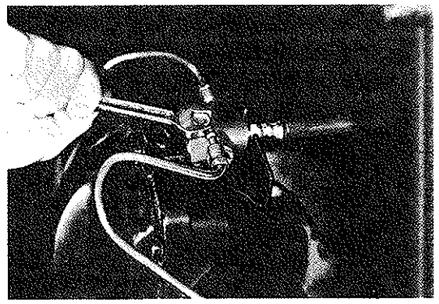


Fig. 4-7 Removing "3-Way" Joint

8. Remove the tail pipe.
9. Disconnect the shock absorber at the U bolt side.
10. Slacken the U bolt nuts such degree that they can be turned by your hand.
11. Slightly raise the axle housing with a jack.
12. Remove the spring shackles.
13. Lower the jack.
14. Remove the U bolt nuts and remove the U bolts, by pulling them upward.

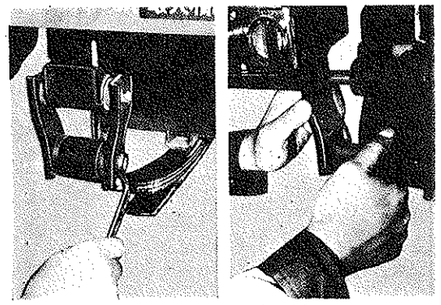


Fig. 4-8 Removing Spring Shackles

15. When the steps above have been taken, the rear axle assembly assumes such condition, as shown in Fig. Roll the rear axle assembly toward the rear and take it out from the underside of the vehicle.

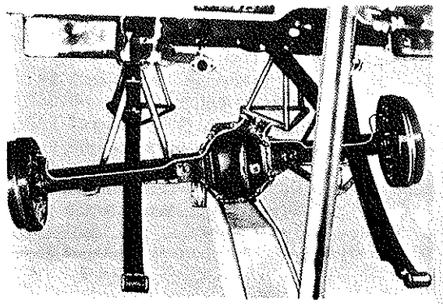


Fig. 4-9 Rear Axle Assembly Removal

In the case of DAIHATSU 4 WHEEL Model, the differential for the rear axle is almost identical with that for the front axle. The front differential differs from the rear differential only in that the former employs two pinion gears, whereas the latter employs four pinion gears.

Disassembly

Mount the rear axle assembly on an overhaul stand. Remove the rear axle shaft, following the procedure under the section "Rear Axle Shafts Removal". Proceed to disassemble the rear axle assembly. Refer to the section under "Front Axle Disassembly" for disassembly procedure.

Inspection and Repair

Refer to the section under "Front Axle Inspection and Repair".

Assembly

Refer to the section under "Assembly of Front Axle".

Installation

Reverse the removal procedure to install the rear axle.

Note

1. Make sure to tighten the following parts given below to specifications.

   Tightening Torque:

U bolt nut:	3.5 to 5.5 Kg-m (25.3 to 39.8 ft-lbs)
Spring shackle:	3 to 4.5 Kg-m (21.7 to 32.5 ft-lbs)
Propeller shaft:	6 to 8 Kg-m (43.4 to 57.9 ft-lbs)
Drain plug:	4 to 6 Kg-m (28.9 to 43.4 ft-lbs)

   (Be sure to apply bond sealer to the threaded section of the drain plug.)
2. Differential Oil Capacity: 1.5 liters (Hypoid gear oil #90)

REAR AXLE SHAFTS

Removal

1. Slightly loosen each hub nut.
2. Jack up the rear end of the vehicle and support the chassis frame with rigid racks.
3. Remove the wheel.
4. Remove the brake drum.

Note

Should any difficulty be encountered in removing the brake drum, first retract the brake shoes. Alternately screw-in a bolt into the brake drum so that the drum can be unseated gradually.

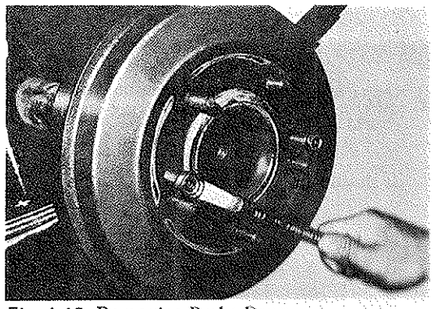


Fig. 4-10 Removing Brake Drum

5. Remove the bolts that attach the axle housing end to the brake backing plate. Pull out the rear axle shaft, using a rear axle remover puller (Special Tool No. 09520-00010).

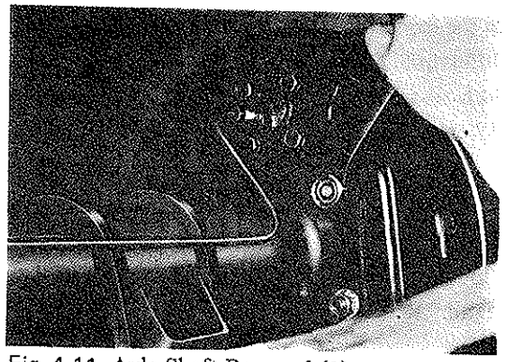


Fig. 4-11 Axle Shaft Removal (1)

6. After the axle shaft has been removed, take out the backing plate.

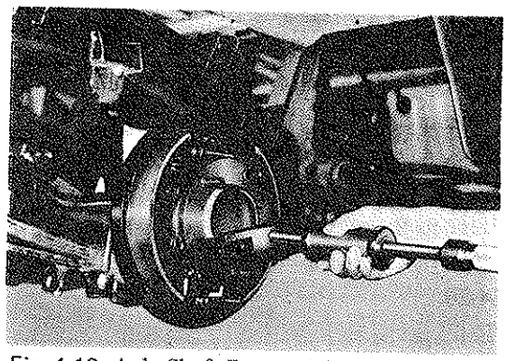


Fig. 4-12 Axle Shaft Removal (2)

Disassembly

1. Unlock the bearing inner lock nut.
2. Remove the bearing inner lock nut, using a rear axle bearing lock nut wrench (commercially available).

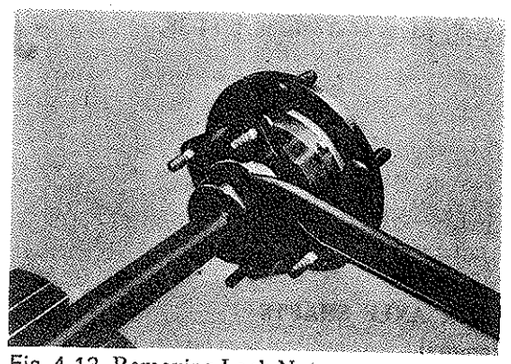


Fig. 4-13 Removing Lock Nut

3. Using a transmission rear bearing anvil (Special Tool No.09334-87301), press the rear axle shaft bearing off the axle shaft. It should be noted that the bearing is pressed off through the rear axle bearing case.
4. Remove the brake drum rear oil deflector from the axle shaft.

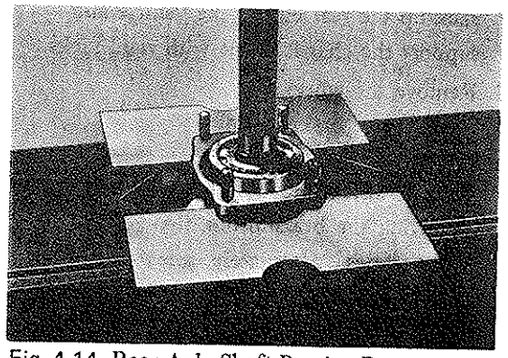


Fig. 4-14 Rear Axle Shaft Bearing Removal

Inspection and Repair

Inspect the disassembled parts. Replace any defective parts, as required.

1. Bearing:

(1) Check the bearing for damage or wear.

(2) Inspect to see whether the bearing runs smoothly without any binding or stiff feeling, while it is being rotated, with a force applied by your hands to the bearing balls.

Fig. 4-15 Checking Rear Axle Shaft Bearing

2. Rear axle shaft:

(1) Check the spline provided at the one end of the shaft for damage or wear. With the side fitted onto the shaft spline, there should be no looseness between two components.

(2) Check the axle shaft for bend.
This bend can be determined by measuring runout at the flange section as well as at the center unmachined section, with the axle shaft supported at each center hole provided at both ends.

Allowable Limit of Runout at Flange Surface:	0.2 mm (0.008 inch)
Allowable Limit of Runout at Center Unmachined Section:	2.0 mm (0.08 inch)

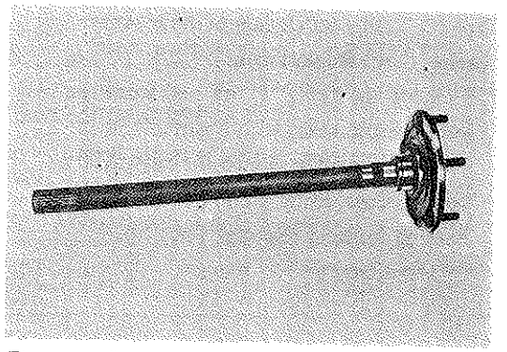


Fig. 4-16 Rear Axle Shaft Check

3. Hub bolt replacement:

(1) Temporarily screw-in a hub nut onto the end of the hub bolt to be removed. With a brass rod placed on the top of the nut, tap the hub bolt in order to drive it off the rear axle shaft.

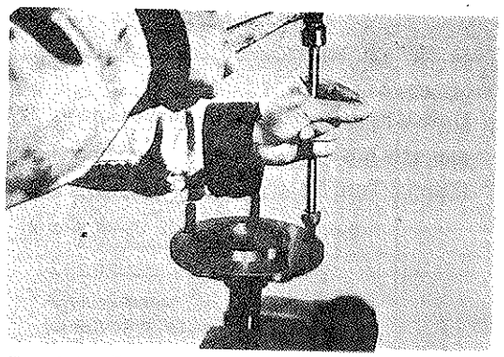


Fig. 4-17 Removing Hub Bolt

(2) Using a pipe [inner diameter, about 20 mm (0.8 inch)] in conjunction with a vice, press a new hub bolt into position. Care should be exercised to ensure that the new hub bolt is driven squarely to the axle shaft.

Note

Be careful that no damage is made to the flange surface of the axle shaft.

4. Serration bolt replacement:
   Replace the serration bolt in the same procedure as with the hub bolt replacement.

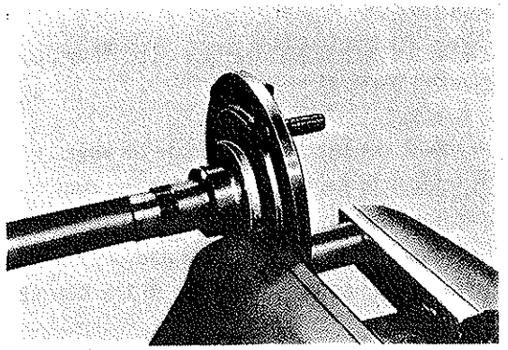


Fig. 4-18 Installing Hub Bolt

Type "T" Oil Seal (Inside of Rear Axle Bearing Case) Replacement

1. Remove the type "T" oil seal from the rear axle bearing case, with a suitable lever.
2. Press a new oil seal into the rear axle bearing case, using a counter shaft rear bearing replacer (Special Tool No. 09310-87302).

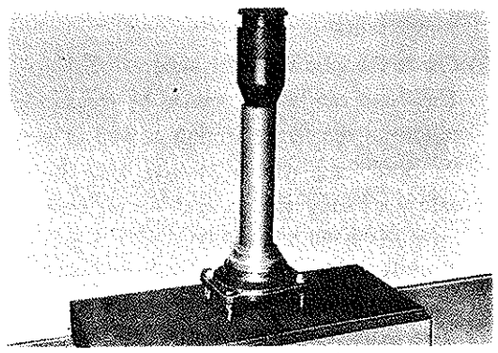


Fig. 4-19 Press-Fitting of Oil Seal

Type "S" Oil Seal (End of Rear Axle Housing) Replacement

1. Remove the oil seal from the end of the rear axle housing, using a steering gear housing overhaul tool (Special Tool No. 09612-12010) in conjunction with a suitable outer sleeve.

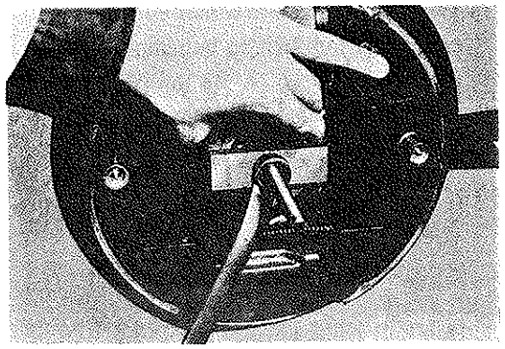


Fig. 4-20 Removing Oil Seal

2. Drive a new oil seal into the end of the rear axle housing.
   (Special Tool No. 09309-87201).

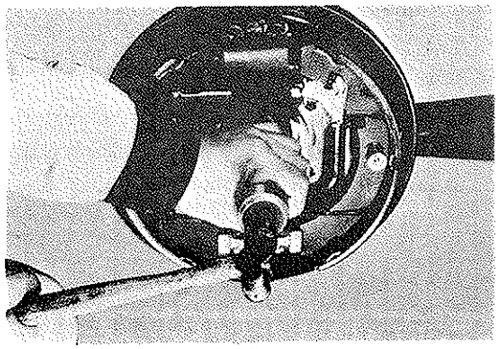


Fig. 4-21 Installing Oil Seal

Assembly

1. Mount the brake drum rear oil deflector on the rear axle shaft with four attaching screws.
2. Press the bearing through the bearing case onto the axle shaft, using a differential drive pinion bearing cone rear replacer (Special Tool No.09506-87301).

Note

1. Make sure to apply lithium grease to the lip-section of the type "T" oil seal.
2. Pack the bearing with lithium grease.
3. Be sure to fill the inside of the rear axle bearing case with lithium grease.

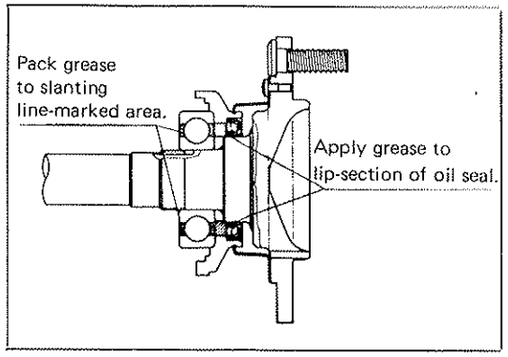


Fig. 4-22 Grease-Lubricating Points

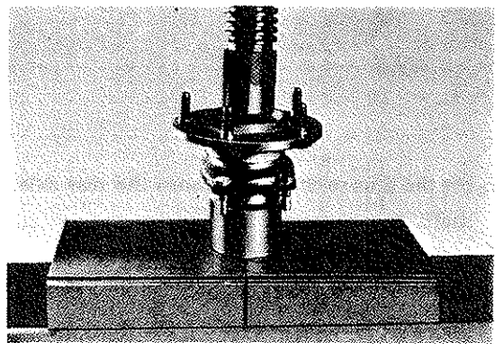


Fig. 4-23 Press-Fitting of Bearing

3. Install a new lock washer on the rear axle shaft. Tighten the lock nut with a rear axle bearing lock nut wrench (commercially available).
   Tightening Torque: 10 to 12 Kg-m (72.3 to 86.8 ft-lbs)
4. Bend the tab of the lock washer so as to prevent the lock nut from turning.

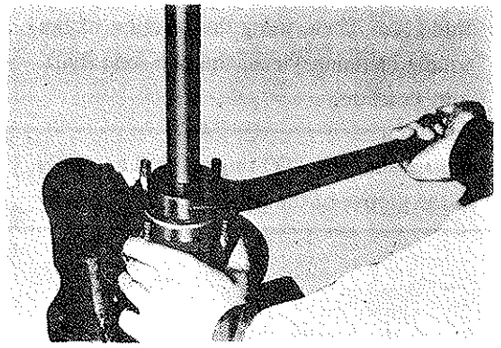


Fig. 4-24 Tightening Lock Nut

Installation

1. Pack grease to the end of the rear axle housing.
2. Apply bond sealer to the end of the rear axle housing. And mount the backing plate to the end of the rear axle housing.

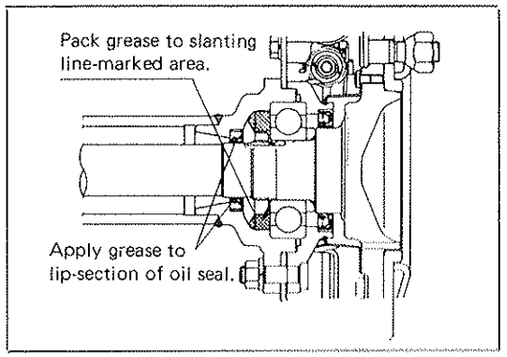


Fig. 4-25 Grease-Lubricating Points

3. Select a suitable shim for the rear wheel bearing as follows:
(1) Measure the sheet thickness of the brake backing plate.
(2) Select a suitable shim from among shims shown in Table in accordance with the thus-measured thickness.

Table 4-1 Shim Thickness Specifications

mm (inch)

Backing plate sheet thickness	Shim thickness
2.94~3.06 (0.1157~0.1205)	0.6 (0.024)
3.07~3.19 (0.1209~0.1256)	0.45 (0.018)
3.20~3.32 (0.1260~0.1307)	0.35 (0.014)
3.33~3.46 (0.1311~0.1362)	0.20 (0.008)

4. Fit the thus-selected shim onto the rear axle shaft.
5. Install a rear axle shaft remover puller (Special Tool No.09520-00010) onto the rear axle shaft.
6. Align the spline of the rear axle shaft with the corresponding spline of the differential side gear. Then, using the reaction of the sliding hammer, install the rear axle shaft into position.

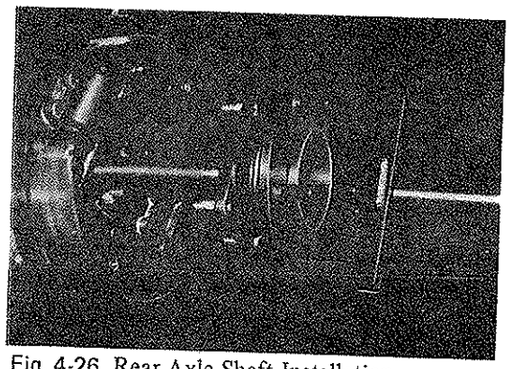


Fig. 4-26 Rear Axle Shaft Installation

Note

Ensure that the "O" ring is fitted correctly in the groove of the bearing case.

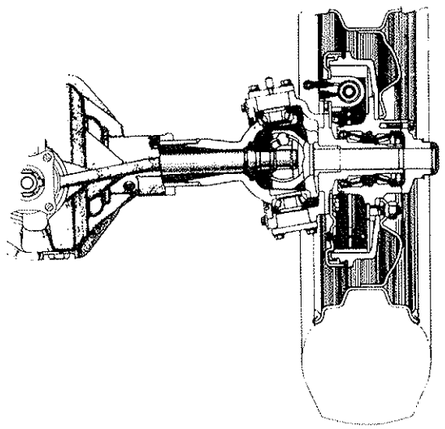
7. Secure the bearing case to the rear brake backing plate with the four attaching bolts.
Tightening Torque: 3.5 to 5.5 Kg-m (25.3 to 39.8 ft-lbs)
8. Install the brake drum and wheel.
Hub Nut
Tightening Torque: 9 to 11 Kg-m (65.1 to 79.6 ft-lbs)

Fig. 4-27 Securing Bearing Case to Backing Plate

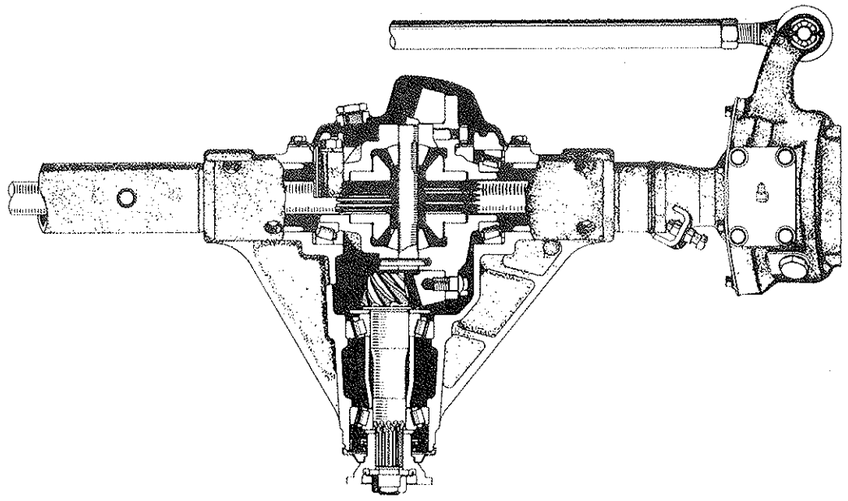
DAIHATSU
4 WHEEL DRIVE

SECTION 5
FRONT AXLE

DESCRIPTION



(1) Sectional View of Front Axle



(2) Sectional View of Differential

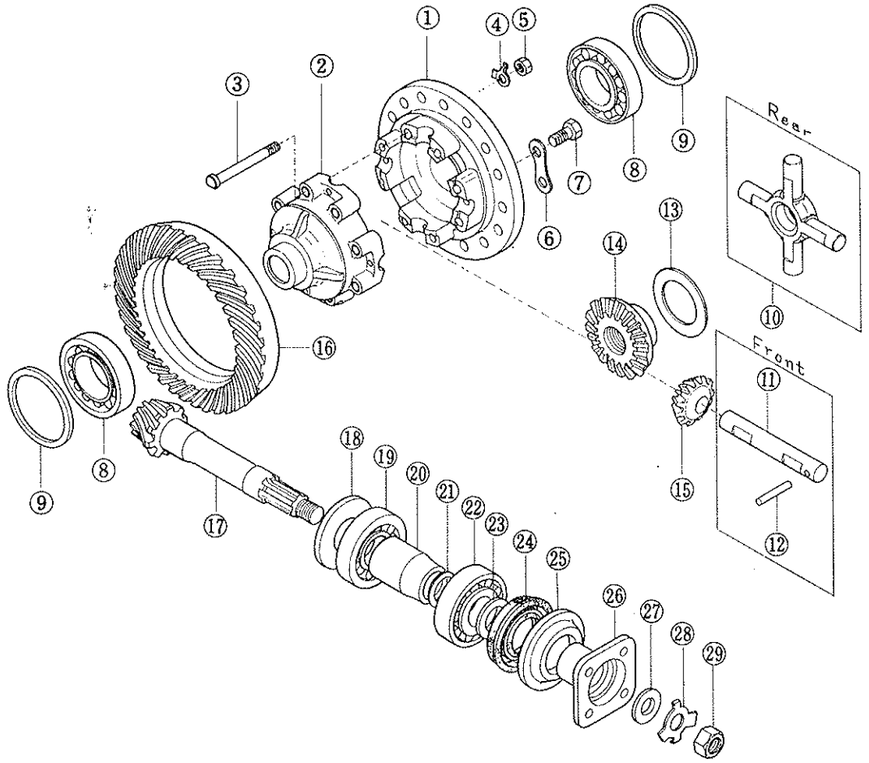
Fig. 5-1 Sectional Views of Front Axle and Differential

The front axle for DAIHATSU 4 Wheel drive Model must drive the front wheels and simultaneously steer the vehicle. Hence, the front axle incorporates a Bar Field type constant velocity joint.
The constant-velocity joint used in Model F50 and F20 can withstand satisfactorily a great angle change in power transmission. It also features superior durability.

In order to prevent the admission of muddy water or dust into the interior of the front axle, the knuckle itself constitutes a joint case. At the one end of the joint case, an oil seal is provided to improve further the sealing characteristics.
The steering knuckle is connected to the front axle housing through two tapered roller bearings, at their upper and lower bearing caps.

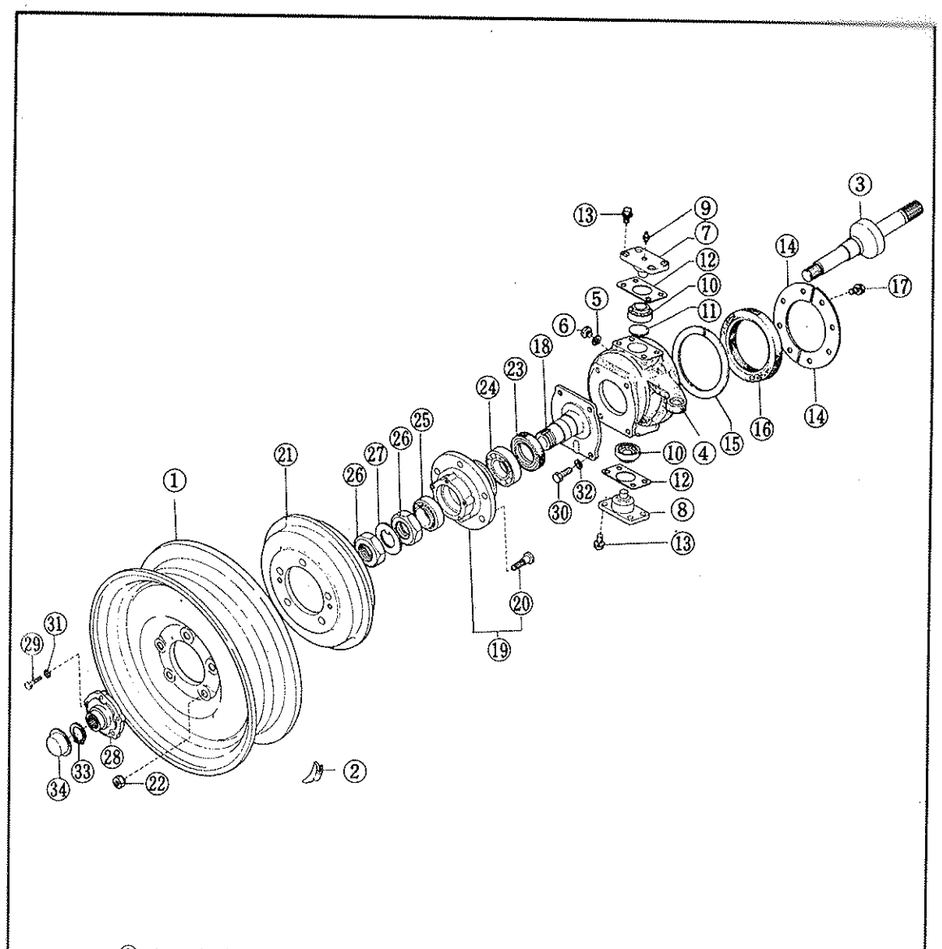
Table 5-1 Front Axle Specifications

Item			Model F50, F20 series
Front alignment (Unloaded state)	Toe-in	mm (inch)	3 – 5 (0.12 – 0.2)
	Camber	(degree)	1° 30′
	Caster	(degree)	0° 30′
	Kingpin inclination angle	(degree)	7° 30′
	Side slip	mm (inch)	IN 3 (0.12) – OUT 3 (0.12)
	Turning angle (degree)	Inner	28°
		Outer	26°
Tire size	Front		6.00-16-4 PR or 6.00-16-6 PR
	Rear		6.00-16-4 PR or 6.00-16-6 PR
Tire inflation pressure Kg/cm^2 (p.s.i.)	Front		1.5 (21.3)
	Rear		2.0 (28.4)
Disc wheel	Front		4.50 E x 16
	Rear		4.50 E x 16



① Differential case (left)
② Differential case (right)
③ Setting bolt
④ ⑥ ㉘ Lock washer
⑤ ㉙ Hexagon nut
⑦ Hexagon bolt
⑧ ⑲ ㉒ Tapered roller bearing
⑨ Shim (18 kinds)
⑩ Differential spider (rear)
⑪ Differential pinion shaft (front)
⑫ Straight pin
⑬ Thrust washer
⑭ Differential side gear
⑮ Differential pinion (Front, two; Rear, four)
⑯ Differential ring gear
⑰ Differential drive pinion
⑱ Shim (7 kinds)
⑳ Differential drive pinion bearing spacer
㉑ Shim (4 kinds)
㉓ ㉗ Plate washer
㉔ Type "T" oil seal
㉕ Dust deflector
㉖ Drive pinion companion flange

Fig. 5-2 Differential Components



① Disc wheel
② Balance weight
③ Front drive shaft
④ Steering knuckle
⑤ Gasket
⑥ Screw plug
⑦ Steering knuckle bearing cap (upper)
⑧ Steering knuckle bearing cap (lower)
⑨ Grease fitting
⑩ ㉔ ㉕ Tapered roller bearing
⑪ Plate plug
⑫ Shim (3 kinds)
⑬ ⑰ Bolt-with-washer
⑭ Oil seal cover plate (outer)
⑮ Oil seal cover plate (inner)
⑯ Type "M" oil seal
⑱ Steering knuckle spindle
⑲ Front axle hub
⑳ Hub bolt
㉑ Front brake drum
㉒ Hub nut
㉓ Type "T" oil seal
㉖ Front axle bearing lock nut
㉗ Claw washer
㉘ Axle outer shaft flange
㉙ ㉚ Hexagon bolt
㉛ ㉜ Spring washer
㉝ Shaft snap ring (3 kinds)
㉞ Front hub outer cap

Fig. 5-3 Front Axle Shaft and Disc Wheel Components

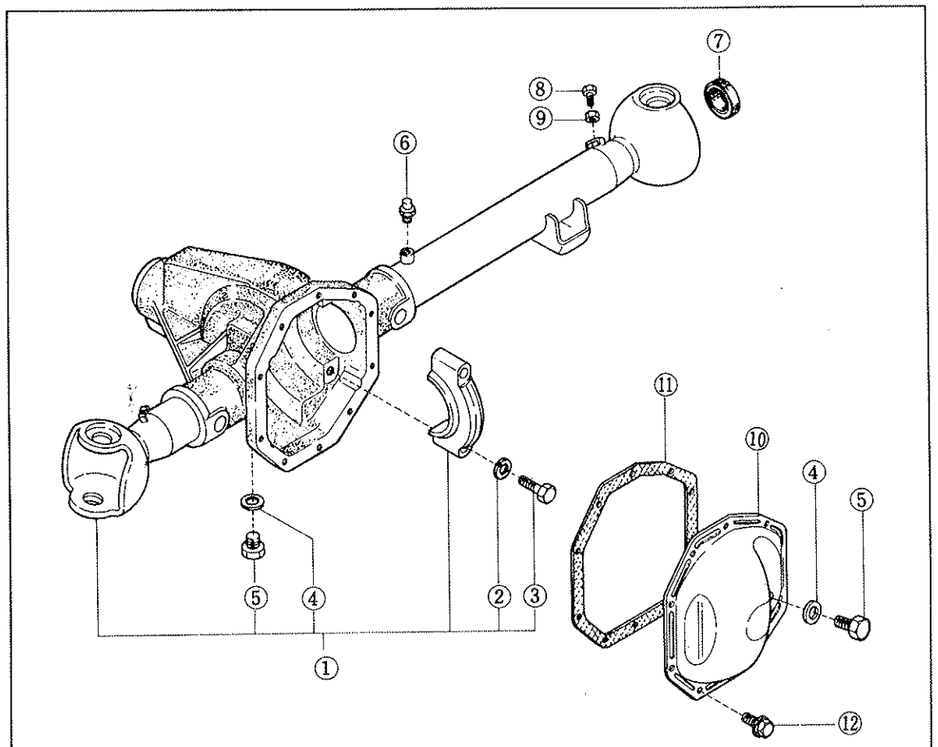


Fig. 5-4 Front Axle Housing Components

IN-VEHICLE-REPAIRS

Front Drive Shaft Removal

1. Slightly slacken each hub nut of the front wheels on both sides.
2. Jack up the front end of the vehicle and support the frame with rigid racks.
3. Remove the right and left wheels.
4. Remove the brake drum. Should any difficulty be encountered in removing the brake drum, alternately screw-in a bolt into the brake drum so that the drum can be unseated gradually.

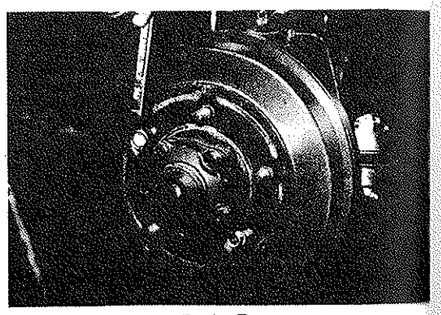


Fig. 5-5 Removing Brake Drum

5. Remove the front hub outer cap.
6. Detach the snap ring mounted on the drive shaft, with snap ring pliers.

> Note
> Sometimes, it may be difficult to remove the snap ring because of a bond sealer used at the time of assembly.

7. Remove the axle outer shaft flange, by removing the attaching bolts.

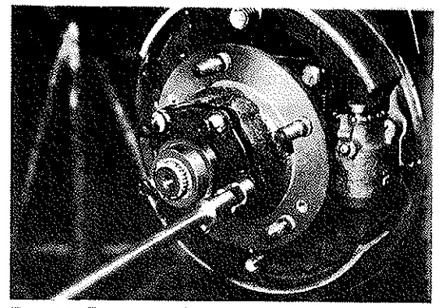


Fig. 5-6 Removing Flange

8. Unfasten the front axle bearing lock nut (55 mm), by straightening the bent tab. Remove the two lock nuts, using a front hub bearing lock nut wrench (Special Tool No.09607-87601).

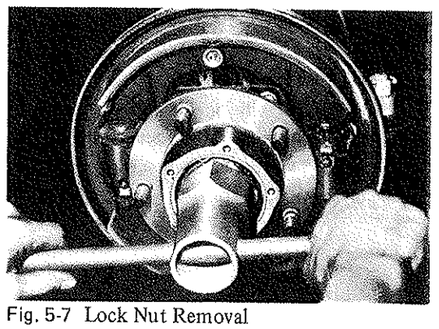


Fig. 5-7 Lock Nut Removal

9. Remove the front axle hub sub-assembly as follows:

(1) Assemble a rear axle shaft remover puller (Special Tool No.09520-00010) and a rear wheel bearing puller (Special Tool No. 09521-87301) in a way shown in Fig. Proceed to remove the hub sub-assembly.

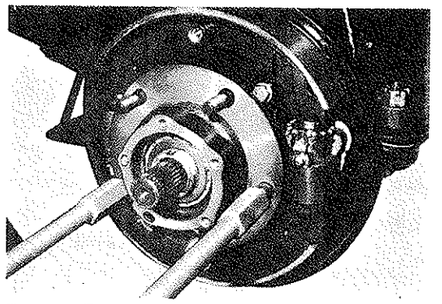


Fig. 5-8 Removing Hub Sub-Assembly

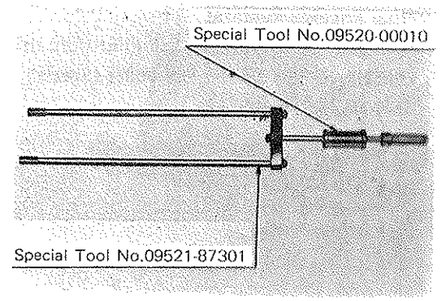


Fig. 5-9 Combination of Special Tools

10. Remove the backing plate, by removing the attaching bolts. Using a piece of wire or the like, suspend the backing plate with the brake hose attached to it.

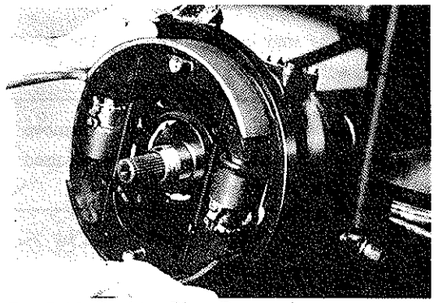


Fig. 5-10 Backing Plate Removal

11. Remove the steering knuckle spindle from the knuckle.

Note

Sometimes, it amy be difficult to remove the spindle because of a bond sealer that was applied to the mating surface at the time of assembly.

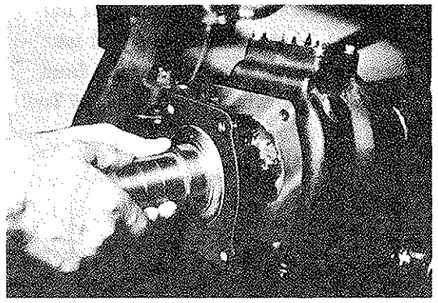


Fig. 5-11 Knuckle Spindle Removal

12. Take the front drive shaft out from the front axle housing.

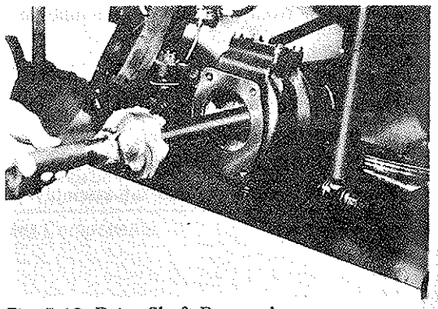


Fig. 5-12 Drive Shaft Removal

Steering Knuckle Removal

1. Disengage the tie rod end ball joint from the knuckle, using a tie rod end puller (Special Tool No.09610-20011).

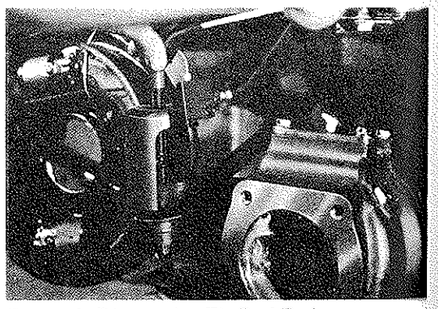


Fig. 5-13 Disengaging Tie Rod End

2. Remove the oil seal cover outer plate ① attaching bolts. Remove the "M" oil seal ② and oil seal cover inner plate ③ from the back side of the steering knuckle.

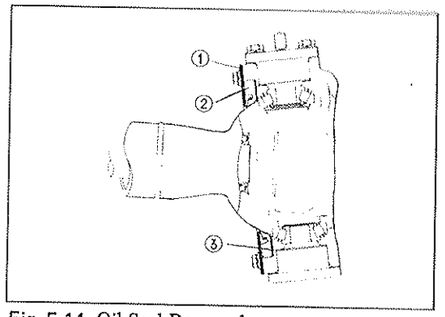


Fig. 5-14 Oil Seal Removal

3. Remove the steering knuckle bearing cap (lower) attaching bolts so as to take the cap and shim pack out from the knuckle.

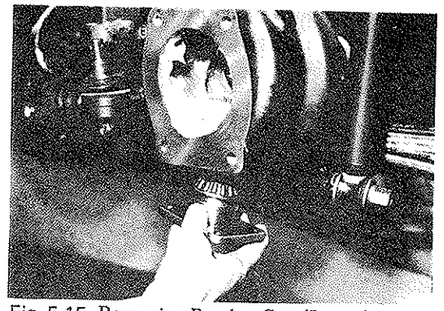


Fig. 5-15 Removing Bearing Cap (Lower)

4. Remove the steering knuckle from the front axle housing.

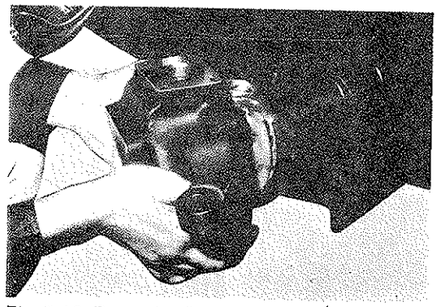


Fig. 5-16 Removing Knuckle

5. Remove the steering knuckle bearing cap (upper) attaching bolts so as to take the cap and shim pack out from the knuckle.

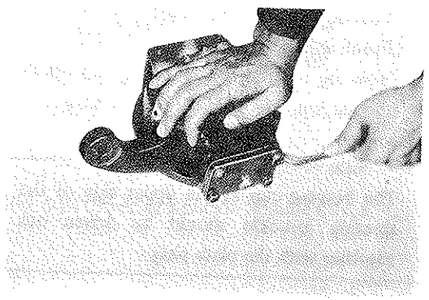


Fig. 5-17 Removing Bearing Cap (Upper)

DISASSEMBLY

1. Front axle hub:

(1) Using a suitable rod, drive the inner bearing and type "T" oil seal off the front axle hub.

Fig. 5-18 Removing Bearing and Oil Seal

(2) Using a suitable rod, drive off the tapered roller outer bearing.

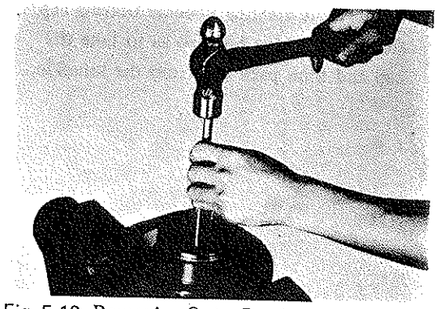


Fig. 5-19 Removing Outer Bearing

2. Steering knuckle bearing cap:
Press the tapered roller bearing cone off the bearing cap, using a transmission rear bearing anvil (Special Tool No.09334-87301).

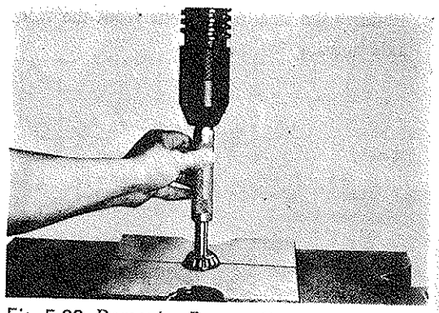


Fig. 5-20 Removing Bearing Cone

3. Tapered roller bearing cup
(Front axle housing end)
Drive the tapered roller bearing cup off the steering knuckle, using a 26 mm socket wrench.

Note

The bearing cup at the upper side of the steering knuckle should be driven out together with the plate plug.

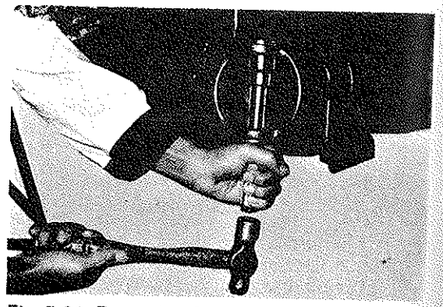


Fig. 5-21 Removing Bearing Cup

INSPECTION AND REPAIRS

Inspect the disassembled parts. Replace any defective parts, as required.

1. Check the front axle hub for cracks or damage.
2. Inspect the tapered roller bearings for damage or wear.
3. Check the steering knuckle for cracks or damage.

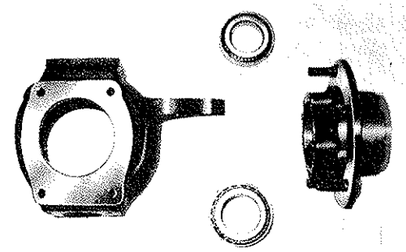


Fig. 5-22 Checking of Hub and Knuckle

4. Checking of the front drive shaft:

(1) Check the front drive shaft to see if any damage or wear is present at the spline provided at its end.

(2) Make sure that there is no looseness with the differential side gear fitted on the spline of the front drive shaft.

(3) Hold the outer portion of the front drive shaft by your hand. Move it in an up-down direction as well as in a right-left direction. There should be no looseness.

(4) Turn the outer portion of the joint. There should be no stiff or binding feeling. Move the outer portion of the joint in a way you would do when describing a circle. It should not move in a triangular shape.

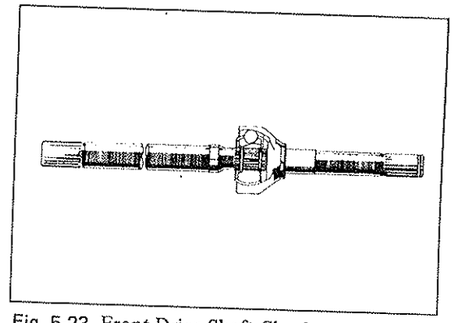


Fig. 5-23 Front Drive Shaft Check

5. Checking of the steering knuckle spindle:

(1) Check the bearing-fitting-area for wear or damage.

(2) Inspect the solid bush for damage or wear.

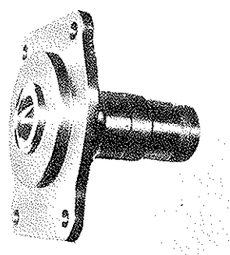


Fig. 5-24 Steering Knuckle Spindle Check

Type "T" Oil Seal (Front Axle Housing End) Replacement

(1) Drive the type "T" oil seal off the front axle housing end, using a steering gear housing overhaul tool (Special Tool No. 09612-12010).

(2) Drive a new type "T" oil seal into the front axle housing end, using an input shaft bearing replacer (Special Tool No. 4141-17).

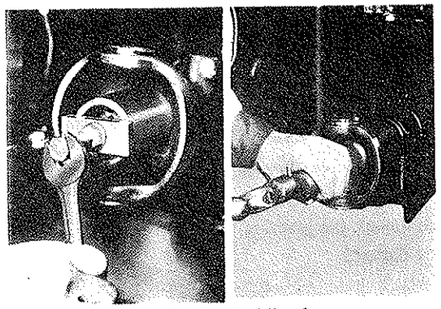


Fig. 5-25 Type "T" Oil Seal Replacement

Hub Bolt Replacement

1. Temporarily screw-in a hub nut onto the end of the hub bolt to be removed. With a brass rod placed on the top of the nut, tap the hub bolt in order to drive it off the front axle hub.
2. Using a pipe [inner diameter, about 20 mm (0.79 inch)] in conjunction with a vice, press a new hub bolt into position. Care should be exercised to ensure that the new hub bolt is driven squarely to the axle hub.

NOTE
Be careful that no damage is made to the hub surface.

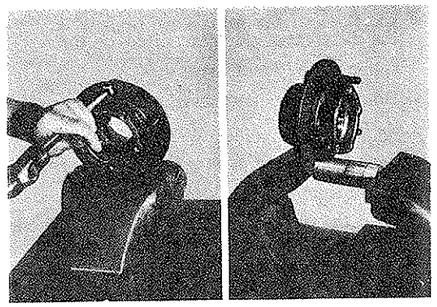


Fig. 5-26 Hub Bolt Replacement

ASSEMBLY

1. Assemble the front axle hub, following the procedure given below:

(1) Press the tapered roller bearing cup (for the front hub outer use) into the front axle hub, using an axle hub and drive pinion bearing tool set (Special Tool No. 09608-87301).

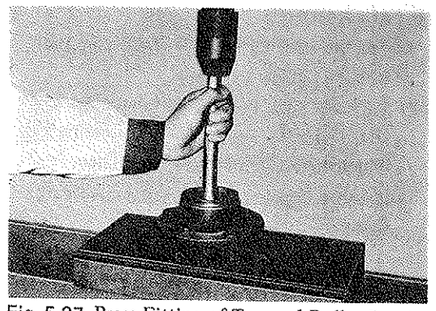


Fig. 5-27 Press-Fitting of Tapered Roller Bearing

(2) Press the tapered roller bearing cup (for the front hub inner use) into the front axle hub, using a front hub and drive pinion bearing tool set (Special Tool No. 09608-20010).

(3) Drive the type "T" oil seal into the front axle hub, using a differential side bearing replacer (Special Tool No.09501-87201).

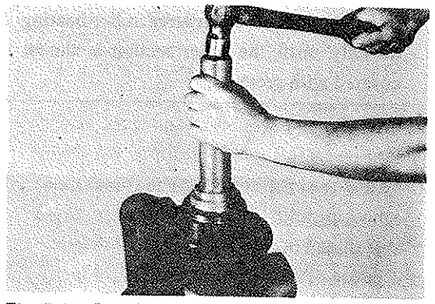


Fig. 5-28 Installing Type "T" Oil Seal

2. Steering knuckle bearing cap:
Press the tapered roller bearing cone onto the steering knuckle bearing cap, using a 16 mm socket wrench and a rod.

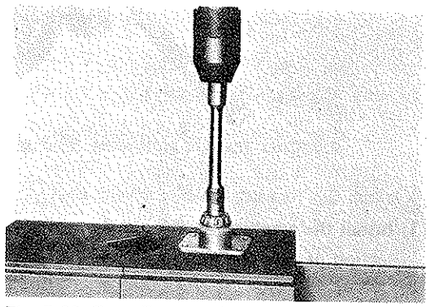


Fig. 5-29 Press-Fitting of Bearing Cone

3. Tapered roller bearing cup (Front axle housing end):

(1) Press the tapered roller bearing cup into the steering knuckle, using a "B" set replacer (Special Tool No.09550-10012).

Note
The plate plug should be first inserted, before the bearing cup is press-fitted into the bore provided at the upper part of the housing end.

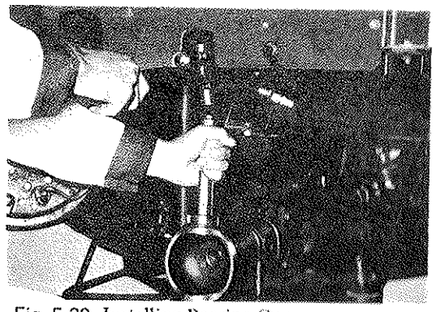


Fig. 5-30 Installing Bearing Cup

INSTALLATION

1. Install the steering knuckle, following the procedure outlined below:

(1) Fit a shim pack having the same thickness as the original shim onto the steering knuckle bearing cap (lower). Then, proceed to mount them on the steering knuckle.

Tightening Torque: 1.5 to 2.2 Kg-m (10.8 to 15.9 ft-lbs)

Note

Make sure to apply lithium grease to the roller section of the tapered roller bearing liberally until the roller section is almost covered with grease.

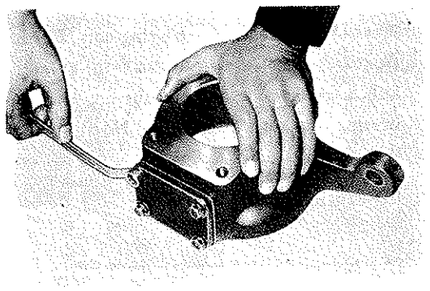


Fig. 5-31 Installing Bearing Cap (Lower)

(2) Coat the end section of the front axle housing with lithium grease to the degree as shown in Fig. At the same time, of grease of more than 10 mm (0.39 inch) thickness.

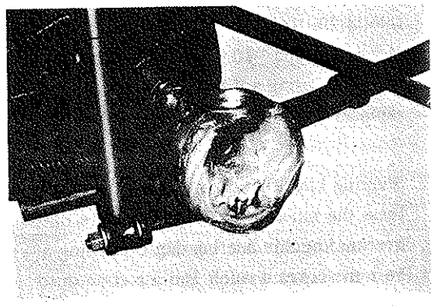


Fig. 5-32 Coating Axle Housing End With Grease

(3) Install the steering knuckle on the end section of the axle housing.

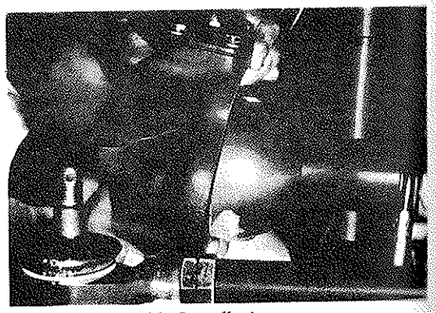


Fig. 5-33 Knuckle Installation

(4) Fit a shim pack having the same thickness as the original shim onto the steering knuckle bearing cap (upper). Then, proceed to mount them on the steering knuckle.

Tightening Torque: 1.5 to 2.2 Kg-m (10.8 to 15.9 ft-lbs)

NOTE:

1. Make sure to apply lithium grease to the roller section of the tapered roller bearing liberally until the roller section is almost covered with grease.
2. The grease fitting should be installed in such a direction that it can be lubricated from the front.

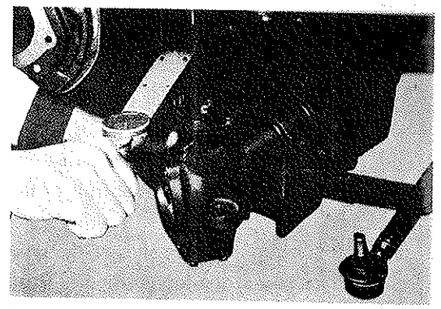


Fig. 5-34 Installing Bearing Cap (Upper)

2. Adjust the starting torque of the tapered roller bearing (kingpin preload) as follows:

(1) Hook a spring scale at the steering knuckle's hole which accommodates the tie rod end. Gently pull the spring scale so as to measure starting torque.

Starting Torque: 10.5 ~ 18.0 Kg-cm (9.3 ~ 15.9 inch-lbs)

[Starting Load: 0.7 ~ 1.2 Kg (1.4 ~ 2.4 lbs)]

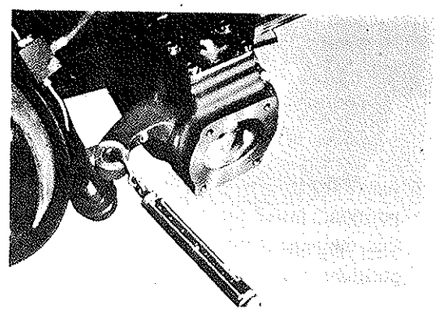


Fig. 5-35 Measuring Starting Torque

(2) Select a shim pack from among shims shown in the table in order that the specified starting torque may be obtained. When the shim pack thickness decreases, the starting torque will become greater. Conversely, when the shim pack thickness increases, the starting torque will become less. The thickness of the upper shim pack should be the same as that of the lower shim pack.

Table 5-2 Shim Size

Thickness	mm (inch)
0.1	(0.0039)
0.15	(0.0059)
0.20	(0.0079)
0.25	(0.0098)
0.30	(0.012)

3. Mount the oil seal cover inner plate and type "M" oil seal on the steering knuckle.

NOTE:
1. Be sure to place the ends of the oil seal cover inner plate at a distance of 20 to 40 mm (0.79 to 1.6 inch) measured on the circumference from the ends of the oil seal.
2. Make sure to bring the ends of the type "M" oil seal at the top position. (This caution is important to prevent grease leakage.)
3. Coat the lip-section of the type "M" oil seal with lithium grease. Moreover, ensure that the girdle spring is properly placed in the oil seal groove.

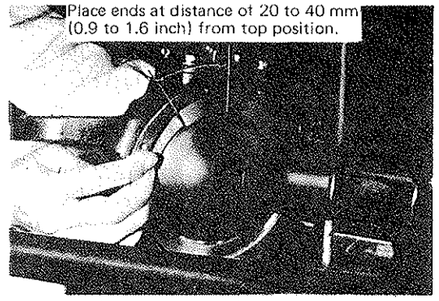


Fig. 5-36 Installing Inner Plate

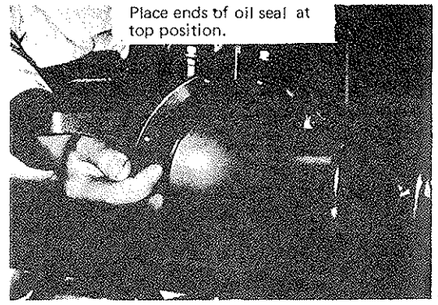


Fig. 5-37 Installing Oil Seal

4. Install the oil seal cover outer plate in position. Install the outer plate in such way that the ends come at the top and bottom positions, respectively.

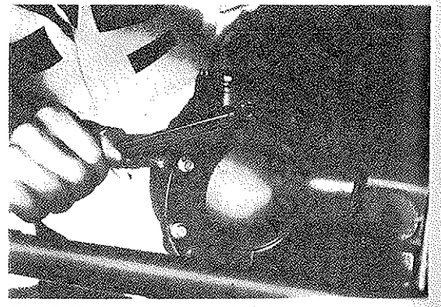


Fig. 5-38 Outer Plate Installation

5. Place the front drive shaft in the front axle housing.

Note
Pack the inside of the constant velocity ball joint with lithium grease.

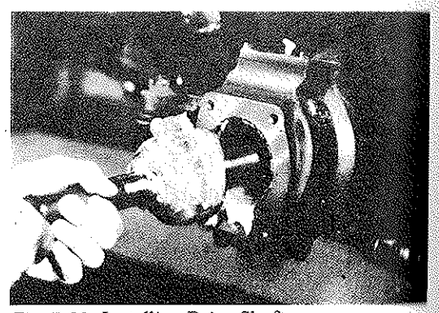


Fig. 5-39 Installing Drive Shaft

6. Install the steering knuckle spindle and front brake backing plate on the steering knuckle.

Tightening Torque: 4.0 to 5.5 Kg-m (28.9 to 39.8 ft-lbs)

NOTE:
1. Make sure to coat the bush section of the steering knuckle spindle with lithium grease.
2. Be certain to apply a bond sealer to the steering knuckle spindle-to-knuckle mating surface.

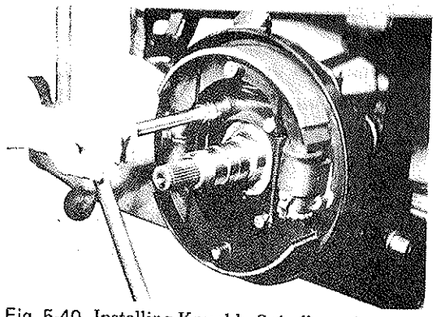


Fig. 5-40 Installing Knuckle Spindle and Backing Plate

7. Mount the front axle hub sub-assembly in place.

NOTE:
1. Be sure to apply lithium grease to the tapered roller bearing located inside the hub.
2. Pack the inside of the hub with lithium grease.
3. Coat the lip-section of the type "T" oil seal with lithium grease.

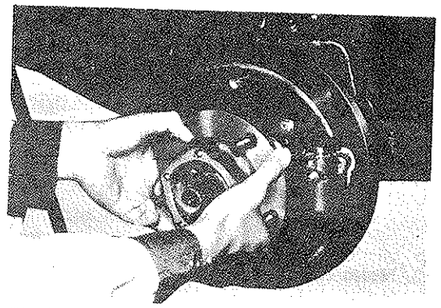


Fig. 5-41 Hub Installation

8. Tighten the front hub bearing lock nut (inner), using a front hub bearing lock nut wrench (Special Tool No.09607-87601).

Tightening Torque: 10 to 15 Kg-m (72.3 to 108.5 ft-lbs)

(1) After the lock nut (inner) has been tightened to specification, return the lock nut 1/6 turn (equivalent to the nut's one side).

(2) Fit a new claw washer. Using the same special tool above, tighten the outer lock nut to specification.

Tightening Torque: 10 to 15 Kg-m (72.3 to 108.5 ft-lbs)

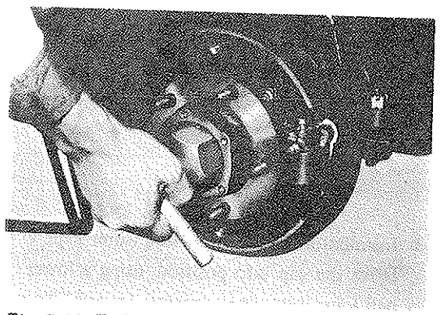


Fig. 5-42 Tightening Lock Nut

9. Measurement of hub starting torque:
   Hook a spring scale at one of the hub bolts. Gently pull the spring scale to measure starting torque.
   Front Hub
   Starting Torque (including Oil Seal): 10 to 25 Kg-cm (8.7 to 21.7 inch-lbs)
   Starting Load: 1.4 to 3.6 Kg (3.1 to 7.9 lbs)

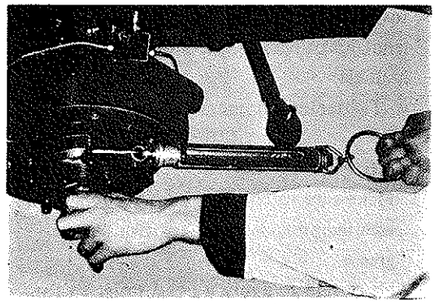


Fig. 5-43 Measuring Starting Torque

10. Lock the nut securely with the claw washer.
11. Install the axle outer shaft flange.
    Tightening Torque: 3.0 to 4.0 Kg-m (21.7 to 28.9 ft-lbs)

> Note
> Be sure to apply a bond sealer to the front axle mating surface.

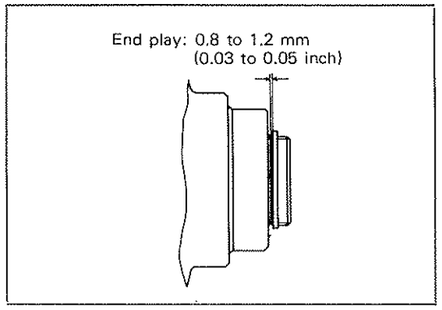


Fig. 5-44 Measuring Drive Shaft End Play

12. Measurement of front drive shaft end play:
    Screw-in a 8 mm bolt into the front drive shaft. Measure the end play, by pulling the 8 mm bolt toward the wheel side as far as it will go.
    Front Drive Shaft
    End Play: 0.8 to 1.2 mm (0.03 to 0.05 inch)

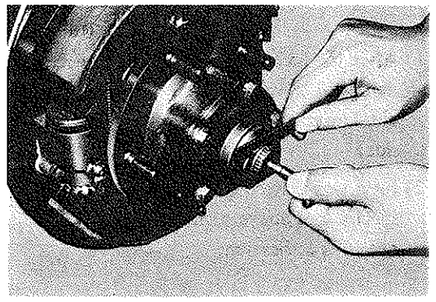


Fig. 5-45 Measuring Drive Shaft End Play

13. Installation of the front hub outer cap:
    Drive the cap into position, using a lower ball joint dust cover replacer (Special Tool No.09635-20010).

> Note
> Make sure to apply a bond sealer to the axle outer shaft flange mating surface.

14. Install the brake drum.
15. Mount the wheel.
    Tightening Torque: 9 to 12 Kg-m (65.1 to 86.8 ft-lbs)

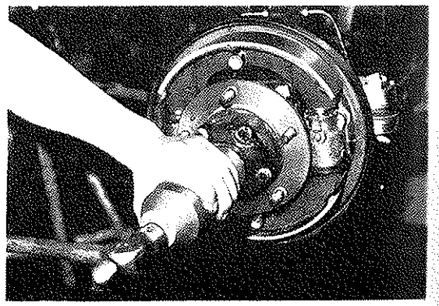


Fig. 5-46 Installing Outer Cap

DIFFERENTIAL

REMOVAL

> Note
> Differential disassembly/assembly, etc. operations for DAIHATSU 4 WHEEL DRIVE Model vehicles should be carried out only after the front axle assembly has been removed.

1. Remove the front axle assembly, following the procedure outlined below:
(1) Slightly slacken each hub nut of the front wheels on both sides. Jack up the front end of the vehicle and support the frame with rigid racks.
(2) Remove the front right and left wheels.
(3) Drain the lubricant from the front axle housing, by removing the drain plug located at the bottom.
(4) Disengage the propeller shaft at the differential side.
(5) Disconnect the front wheel cylinder brake tube from the 3-way joint. Furthermore, detach the 3-way joint from the backing plate.

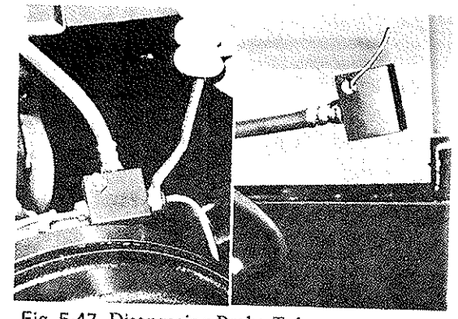


Fig. 5-47 Disengaging Brake Tube

(6) Remove the cotter pin and castle nut. Disengage the tie rod end from the steering knuckle, using a tie rod end puller (Special Tool No.09610-20011).

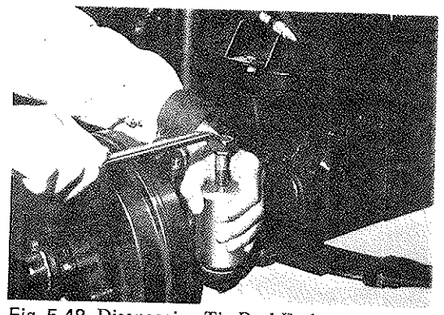


Fig. 5-48 Disengaging Tie Rod End

(7) Disconnect the front shock absorbers at their lower side.
(8) Slacken the U bolt nuts to such degree that they can be turned by hand.
(9) Slightly raise the front axle housing with a jack.
(10) Remove the spring shackles, by removing the shackle inner plate attaching nuts.

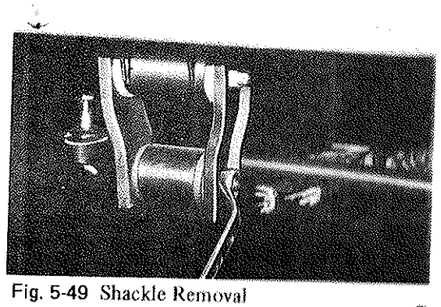


Fig. 5-49 Shackle Removal

(11) Lower the jack. Remove the U bolt nuts and pull the U bolts upward to remove them.

(12) When all of the steps above have been followed, the front axle assembly assumes such condition, as shown in Fig. 5-50. Roll the axle assembly toward the front from under the vehicle.

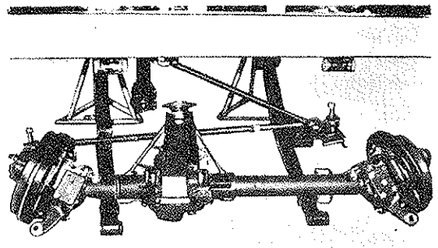


Fig. 5-50 Front Axle Assembly Removal

DISASSEMBLY

1. Remove the front axle housing cover, removing the cover attaching bolts.
2. Mount the front axle assembly on an overhaul stand.

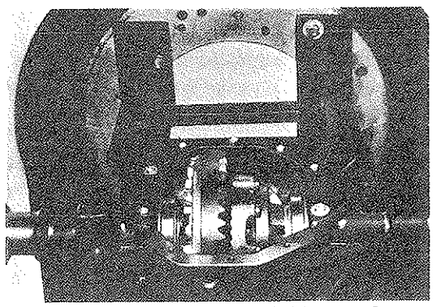


Fig. 5-51 Mounting Front Axle Housing On Overhaul Stand

3. Remove the front drive shafts, steering knuckles, etc. on the right and left sides.
4. Measure the runout at the back of the ring gear. Record the reading for latter reference at the time of reassembly.

   Allowable Limit
   of Runout: 0.05 mm (0.0020 inch)

> Note
> When measuring the runout of the ring gear, the differential case should exhibit no end play in the axial-direction.

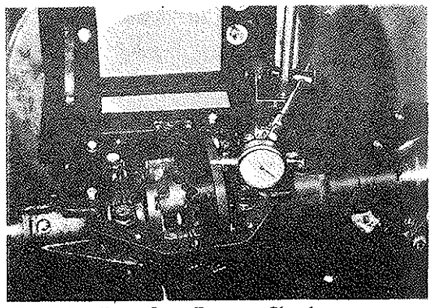


Fig. 5-52 Ring Gear Runout Check

5. When removing the bearing caps, mark a mate mark on the housing and the corresponding bearing cap, respectively, with a center punch or the like. Then, proceed to remove the bearing caps.

> NOTE:
> 1. Since the bores of the front axle housing and bearing caps have been machined as a pair, it is mandatory to put identification marks in order to ensure correct combination of them on reassembly.
> 2. Make sure to install the bearing cap in such a direction that the stepped side faces toward the outside.

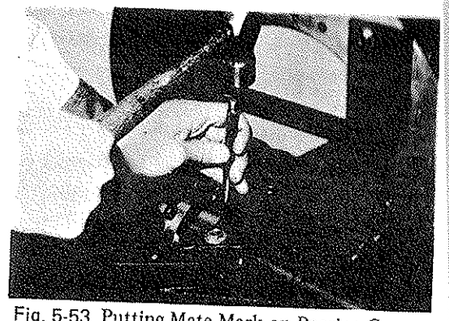


Fig. 5-53 Putting Mate Mark on Bearing Cap

6. Spread the differential case section of the front axle housing, using a differential gear expander (Special Tool No.09401-87601). Take the differential case assembly together with the shims out from the axle housing.

> Note
> Make sure to place properly the bearing caps, side bearing shims, etc. in order that components for the right side may not be intermixed with the ones for the left side.

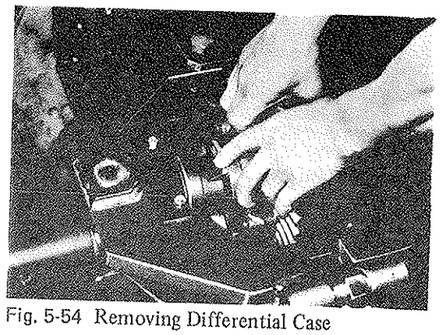


Fig. 5-54 Removing Differential Case

7. Turn over the front axle housing. Remove the drive pinion, following the procedure outlined below:

(1) Unfasten the lock nut mounted at the end of the drive pinion. Loosen the lock nut, with a 27 mm socket wrench and a drive pinion flange holding tool (Special Tool No.09330-87301).

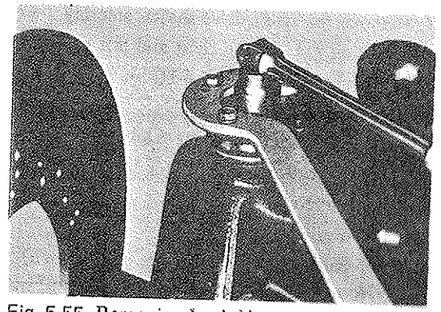


Fig. 5-55 Removing Lock Nut

(2) Remove the following parts: the lock nut, lock washer, plate washer, drive pinion companion flange and dust deflector.
(3) Again screw-in the lock nut onto the end of the drive pinion. Using a plastic hammer, tap the lock nut so as to drive off the drive pinion together with the spacer and shims.

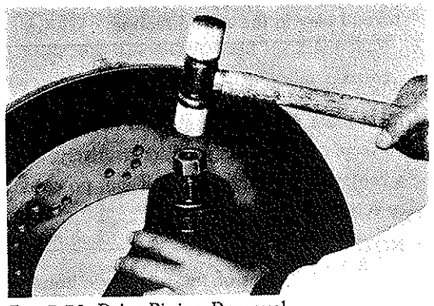


Fig. 5-56 Drive Pinion Removal

8. Place an axle hub and drive pinion bearing tool set (Special Tool No.09608-87301) to the cut-out section of the front axle housing. Using a hammer, drive the bearing outer race off the axle housing.

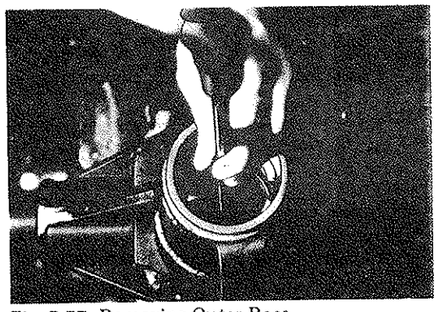


Fig. 5-57 Removing Outer Race

9. Again, turn over the front axle housing mounted on the overhaul stand. Drive the inner bearing, plate washer, and type "T" oil seal off the axle housing, using an axle hub and drive pinion bearing tool set (Special Tool No.09608-87301) in conjunction with a suitable rod and a hammer.

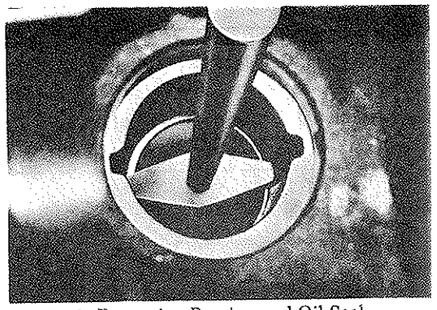


Fig. 5-58 Removing Bearing and Oil Seal

10. Press the drive pinion adjusting shim pack and bearing cone off the drive pinion, using a differential drive pinion bearing cone remover (Special Tool No.09547-87301).

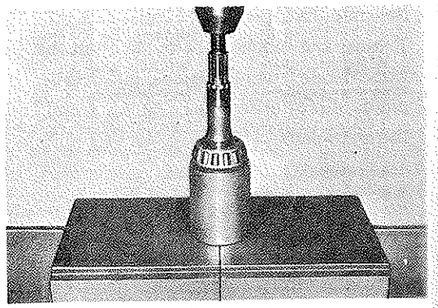


Fig. 5-59 Removing Bearing Cone

11. Pull the side bearing cone off the differential case, using a universal puller set (Special Tool No.09950-20010).

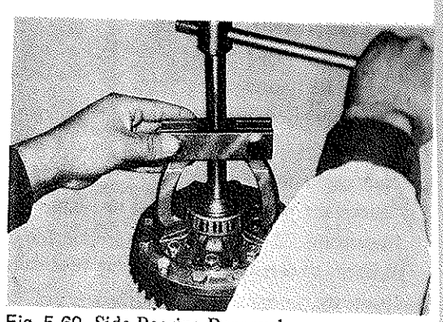


Fig. 5-60 Side Bearing Removal

12. Straighten the bent lock plates for the ring gear setting bolts. Slacken the 12 hexagon bolts so as to detach the ring gear from the differential case.

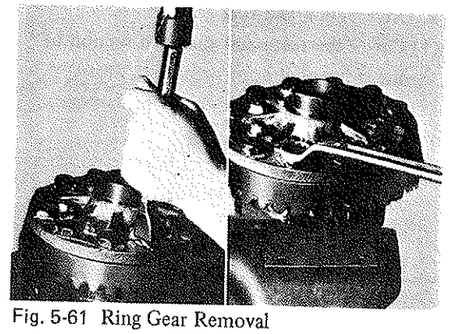


Fig. 5-61 Ring Gear Removal

13. Straighten the bent lock plates for the differential case setting bolts. Slacken the eight (8) hexagon nuts and bolts.

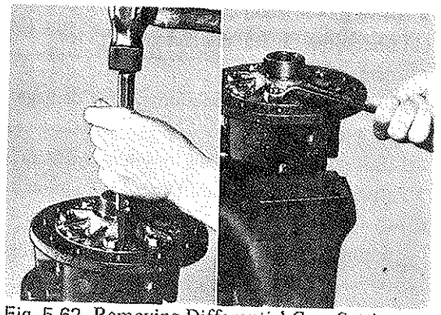


Fig. 5-62 Removing Differential Case Setting Bolts

14. Separate the 2-piece differential case. Remove the following parts out from the case: the differential pinions, differential pinion shafts, differential side gears, and thrust washers.

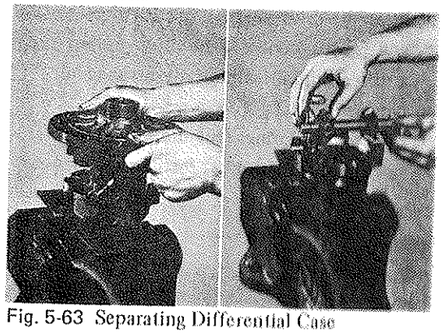


Fig. 5-63 Separating Differential Case

INSPECTION AND REPAIRS

1. Front axle housing:
(1) Check the housing for damage or cracks.
(2) Inspect the side bearing-fitting section for damage or wear.
(3) Check the spring seat section for signs of distortion.
(4) Inspect to see if the bleeder plug functions properly.

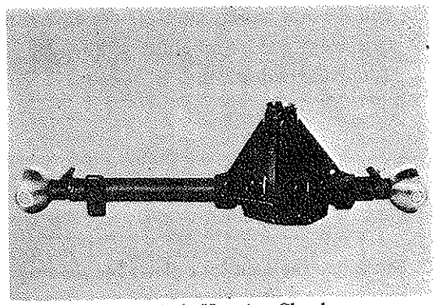


Fig. 5-64 Front Axle Housing Check

2. Drive pinion and ring gear:
(1) Check the teeth and threaded section of the drive pinion for damage or wear.
(2) Inspect the ring gear teeth for damage or wear.

Note
In the event either the drive pinion or the ring gear proves to be defective, both of them should be replaced as a pair.

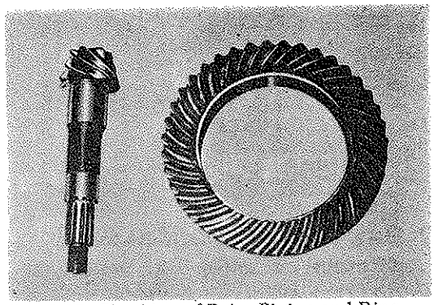


Fig. 5-65 Checking of Drive Pinion and Ring Gear

3. Drive pinion companion flange:
(1) Check the oil seal-contact-area ① for damage or wear.
(2) Inspect the splined section ② for damage or wear.
Ensure that there is no looseness when it is fitted onto the spline of the drive pinion.
(3) Check to see if the dust deflection ③ is mounted properly on the companion flange.

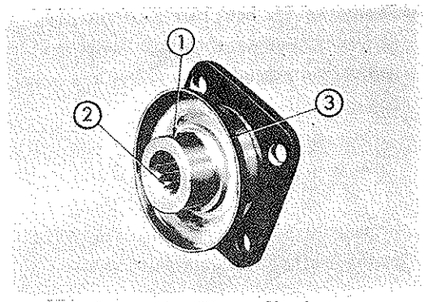


Fig. 5-66 Companion Flange Check

4. Inspect to see whether the drive pinion adjustment shims ① and drive pinion spacer shim ② exhibit any breakage or damage.
5. Check the bearings (for the drive pinion front and rear use) ③ for damage or wear.

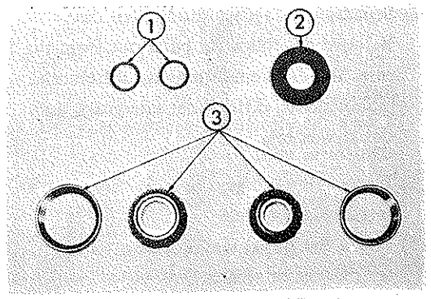


Fig. 5-67 Checking of Shims and Bearings

6. Check the side bearings for damage or wear.

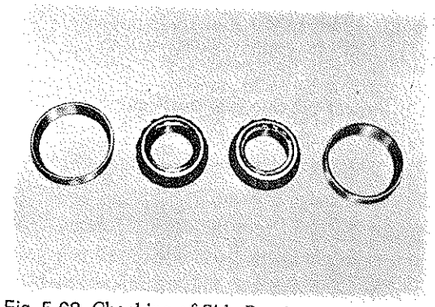


Fig. 5-68 Checking of Side Bearings

7. Check the teeth and bores of the side gears ① for damage or wear.
Allowable Limit of Wear in Bore: 46.850 mm (1.84 inch)
8. Inspect the side gear thrust washers ② for wear.
Allowable Limit of Wear in Thickness: 0.4 mm (0.016 inch)

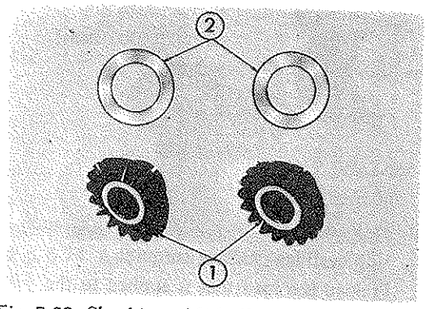


Fig. 5-69 Checking of Side Gears and Thrust Washers

9. Check the pinions ① to see if any damage or wear is present at the gear teeth, the differential case-contact-areas, or the bores where the pinion shafts fit.
Allowable Limit of Wear in Bore: 18.20 mm (0.72 inch)
10. Inspect the pinion gear-fitting-area of the pinion shaft ② for damage or wear.
Allowable Limit of Wear in Outer Dia.: 17.765 mm (0.699 inch)

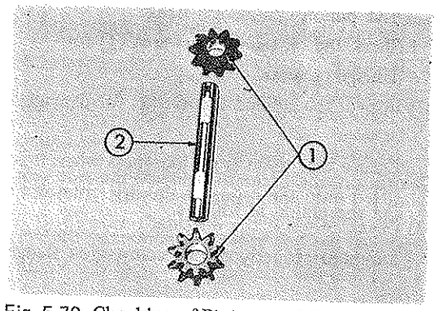


Fig. 5-70 Checking of Pinions and Pinion Shaft

11. Differential case:
(1) Check the pinion-contact-section ① for damage or wear.
(2) Inspect the side gear boss-contact-area ② for damage or wear.
(3) Check the thrust washer-contact-area ③ for damage or wear.
(4) In the event that the original runout measured at the back side of the ring gear has exceeded the allowable limit, check runout at the ring gear mounting surface of the differential case.

Allowable Limit of Runout: 0.05 mm (0.002 inch)

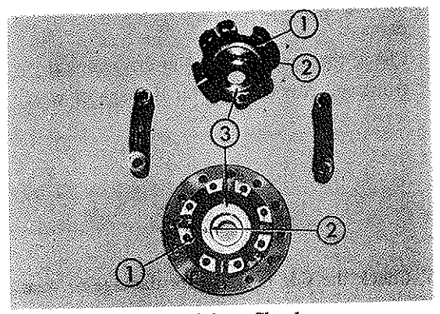


Fig. 5-71 Differential Case Check

ASSEMBLY

– Instructions on Assembly –

1. Preload of the drive pinion bearings and side bearings (starting torque):
Preload is a load that is applied to the bearings in order that the pinion or ring gear may not be moved axially under loaded conditions. Furthermore, it prevents a consequential end play owing to the original bedding-in of the bearings.
2. Backlash:
Backlash is a play which is provided between the ring gear and the drive pinion in order to ensure a proper, smooth mesh of the gears.
3. Tooth Contact (relationship between the pinion and the ring gear):
The pinion and the ring gear should be assembled and adjusted in such a way that a proper tooth contact pattern is obtained, thus preventing abnormal noises under both forward and backward motions of the vehicle.

1. Thoroughly wash all parts to be assembled.
2. Measure the backlash between the side gear and the pinion as follows:
(1) Place the side gears and pinions in the differential case. Slightly press the pinion shaft so that the pinion is pressed against the case as far as it will go.
(2) Measure the backlash.

Specified Backlash: 0.05 to 0.15 mm (0.002 to 0.006 inch)

Note
If the backlash should exceed the allowable limit, the gears or thrust washers should be replaced.

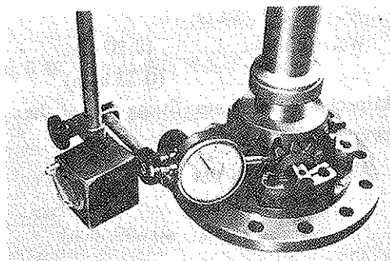


Fig. 5-72 Measuring Backlash

3. Assemble the differential gear case as follows:
(1) Coat the side gears, pinions, pinion shaft and thrust washers with gear oil. Position these parts in the differential gear case. Align the straight pin hole of the pinion shaft with the corresponding hole in the case. Then, insert the straight pin into place. After the straight pin has been assembled, stake the pin hole.

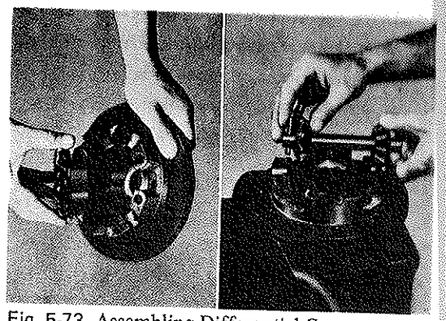


Fig. 5-73 Assembling Differential Case

(2) Assemble the differential gear case by inserting eight (8) setting bolts and tightening hexagon nuts. Lock the nuts with new lock washers.

Tightening Torque: 3.0 to 5.0 Kg-m (21.7 to 36.2 ft-lbs)

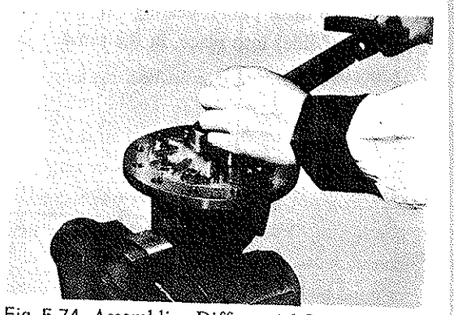


Fig. 5-74 Assembling Differential Case

(3) Attach the ring gear to the differential gear case with 12 hexagon bolts. Lock the bolts with new lock washers.

Ring Gear Attaching Bolt
Tightening Torque: 9 to 11 Kg-m (65.1 to 79.6 ft-lbs)

NOTE:
1. If there are burrs at the edges of the bolt holes in the ring gear or the case, be certain to remove them.
2. When tightening the ring gear attaching bolts, first tighten them diagonally in pairs. Then, tighten them along the ring gear's circumference to specification.

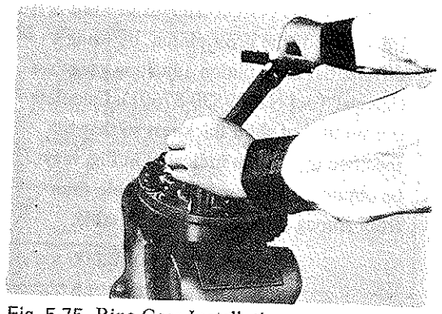


Fig. 5-75 Ring Gear Installation

4. Press the side bearing cone onto the differential case, using a counter shaft front bearing replacer (Special Tool No. 09309-87201).

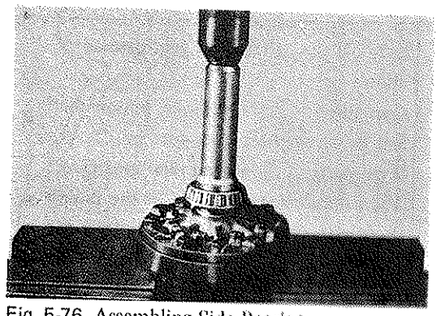


Fig. 5-76 Assembling Side Bearing

5. Drive the drive pinion bearing cup (for the propeller shaft side) into the front axle housing, using a hammer in conjunction with an axle hub and drive pinion bearing tool set (Special Tool No.09608-87301).

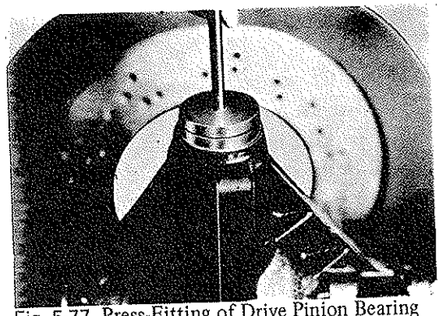


Fig. 5-77 Press-Fitting of Drive Pinion Bearing Cup (Propeller Shaft Side)

6. Drive the drive pinion bearing cup (for the ring gear side) into place, in the same procedure above.

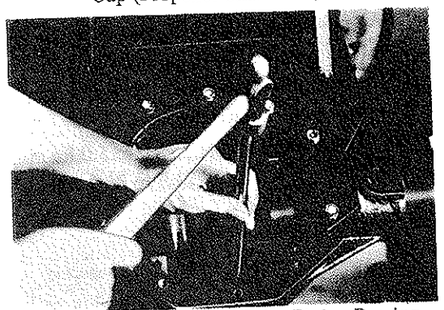


Fig. 5-78 Press-Fitting of Drive Pinion Bearing Cup (Ring Gear Side)

7. Determine the correct amount of shim thickness for the drive pinion, by using a differential drive pinion adjusting gauge set (Special Tool No. 09530-87601). Calculate the amount of shim thickness so that the specified dimension indicated in Fig. may be obtained. Then, select a suitable shim from among shims shown in the table.

Table 5-4 Drive Pinion Shim

Thickness mm (inch)
3.10 (0.122)
3.15 (0.124)
3.20 (0.126)
3.25 (0.128)
3.30 (0.130)
3.35 (0.132)
0.30 (0.012)

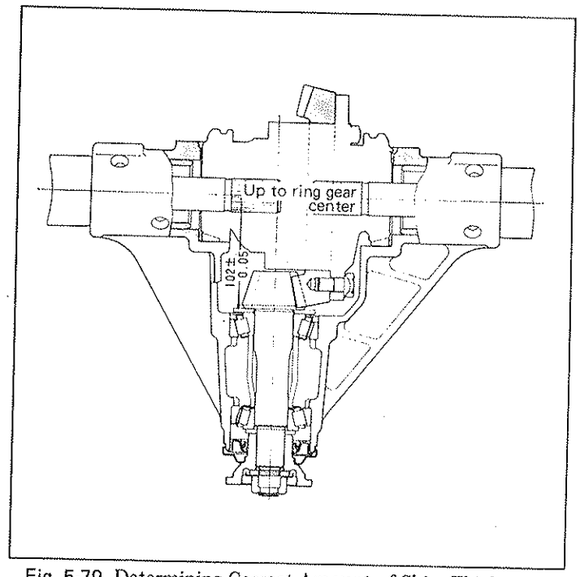


Fig. 5-79 Determining Correct Amount of Shim Thickness

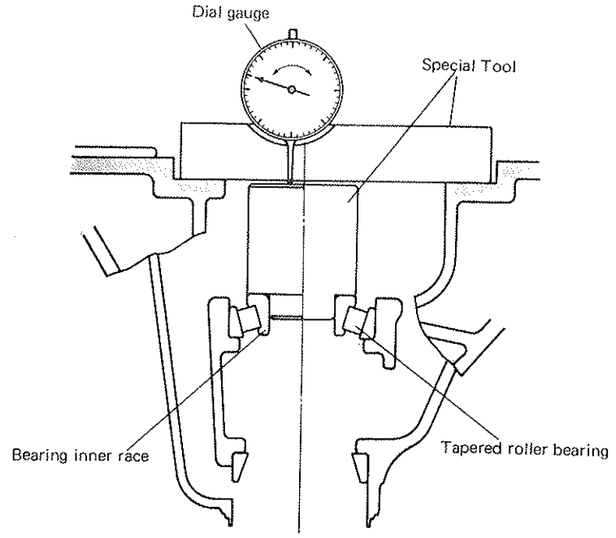


Fig. 5-80 Measuring Amount of Drive Pinion Adjusting Shim

(1) Press the bearing outer races (front and rear) into the differential carrier. With the rear inner case in its assembled position, set the reference block designed exclusively for this purpose.

> Note
> In order to obtain a proper seating, turn the rear bearing inner race several times.

(2) Set the pointer of the dial gauge at the "0" position in relation to the master gauge.
(3) Using the above-described measuring instruments, measure the distance between the bearing cap mounting surface and the reference block up to 1/100 mm.
(4) Select a suitable shim pack based on the reading of the dial gauge.
(5) How to determine shim thickness (Example):

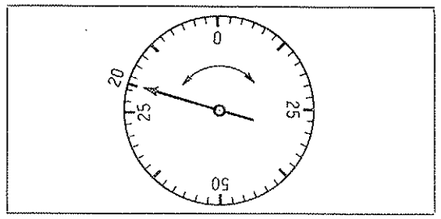


Fig. 5-81 Determining Shim Thickness (Example)

Calculation formula:

Shim thickness = Reference Shim Dimension + (Reading of Dial Gauge)

In the case of the example shown here:
3.25 – (–0.20) = 3.45
Therefore, use a 3.15 mm thick shim and a 0.30 mm thick shim in accordance with the chart below.

No.	1	2	3	4	5	6
Shim thickness mm	3.10	3.15	3.20	3.25	3.30	3.35
Reading of dial gauge	+0.15	+0.10	+0.05	±0	–0.05	–0.10

(Remarks: The reference shim may be changed by the tooth contact pattern.)

8. Place onto the drive pinion adjusting shim pack which has been determined in Step 7 above.
9. Press the bearing cone (for the ring gear side) onto the drive pinion, using a differential drive pinion bearing cone rear replacer (Special Tool No.09506-87301).

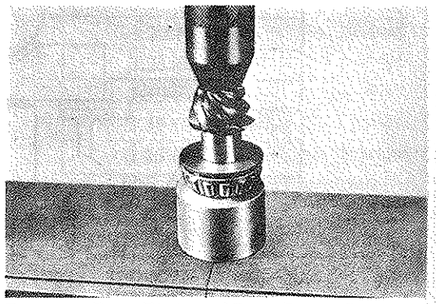


Fig. 5-82 Press-Fitting of Drive Pinion Bearing Cone (Ring Gear Side)

10. Install the drive pinion in the front axle housing as follows:
(1) Place the following parts onto the drive pinion: the drive pinion bearing spacer ① and drive pinion spacer shim ② that were removed at the time of disassembly. Then, install the drive pinion in the front axle housing.

> Note
> When assembling, be sure to coat the bearings with differential lubricant.

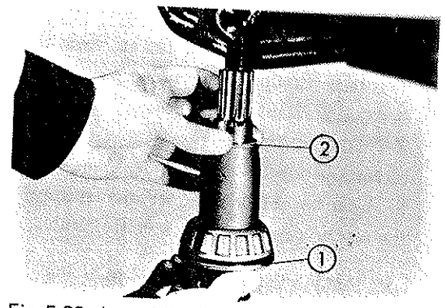


Fig. 5-83 Assembling Drive Pinion

11. Proceed to insert the bearing inner race, plate washer, and drive pinion companion flange onto the drive pinion. While holding the companion flange with a drive pinion flange holding tool (Special Tool No. 09330-87301), tighten the hexagon nut to specification.
Hexagon Nut
Tightening Torque: 20 to 25 Kg-m (144.7 to 180.8 ft-lbs)

> Note
> Make sure to use a new hexagon nut. At this stage, the lock washers or oil seal should not be installed.

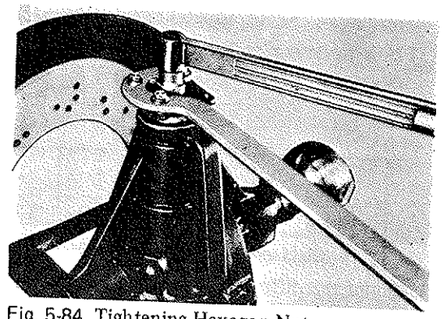


Fig. 5-84 Tightening Hexagon Nut

12. Check the starting torque of the drive pinion. Adjust it, as required.
Hook a spring scale at the bolt hole in the drive pinion companion flange. Pull the spring scale in the tangential direction to measure the starting torque.
Specified Preload: 1.5 to 4.5 Kg (3.3 to 9.9 lbs)

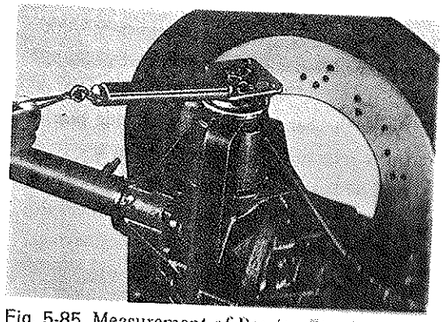


Fig. 5-85 Measurement of Bearing Starting Torque

Note

The starting torque can be adjusted by increasing or decreasing the drive pinion spacer shim ①.

1. If the starting torque does not reach the specified value, reduce the shim thickness. Conversely, if the starting torque exceeds the specified value, increase the shim thickness.
2. Shim availability is in the Table.

Table 5-5 Drive Pinion Spacer Shim

Thickness mm (inch)
0.08 (0.0031)
0.25 (0.0098)
0.30 (0.0118)
0.40 (0.0157)
0.50 (0.0197)

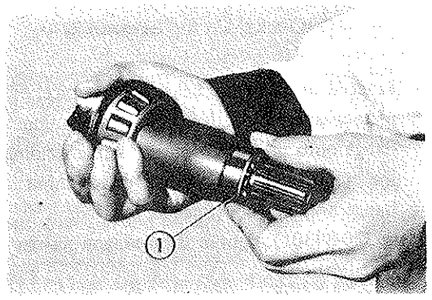


Fig. 5-86 Adjustment of Bearing Starting Torque

13. Mount the differential case in the front axle housing as follows:

(1) Spread the differential section of the front axle housing, using a differential gear expander (Special Tool No.09401-87601).

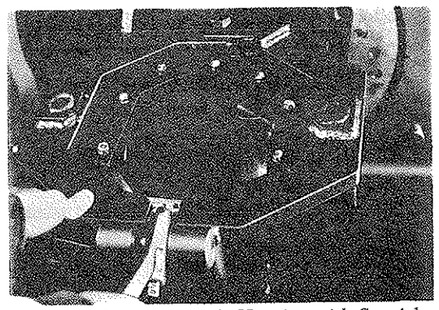


Fig. 5-87 Spreading Axle Housing with Special Tool

(2) Place the bearing cup on each side bearing cone which has been installed in the differential case. Place in the front axle housing the differential case together with the side bearing shim packs, each having the same thickness as with the original ones at the time of disassembly.

Note

When assembling, be sure to coat the bearings with differential lubricant.

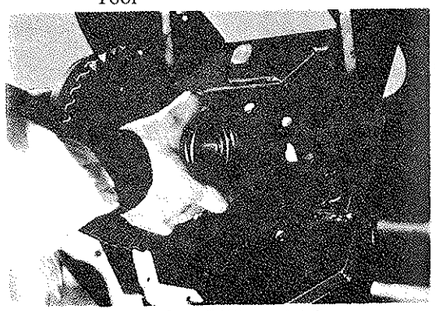


Fig. 5-88 Assembling Differential Case

14. Install the bearing caps on the front axle housing.

Bearing Cap
Tightening Torque: 8 to 12 Kg-m
(57.9 to 86.8 ft-lbs)

NOTE:

1. Make sure to match the mate marks on the bearing cap and the axle housing which were punched during disassembly.
2. Be certain to tighten the hexagon bolts alternately to specification.

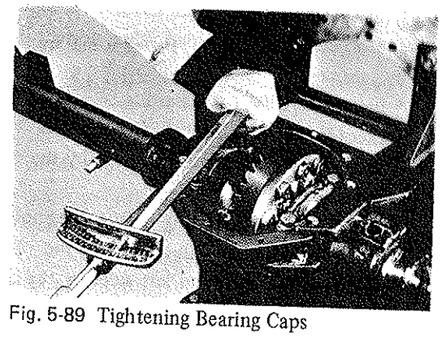


Fig. 5-89 Tightening Bearing Caps

15. Check the backlash between the ring gear and the drive pinion. Adjust the backlash, as needed, following the procedure given below:

(1) Install a dial gauge on the housing with the dial gauge's button contacted squarely against the tooth surface at the heel end of the ring gear. Measure the backlash.
Specified Backlash: 0.1 to 0.2 mm
(0.0039 to 0.0079 inch)

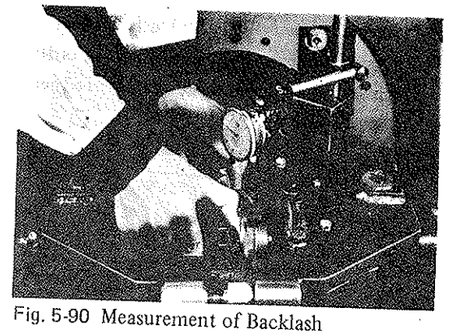


Fig. 5-90 Measurement of Backlash

(2) Adjust the backlash by increasing or decreasing the side bearing shims.

Note

When the side shim thickness at one side is increased, the side shim thickness at the other side should be decreased by the same amount. Conversely, when the side shim at one side is reduced, the side shim at the other side should be increased by the same amount.

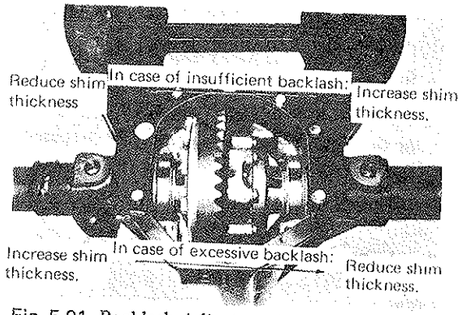


Fig. 5-91 Backlash Adjustment

16. Check the total starting torque of the differential as follows:

(1) Hook a spring scale at the bolt hole in the drive pinion companion flange. Pull the spring scale in the tangential direction so as to measure the total starting torque.
Specified Total Preload: 1.9 to 5.4 Kg
(4.2 to 11.9 lbs)

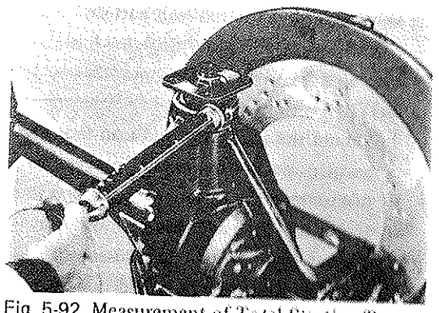


Fig. 5-92 Measurement of Total Starting Torque

(2) If the total starting torque has not conformed to the specified value, correct it by means of the side bearing shims.
* In case that the total starting torque exceeds the specified value, reduce the shims on the right and left sides by the same amount.
* In case the total starting torque does not reach the specified value, increase the shims on the right and left sides by the same amount.

(3) After the total starting torque has been corrected, recheck the backlash between the ring gear and the drive pinion in order to insure that the backlash has conformed to specification.

Table 5-6 Side Bearing Shim Availability

Thickness mm (inch)
2.45 (0.097)
2.50 (0.098)
2.55 (0.100)
2.60 (0.102)
2.65 (0.104)
2.70 (0.106)
2.75 (0.108)
2.80 (0.110)
2.85 (0.112)
2.90 (0.114)
2.95 (0.116)
3.00 (0.118)
3.05 (0.120)
3.10 (0.122)
3.15 (0.124)
3.20 (0.126)
3.25 (0.128)
3.30 (0.130)

17. Check the tooth contact pattern between the ring gear and the drive pinion as follows:

(1) Solve red lead by a solvent, such as gear oil or the like. Evenly apply the thus-prepared red lead to both sides of eight (8) to nine (9) teeth of the ring gear.

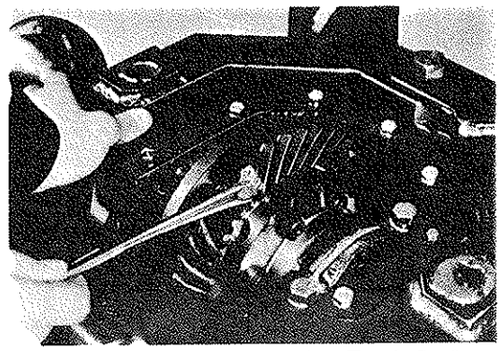


Fig. 5-93 Applying Red Lead to Tooth Surface

(2) Roll the ring gear several times in both forward and backward directions.

(3) Make sure that the red lead pattern produced by rolling the ring gear has indicated a correct tooth contact.

NOTE:
1. Should the pattern of red lead indicate an incorrect tooth contact, proceed to disassemble the differential.
2. If the ring gear and drive pinion of a correct pair have not been used, a correct tooth pattern would not be obtained.

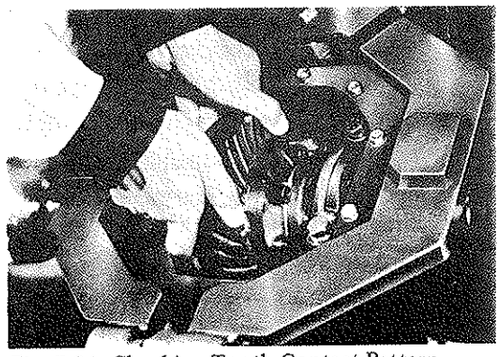


Fig. 5-94 Checking Tooth Contact Pattern

(4) Fig. shows at a correct tooth contact pattern produced by red lead.

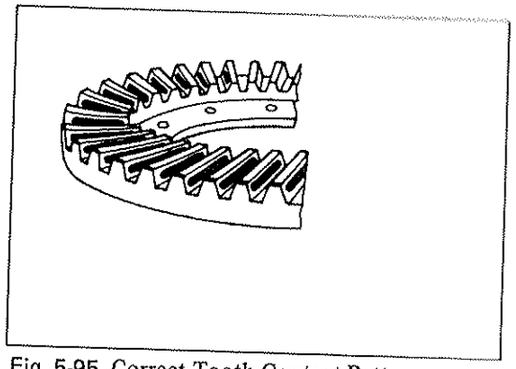


Fig. 5-95 Correct Tooth Contact Pattern

1 Contact on the heel:
To correct this kind of tooth contact pattern, move the pinion toward the ring gear, by reducing the drive pinion adjusting shim thickness. Then, move the ring gear away from the drive pinion to obtain a correct backlash.

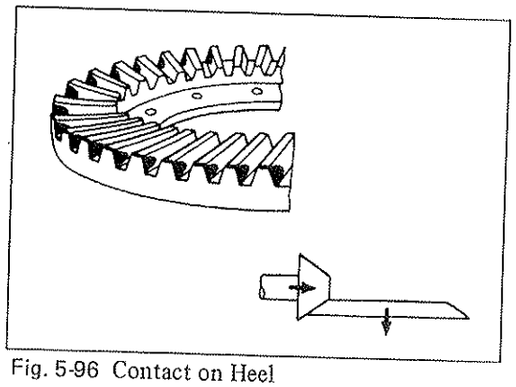


Fig. 5-96 Contact on Heel

2 Contact on the toe:
To correct this kind of tooth contact pattern, move the pinion away from the ring gear, by increasing the drive pinion adjusting shim thickness. Then, move the ring gear toward the pinion to obtain a correct backlash.

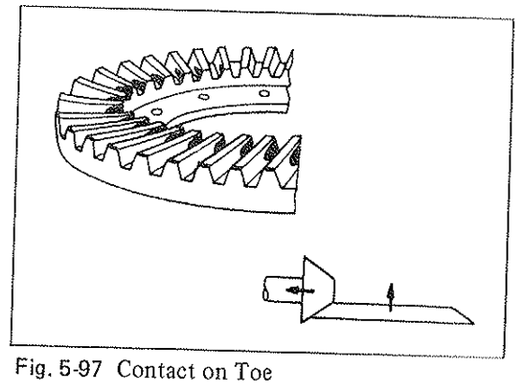


Fig. 5-97 Contact on Toe

3 Flank contact (Low yet shallow contact)
To correct this kind of tooth contact pattern, move the pinion away from the ring gear, by increasing the drive pinion adjusting shim thickness. Then, move the ring gear toward the pinion to obtain a correct backlash. (This procedure is the same as for correcting the contact on the toe as outlined in Step 2 above.)

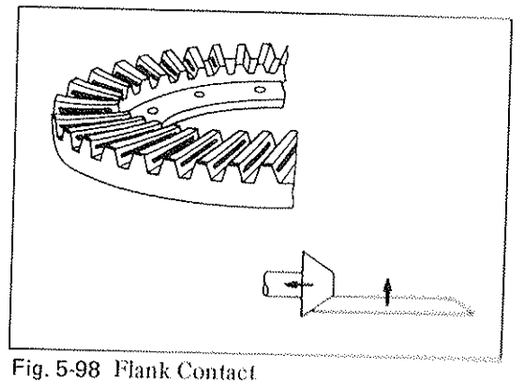


Fig. 5-98 Flank Contact

4 Face contact (High yet shallow contact)
To correct this kind of tooth contact pattern, follow the same procedure as for correcting the contact on the heel as outlined in Step 1 above.

NOTE:
1. Repeat the above-described procedure until a good tooth contact pattern is obtained.
2. Upon completion of the tooth contact pattern adjustment, thoroughly clean red lead from the tooth surfaces of both the pinion and ring gear.

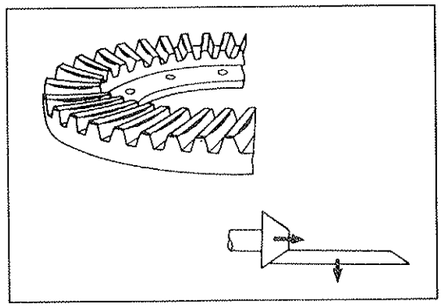


Fig. 5-99 Face Contact

18. Remove the hexagon nut at the center of the drive pinion companion flange.
Proceed to remove the companion flange.
19. Drive a new type "T" oil seal into the front axle housing, using an output shaft bearing replacer (Special Tool No.09309-87301).

Note
Make sure to apply lithium grease to the lip-section of the oil seal.

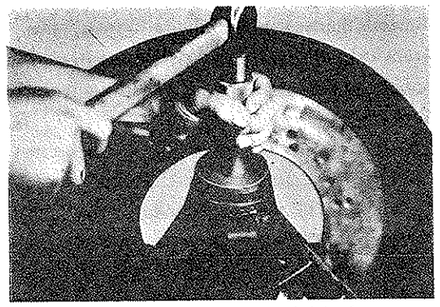


Fig. 5-100 Installing Type "T" Oil Seal

20. Install the drive pinion companion flange as follows:
(1) Install the following parts onto the drive pinion in this sequence: the drive pinion companion flange, plate washer, a new lock washer and hexagon nut. Tighten the nut to specification.
Companion Flange Nut
Tightening Torque: 20 to 25 Kg-m
(144.7 to 180.8 ft-lbs)
(2) Lock the hexagon nut with the lock washer.

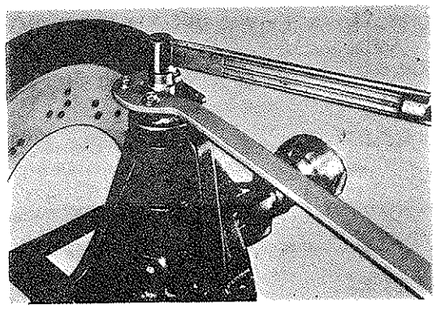


Fig. 5-101 Tightening Hexagon Nut

21. Mount the front axle housing cover.
Tightening Torque: 1.8 to 2.4 Kg-m
(13.0 to 17.4 ft-lbs)

NOTE:
1. Be sure to use a new cover gasket.
2. Flange bolts should be used for the axle housing cover attaching bolts.

22. Install the front drive shaft, brake drums and so forth so as to complete the assembly operation of the front axle.

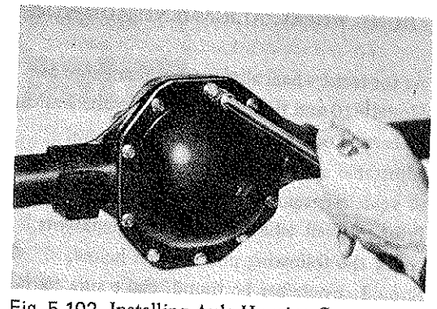


Fig. 5-102 Installing Axle Housing Cover

INSTALLATION

Reverse the removal procedure to install the front axle assembly. When installing it, care should be exercised as to the following points listed below:

1. Be sure to replace original gaskets with new ones.
2. When installing tapered roller bearings, pack the rollers with lithium grease.
3. Apply a bond sealer to the axle outer shaft flange, before it is mounted to the hub.
4. Tightening Torque:

"U" bolt nut:	5.0 to 8.0 Kg-m (36.2 to 57.9 ft-lbs)
Spring shackle:	3.0 to 4.5 Kg-m (21.7 to 32.5 ft-lbs)
Tie rod lock nut:	12 to 17 Kg-m (86.8 to 123.0 ft-lbs)
Tie rod end x knuckle:	3.5 to 5 Kg-m (25.3 to 36.2 ft-lbs)
Propeller shaft:	6 to 8 Kg-m (43.4 to 57.9 ft-lbs)
Drain plug:	4 to 6 Kg-m (28.9 to 43.4 ft-lbs)

(Apply a bond sealer to the threaded section of the drain plug.)

Hub nut:	9 to 12 Kg-m (65.1 to 86.8 ft-lbs)

5. Differential lubricant capacity:

Hypoid Gear Oil	1.5 liters

FRONT WHEEL ALIGNMENT ADJUSTMENTS

As for front wheel alignment adjustments for Model F10 and F20, only toe-in adjustment can be carried out. Camber and caster are not adjustable as they were determined at the time of vehicle designing.

Prior to front wheel alignment adjustments, check the following points given below. Should any defect be found, make sure to adjust or correct, as required.

1. Ensure that vehicle is under unloaded state and is placed on a level floor.
2. Tire air inflation pressure, unevenly-worn tires, and variation in outer diameter.
3. Wheel runout.
4. Front wheel bearing play.
5. Worn kingpins.
6. Looseness in tie rod ends and drag links.
7. Distorted bases of right and left wheels.
8. Shock absorber inoperative.
9. Looseness in spring "U" bolts and steering gear housing.

If test vehicle should exhibit some of the above-described defects, it may not be able to perform front wheel alignment adjustments. Therefore, the checks must precede front wheel alignment adjustments.

1. Measurement and adjustment of toe-in:
   Measure toe-in of test vehicle with a toe-in gauge. If the reading does not conform to specification, correct the toe-in by adjusting the length of the tie rods. This adjustment can be made by slackening the tie rod end nuts (right-hand thread in the case of the right tie rod ends; left-hand thread in the case of the left tie rod ends).

Table 5-6 Toe-in and Side Slip

Toe-in	3 to 5 mm (0.12 to 0.20 inch)
Side slip	in 3 to out 3 mm/m

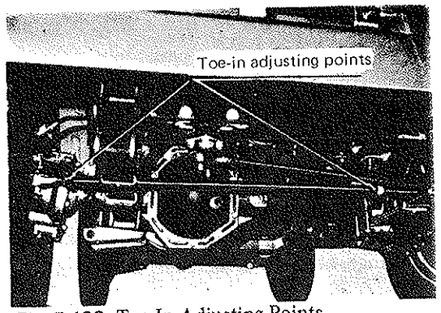


Fig. 5-103 Toe-In Adjusting Points

2. Camber and caster:
   Camber and caster are unadjustable factors. Nonetheless, if they should show unusual values, carry out a total inspection on the front ends. Those front end defects, such as a bent front axle housing, defective spring seats, and weak front springs, will affect camber and caster.

Table 5-7 Camber and Caster

Camber	1° 30′
Caster	30′
Kingpin inclination angle	7° 30′

DAIHATSU
4 WHEEL DRIVE

SECTION 6
SUSPENSIONS

DESCRIPTION

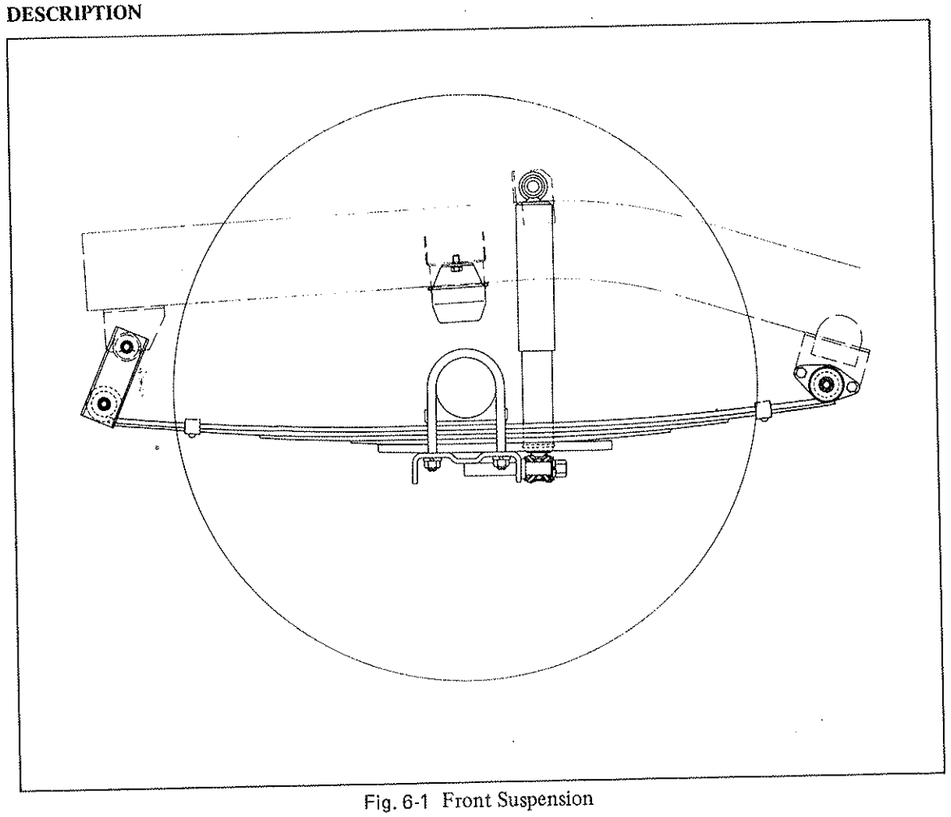


Fig. 6-1 Front Suspension

The front suspension consists of the synmetric type longitudinal leaf springs and double-action telescopic type shock absorbers. For improved riding comfort, the spring bracket pins and shackles incorporate rubber bushes.

Both ends of the No.1 leaf of the front spring are rolled up, forming a cylindrical shape, where rubber bushes with a flange are inserted.

To improve further riding comfort, both ends of each spring leaf have been given taper-rolling treatment. Moreover, in order to prevent squeak noises, graphite grease has been applied between spring leaves.

The shackle attaches the front eye of the front spring to the frame. When the vehicle is in motion, the springs alternately flatten and arch as the wheels move up and down in passing over irregularities in the road surface. In addition to this flattening and arching action of the spring, the change in vehicle load also causes constant variation in the span distance between the spring eyes. The shackle compensates such change in spring span, by changing its attaching angle in relation to the frame.

The spring shackle is of the compression type where the shackle plate can be split and pins are welded to the shackle plate.

The front shock absorber is of the double-action type. The lower end is attached to the front axle through the U bolt seat, whereas the upper end is mounted to the frame through the upper bracket.

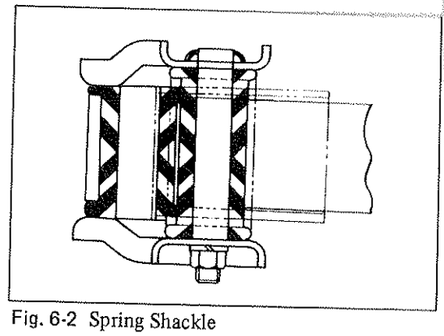


Fig. 6-2 Spring Shackle

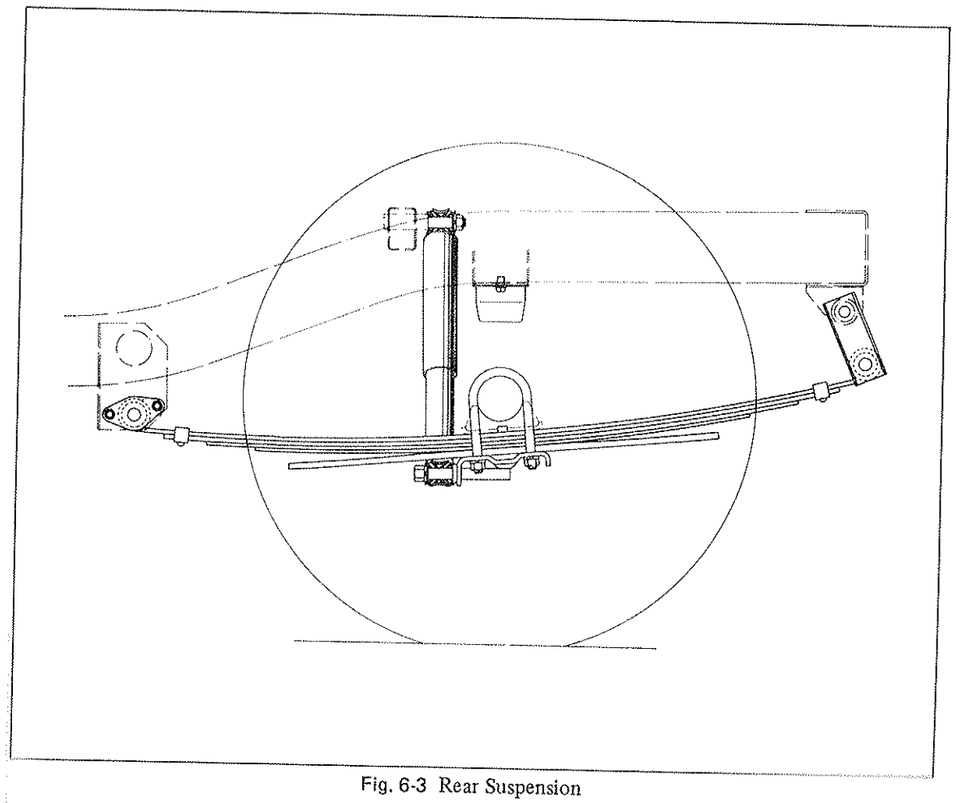


Fig. 6-3 Rear Suspension

(1) U bolts

On all the F20, 25, 50 and 55 series, the right inner U bolt differs from other three U bolts in its shape in order to avoid interfering with the differential carrier. For the rear side, the four U bolts are identical.

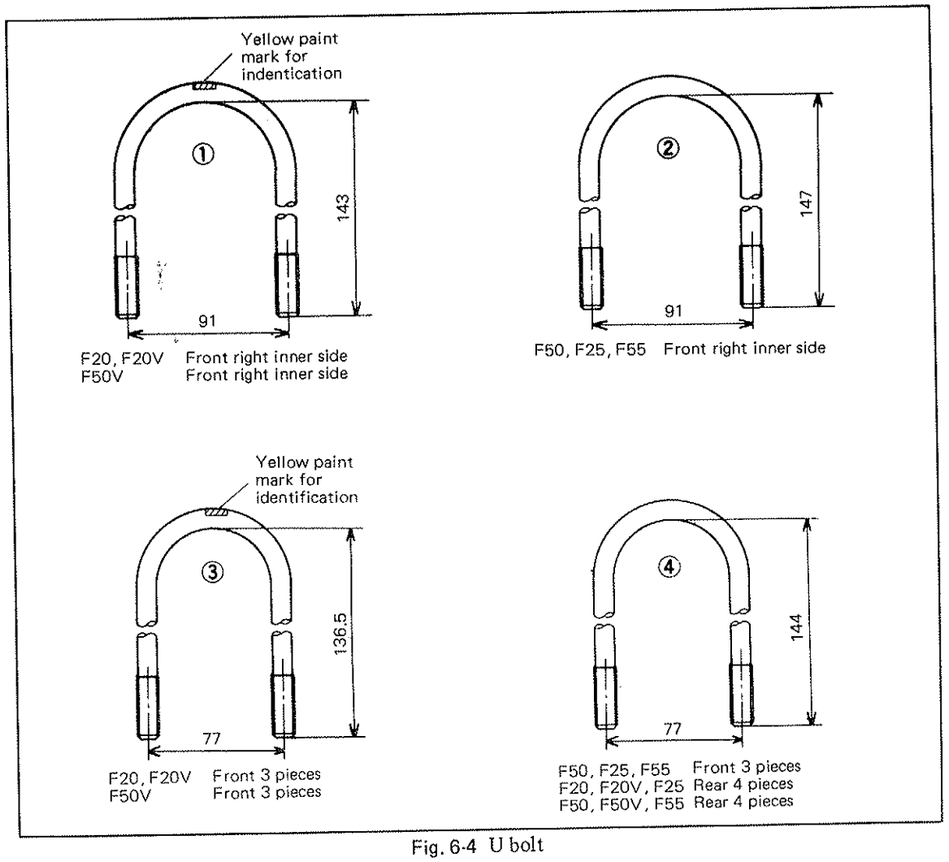


Fig. 6-4 U bolt

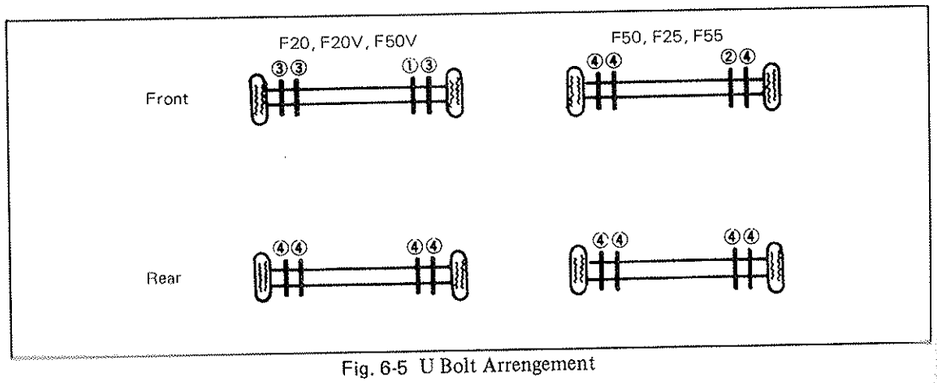


Fig. 6-5 U Bolt Arrengement

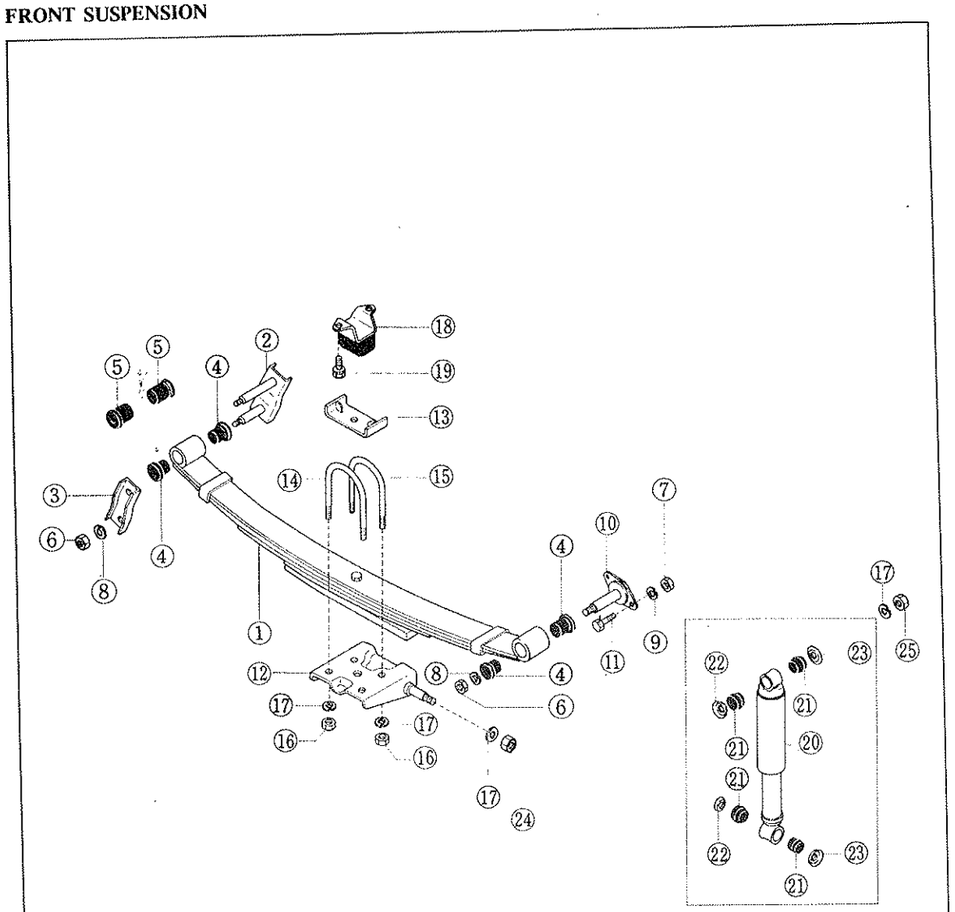
Specifications of Front Suspension

Item \ Model		F20-J	F20V	F50-J	F50V	F25	F55
Spring	Length mm (inch)	950 (37.40)	←	←	←	1,050 (42.34)	←
	Width×Leaf thickness–No. of leaves mm (inch)	50×7–4 (1.97×0.28–4)	$50\times^{7-1}_{8-3}$ ($1.97\times^{0.28-1}_{0.31-3}$)	50×7–5 (1.97×0.28–5)	50×8–4 (1.97×0.31–4)	$60\times^{7-1}_{8-4}$ ($2.36\times^{0.28-1}_{0.31-4}$)	60×8–5 (2.36×0.31–5)

Specifications of Rear Suspension

Item \ Model		F20-J	F20V	F50-J	F50V	F25, F55
Spring	Length mm (inch)	1,050 (41.34)	←	←	←	1,230 (48.43)
	Width×Leaf thickness–No. of leaves mm (inch)	$50\times^{6-2}_{7-2}$ ($1.97\times^{0.24-2}_{0.28-2}$)	←	←	$50\times^{6-1}_{7-3}$ ($1.97\times^{0.24-1}_{0.28-3}$)	60×7–4 (2.36×0.28–4)
	Auxiliary spring (Length×width×thickness–No. of leaves) mm (inch)	500×50×13–1 (19.69×1.97×0.51–1)	560×50×13–1 (22.05×1.97×0.51–1)	500×50×13–1 (19.69×1.97×0.51–1)	610×50×13–1 (24.02×1.97×0.51–1)	850×60×13–1 (33.46×2.36×0.51–1) 485×60×13–1 (19.09×2.36×0.51–1)

FRONT SUSPENSION



① Front spring
② Spring shackle
③ Spring shackle inner plate
④ ⑤ ㉑ Bush
⑥ ⑦ ⑯ ㉕ Nut
⑧ ⑨ ⑰ Spring washer
⑩ Spring bracket pin
⑪ Bolt
⑫ Front spring "U" bolt seat
⑬ Front leaf spring seat
⑭ ⑮ "U" bolt
⑱ Front spring bumper
⑲ Bolt with washer
⑳ Front shock absorber
㉒ ㉓ Washer
㉔ Hexagon nut

Fig. 6-6 Front Spring and Shcok Absorber Components

Removal

1. Jack up the front end of the vehicle and support the frame with rigid racks.
2. Remove the tire.

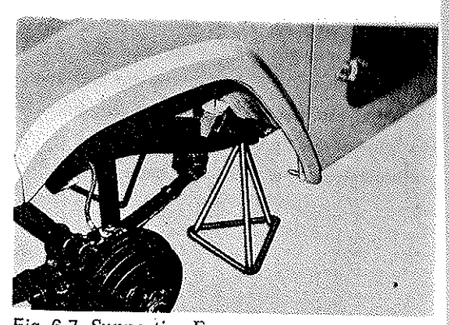


Fig. 6-7 Supporting Frame

3. Remove the front shock absorber as follows:
(1) Disengage the lower part of the shock absorber from the U bolt seat joint section.
(2) Remove the nut that attaches the upper part of the shock absorber to the farme.

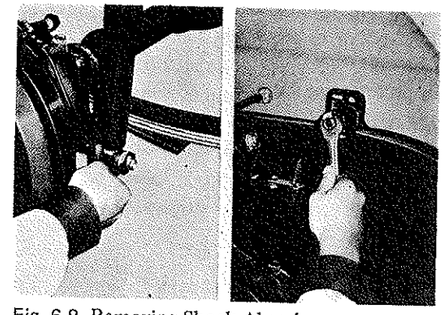


Fig. 6-8 Removing Shock Absorber

4. Remove the front spring, following the procedure given below:
(1) Remove the four attaching nuts of the U bolts that are located at the center of the front spring. Take out the bolts and U bolt seat.
(2) Jack up the front axle housing so as to relieve the spring from any load.

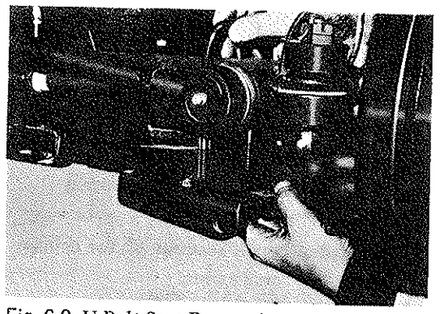


Fig. 6-9 U Bolt Seat Removal

(3) Remove the shackle attaching nuts (two) and take the shackle plate out.
(4) Remove the shackle and four bushes.

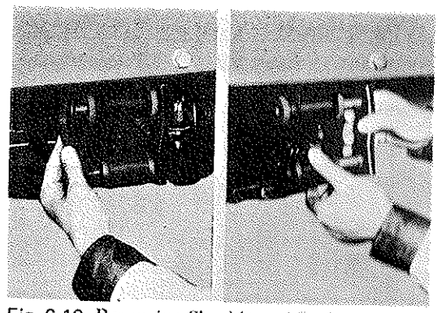


Fig. 6-10 Removing Shackle and Bushes

(5) Remove the nut at the end of the spring bracket pin provided at the rear end of the front spring. Then, take out the bolt and nut at the bracket pin support section.
(6) Remove the spring together with the bracket pin out from the frame.

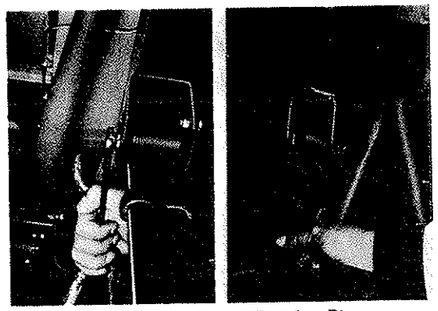


Fig. 6-11 Removing Spring Bracket Pin

Inspection and Repairs

1. Checking of the shock absorber:
(1) Check the shock absorber for damage, fluid leak, or reduced damping force.
(2) Check the bushes for damage or wear.

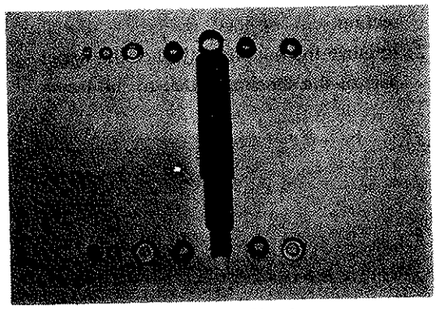


Fig. 6-12 Shock Absorber Check

2. Checking of the front spring:
(1) Inspect the bushes ① for damage or wear.
(2) Check the shackle pin ② and spring bracket pin ③ for damage, wear or rust.
(3) Check the threaded section of the U bolts ④ for damage or wear.
(4) Inspect the front spring ⑤ for damage or weak condition.
(5) Inspect the U bolt seat pin ⑥ for damage or rust.

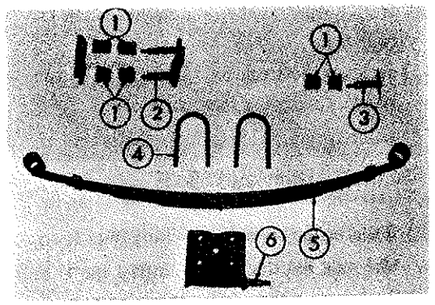


Fig. 6-13 Front Spring Check

3. Measure the height of the spring.

mm (inch)

Model	Driver side	Passenger side
F20J	135 (5.31)	←
F20V	130 (5.12)	123 (4.84)
F50J	145 (5.71)	135 (5.31)
F50V	132 (5.20)	130 (5.12)
F25	75 (2.95)	←
F55	79.5 (3.13)	←

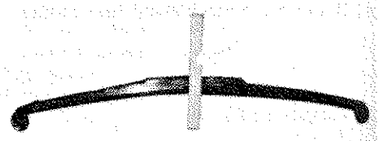


Fig. 6-14 Measuring Spring Height

Installation

1. Install the front spring as follows:
(1) Install two bushes and spring bracket pin into the spring eye section at the rear end of the front spring. Then, place the rear spring eye in the frame bracket.
Tentatively, attach the bracket pin support section to the frame bracket by means of bolts and nuts. Also, attach the end of the pin section by means of a nut.

Note

Be sure not to tighten the bolts and nuts securely at this stage.

(2) Install bushes into the spring eye at the front end as well as into the bracket, two each. Attach the spring eye section to the frame, using the shackle and shackle plate.

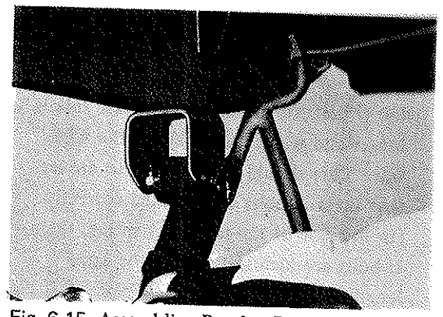


Fig. 6-15 Assembling Bracket Pin

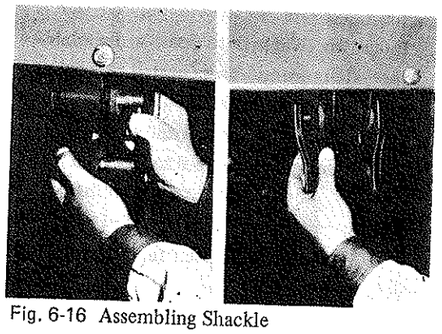


Fig. 6-16 Assembling Shackle

2. Tighten the bracket pin and shackle as follows:
(1) Torque the nut at the end of the pin section of the bracket pin.
Tightening Torque: 3.0 to 4.5 kg-m
(21.7 to 32.5 ft-lbs)
(2) Torque the two bolts at the both sides of the bracket pin supporting section.
Tightening Torque: 1.5 to 2.2 kg-m
(10.8 to 15.9 ft-lbs)

(3) Tighten the nut at the end of the shackle pin section of the spring shackle.
Tightening Torque: 3.0 to 4.5 kg-m
(21.7 to 32.5 ft-lbs)

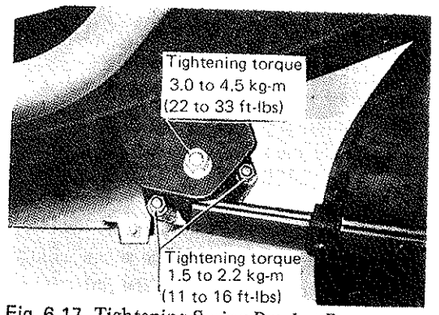


Fig. 6-17 Tightening Spring Bracket Pin

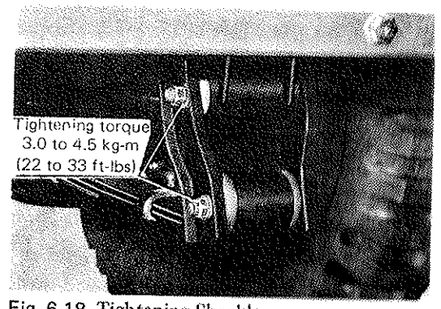


Fig. 6-18 Tightening Shackle

3. Attach the front spring to the front axle with U bolts.

(1) As for the U bolts for the right front spring, the U bolt for the differential case side is longer and wider than that for the wheel side. Care should be exercised to ensure that these U bolts are installed correctly. (In the case of the left front spring, their U bolts are identical, having the same length.)

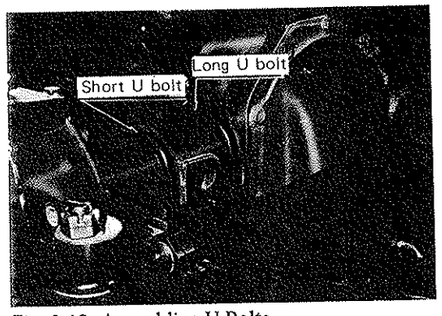


Fig. 6-19 Assembling U Bolts

(2) Place two U bolts into position from above the axle housing. Then, install the U bolt seat from underneath the spring and tighten the U bolt seat with nuts.

Tightening Torque: 5.0 to 8.0 kg-m (36.2 to 57.9 ft-lbs)

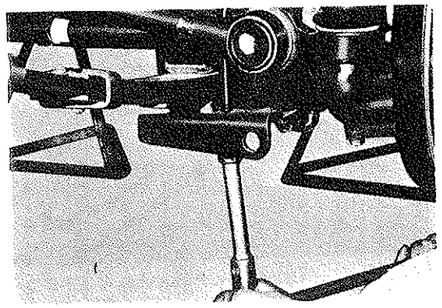


Fig. 6-20 Tightening U Bolts

NOTE:
1. Make sure to tighten the attaching nuts evenly.
2. Ensure that the spring center bolt is fitted exactly in the attaching hole provided at the underside of the front axle housing for this purpose.
3. Be sure that the front spring seat is mounted securely and correctly. (only the right side)

4. Install the front shock absorber as follows:

(1) Attach the upper part of the shock absorber to the frame with the nut.

Tightening Torque: 3.5 to 5.5 kg-m (25.3 to 39.8 ft-lbs)

(2) Attach the lower part of the shock absorber to the U bolt seat.

Tightening Torque: 3.5 to 5.5 kg-m (25.3 to 39.8 ft-lbs)

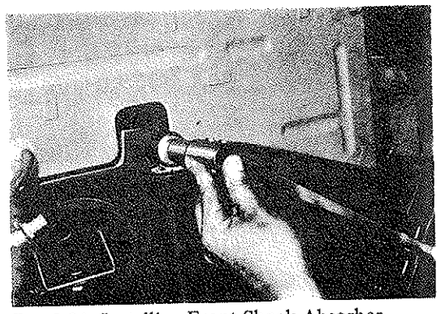


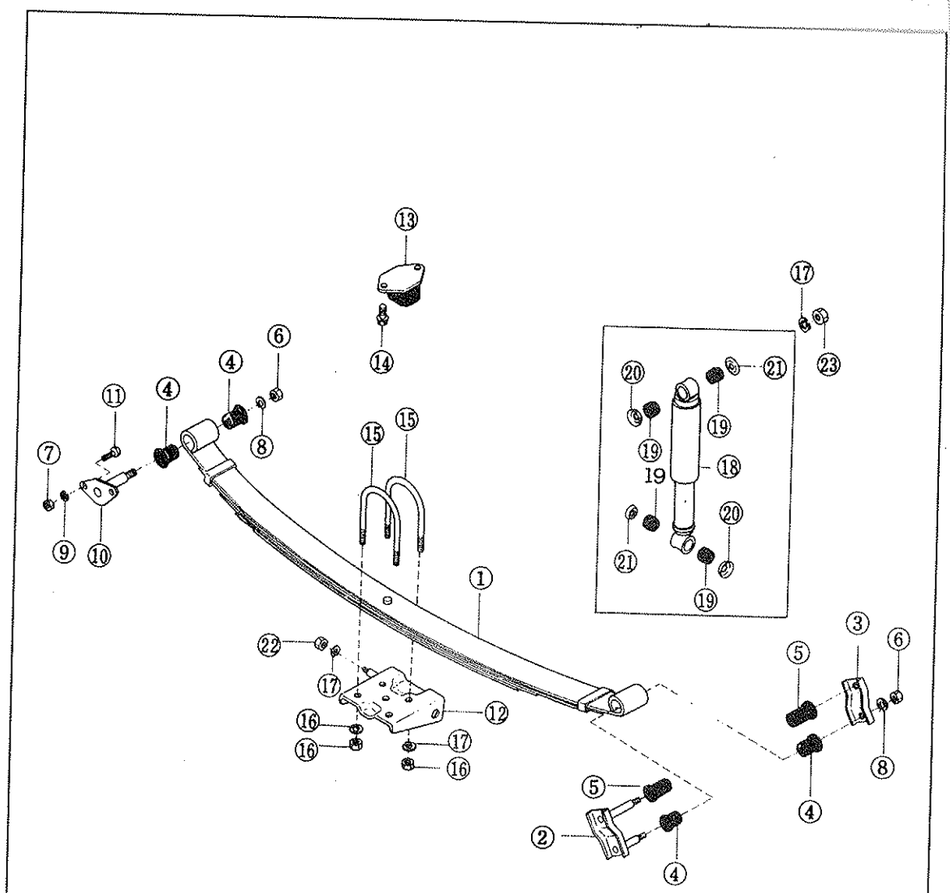
Fig. 6-21 Installing Front Shock Absorber

5. Mount the tire and remove the rigid racks, using a jack.

Tire Hub Nut

Tightening Torque: 9 to 12 kg-m (65.1 to 86.8 ft-lbs)

REAR SUSPENSION



① Rear spring
② Spring shackle
③ Spring shackle inner plate
④⑤⑲ Bush
⑥⑦⑭㉓ Nut
⑧⑨⑰ Spring washer
⑩ Spring bracket pin
⑪ Bolt
⑫ Rear spring "U" bolt seat
⑬ Rear spring bumper
⑭ Bolt with washer
⑮ "U" bolt
⑱ Rear shock absorber
⑳ ㉑ Washer
㉒ Hexagon nut

Fig. 6-22 Rear Spring and Shock Absorber Components

Removal

1. Jack up the front end of the vehicle and support the frame with rigid racks.
2. Remove the tires.

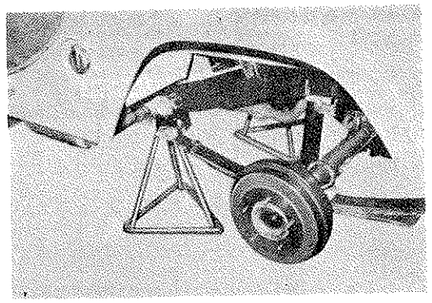


Fig. 6-23 Supporting Frame

3. Remove the rear shock absorber as follows:
(1) Disengage the lower part of the shock absorber from the U bolt seat joint section.
(2) Remove the nut that attaches the upper part of the shock absorber to the cross member.

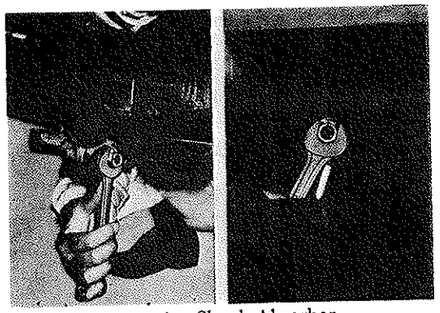


Fig. 6-24 Removing Shock Absorber

4. Remove the rear spring, following the procedure given below:
(1) Remove the four attaching nuts of the U bolts that are located at the center of the rear spring. Take out the U bolt seat, too.
(2) Jack up the rear axle housing so as to relieve the spring from any load.

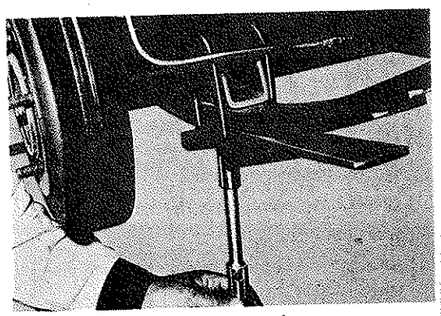


Fig. 6-25 U Bolt Seat Removal

(3) Remove the shackle attaching nuts (two) and take the shackle plate out.
(4) Remove the shackle and four bushes.

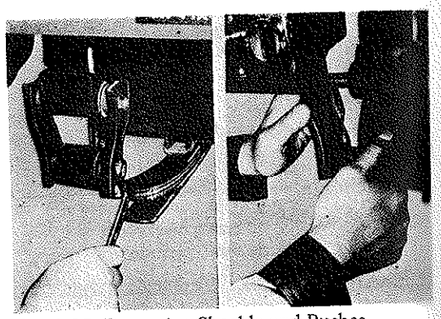


Fig. 6-26 Removing Shackle and Bushes

(5) Remove the nut at the end of the spring bracket pin provided at the front end of the rear spring. Then, take out the bolt and nut at the bracket pin support section.
(6) Remove the spring together with the bracket pin out from the frame.

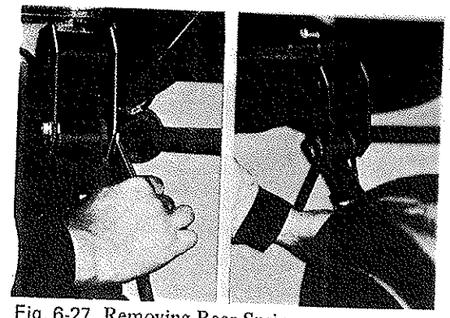


Fig. 6-27 Removing Rear Spring

Inspection and Repairs

1. Checking of the shock absorber:
(1) Check the shock absorber for damage, fluid leak, or reduced damping force.
(2) Check the bushes for damage or wear.

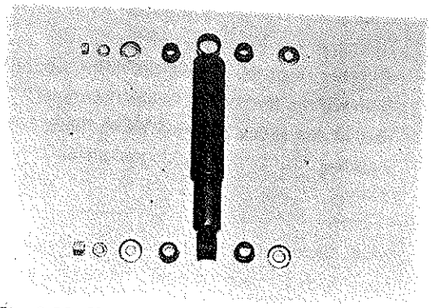


Fig. 6-28 Shock Absorber Check

2. Checking of the rear spring:
(1) Inspect the bushes ① for damage or wear.
(2) Check the shackle pin ② and spring bracket pin ③ for damage, wear or rust.
(3) Check the threaded section of the U bolts ④ for damage or wear.
(4) Inspect the rear spring ⑤ for damage or wear condition.
(5) Check the U bolt seat pin ⑥ for damage or rust.

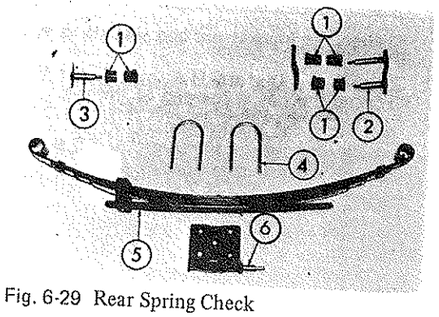


Fig. 6-29 Rear Spring Check

3. Measure the height of the spring.

mm (inch)

Model	Driver side	Passenger side
F20J, F50J	181 (7.13)	170 (6.69)
F20V	177 (6.97)	175 (6.89)
F50V	181 (7.13)	170 (6.69)
F25, F55	151 (5.94)	←

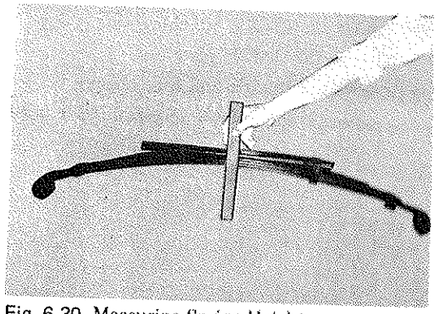


Fig. 6-30 Measuring Spring Height

Installation

1. Install the rear spring as follows:

(1) Insert two bushes and spring bracket pin into the spring eye section at the front end of the rear spring. Then, place the spring eye section in the cross member bracket. Tentatively, attach the bracket pin support section to the bracket by means of bolts and nuts. Also, attach the end of the pin section by means of a nut.

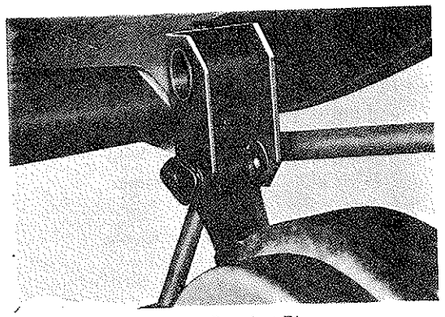


Fig. 6-31 Assembling Bracket Pin

> Note
> Make sure not to tighten the bolts and nuts securely at this stage.

(2) Install bushes into the spring eye at the rear end as well as into the bracket, two each. Attach the spring eye section to the cross member, using the shackle and shackle plate.

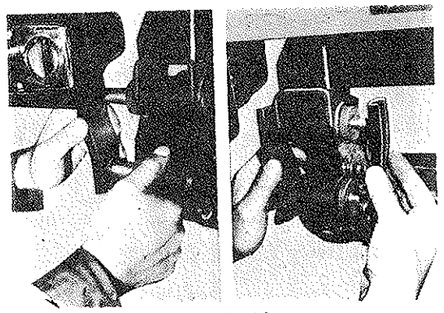


Fig. 6-32 Assembling Shackle

> Note
> when assembling the shackle on the right rear spring, care should be exercised because only a small gap is available between the tail pipe and the shackle.

2. Tighten the bracket pin and shackle as follows:

(1) Torque the nut at the end of the pin section of the bracket pin.

Tightening Torque: 3.0 to 4.5 kg-m
(21.7 to 32.5 ft-lbs)

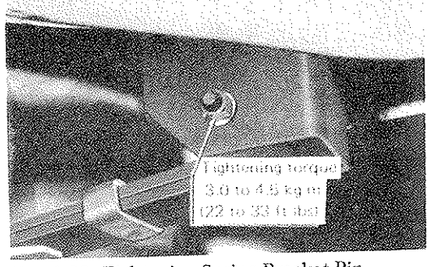


Fig. 6-33 Tightening Spring Bracket Pin

(2) Torque the two bolts at both sides of the bracket pin support section.

Tightening Torque: 1.5 to 2.2 kg-m
(11.0 to 15.9 ft-lbs)

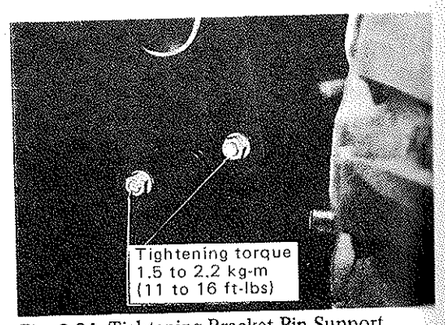


Fig. 6-34 Tightening Bracket Pin Support Section

(3) Torque the nut at the end of the shackle pin section of the spring shackle.

Tightening Torque: 3.0 to 4.5 kg-m
(21.7 to 32.5 ft-lbs)

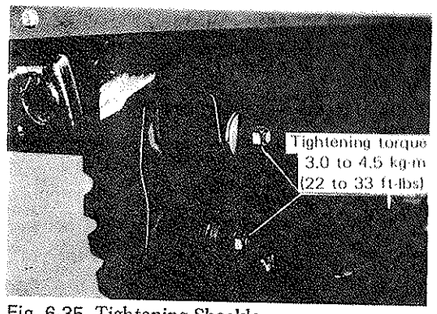


Fig. 6-35 Tightening Shackle

3. Attach the rear spring to the rear axle housing with U bolts, as follows:

(1) Place two U bolts into position from above the axle housing. Then, install the U bolt seat from underneath the spring and tighten the U bolt seat with nuts.

Tightening Torque: 5.0 to 8.0 kg-m
(36.2 to 57.9 ft-lbs)

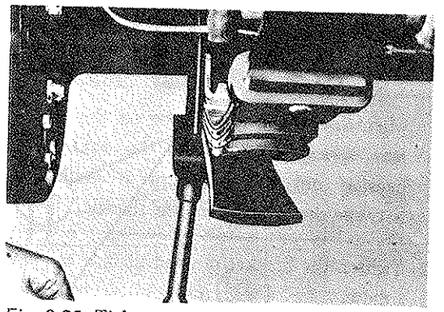


Fig. 6-36 Tightening U Bolts

> NOTE:
> 1. Pay particular attention to the brake line that is mounted along the rear axle housing.
> 2. Be certain to tighten the attaching nuts evenly.

4. Install the rear shock absorber as follows:

(1) Attach the upper part of the shock absorber to the cross member.

Tightening Torque: 3.5 to 5.5 kg-m
(25.3 to 39.8 ft-lbs)

(2) Attach the lower part of the shock absorber to the U bolt seat.

Tightening Torque: 3.5 to 5.5 kg-m
(25.3 to 39.8 ft-lbs)

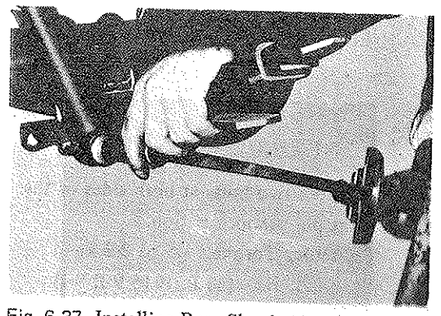


Fig. 6-37 Installing Rear Shock Absorber

5. Mount the tires and remove the rigid racks, using a jack.

Tire Hub Nut
Tightening Torque: 9 to 12 kg-m
(65.1 to 86.8 ft-lbs)

Rear suspension (F25, F55 series)

On the F25 and F55 series, the upper swing method has been employed as the rear axle installation method.

1. Remove the rear spring and shock absorber, following the procedure given below:

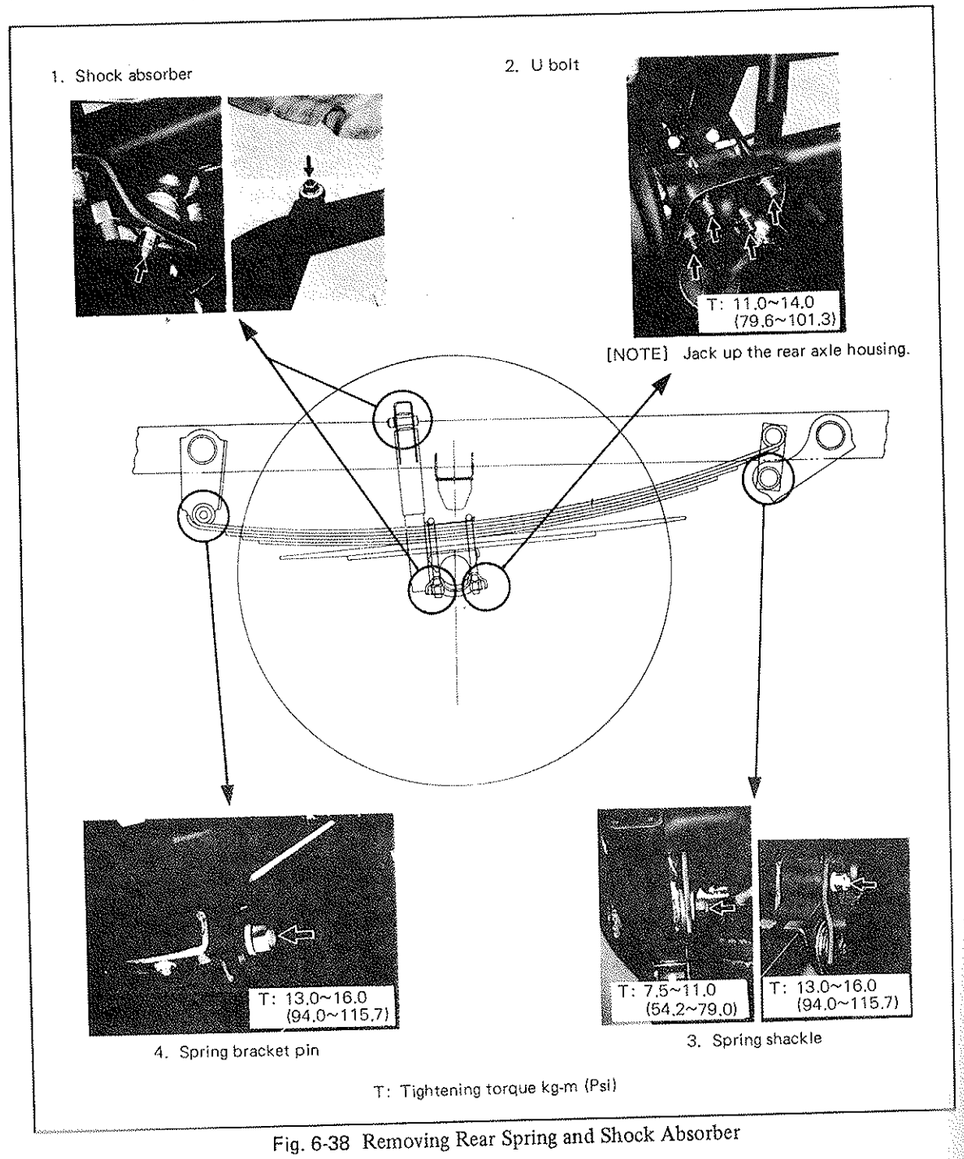


Fig. 6-38 Removing Rear Spring and Shock Absorber

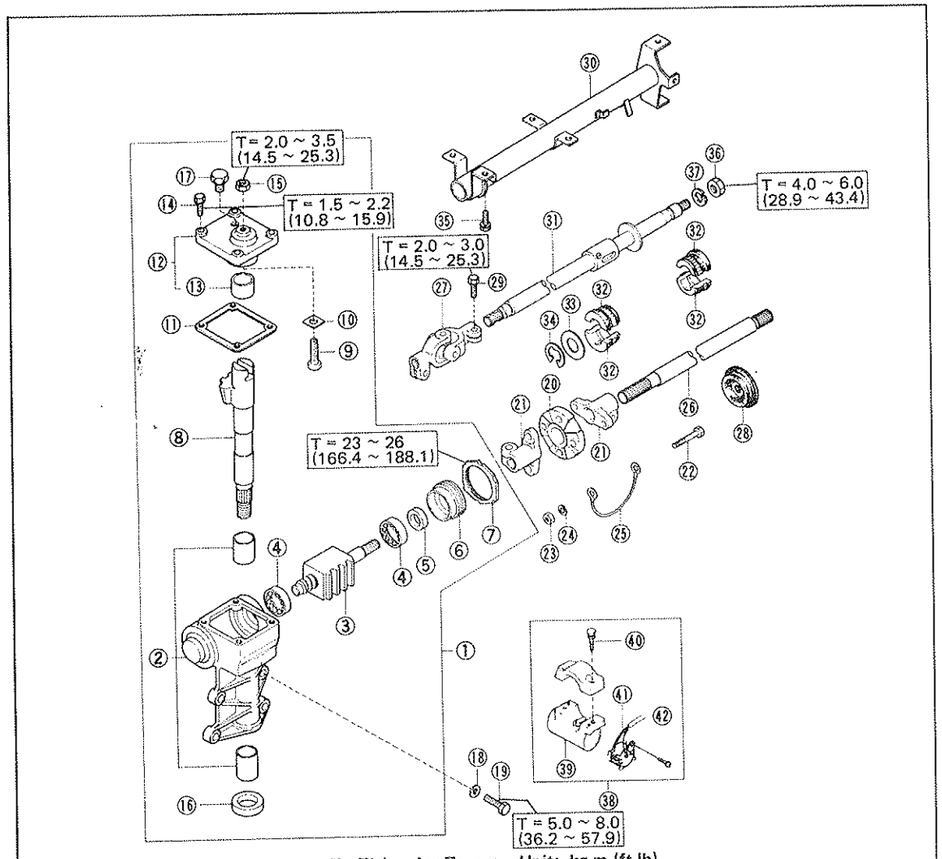
Installation

Reverse the removal procedure to install the rear spring and shock absorber.

4 DAIHATSU WHEEL DRIVE

SECTION 7
STEERING

STEERING COMPONENTS AND TIGHTENING TORQUES



T: Tightening Torque Unit: kg-m (ft-lb)

① Steering gear housing assembly
② Steering gear housing subassembly
③ Steering shaft assembly with ball-nut
④ Radial ball bearing
⑤ ⑯ Type "T" oil seal
⑥ Worm bearing adjusting screw
⑦ Worm bearing adjusting screw lock nut
⑧ Steering sector shaft
⑨ Sector shaft adjusting screw
⑩ Sector shaft adjusting plate
⑪ Sector shaft end cover gasket
⑫ Sector shaft end cover subassembly
⑬ Bimetal formed bush
⑭ Steering gear housing bolt
⑮ Sector shaft adjusting nut
⑰ Tapered screw plug with head
⑱ ㉔ ㊲ Spring washer
⑲ ㉒ Bolt
⑳ Main shaft flexible coupling
㉑ Main shaft flexible coupling yoke
㉓ ㊱ Nut
㉕ Flexible coupling ground
㉖ Steering intermediate shaft
㉗ Steering shaft universal joint assembly
㉘ Steering shaft dust cover
㉙ ㉟ Bolt with washer
㉚ Steering column tube subassembly
㉛ Steering main shaft subassembly
㉜ Bush
㉝ Washer plate
㉞ "E" ring
㊳ Steering column upper bracket assembly with switch
㊴ Steering column upper bracket subassembly
㊵ Steering lock set bolt
㊶ Ignition switch assembly
㊷ Screw with washer

Fig. 7-1 Steering Components and Tightening Torques

STEERING GEAR HOUSING

Removal

1. Remove the following parts in this sequence.
   (1) Air cleaner hose
   (2) Air cleaner body
   (3) Separate the pitman arm from the steering relay rod.
   Special Service Tool (09611-87201)

Fig. 7-2 Disconnecting Pitman Arm

   (4) Remove the attaching bolt ① that connects the steering intermediate shaft to the steering gear housing.
   NOTE: Be certain to set the front wheels at their straight-ahead position.
   (5) Remove the steering gear housing attaching bolts. Proceed to take the steering gear housing together with the pitman arm out toward the upper part of the vehicle.

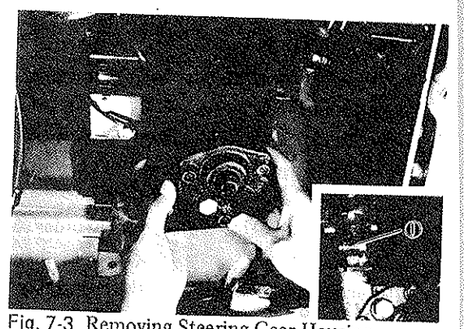


Fig. 7-3 Removing Steering Gear Housing

Disassembly

1. Drain the gear oil by removing the oil plug.
2. Remove the following parts in this sequence.
   (1) Pitman arm
   Special Service Tool (09610-87301)

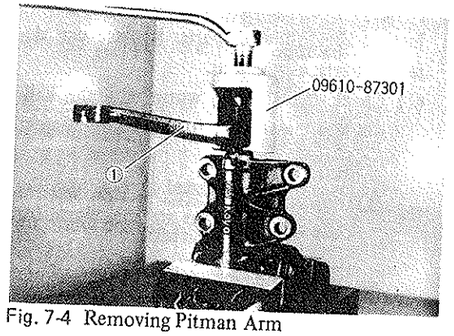


Fig. 7-4 Removing Pitman Arm

   (2) Sector shaft adjusting screw lock nut
   (3) End cover
   (4) Sector shaft

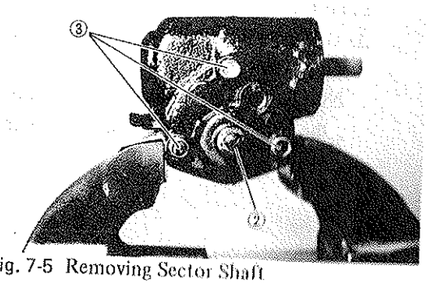


Fig. 7-5 Removing Sector Shaft

(5) Remove the worm bearing adjusting lock nut and worm bearing adjusting screw.
Special Service Tools (09617-28010)
(09616-30011)

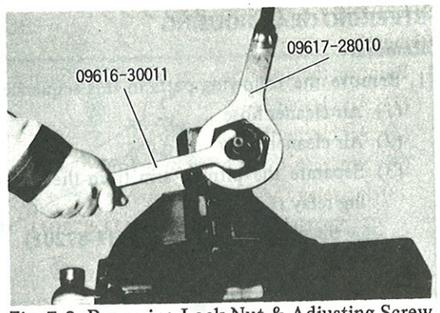


Fig. 7-6 Removing Lock Nut & Adjusting Screw

(6) Gently pull the steering worm out.
NOTE:
1. Never disassemble the ball-nut from the steering worm.
2. Be certain not to allow the ball nut to run and hit to either end of the worm gear.
3. Keep the removed bearings in order so that they may be installed in their original position during the reassembly.

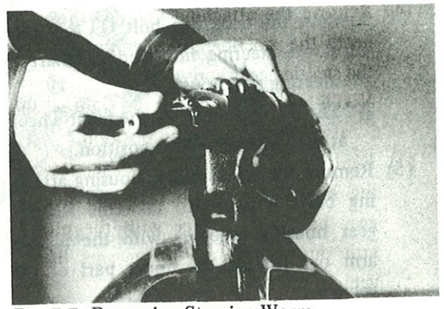


Fig. 7-7 Removing Steering Worm

Inspection

1. Inspect the following parts. Replace any defective parts, as required.
(1) Check the steering worm with the ball-nut shaft assembly for evidence of wear or damage.
① Inspect the threaded section and the cone section of the steering worm for damage.
② Inspect the rack section of the ball-nut for damage.
③ Inspect the bearings for damage.
(2) Check to see if the ball-nut turns smoothly.
① The ball-nut should turn freely by its own weight.
NOTE: Be very careful not to allow the ball-nut to run and hit to the end of the worm shaft.

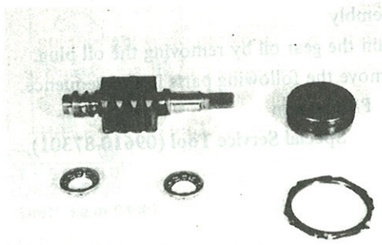


Fig. 7-8 Checking Worm

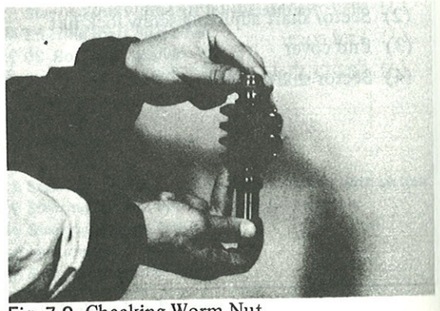


Fig. 7-9 Checking Worm Nut

(3) Sector shaft
① Inspect the gear section for signs of damage or cracks.
② Inspect the bush-fitting section of the shaft for evidence of wear or damage.
Specified Diameter:
31.966 ~ 31.991mm
(1.2585 ~ 1.2595 inches)

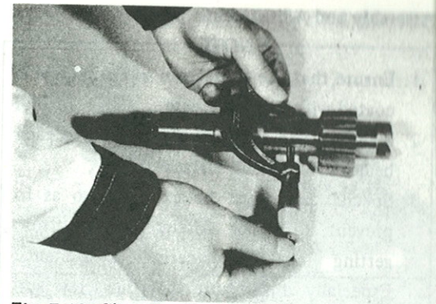


Fig. 7-10 Checking Sector Shaft

③ Inspect the bimetal formed bush for wear or damage.
Sector Shaft-to-Bush Clearance:
0.009 ~ 0.059mm
(0.0004 ~ 0.0023 inch)
④ Inspect the lip-section of the oil seal for wear or damage.

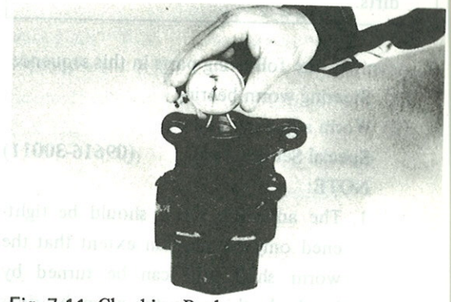


Fig. 7-11 Checking Bush

⑤ Measure the clearance between the sector shaft and the thrust washer. Select a suitable thrust washer so that the clearance may become a minimum.
Specified Clearance: Not to Exceed 0.1mm (0.0039 inch)

Thrust Washer Thickness Availability

Part number	Thickness (mm)
45352-87602	2.00
45353-87602	1.95
45354-87602	2.05
45355-87602	2.10
45356-87602	2.15

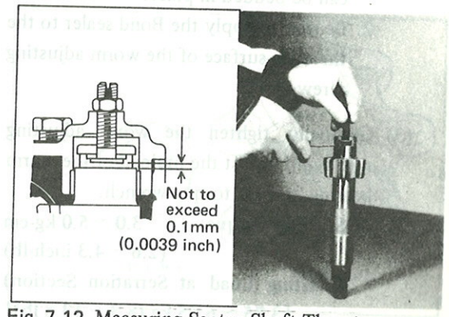


Fig. 7-12 Measuring Sector Shaft Thrust Clearance

Assembly and Adjustments

NOTE

1. Ensure that the lip-section of the oil seal is coated with lithium grease.
2. Make sure to thinly apply gear oil to each bearing and sliding surfaces.
3. Special care must be exercised so as to prevent chips or foreign matters from getting into the steering components. Especially, make sure that the screw surface of the ball-nut is absolutely free from dirts.

1. Assemble the following parts in this sequence.
   (1) Steering worm bearing
   (2) Worm adjusting screw
   Special Service Tool (09616-30011)
   NOTE:
   1. The adjusting screw should be tightened only to such an extent that the worm shaft still can be turned by hands. In this way, the worm bearings can be bedded in place.
   2. Be sure to apply the Bond sealer to the threades surface of the worm adjusting screw.

(3) Gradually tighten the worm adjusting screw and adjust the preload of the worm bearing, using a torque wrench.
Starting Torque: 3.0 ~ 5.0 kg-cm (2.6 ~ 4.3 inch-lb)
(Starting Load at Serration Section) [3.75 ~ 6.25 kg (8.3 ~ 13.8 lb)]

(4) Adjusting lock nut
Special Service Tools (09617-28010) (09616-30011)
Tightening Torque: 23 ~ 26 kg-m (166.4 ~ 188.1 ft-lb)

(5) Remeasure the starting torque. And ensure that the preload meets the specification.

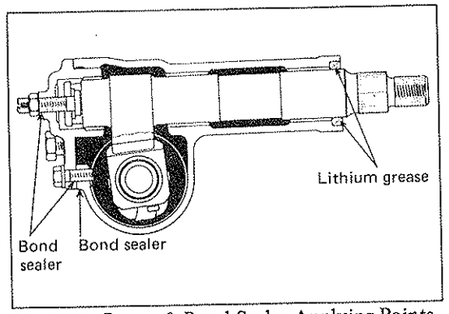


Fig. 7-13 Grease & Bond Sealer Applying Points

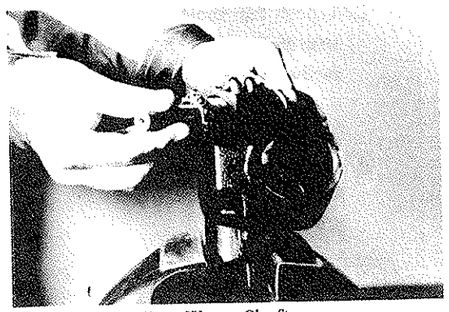


Fig. 7-14 Installing Worm Shaft

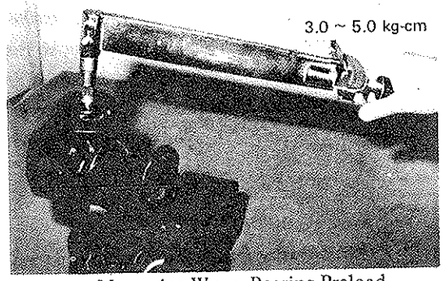


Fig. 7-15 Measuring Worm Bearing Preload

Fig. 7-16 Tightening Lock Nut

(7) Install the adjusting screw. And attach the end cover with the gasket interposed in position.
NOTE:
1. Be certain to apply the Bond sealer to both sides of the gasket.
2. The gear of the sector shaft should be meshed with the center section of the nut after the ball-nut has been set at its center position.
3. The adjusting screw must be backed off, until the end cover comes in close contact with the gear housing surface. Then, proceed to tighten the attaching bolts.
Tightening Torque:
1.5 ~ 2.2 kg-m (10.8 ~ 15.9 ft-lb)
4. Make sure to apply the Bond sealer to the sector shaft adjusting screw's threaded surface and the bottom surface of the lock nut. Moreover, apply the sealer to one passing-through bolt among the three attaching bolts of the end cover.

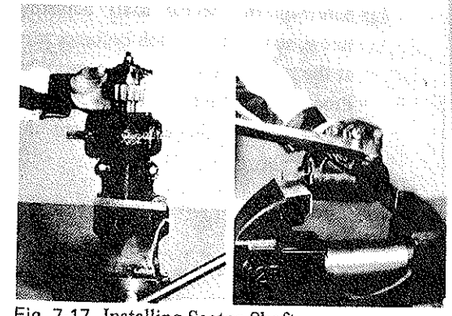


Fig. 7-17 Installing Sector Shaft

(8) Install the pitman arm onto the sector shaft, making sure that the mate marks are lined up to each other. Proceed to tighten the attaching nut temporarily.
NOTE:
1. The final tightening should be made only after the preload adjustment has been completed.
2. Ensure that the "D" mark provided on the pitman arm faces toward the gear housing side.

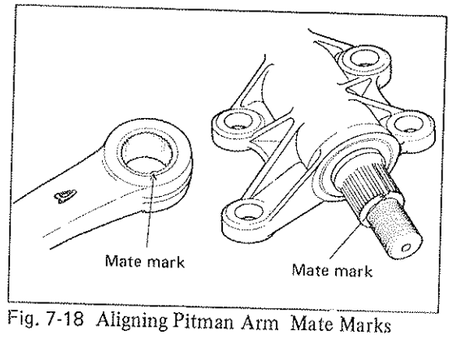


Fig. 7-18 Aligning Pitman Arm Mate Marks

(9) Adjust the preload of the sector shaft.
① Set the steering gear engagement at the neutral position.
NOTE: This neutral setting can be obtained by moving the pitman arm and then by stopping it at half of the whole travel.

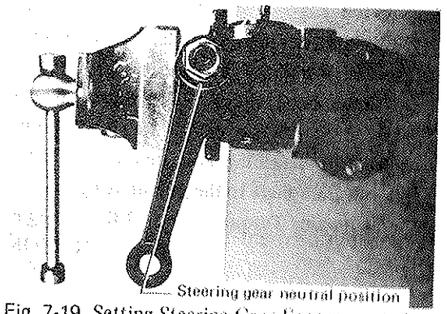


Fig. 7-19 Setting Steering Gear Engagement at Neutral Position

② Screw-in the sector shaft adjusting screw, until the backlash becomes zero at the tip-end of the pitman arm. Proceed to tighten the adjusting screw further about 90 degrees from the setting above.

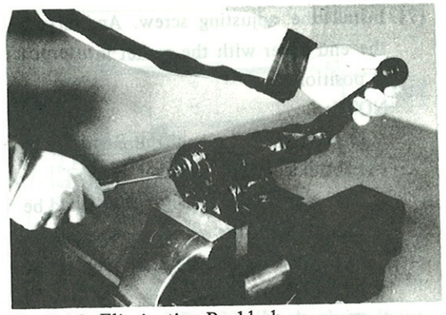


Fig. 7-20 Eliminating Backlash

③ Measure the preload.
Starting Torque: 5.0 ~ 8.0 kg-cm (4.3 ~ 6.9 inch-lb)
(Starting Load at Serration Section) [6.25 ~ 10.0kg (13.8 ~ 22.1 lb)]

④ Tighten the lock nut.
Tightening Torque: 2.0 ~ 3.5 kg-m (14.5 ~ 25.3 ft-lb)

⑤ Remeasure the starting torque. And ensure that the preload meets the specification.

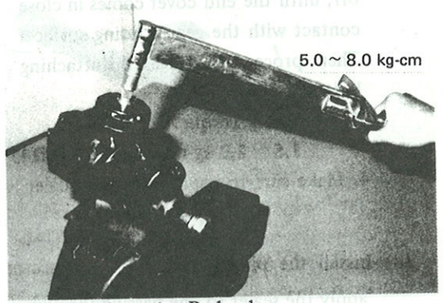


Fig. 7-21 Measuring Preload

⑥ Checking of the backlash of the gear Apply a load of 0.25 kg (0.55 lb) to the tip-end of the pitman arm with the steering gear set at its neutral position. Make sure that the steering gear exhibits no backlash.

⑦ Tighten the pitman arm securely.
Tightening Torque: 12.0 ~ 17.0 kg-m (86.8 ~ 123.0 ft-lb)

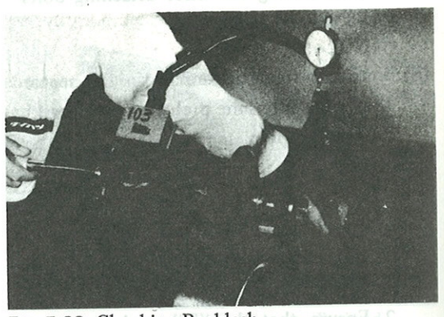


Fig. 7-22 Checking Backlash

Installation

1. With the steering gear set at its neutral position, install the gear housing.
Tightening Torque: 5.0 ~ 8.0 kg-m (36.2 ~ 57.9 ft-lb)
2. Install the attaching bolt that connects the intermediate shaft to the gear housing.
Tightening Torque: 2.0 ~ 3.0 kg-m (14.5 ~ 21.7 ft-lb)

Fig. 7-23 Installing Gear Housing

3. Attach the relay rod to the pitman arm.
Tightening Torque: 3.5 ~ 5.0 kg-m (25.3 ~ 36.2 ft-lb)
4. Refill the steering gear housing with SAE #90 gear oil.
Steering Gear Oil Capacity: 280 cc

NOTE:

1. Make sure that the bleeder hole of the plug is not restricted.
Reference Information:
Bleeder Discharge Valve Opening Pressure: Not To Exceed 0.3 kg-cm²
2. Prior to the installation, be certain to apply the Bond sealer to the bleeder threaded surface. Then, proceed to tighten the breather.

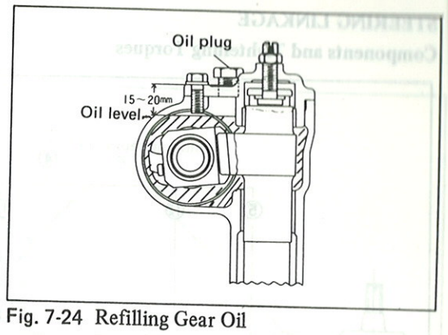
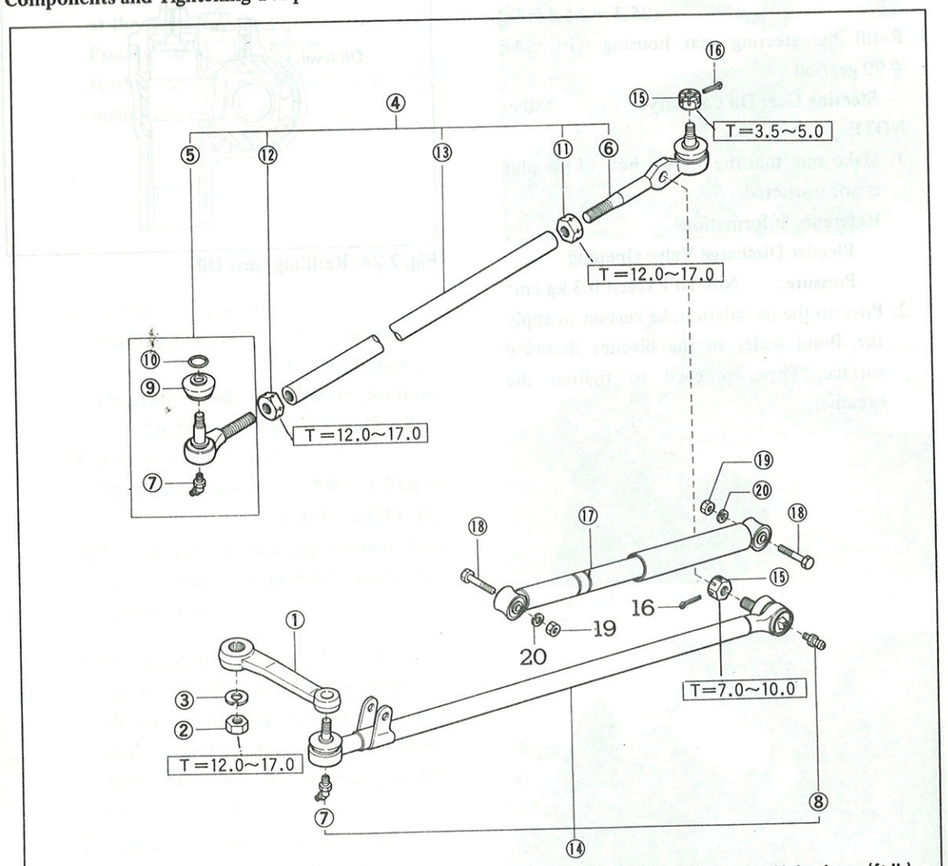


Fig. 7-24 Refilling Gear Oil

STEERING LINKAGE

Components and Tightening Torques



① Pitman arm
② ⑪ Hexagon nut
③ ⑳ Spring washer
④ Tie rod assembly
⑤ ⑥ Tie rod end subassembly
⑦ ⑧ Grease fitting
⑨ Steering link joint dust seal
⑩ Steering link joint dust seal band
⑫ ⑲ Nut
⑬ Steering tie rod
⑭ Steering relay rod assembly
⑮ Castle nut
⑯ Cotter pin
⑰ Steering shimmy damper assembly
⑱ Bolt

Fig. 7-25 Steering Linkage Components and Tightening Torques

Adjustment

1. Toe-in adjustment

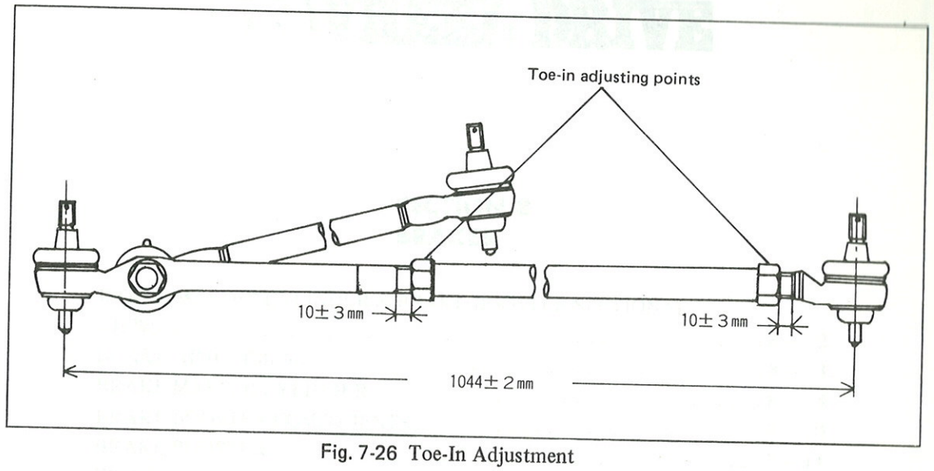


Fig. 7-26 Toe-In Adjustment

(1) Slacken the tie rod nuts provided at the right and left ends. Proceed to adjust the tie rod length.

NOTE:

1. Make sure that the remaining portions of the threaded sections at both ends of the tie rod are the same at the right and left sides.
2. The tie rod nuts at both ends should be tightened securely only after the side slip adjustment has been completed.

Tightening Torque: 12.0 ~ 17.0 kg-m (86.8 ~ 123.0 ft-lb)

(2) Measure the amount of side slip on a side slip tester.

Specified Amount of Side Slip:

In 3mm ~ Out 3mm (In 0.118 inch ~ Out 0.118 inch)

4 DAIHATSU WHEEL DRIVE

SECTION 8
BRAKES

BRAKE MASTER CYLINDER & BRAKE BOOSTER

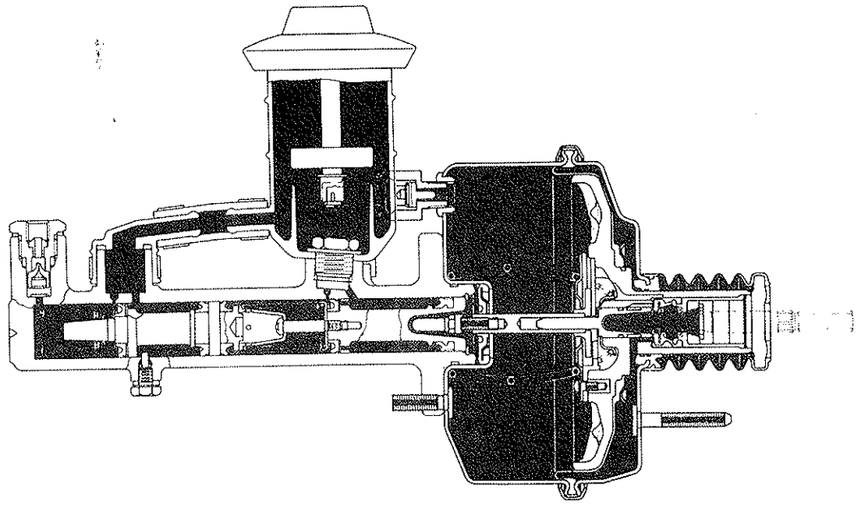


Fig. 8-1 Brake Master Cylinder with Booster

BRAKE ADJUSTMENTS

Brake Pedal

1. Pedal height adjustment
   (1) Slacken the lock nut of the stop lamp switch. Turn the stop lamp switch in order that the distance between the upper edge of the brake pedal pad and the floor panel may become the specified pedal height. And tighten the lock nut.
   Specified Brake Pedal Height:
   177 ~ 192mm
   (6.978 ~ 7.559 inches)
2. Pedal free play adjustment
   (1) Slacken the lock nut of the stop lamp switch. Turn the push rod, until the specified free play is obtained.
   Specified Brake Pedal Free Play:
   3 ~ 8mm (0.118 ~ 0.315 inch)
3. Pedal reserve travel adjustment
   (1) After the brake pedal height and free play adjustments have been completed, fully depress the brake pedal. If the pedal reserve travel proves to be less than the specified value, proceed to perform the brake shoe clearance adjustment.
   Specified Brake Pedal Reserve Travel:
   Not Less Than 75mm
   (2.953 inches)

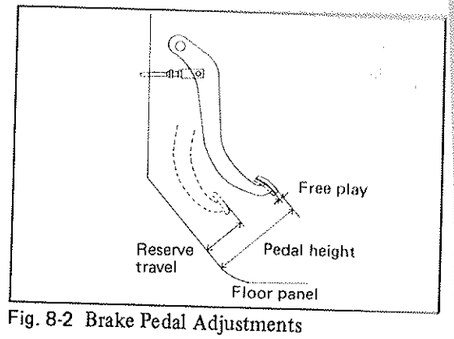


Fig. 8-2 Brake Pedal Adjustments

NOTE:

1. As for the pedal height and free play adjustments of those motor vehicles with a booster, first disconnect the clevis from the brake pedal. And carry out the adjustment by turning the stop lamp switch. Proceed to turn the push rod until the hole pin can be inserted into the hole freely.
2. In the case of those motor vehicles with a booster, the adjustment above should be performed while the engine is running.

Brake Shoe Adjustment

Front Wheels

1. Jack up the vehicle and support it with rigid racks.
2. While the wheel is being rotated by hands, depress the brake pedal.
   Repeat this procedure two or three times so that the brake shoes fit snugly against the inner surface of the brake drum.
3. Detach the shoe adjusting hole plug of the brake drum from the brake backing plate.
4. Turn the adjusting nut in the direction which makes the brake shoes expand (i.e. a direction toward the center of the brake drum) until the wheel is locked.
   Then, depress the brake pedal several times in order that the brake shoes become snugly fitted against the inner surface of the brake drum. With the brake pedal in its released position, check to see if the wheel still can be turned by hands. If so, continue the adjusting

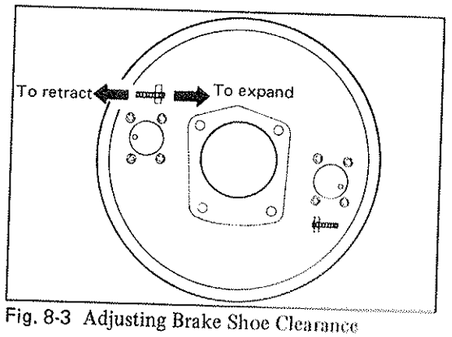


Fig. 8-3 Adjusting Brake Shoe Clearance

procedure above until the wheel is completely locked.

Special Service Tool (09704-10010)

5. Next, back off the adjusting nut the specified backing-off number in the direction which makes the brake shoes retract (i.e. a direction toward the outer edge of the brake drum).

Specified Number of Backing-Off Notch: About 6 Notches

Rear Wheels

The rear brake is of the automatic adjusting type, thereby needing no adjustment. When the brake pedal is depressed, the brake shoes are adjusted to a proper clearance, as required. If the rear brake should exhibit any malfunction, remove the brake drums and check the automatic brake adjuster mechanism for proper function.

Parking Brake

1. Drum-to-lining clearance adjustment
   (1) Turn the adjusting cam shaft counterclockwise so that the brake shoes may contact closely against the inner surface of the brake drum. Then, back off the adjusting cam one notch.

Specified Number of Backing-Off Notch: One Notch

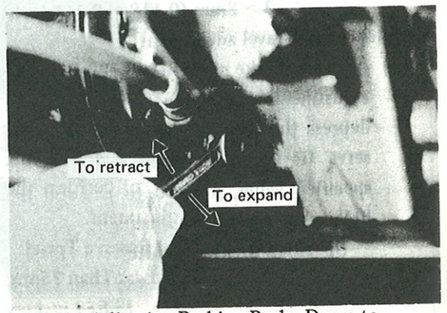


Fig. 8-4 Adjusting Parking Brake Drum-to-Lining Clearance

2. Parking lever check and adjustment
   (1) Pull the parking lever upward, until the parking brake is fully applied. Note that the parking brake was emanating clicking sounds during the parking brake application. Also, count the number of the sector notches over which the parking brake lever has traveled before it reaches the full application position.

Specified Working Travel: 3 ~ 7 Notches [When a Operation Force of 30kg (66 lb) Is Applied]

   (2) After the drum-to-lining clearance of the parking brake has been adjusted, proceed to adjust the parking brake working travel to the specified value by means of the adjusting nut of the parking brake cable.

NOTE: It is necessary to perform the adjusting operation above separately at two different points, since the front brake is of the two leading type.

6. Install the shoe adjusting hole plug of the brake drum on the brake backing plate.

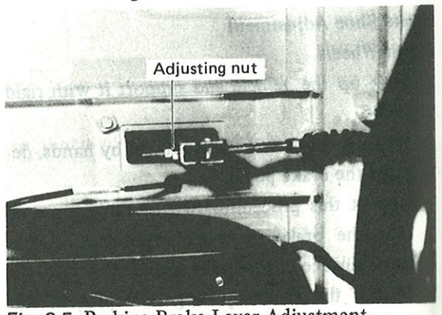
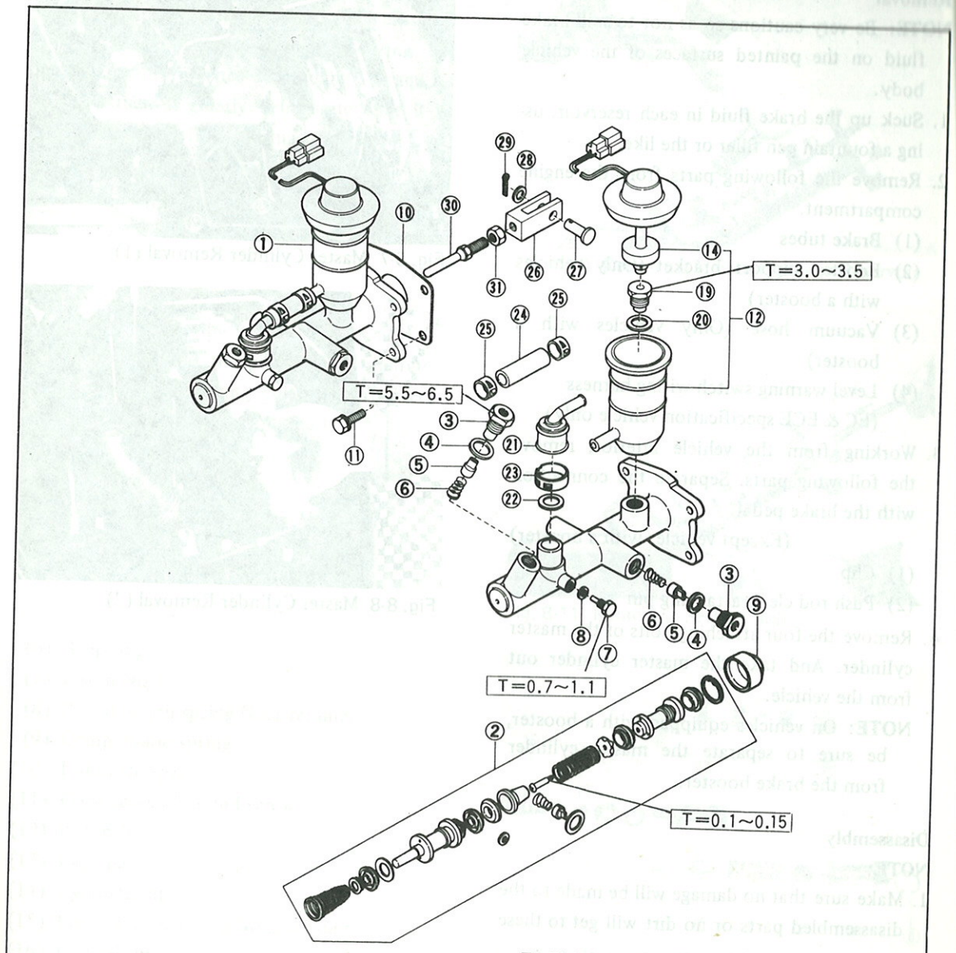


Fig. 8-5 Parking Brake Lever Adjustment

BRAKE MASTER CYLINDER

Components and Tightening Torques



T: Tightening Torque Unit: kg-m (ft-lb)

① Brake master cylinder assembly
② Brake master cylinder kit
③ Master cylinder fluid outlet plug subassembly
④⑧⑩㉒ Gasket
⑤ Outlet check valve
⑥ Conical spring
⑦ Setting bolt
⑨ Master cylinder boot for less brake booster
⑪ Bolt with washer for less brake booster
⑫ Master cylinder reservoir set
⑭ Level warning switch assembly with cap (EC & ECE alone)
⑲ Master cylinder reservoir setting bolt
⑳ Reservoir setting bolt washer
㉑ Union
㉓㉕ Clip
㉔ Reservoir brake tube
㉖ Master cylinder push rod clevis
㉗ Pin with hole
㉘ Plate washer
㉙ Cotter pin
㉚ Master cylinder push rod
㉛ Nut

Fig. 8-6 Brake Master Cylinder Components and Tightening Torques

BRAKE MASTER CYLINDER

Removal

NOTE: Be very cautions so as not to spill brake fluid on the painted surfaces of the vehicle body.

1. Suck up the brake fluid in each reservoir, using a fountain pen filler or the like.
2. Remove the following parts from the engine compartment.
   (1) Brake tubes
   (2) Booster support bracket (Only vehicles with a booster)
   (3) Vacuum hose (Only vehicles with a booster)
   (4) Level warning switch wiring harness (EC & ECE specification vehicle only)
3. Working from the vehicle interior, remove the following parts. Separate the connection with the brake pedal.
   (Except vehicles with a booster)
   (1) Clip
   (2) Push rod clevis attaching pin
4. Remove the four attaching bolts of the master cylinder. And take the master cylinder out from the vehicle.

   NOTE: On vehicles equipped with a booster, be sure to separate the master cylinder from the brake booster.

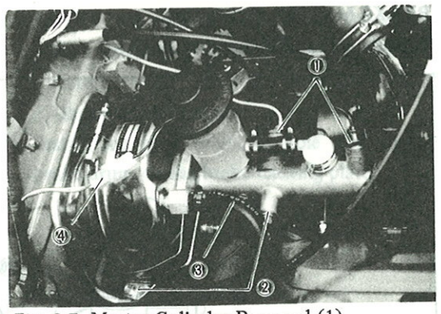


Fig. 8-7 Master Cylinder Removal (1)

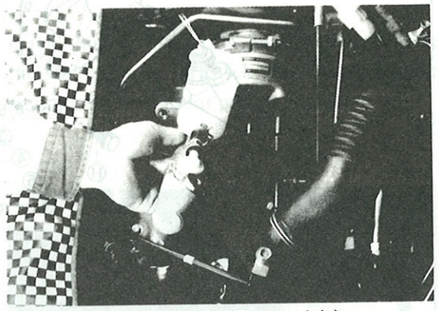


Fig. 8-8 Master Cylinder Removal (2)

Disassembly

NOTE:

1. Make sure that no damage will be made to the disassembled parts or no dirt will get to these parts.
2. Utmost care must exercised to ensure that the rubber parts inside the cylinder are free from mineral oils.

1. Remove the following parts from the master cylinder.
   (1) Master cylinder push rod
   (2) Master cylinder reservoir setting bolt

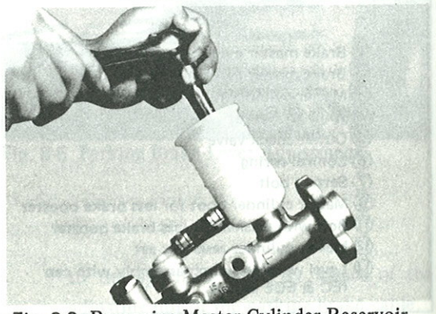


Fig. 8-9 Removing Master Cylinder Reservoir Setting Bolt

   (3) Master cylinder reservoir with brake tube
   (4) Union

   NOTE: Be certain to replace the existing union with a new one during reassembly, since the sealing characteristic will greatly deteriorate once it is removed from the master cylinder.

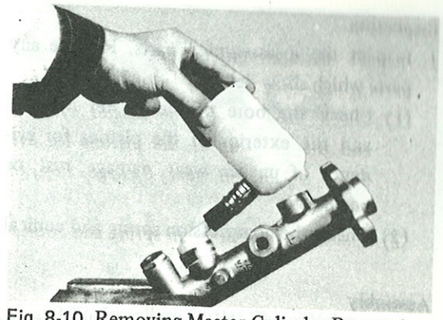


Fig. 8-10 Removing Master Cylinder Reservoir

   (5) Setting bolt

   NOTE: Push the piston No.1 to such an extent that the piston No.2 separates from the setting bolt. Then, proceed to remove this setting bolt.

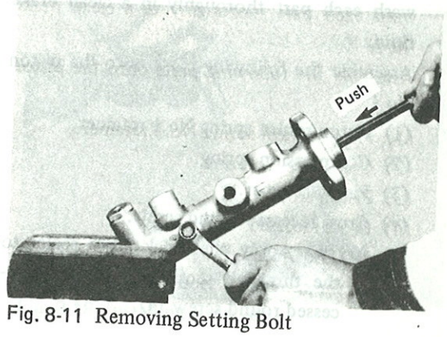


Fig. 8-11 Removing Setting Bolt

   (6) Snap ring
   (7) Piston No.1
   (8) Piston return spring No.1 retainer
   (9) Compression spring
   (10) Piston stopper
   (11) Cross recessed round screw
   (12) Piston No.2
   (13) Cup spacer
   (14) Cylinder cup
   (15) Piston return spring No.2 retainer
   (16) Conical spring

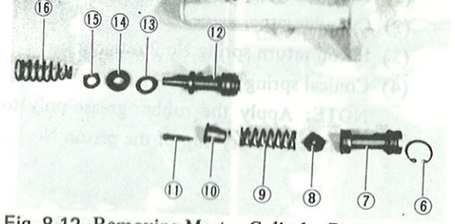


Fig. 8-12 Removing Master Cylinder Pistons

   (17) Outlet plug
   (18) Gasket
   (19) Outlet check valve
   (20) Conical spring

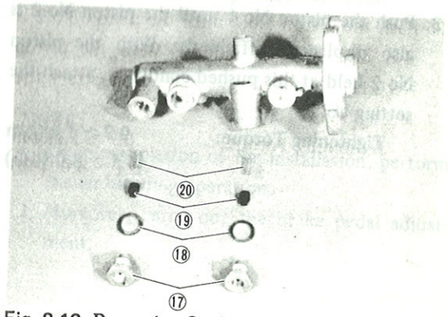


Fig. 8-13 Removing Outlet Check Valve

Inspection

1. Inspect the disassembled parts. Replace any parts which show defects.
   (1) Check the bore of the master cylinder and the exterior of the pistons for evidence of uneven wear, damage, rust, or corrosion.
   (2) Check the compression spring and conical springs for signs of flattened condition, deformation or rust.
   (3) Check the cylinder cup, retainers, gasket and outlet check valve for evidence of damage, deformation, or wear.
   (4) Check the reservoir for damage and its attaching section for deformation.

Assembly

NOTE: Prior to the reassembly, make sure to wash each part thoroughly in a clean brake fluid.

1. Assemble the following parts onto the piston No.1.
   (1) Piston return spring No.1 retainer.
   (2) Compression spring.
   (3) Piston stopper.
   (4) Cross recessed round screw.
   NOTE: Apply the Lock Tight sealer to the threaded section of the cross recessed round screw ④.

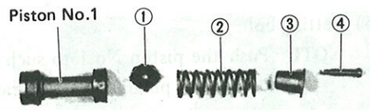


Fig. 8-14 Assembling Piston No.1

2. Assemble the following parts onto the piston No.2.
   (1) Cup spacer
   (2) Cylinder cup
   (3) Piston return spring No.2 retainer
   (4) Conical spring
   NOTE: Apply the rubber grease only to the secondary cup of the piston No.1.

Fig. 8-15 Assembling Piston No.2

3. Push the piston No.1 until the piston No.2 is also displaced sufficinetly. With the piston No.2 held at this pushed condition, attach the setting bolt.
   Tightening Torque: 0.7 ~ 1.1kg-m (5.1 ~ 8.0 ft-lb)

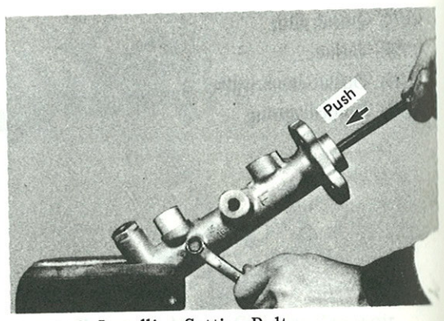


Fig. 8-16 Installing Setting Bolt

4. Assemble the outlet check valve.
   (1) Conical spring
   (2) Outlet check valve
   (3) Gasket
   (4) Outlet plug
   Tightening Torque: 5.5 ~ 6.5kg-m (39.8 ~ 47.0 ft-lb)

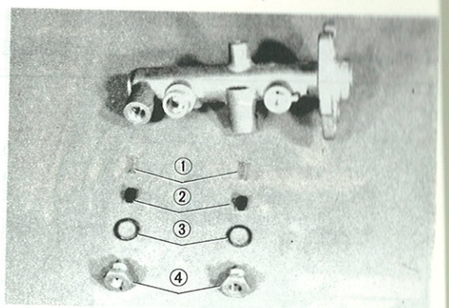


Fig. 8-17 Installing Outlet Check Valve

5. Union
   NOTE:
   1. Never use the old union. Be sure to replace it with a new part during the reassembly.
   2. Previous to the reassembly, heat a new union in a hot water of 60° to 80° for five or six minutes. Then, proceed to attach the thus-heated union in place.
6. Master cylinder reservoir with brake tube.
7. Master cylinder reservoir setting bolt.
   Tightening Torque: 3.0 ~ 3.5kg-m (21.7 ~ 25.3 ft-lb)
8. On vehicles with a booster, adjust the clearance between the booster push rod and the master cylinder push rod.
   Specified Clearance: 0.60 ~ 0.65mm (0.0236 ~ 0.0256 inch)
   Special Service Tool (09737-00010)

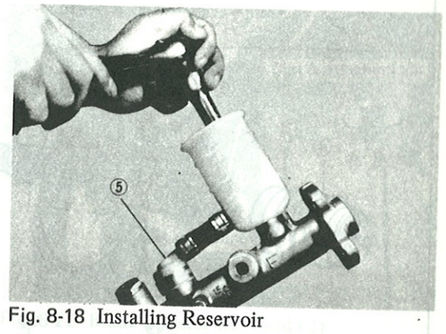


Fig. 8-18 Installing Reservoir

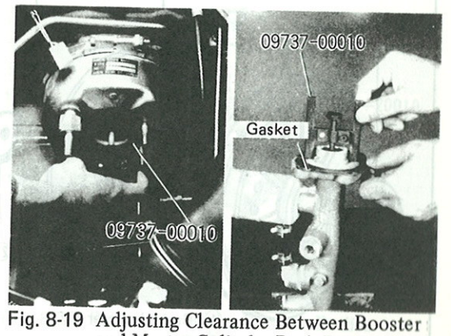


Fig. 8-19 Adjusting Clearance Between Booster and Master Cylinder Push Rods

Installation

Reverse the removal procedure to install the master cylinder.

Tightening Torques

Master cylinder x Brake booster
1.0 ~ 1.6 kg-m (7.2 ~ 11.6 ft-lb)

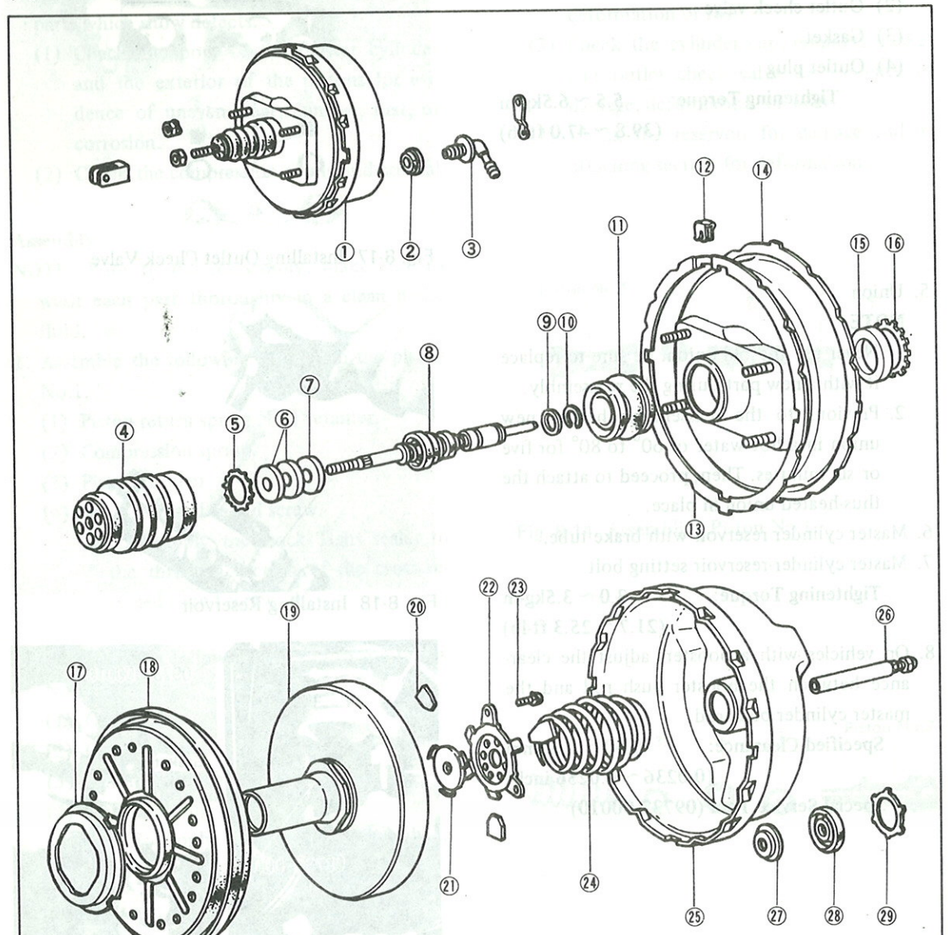
Master cylinder x Bracket
1.0 ~ 1.6kg-m (7.2 ~ 11.6 ft-lb)

NOTE:

1. Upon completion of the installation, perform the air bleeding operation.
2. Moreover, carry out the brake pedal adjustment.

BRAKE BOOSTER COMPONENTS

(Option except for those vehicles F50 for EC & ECE and Australia and F20 for Australia)



① Brake booster Ay.
② Grommet
③ Booster check valve
④ Boot
⑤ Internal circular ring
⑥ Filter
⑦ Separator
⑧ Air valve
⑨ Washer
⑩ Snap ring
⑪ Booster body seal
⑫ Connector lock
⑬ Booster body connector
⑭ Booster No.2 body
⑮ Booster piston bearing
⑯ Internal circular ring
⑰ Diaphragm retainer
⑱ Booster diaphragm
⑲ Booster piston
⑳ Reaction lever
㉑ Reaction plate
㉒ Reaction retainer
㉓ Reaction screw
㉔ Piston return spring
㉕ Booster No.1 body
㉖ Push rod
㉗ Body seal retainer
㉘ Seal No.1
㉙ Internal circular ring

Fig. 8-20 Brake Booster Components

BRAKE BOOSTER

Removal

NOTE: Be very cautious so as not to spill brake fluid on the painted surfaces of the vehicle body.

1. Suck up the brake fluid in each reservoir, using a fountain pen filler or the like.
2. Remove the following parts from the engine compartment.
   (1) Vacuum hose
   (2) Brake tubes
   (3) Booster support bracket
   (4) Level warning switch (EC & ECE only)
3. Working from the vehicle interior, remove the following parts. Separate the connection with the brake pedal.
   (1) Clip, Cotter pin
   (2) Push rod clevis attaching pin
4. Remove the four attaching nuts of the booster. Proceed to take out the brake booster together with the master cylinder.
5. Separate the master cylinder from the brake booster.

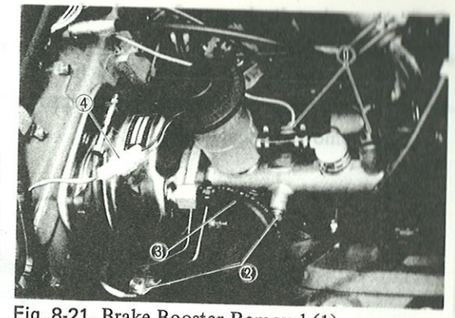


Fig. 8-21 Brake Booster Removal (1)

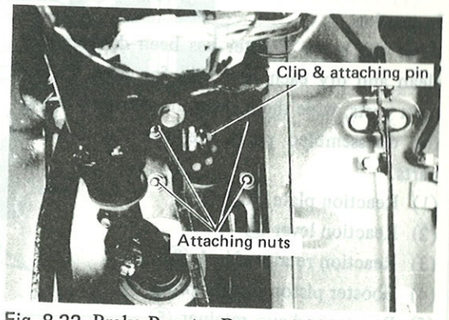


Fig. 8-22 Brake Booster Removal (2)

Disassembly

(Care must be exercised especially as to the following points described below during the disassembly.)

1. Separate the booster body No. 1 from the booster body No. 2, making sure to observe the following points.
   (1) Prior to the disassembly, scribe mate marks on the booster bodies No. 1 and No. 2, respectively.
   (2) Apply a force to the booster, using the Special Service Tool (09738-20010) in combination with a press.
   (3) Disengage the cut-out section of the body connector.
   (4) Gradually slacken the press so that the booster bodies may be separated from each other.

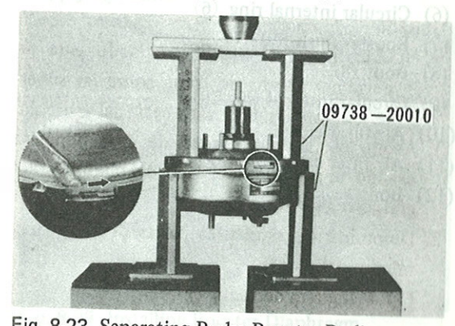


Fig. 8-23 Separating Brake Booster Bodies

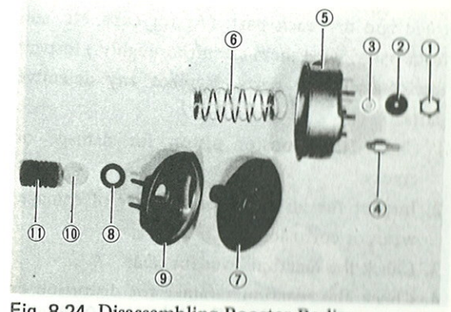


Fig. 8-24 Disassembling Booster Bodies

2. Remove the diaphragm from the booster piston, as follows.
   (1) Using the Special Service Tool (09736-30020), turn the diaphragm retainer so as to remove the diaphragm.

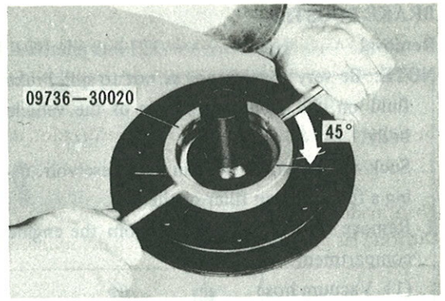


Fig. 8-25 Removing Booster Diaphragm

Inspection

After the brake booster has been disassembled, clean and dry each part. (As for cups, etc. and resin parts, wipe them clean thoroughly.) Inspect the disassembled parts. Replace any defective parts.

(1) Reaction plate No.1 ①
(2) Reaction lever ②
(3) Reaction retainer No.1 ③
(4) Booster piston return spring ④
(5) Booster rod cup retainer ⑤
(6) Circular internal ring ⑥
(7) Booster push rod ⑦
(8) Boot ⑧
(9) Circular internal ring ⑨
(10) Air filter element ⑩
(11) Air filter separator ⑪
(12) Body seal ⑫

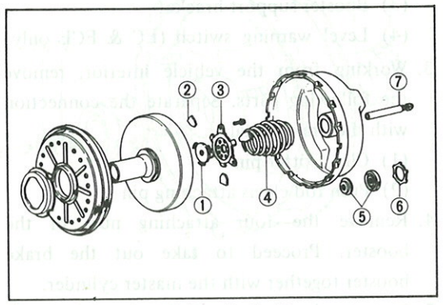


Fig. 8-26 Disassembling Brake Booster

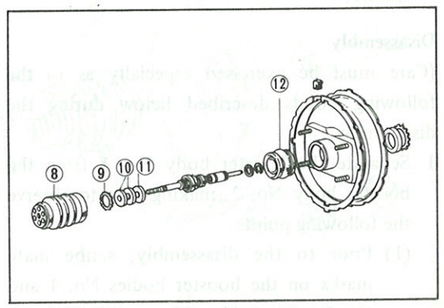


Fig. 8-27 Disassembling Brake Booster

Assembly

NOTE: Prior to reassembly, make certain to apply a film of silicon grease to those points designated as an arrow in the diagram below.

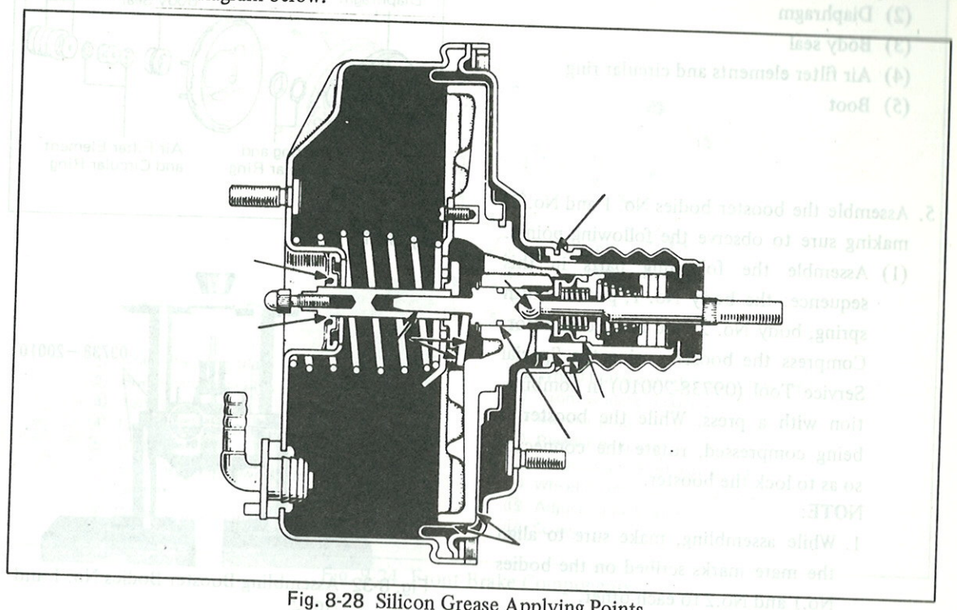


Fig. 8-28 Silicon Grease Applying Points

Assembly

(Care must be exercised especially as to the following points described below during the assembly.)

1. Install the diaphragm onto the booster piston, as follows.
   (1) Using the Speical Service Tool (09736-30020), turn the diaphragm retainer so as to install the diaphragm onto the piston.

Fig. 8-29 Installing Booster Diaphragm

2. Install the air valve to the diaphragm.
3. Install the reaction retainer, plate and lever to the diaphragm.

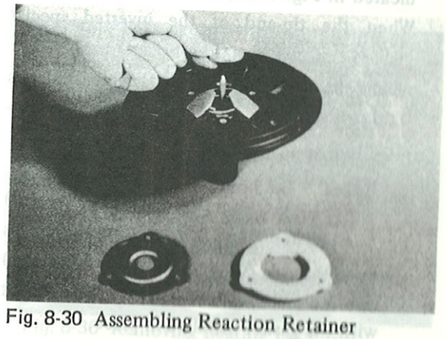


Fig. 8-30 Assembling Reaction Retainer

4. Install the following parts to the body.
   (1) Bearing and circular ring
   (2) Diaphragm
   (3) Body seal
   (4) Air filter elements and circular ring
   (5) Boot

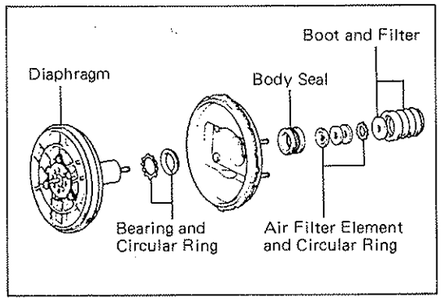


Fig. 8-31

5. Assemble the booster bodies No. 1 and No. 2, making sure to observe the following points.
   (1) Assemble the following parts in this sequence: the body No. 1, piston return spring, body No. 2, and body connector. Compress the booster, using the Special Service Tool (09738-20010) in combination with a press. While the booster is being compressed, rotate the connector so as to lock the booster.
   NOTE:
   1. While assembling, make sure to align the mate marks scribed on the bodies No.1 and No.2 to each other.
   2. Special attention should be paid so that the diaphragm may not be pinched between the booster bodies.

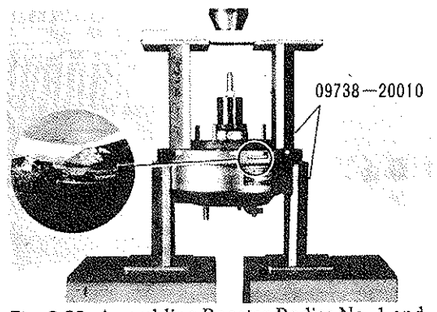


Fig. 8-32 Assembling Booster Bodies No. 1 and No. 2

Adjustment

1. After the brake booster has been assembled, place the brake booster push rod gauge (special tool No. 09737-00010) on the brake master cylinder. And measure the master cylinder by setting the special gauge as indicated in Fig. Then, invert the special gauge. When the tip-end of the inverted special guage's rod just butts the booster push rod, it means that the push rod-to-piston clearance is 0.60 to 0.65mm, thereby meeting the specification.
   Specified Piston-tp-Push Rod Clearance:
   0.60 ~ 0.65mm (0.0236 ~ 0.0256 inch)
   (At Time When Atmospheric Pressure Is Applied to Inside of Booster)

NOTE: The mesurement must be carried out with the gasket installed in place.

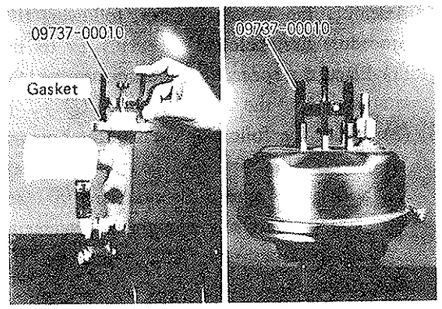


Fig. 8-33 Booster Push Rod Adjustment

Installation

Reverse the removal procedure to install the brake booster.

NOTE:

1. Upon completion of the installation, perform the air bleeding operation.
2. Moreover, carry out the brake pedal adjustment.

FRONT BRAKE

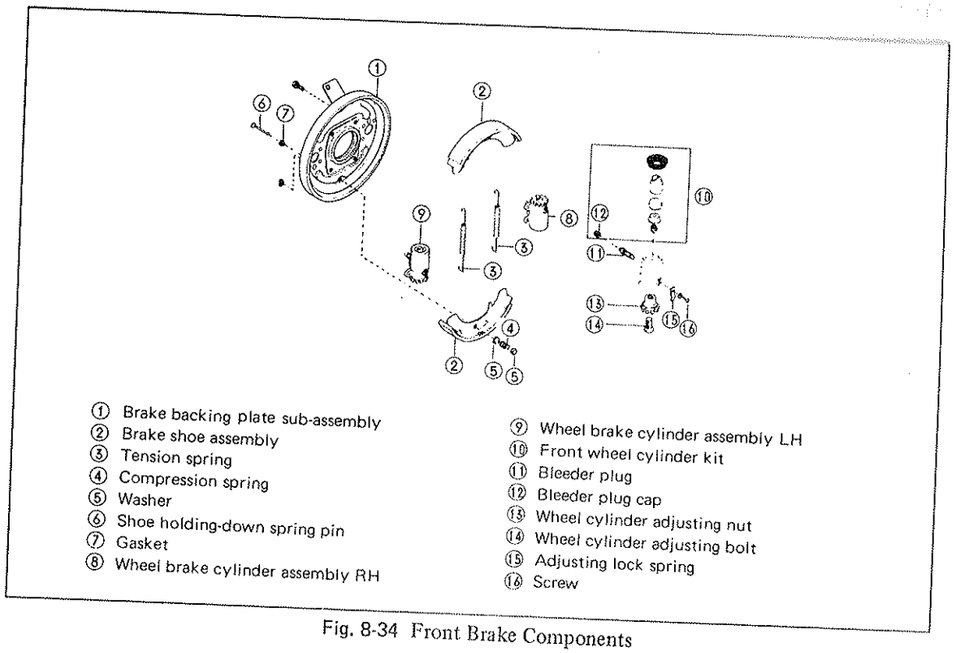


Fig. 8-34 Front Brake Components

Removal

1. Slightly slacken the front wheel hub nuts
2. Jack up the vehicle and support it with rigid racks.
3. Remove the front wheel.
4. Remove the brake drum. The brake drum can be easily removed by screwing 10mm bolts into the threaded holes provided on the brake drum.

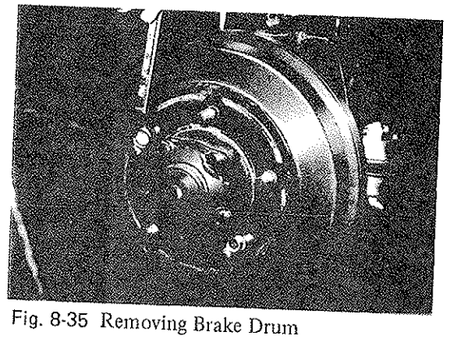


Fig. 8-35 Removing Brake Drum

5. Remove the front hub cap.
6. Using snap ring pliers, remove the snap ring on the front drive shaft.
7. Remove the axle outer shaft flange, by taking out its attaching bolts.
8. Remove the front axle bearing lock nut, with a front hub bearing lock nut wrench (Special Tool Np. 09607-87601).

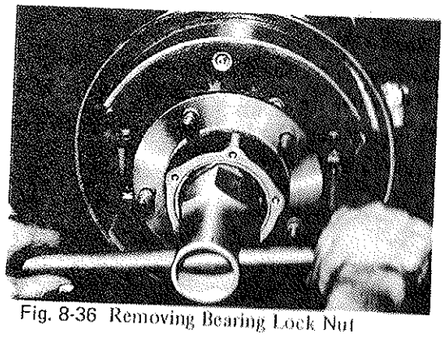


Fig. 8-36 Removing Bearing Lock Nut

(1) Two lock nuts are installed with a claw washer (to prevent the nuts from turning) interposed between the nuts. It is, therefore, necessary first to straighten the bent claw.

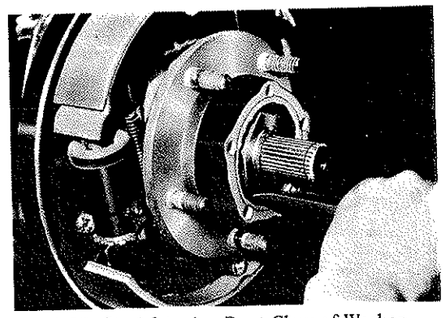


Fig. 8-37 Straightening Bent Claw of Washer

9. Detach the front axle hub sub-assembly from the steering knuckle spindle.

> Note
> Should any difficulty be encountered in removing the front axle hub sub-assembly, use a rear axle shaft remover puller (Special Tool No. 09520-00010) in conjunction with a rear wheel bearing puller (Special Tool No. 09521-87301).

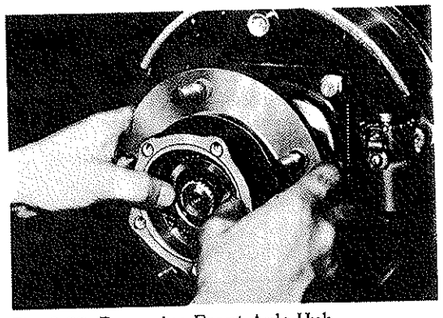


Fig. 8-38 Removing Front Axle Hub

10. Remove the brake backing plate retaining bolts.

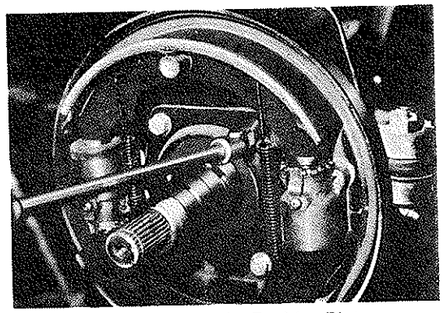


Fig. 8-39 Removing Brake Backing Plate

Disassembly

Wheel Cylinders

1. Detatch the adjusting lock spring.
2. Remove the adjusting bolt and nut.
3. Detach the wheel cylinder boot and take out the piston and cup.

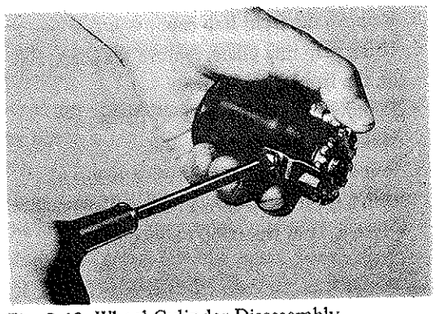


Fig. 8-40 Wheel Cylinder Disassembly

Inspection

Brake Drums

1. Inspect to see whether any damage, wear, score, or uneven wear is present at the inner surface of the drum.

   Allowable Limit of Wear in Inner Diameter: 2 mm (0.08 inch)

   Specified Inner Diameter: 254 mm (10.0 inches)

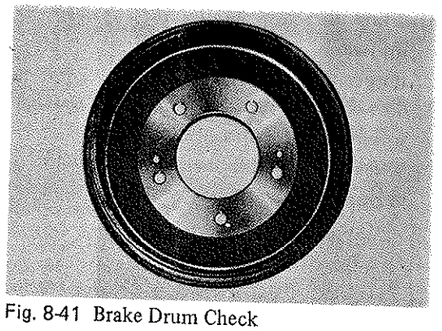


Fig. 8-41 Brake Drum Check

Brake Shoes

1. Check the brake shoes for damage or deformation.
2. Inspect the brake linings for wear.

   Allowable Limit of Wear in Thickness: 1.0 mm (0.04 inch)

   (Thickness of Remaining Lining)
3. If the brake linings are worn beyond the allowable limit, reline the brake shoes.
4. Brake shoe-to-drum contact:

   Coat the inner surface of the brake drum with a light film of chalk. Slide the brake shoes against the inner surface of the drum. Check to see if the chalk particles can be seen evenly over the whole surface of the brake linings. If the brake linings show a poor contact, correct the brake linings, using a shoe grinder.

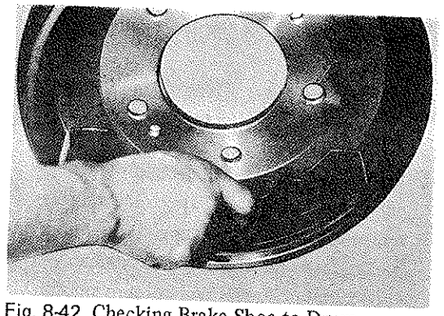


Fig. 8-42 Checking Brake Shoe-to-Drum Contact

Front Wheel Brake Cylinders

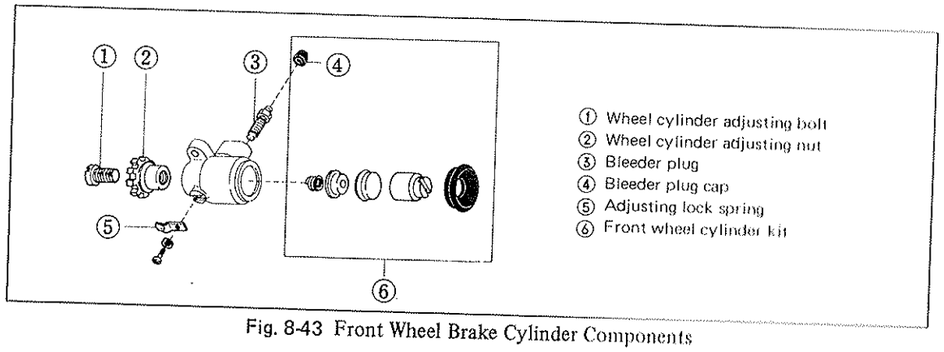


Fig. 8-43 Front Wheel Brake Cylinder Components

1. Check the piston and the wheel cylinder bore for wear.
2. Inspect the piston cup and boot for wear.
3. Check the bleeder plug for clogged passage.
4. Inspect the adjusting nut for wear.
5. Check the adjusting nut and push rod for seizure due to rust.

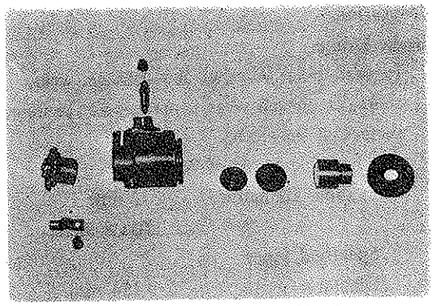


Fig. 8-44 Brake Wheel Cylinder Check

Assembly

Reverse the disassembly procedure to assemble the brake wheel cylinder.

1. Prior to reassembly, soak the cylinder cups in a clean brake fluid.
2. There are two kinds of adjusting bolts and nuts; one is of the right hand thread type, and the other is of the left hand thread type.

   Right Wheels: Right Hand Thread
   Left Wheels: Left Hand Thread

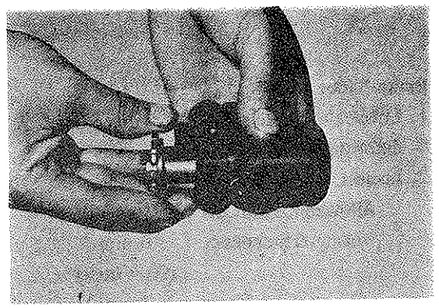


Fig. 8-45 Assembling Wheel Cylinder

3. Lubricate the threaded section of the adjusting bolt as well as the adjusting nut-to-cylinder body fitting section, applying brake grease to those points. Such application of grease will ensure smooth operation of the brake wheel cylinder and also prevent the occurrence of rust.

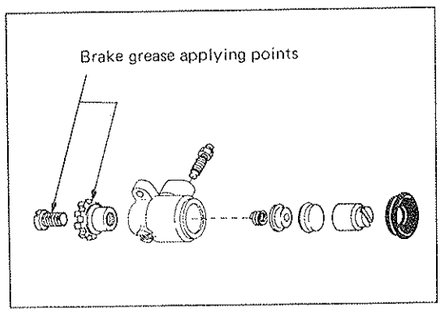


Fig. 8-46 Brake Grease Application

Installation

1. Attach the backing plate to the steering knuckle spindle.

   Tightening Torque: 3.5 to 5.5 Kg-m
   (25 to 40 ft-lbs)

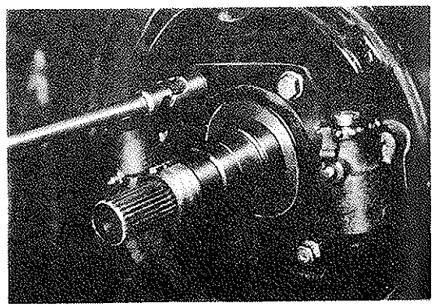


Fig. 8-47 Attaching Backing Plate

2. Install the wheel cylinders on the backing plate.

> Note
> Make sure to apply a bond sealer to the mating surfaces.

3. Install the brake shoes in place as follows:

(1) Apply a thin film of brake grease to the brake shoe-backing plate sliding areas.

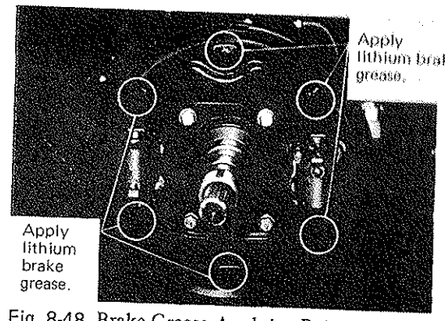


Fig. 8-48 Brake Grease Applying Points

(2) Retain the brake shoes with the shoe hold-down spring pins.
(3) Attach the tension springs.

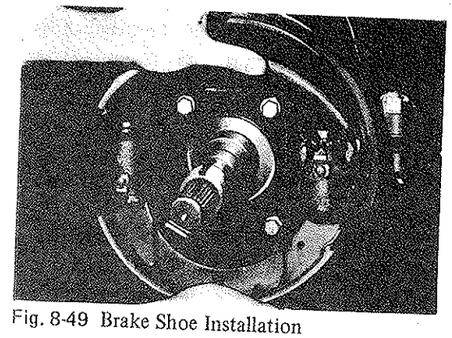


Fig. 8-49 Brake Shoe Installation

4. Liberally apply lithium grease to the front hub bearing (inner). Proceed to install the hub to the knuckle spindle as follows:

(1) Position the taper roller bearing of the front hub bearing (outer) in the hub. Tighten the front axle bearing lock nut, using a front hub bearing lock nut wrench (Special Tool No.09607-87601).

Tightening Torque: 10 to 15 Kg-m
(72.3 to 108.5 ft-lbs)

> NOTE:
> 1. Before the bearings are assembled into place, make certain to coat the rollers and races liberally with lithium grease.
> 2. Fill the inside of the front hub, from the edge of the outer race of the outer bearing to the edge of the outer race of the inner bearing, with lithium grease.

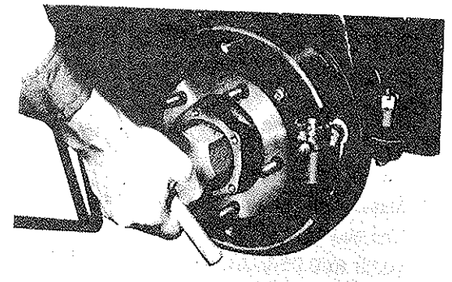


Fig. 8-50 Tightening Lock Nut (Inner)

(2) After the front axle bearing lock nut has been fully tightened, back off 1/6 (one side of the nut).

5. After tightening the inner lock nut, position the claw washer. Proceed to tighten the outer lock nut.

   Tightening Torque: 10 to 15 Kg-m (72.3 to 108.5 ft-lbs)

   After the above-described procedures have been followed, measure the preload of the hub. Refer to the section "Front Axle", for the measurement procedure. After the lock nut has been tightened to specification, bend the claw washer to prevent the nuts from turning.

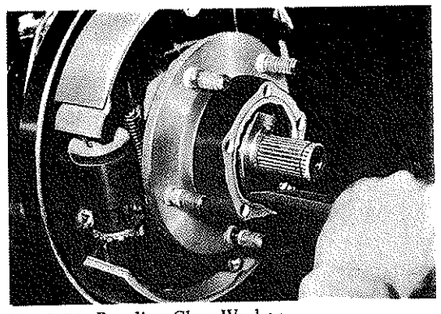


Fig. 8-51 Bending Claw Washer

6. Attach the axle outer shaft flange to the hub.

   Tightening Torque: 2.5 to 3.5 Kg-m (18.1 to 25.3 ft-lbs)

> Note
> Be certain to apply a bond sealer to the threaded section of the attaching bolts.

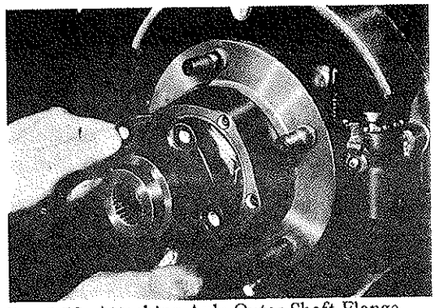


Fig. 8-52 Attaching Axle Outer Shaft Flange

7. Measure the end play of the drive shaft. The end play should be 0.8 to 1.2 mm (0.03 to 0.05 inch), with the drive shaft pulled as far as it will go toward the wheel side.

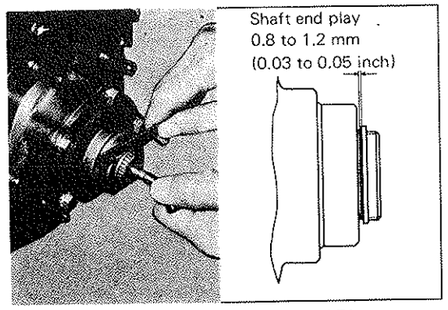


Fig. 8-53 Measuring Drive Shaft End Play

8. Install the front hub outer cap into position.

> Note
> It is advisable to use a lower ball joint dust cover replacer (Special Tool No. 09635-20010) to install the front hub outer cap on the front hub.

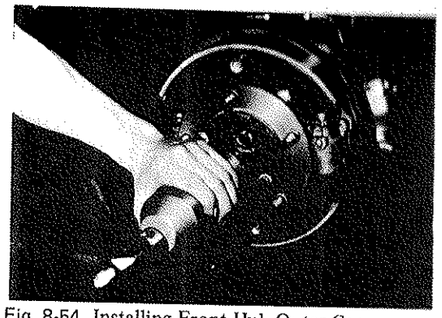


Fig. 8-54 Installing Front Hub Outer Cap

9. Bleed the hydraulic system. Carry out the brake adjustment, using a brake shoe adjusting tool (Special Tool No. 09704-10010).

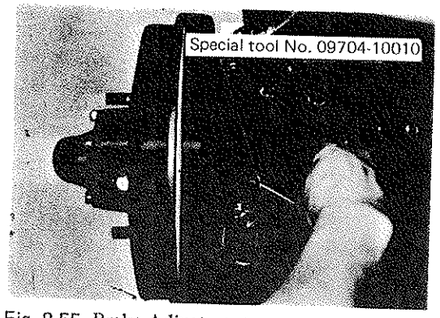


Fig. 8-55 Brake Adjustment

10. Mount the front wheel.
11. Remove the rigid racks from under the vehicle, using a jack.

REAR BRAKE

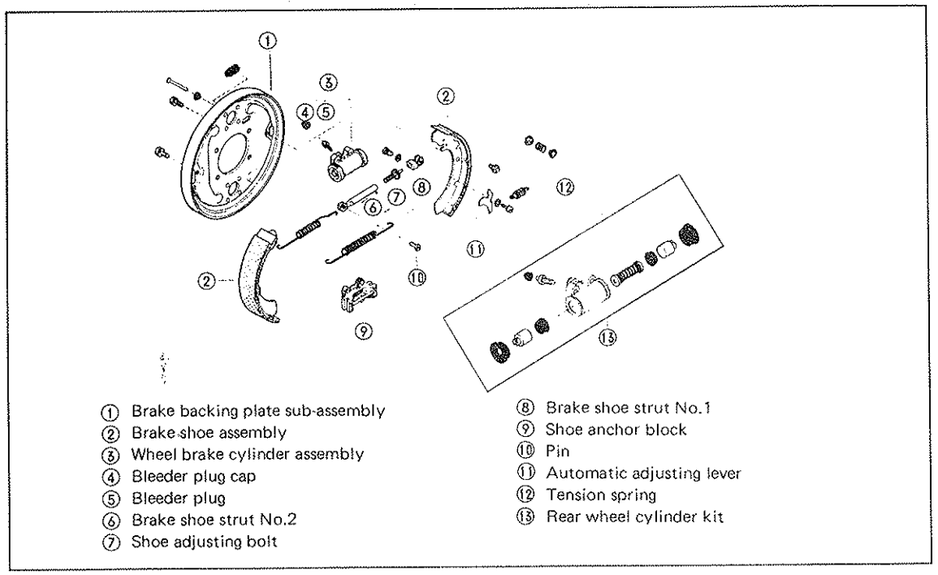


Fig. 8-56 Rear Brake Components

Removal

1. Jack up the rear axle. Place a rigid rack underneath the spring seat. Position a chock at the front wheel.
2. Remove the rear wheel.
3. Remove the brake drum.

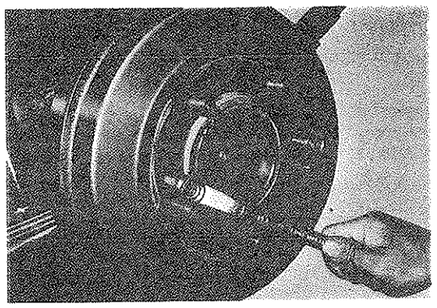


Fig. 8-57 Removing Brake Drum

4. Disconnect the brake tube from the wheel cylinder, by slackening the flare nut.
5. Remove the backing plate attaching bolts. Pull out the rear axle shaft together with the backing plate, using a rear axle shaft remover puller (Special Tool No. 09520-00010).

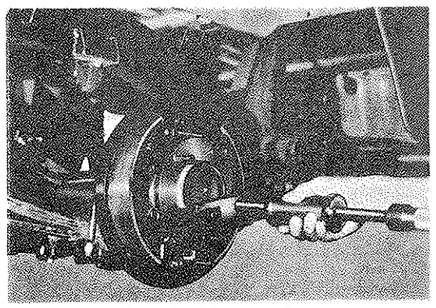


Fig. 8-58 Pulling Out Rear Shaft

6. Remove the brake shoes, wheel cylinder and anchor block, etc. from the backing plate, following the procedure given below:
   (1) To remove the return spring at the adjuster side, insert a suitable rod into the hold-down hole provided on the brake shoe. With this rod used as a fulcrum, remove the return spring, by inserting the end of a screw driver to the hook section of the return spring and by prying the spring out from the brake shoe.
   (2) Remove the struts No.1 and No.2 together with the return spring out from each groove of the brake shoes. Then, remove the brake shoes.
   (3) Remove the wheel cylinder and anchor block, by removing their attaching bolts.

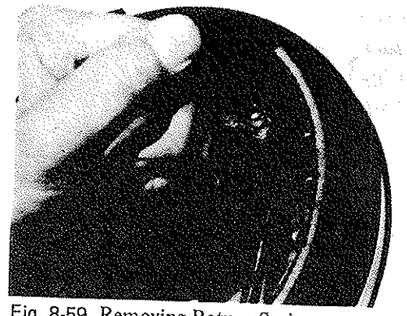


Fig. 8-59 Removing Return Spring

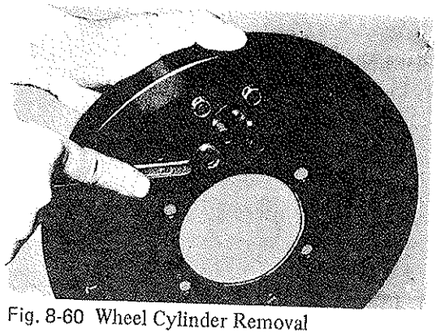


Fig. 8-60 Wheel Cylinder Removal

Disassembly

Wheel Cylinders

1. Detach the wheel cylinder boot and take out the piston, cups and spring, etc.

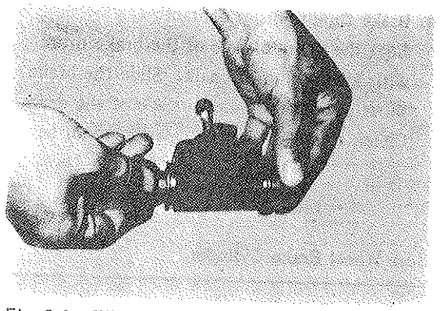


Fig. 8-61 Wheel Cylinder Disassembly

Inspection

Brake Drums

1. Inspect to see whether any damage, wear, score, or uneven wear is present at the inner surface of the drum.

Allowable Limit of Wear in Inner Diameter:	2 mm (0.08 inch)
Specified Inner Diameter:	254 mm (10.0 inches)

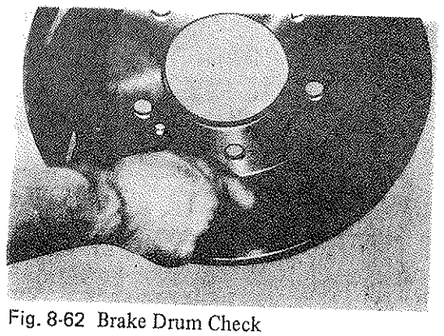


Fig. 8-62 Brake Drum Check

Backing Plates

1. Check to see if any wear or bend is present at the brake shoe-contact areas.
2. Check the backing plate for cracks or damage.

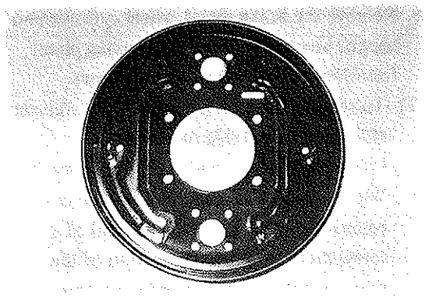


Fig. 8-63 Backing Plate Check

Brake Shoes

1. Check the brake shoes for damage or deformation.
2. Inspect the brake linings for wear.
   Allowable Limit of
   Wear in Thickness: 1.0 mm
   (0.04 inch)
   (Thickness of Remaining Lining)
3. If the brake linings are worn beyond the allowable limit, reline the brake shoes.
4. Brake shoe-to-drum contact:
   Coat the inner surface of the brake drum with a light film of chalk. Slide the brake shoes against the inner surface of the drum. Check to see if the chalk particles can be seen evenly over the whole surface of the brake linings. If the brake linings show a poor contact, correct the brake linings, using a shoe grinder.

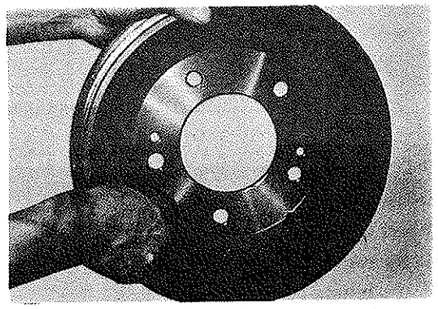


Fig. 8-64 Checking Brake Shoe-to-Drum Contact

Rear Wheel Brake Cylinder

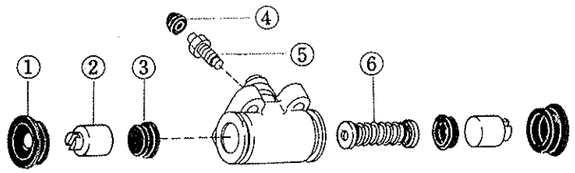


Fig. 8-65 Rear Wheel Brake Cylinder Components

1. Check the piston and the wheel cylinder bore for wear.
2. Inspect the piston cup and boot for wear.
3. Check the bleeder plug for clogged passage.

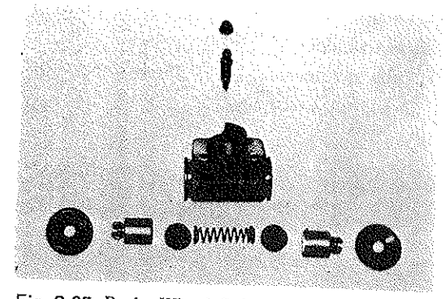


Fig. 8-65 Brake Wheel Cylinder Check

Automatic Adjuster Mechanism

1. Replace the automatic adjuster if any wear is present at the section where the adjuting bolt engages with the adjusting lever, resulting in easy disengagement.

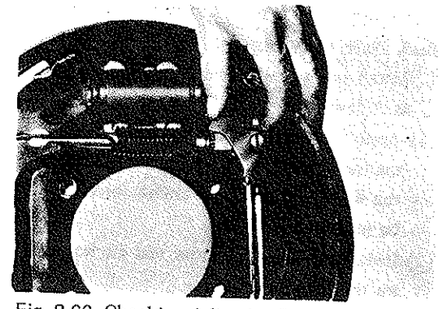


Fig. 8-66 Checking Adjusting Bolt and Lever

2. Replace the automatic adjuster if it requires a high effort to turn the adjusting bolt due to rusted teeth of the adjusting bolt or due to foreign matters lodged between its teeth.

Fig. 8-67 Adjusting Bolt Check

3. Replace the shoe return spring, if it is prone to contact the teeth of the adjusting bolt because of its weakened spring tension.

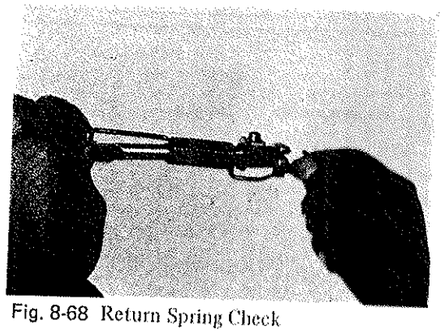


Fig. 8-68 Return Spring Check

Assembly

Wheel Cylinders

1. Prior to reassembly, soak the cylinder cups in a clean brake fluid.

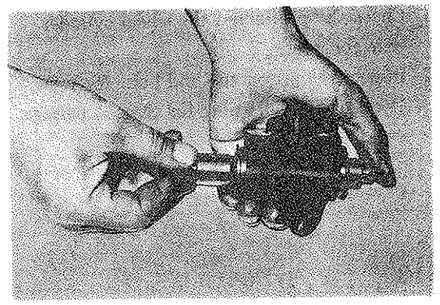


Fig. 8-69 Assembling Wheel Cylinder

Back Plate Assemblies

1. Install the wheel cylinder and anchor block as follows:

(1) Apply a thin film of bond sealer to the mating surfaces of the backing plate where the wheel cylinder and anchor block are to be mounted.

(2) Install the wheel cylinder and anchor block on the backing plate.

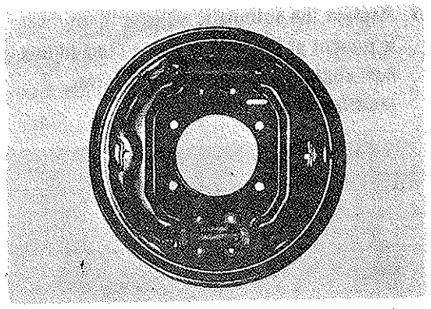


Fig. 8-70 Installing Wheel Cylinder and Anchor Block

Note

When assembling the anchor block, the elongated slot for adjusting the adjuster should come to the wheel cylinder side.

2. Install the brake shoes as follows:

(1) Apply brake grease to the backing plate as well as to the brake shoes at those points (1) through ④

Note

Make certain that the brake linings are kept free from brake grease.

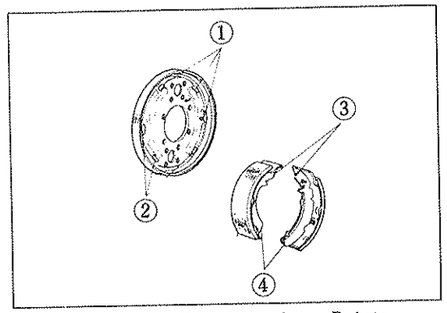


Fig. 17-90 Brake Grease Applying Points

(2) Each brake shoe should be mounted on the backing plate in such a direction that its cut-out section comes to the top and the setting bolt comes to the right. Position the brake shoe webs into the shoe slots that are provided on the wheel cylinder pistons and anchor block, respectively. Using both hands, apply force to the both shoes at the same time so that the brake hoe webs may engage into their respective slot.

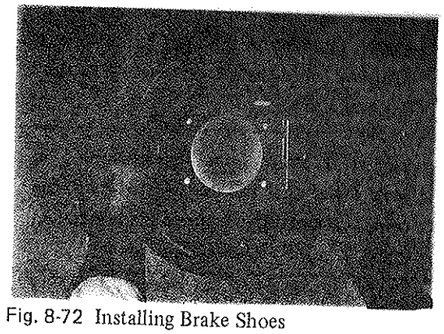


Fig. 8-72 Installing Brake Shoes

Assembly of Automatic Adjuster Mechanism

1. Place the strut No.2 into the tension spring.
2. Coat the threaded section of the adjusting bolt with brake grease. Screw the adjusting bolt into the strut No.2 as far as it will go.

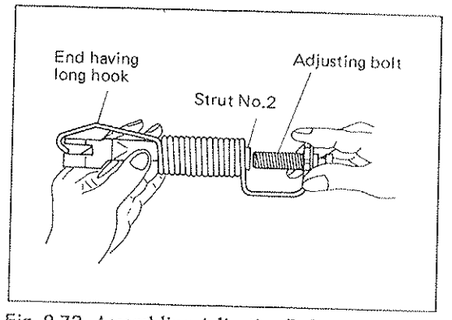


Fig. 8-73 Assembling Adjusting Bolt

3. Apply brake grease to the adjusting bolt at those places where the adjusting bolt contacts the strut No.1 and the setting bolt. Then, place the strut No.1 onto the adjusting bolt.

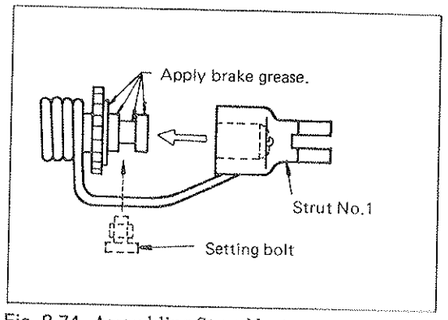


Fig. 8-74 Assembling Strut No.1

4. Screw the setting bolt into the threaded hole provided in the strut No.1.

Note

Make sure that the adjusting bolt can be turned smoothly, over its entire circumference, in the strut No.1.

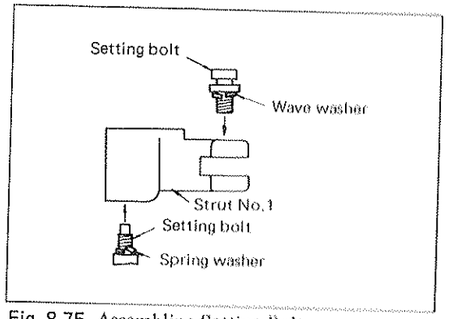


Fig. 8-75 Assembling Setting Bolt

5. Position the strut No.1 into the cut-out section provided in the right brake shoe; the strut No.2 into the cut-out section in the left brake shoe.

> Note
> The strut No.2 should be assembled in such a way that the thin side of its flange comes to the top (because a pin is installed later).

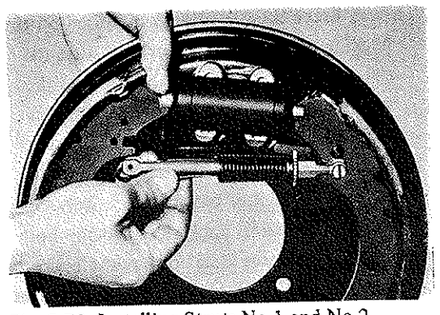


Fig. 8-76 Installing Struts No.1 and No.2

6. Align the hole provided in the flange section of the strut No.2 with the hole provided in the brake shoe. After lining up the holes, insert the pin in place. The direction of the groove located in the pin's head should be lined up with the strut shaft.
7. Attach the right hook of the return spring to the groove provided in the right brake shoe. When installing the return spring, the hook section must come under the setting bolt (i.e. anchor block side).

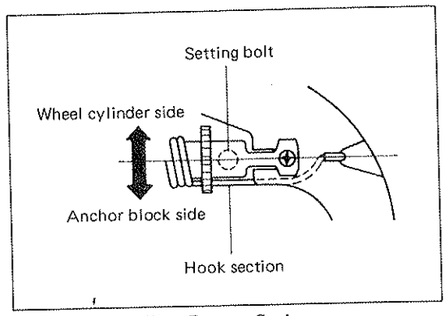


Fig. 8-77 Installing Return Spring

8. Attach the left hook of the return spring to the groove provided in the left brake shoe, using a suitable rod. The spring hook section should be engaged securely in the groove at the pin's head.

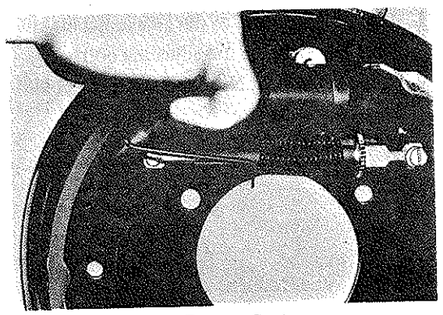


Fig. 8-78 Installing Return Spring

9. Secure each brake shoe on the right and left sides with the respective brake shoe hold-down spring.

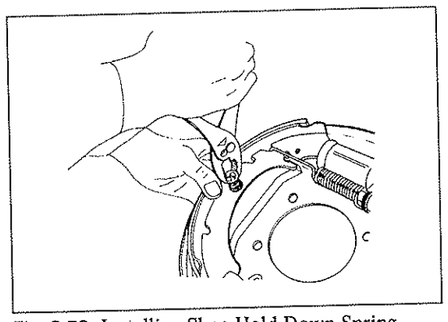


Fig. 8-79 Installing Shoe Hold-Down Spring

10. Install the adjusting lever as follows:
(1) Apply a thin film of brake grease to the both sides of the pin fulcrum of the adjusting lever.
(2) Position the lever in the groove of the setting bolt located on the strut No.1.
(3) Attach the tensions spring to the lever.

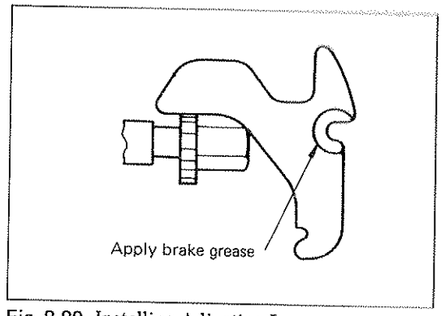


Fig. 8-80 Installing Adjusting Lever

Assembling Rear Brake

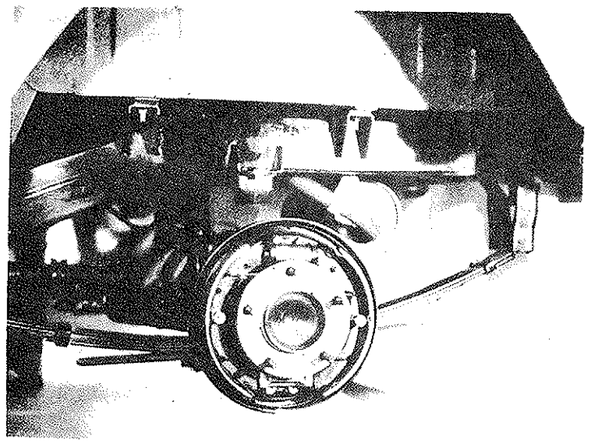


Fig. 8-81 Assembling Rear Brake

1. Apply a bond sealer to the end section of the rear axle housing. Place the original shim which was removed at the time of disassembly. Attach the backing plate assembly to the end section.

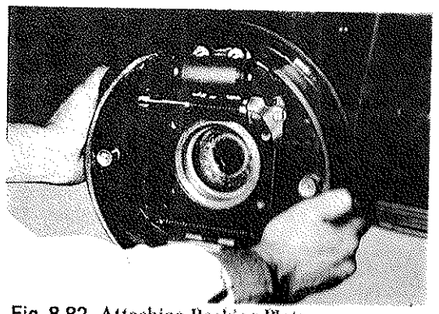


Fig. 8-82 Attaching Backing Plate

2. Position the shim for the rear shaft bearing on the exterior of the housing end. Press the rear axle shaft into place, using a rear axle shaft remover puller (Special Tool No. 09520-00010).

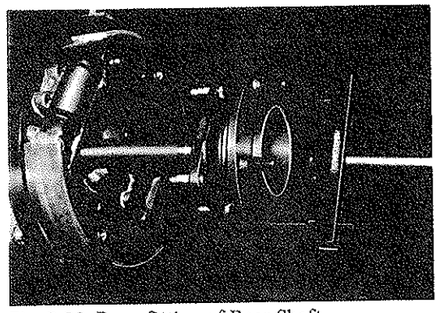


Fig. 8-83 Press-fitting of Rear Shaft

3. Install the brake backing plate to the rear axle housing.
   Tightening Torque: 3 to 5 Kg-m
   (21.7 to 36.2 lbs)

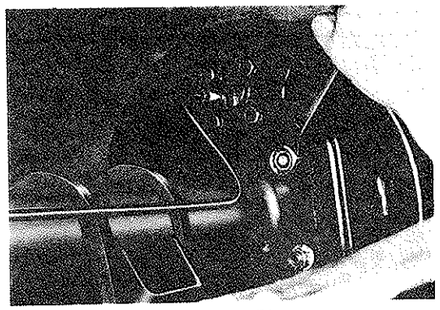


Fig. 8-84 Installing Backing Plate

4. Connect the brake tube to the wheel cylinder.
5. Install the brake drum.
6. Bleed the hydraulic system.
7. Mount the rear wheel.
   Tightening Torque: 9 to 11 Kg-m
   (65.1 to 79.6 lbs)
8. Remove the rigid racks from under the vehicle, using a jack.

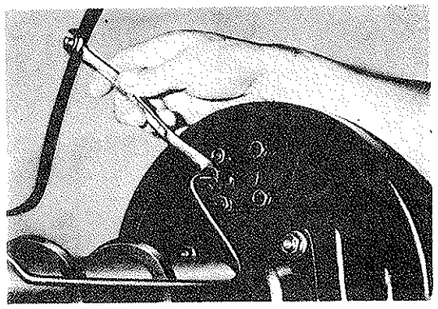
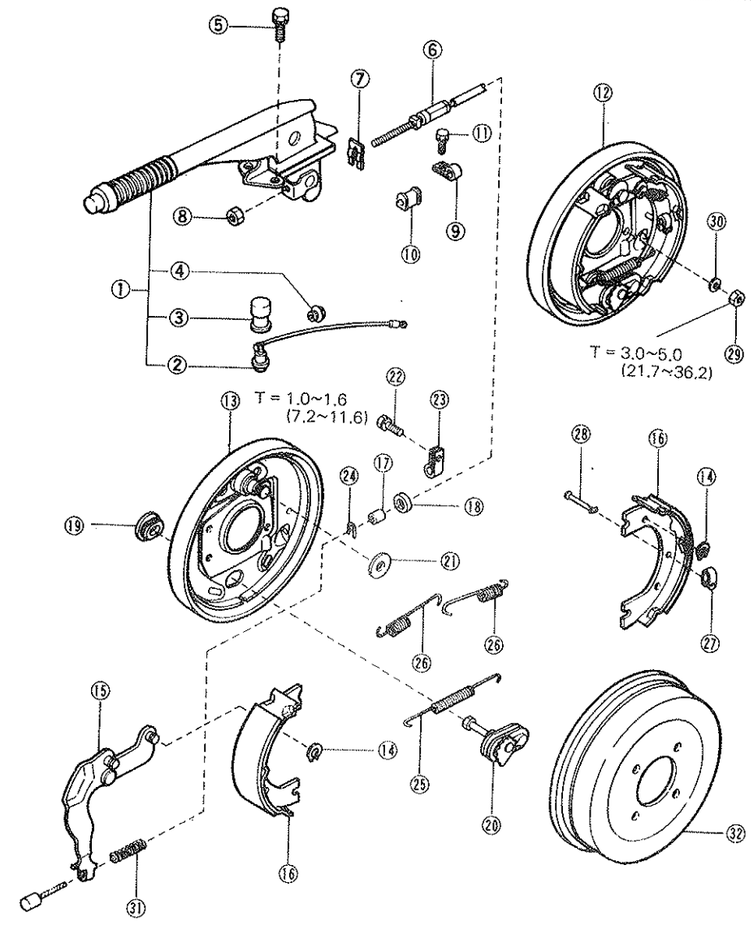


Fig. 8-85 Connecting Brake Tube

PARKING BRAKE



① Parking brake lever Ay.
② Brake warning light switch
③ Brake warning light switch cover
④⑩ Grommet
⑤⑪㉒ Bolt with washer
⑥ Parking brake cable
⑦ Clip
⑧㉙ Nut
⑨㉓ Clamp
⑫ Parking brake Ay.
⑬ Parking brake plate Ay.
⑭㉔ "E" Ring
⑮ Shoe lever
⑯ Brake shoe
⑰ Spacer
⑱ Dust seal
⑲ Adjuster cam hole cover
⑳ Adjuster
㉑ Plate washer
㉕㉖ Tension spring
㉗ Brake shoe hold down spring
㉘ Brake shoe hold down pin
㉚ Washer
㉛ Compresion spring
㉜ Parking brake drum

Fig. 8-86 Parking Brake Components

Parking brake Shoe, Drum

Disassembly

1. Release the parking brake lever and remove the propeller shaft.
2. Remove the parking brake drum.
   Remove the following parts.
   (1) Parking brake drum
   (2) Tension spring
   (3) Plate washer

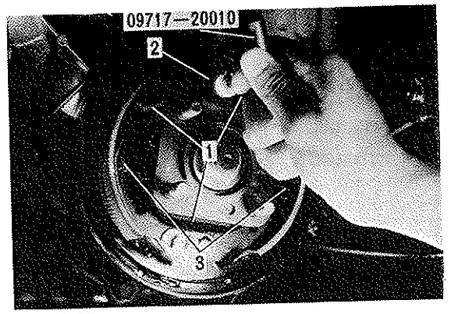


Fig. 8-87

   (4) Shoe tension spring
   (5) Adjuster
   (6) Brake shoe
   (7) Lever hole cover

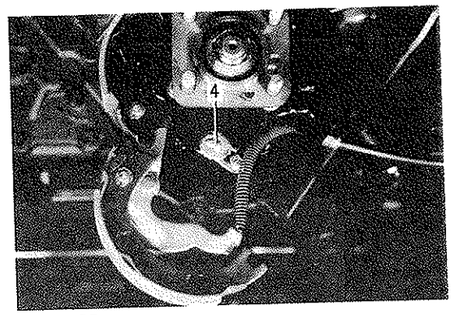


Fig. 8-88

Inspection

Check the parking brake parts for damage, wear, and scores or uneven wear.

(1) Brake drum
   Inner Diameter
   Wearing Limit: 162.0 mm (6.378 inch)

(2) Brake lining
   Limit of Thickness: 1.0 mm (0.039 inch)

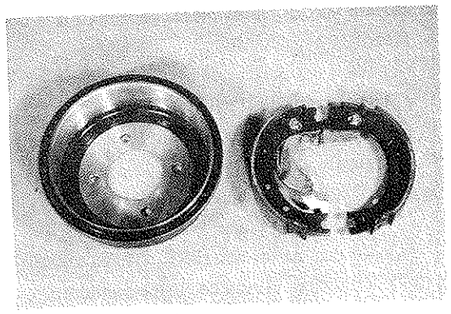


Fig. 8-89 Inspection

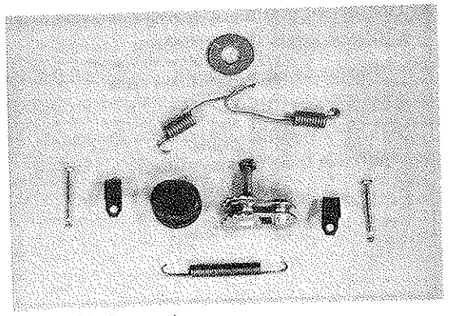


Fig. 8-90 Inspection

Installation

1. Apply brake grease on the backing plate surfaces contacting the shoes.

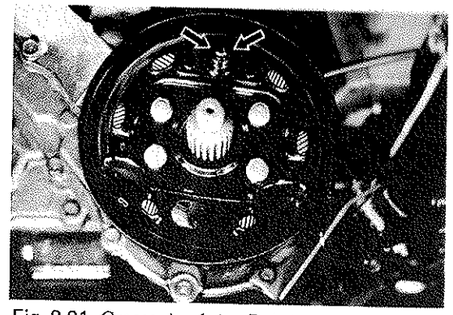


Fig. 8-91 Grease Applying Points

2. Installe the forowing parts on the parking brake plate.
   (1) Lever hole cover
   (2) Adjuster
   (3) Brake shoe
   (4) Brake shoe hold down spring
   (5) Plate washer
   (6) Tension spring
   (7) Parking brake drum

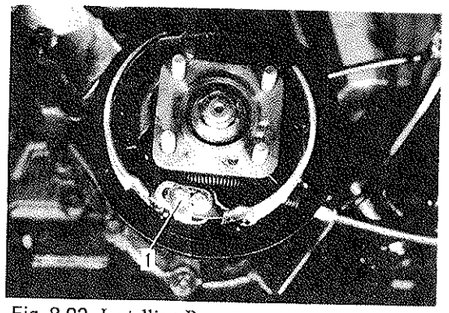


Fig. 8-92 Installing Parts

3. Install the propeller shaft.
   Tightening Torque: 6 to 8 Kg-m (43.4 to 57.9 ft-lbs)

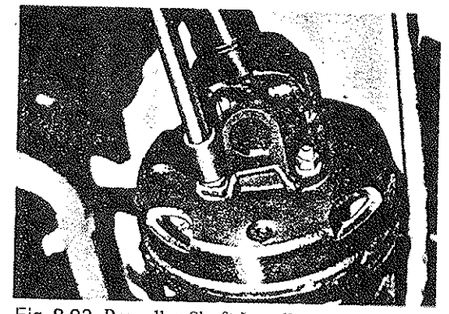


Fig. 8-93 Propeller Shaft Installation

4. Adjust the brake shoe-to-drum clearance.

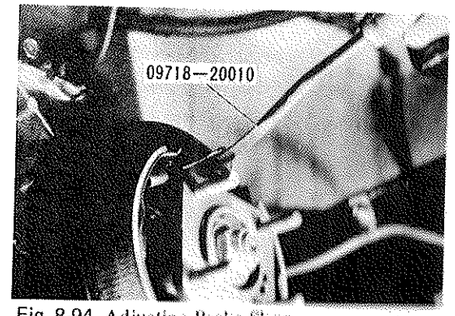


Fig. 8-94 Adjusting Brake Shoe

4 DAIHATSU WHEEL DRIVE

SECTION 9
BODY ELECTRICAL SYSTEM

WARNING SYSTEM

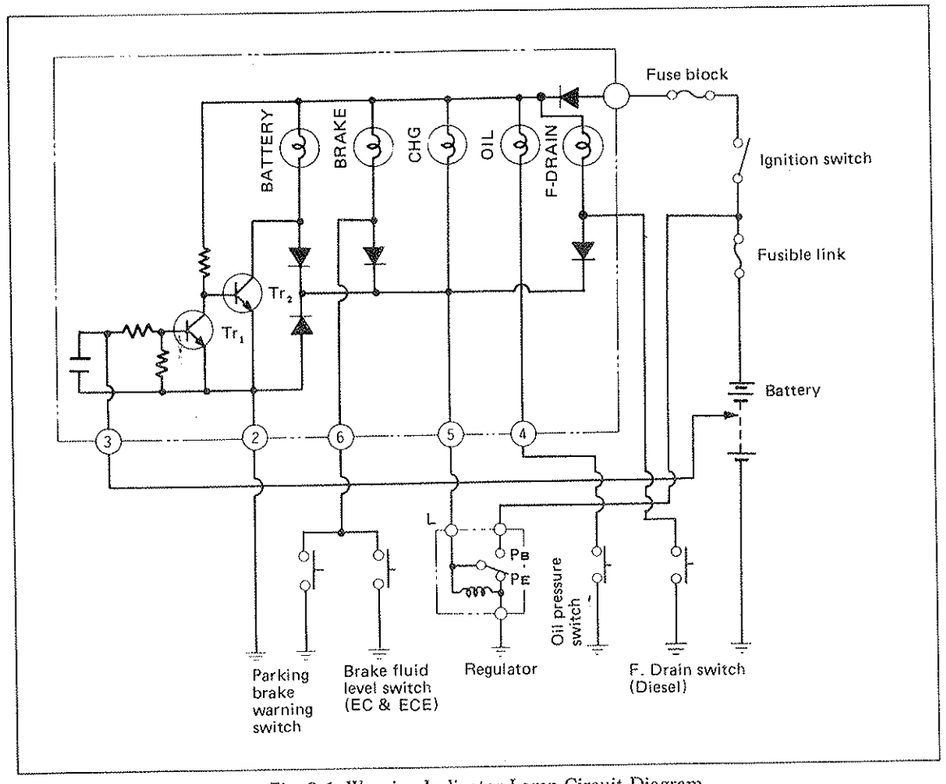


Fig. 9-1 Warning Indicator Lamp Circuit Diagram

OIL Warning System

Check

Check the continuity between the terminal and the ground by means of a circuit tester.

When Engine Is Stopped → ON **When Engine Is Running → OFF**	**Normal**

Reference Information

After the engine has started, the oil pressure should be at least 0.3kg/cm^2.

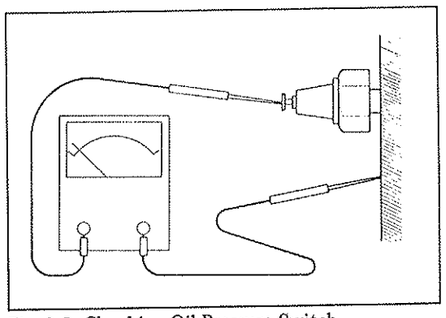


Fig. 9-2 Checking Oil Pressure Switch

CHG Warning System

Generator Regulator

Check

1. Remove the generator regulator. Measure the resistance between the "L" terminal (yellow/white) and the "E" terminal (white/black), using a circuit tester.

Measuring terminal	Condition of voltage relay	Resistance value (Ω)
L – E	Stationary	0
	Pulled	Approx. 100

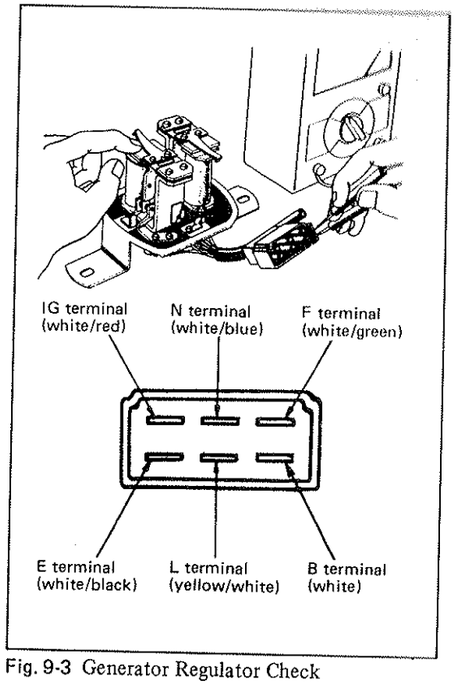


Fig. 9-3 Generator Regulator Check

BRAKE Warning System

Check

Check the continuity between the terminal and the ground by means of a circuit tester.

1. Parking brake

When Parking Brake Lever Is Pulled Up → ON When Parking Brake Lever Is Lowered → OFF	Normal

2. Brake fluid (EC & ECE only)
   Gradually raise the cap of the reserve tank. If the continuity is obtained midway between the connector terminals, it indicates that the brake warning system is functioning properly.
   NOTE: Ensure that the reserve tank is filled with the brake fluid up to the specified level.

BATTERY Warning System

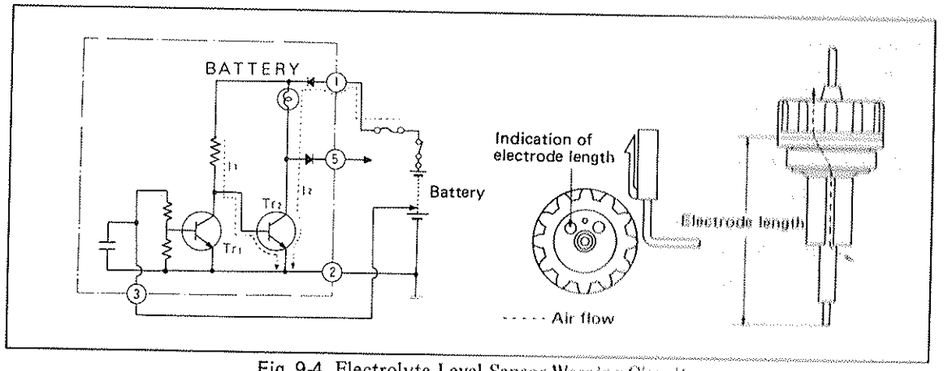


Fig. 9-4 Electrolyte Level Sensor Warning Circuit

Electrolyte Level Sensor

Check

1. Check the continuity between the electrolyte level sensing electrode section and the terminal by means of a circuit tester. If the continuity is obtained, it represents that the sensor is functioning properly.
2. Blow your breath from the cap side of the electrolyte level sensor. If the air flows from the level sensor, it indicates a proper function.

   NOTE: The electrolyte level sensor must be installed securely in the fourth cell counting from the nagative ⊖ terminal of the battery.

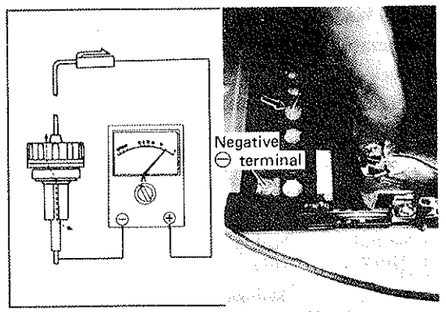


Fig. 9-5 Electrolyte Level Sensor Check

Fuel Drain Trap

Inspection

1. Disconnect cupler of the fuel drain trap wiring and contact point unit.
2. Submerge the contact unit in a container witch contains water. Start the engine. Check to see if the indicator lamp goes on. If so, it denotes that the warning indicator is functioning properly.

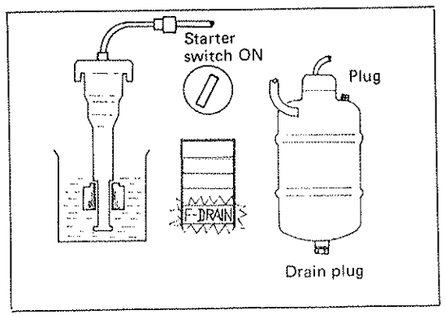


Fig. 9-6

Water Draining Procedure

1. If the fuel drain trap has collected water, Slacken the plug provided at the bottom of the fuel drain trap so as the drain water to the outside. If the water can not be drained properly when the drain plug only is slackend, slacken the top plug too.

Headlamp Aiming Adjustment

1. Place the vehicle on a level floor. Draw reference lines on a screen to be used for aiming adjustment of headlamps, following the procedure given below:

(1) Position the vehicle in front of the screen such that the headlamps of the vehicle come at a distance of three (3) meters (9.8 ft). In addition, the vehicle must be positioned exactly normal to the screen.

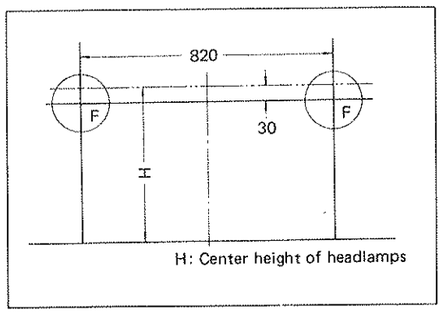


Fig. 9-7 Headlamp Aiming Adjustment Chart

(2) Measure the center height of the headlamps. Draw a horizontal reference line on the screen surface at a height 30 mm (1.2 inch) below the headlamp center height (H).
(3) Draw vertical lines through points directly ahead of the center of each headlamp on both right and left sides. Thus, establish intersections (F) of the headlamp vertical lines and the horizontal reference line.
2. Turn the three adjusting screws of the headlamp so as to adjust the light axis in vertical and lateral directions in order that the headlamp aims at the point F, with the upper beam turned ON. Repeat the same procedure on the other headlamp.

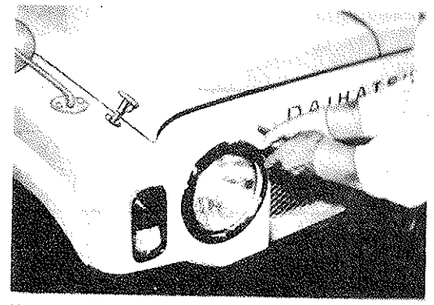


Fig. 9-8 Headlamp Aiming Adjustment

Light Control Switch, Wiper Switch and Heater Blower Switch

Removal

1. Remove the switch knob.
2. Remove the lock nut, using a lock nut wrench (Special Tool No. 09802-12010).
3. Withdraw the switch from the backside of the instrument panel.
4. Disconnect the connector wiring.

Fig. 9-10 Removing Light Control Switch

Inspection

Using a circuit tester, check each switch to see whether continuity exists between the terminals at the connector, with the switch in its actuated condition.

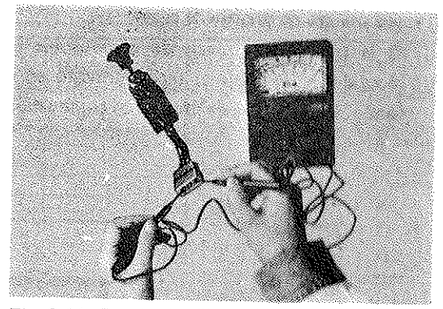
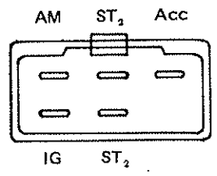


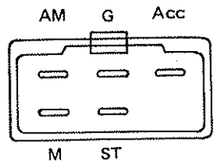
Fig. 9-11 Continuity Test of Each Switch

Switch \ Terminal	AM	Acc	IG (M)	ST_1	ST_2
LOCK					
Acc	○	○			
ON	○	○	○		
START	○	○	○	○	○



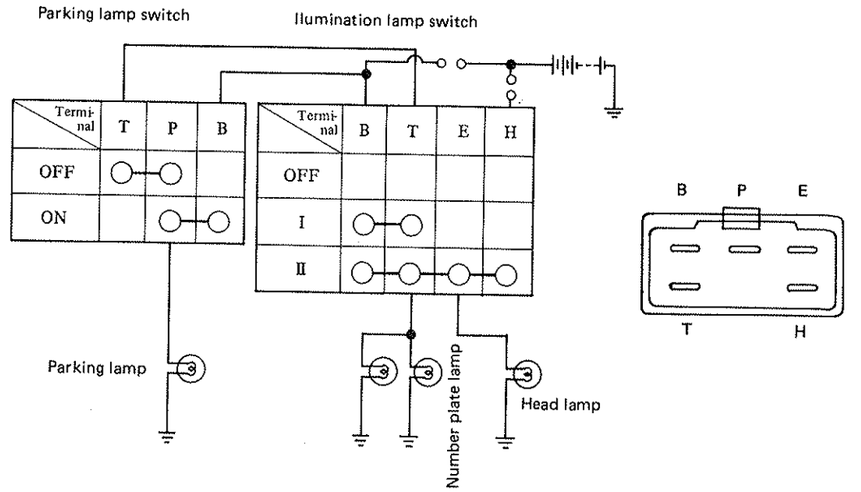
Starter switch connector (F20, F25)

Switch \ Terminal	AM	Acc	M	G	ST
LOCK					
Acc	○	○			
ON	○	○	○		
GLOW	○	○	○	○	
START	○	○	○		○



Starter switch connector (F50, F55)

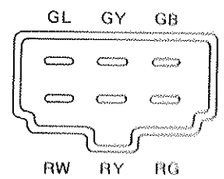
Fig. 9-12



Light control switch connection

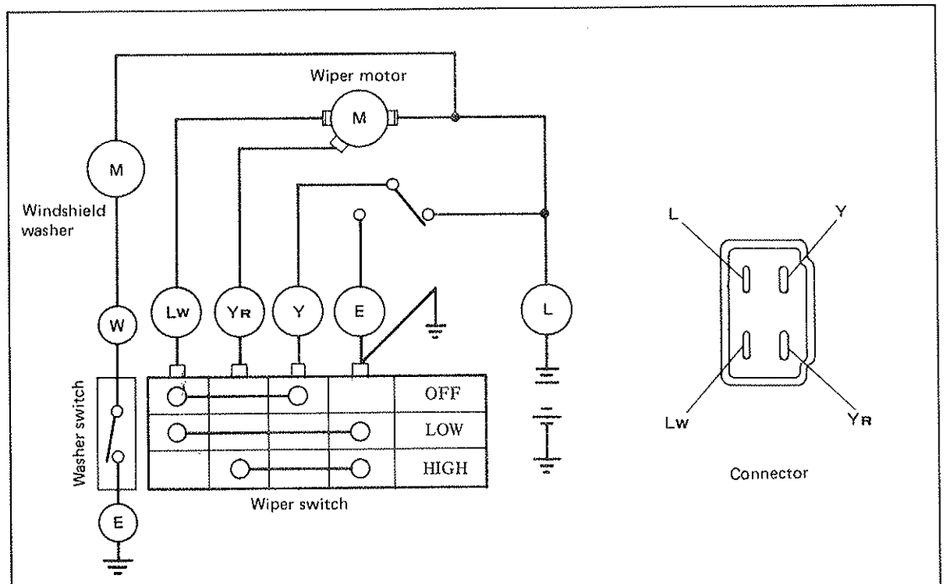
Switch \ Terminal		Turn signal flasher (LH)	Frasher unit	Turn signal flasher (RH)
		GB	GL	GY
Turn signal flasher	L	○	○	
	N			
	R		○	○
Hazard warning switch	OFF			
	ON	○	○	○

Switch \ Terminal		Headlamp (high)	Battery	Headlamp (low)
		RY	RW	RG
Dimmer switch	ON_1	○	○	
	ON_2		○	○

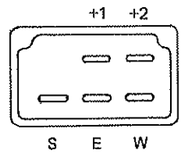


Frasher and Hazard switch connector

Fig. 9-13



Terminal / Switch	S	+1	E	+2	W	E
OFF	○	○			○	○
I		○			○	○
II			○		○	○



Wiper and Washer switch connector

Fig. 9-14

Turn Signal Switch and Hazard Warning Switch Removal

1. Disconnect the negative ⊖ terminal from the battery.
2. Remove the horn button assembly.
3. Remove the nut of the steering ball nut shaft.

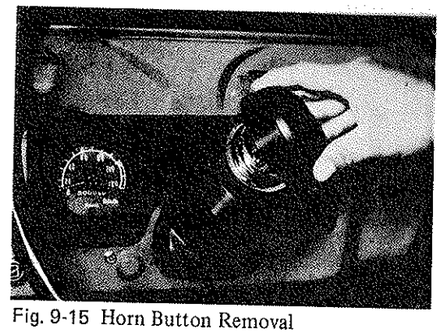


Fig. 9-15 Horn Button Removal

4. Detach the steering wheel with a steering wheel puller (Special Tool No. 09609-20010).
5. Remove the steering column cover and ignition switch.
6. Detach the instrument panel steering wheel cover.
7. Disconnect the connector of the switch.
8. Detach the turn signal switch assembly.

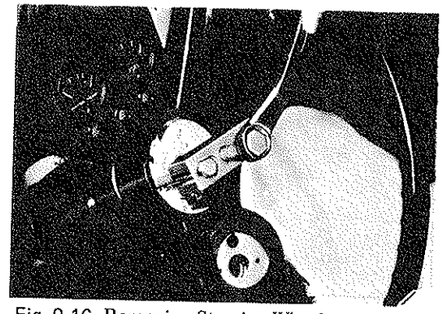


Fig. 9-16 Removing Steering Wheel

Inspection

Using a circuit tester, check each switch to see if continuity exists between the terminals at the connector, with the switch in its actuated condition.

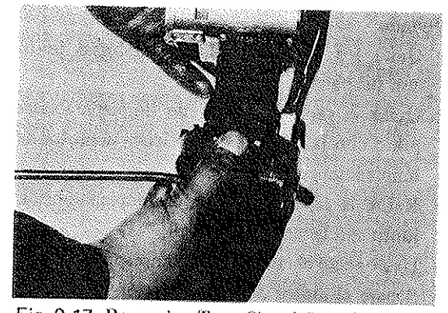
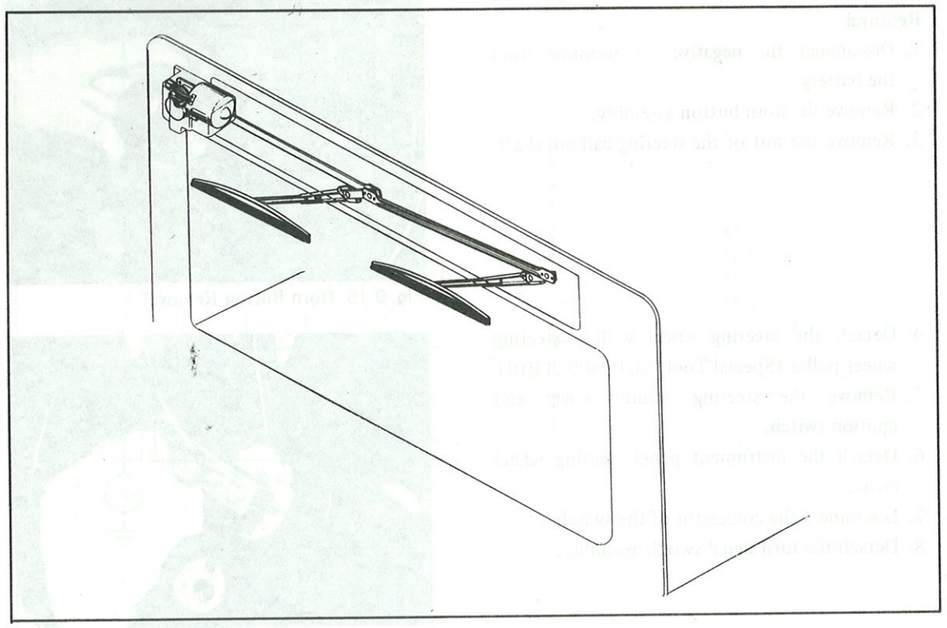


Fig. 9-17 Removing Turn Signal Switch Assembly

WINDSHIELD WIPER



Removal

1. Remove the wiper arms together with their blades.
2. Remove the wiper motor cover together with the bands which retain the windshield wiper motor.
3. Remove the windshield wiper hole cover together with the sunvisor.
4. Disconnect the wiring connector of the windshield wiper.
5. Separate the wiper motor from the link at the joint section. Take out the wiper motor.
6. Detach the wiper link.

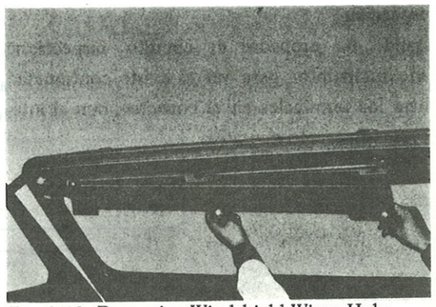


Fig. 9-19 Removing Windshield Wiper Hole Cover

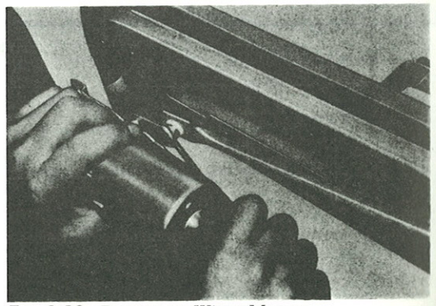


Fig. 9-20 Removing Wiper Motor

Installation

1. Mount the wiper link on the wiper motor. Then, install the wiper motor on the windshield frame.
2. As for the remaining steps, reverse the removal procedure to install the wiper motor.
3. Install the wiper arms in such a way that their blades come at a point 10 to 30 mm (0.4 to 1.2 inch) below the bottom of the weather strip. Furthermore, the difference in height between the right and left wiper blades should be no more than 20 mm (0.8 inch).
4. Operate the wiper motor and see if their blades stop at the specified position.
   If the blades should stop at a point slightly below the highest point, correct such installation by adjusting the crank installation position in relation to the wiper motor.

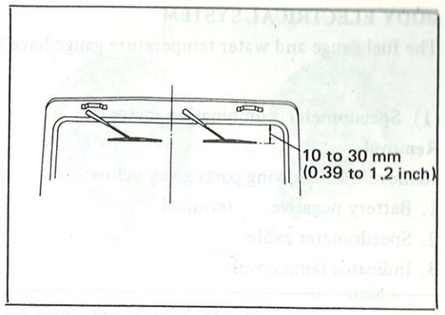


Fig. 9-21 Wiper Blade Installation Position

Injection Position of Washer Nozzle

Adjust the washer nozzle in order that the washer fluid is squirted at a 100 mm dia. circle with the "a".

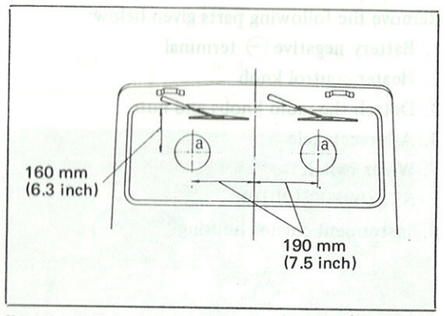


Fig. 9-22 Injection Position of Washer Nozzle

BODY ELECTRICAL SYSTEM

The fuel gauge and water temperature gauge have been incorporated into a combination meter.

(1) Speedometer, combination meter

Removal

Remove the following parts given below:

1. Battery negative — terminal
2. Speedometer cable
3. Indicator lamp cover

> Note
> The cover can be detached by inserting a screw driver into a cut-out section provided below the cover.

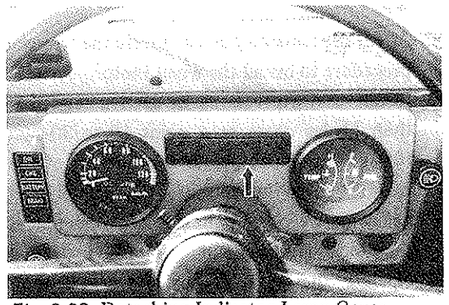


Fig. 9-23 Detaching Indicator Lamp Cover

4. Meter panel attaching screws (3 pices)
5. After pulling out the meter, remove the wiring and connectors.

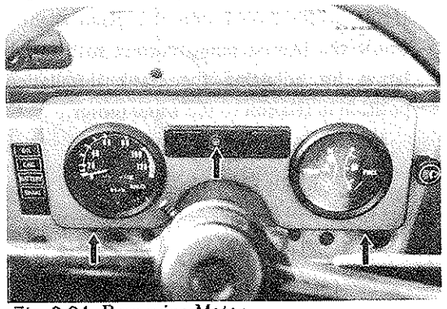


Fig. 9-24 Removing Meter

(2) Car clock, ammeter, water temperature receiver gauge and fuel receiver gauge (Deluxe Models)

Remove

Remove the following parts given below:

1. Battery negative ⊖ terminal
2. Heater control knob
3. Detach the radio knobs and nuts.
4. Ash receptacle
5. Wiper switch
   SST (09802-12010)
6. Instrument cluster housing

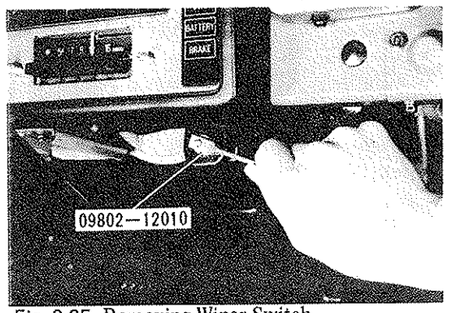


Fig. 9-25 Removing Wiper Switch

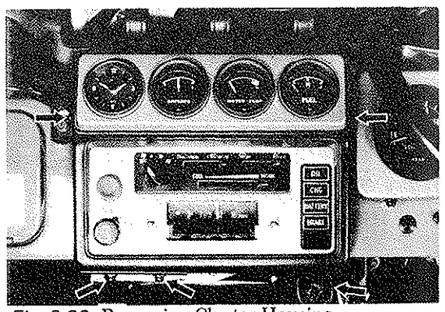


Fig. 9-26 Removing Cluster Housing

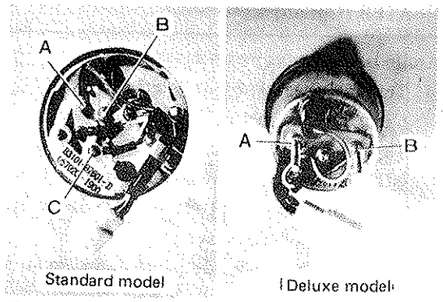
Inspection

1. Fuel receiver gauge

Unit inspection

(1) With the connector connected to the gauge, turn ON the ignition switch. The battery voltage should be present at the terminal A.
(2) Under the above described state, a voltage that varies in a range from about 0 to 7V should be present at the terminal B.
(3) Disconnect the connector from the gauge. Measure resistance values between the following terminals stated below:

Standard model:	Terminals A ⟷ C
Deluxe model:	Terminals A ⟷ B
Resistance value:	Approx. 55 Ω



Standard model　　Deluxe model

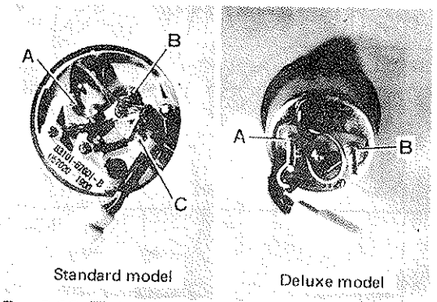
Fig. 9-27 Fuel Receiver Gauge Check

2. Water temperature receiver gauge

Unit inspection

(1) With the connector connected to the gauge, turn ON the ignition switch. The battery voltage should be present at the terminal A.
(2) Under the above-described state, a voltage that varies in a range from about 0 to 7V should be present at the terminal B.
(3) Disconnect the connector from the gauge. Measure resistance values between the following terminals stated below:

Standard model:	Terminals A ⟷ C
Deluxe model:	Terminals A ⟷ B
Resistance value:	Approx. 55 Ω



Standard model　　Deluxe model

Fig. 9-28 Water Temperature Receiver Gauge Check

Water temperature	Resistance value (Ω)	Tolerable error (Ω)
50°C	226.0	+ 33.6 − 36.6
115°C	26.4	+ 1.71 − 2.21

3. Ammeter

Inspection

Apply the battery voltage across the terminals A and B with a 12V bulb placed in series. The ammeter is satisfactory, if the pointer of the ammeter swings.

> Note
> If the battery voltage should be applied directly to the ammeter, a large amount of current would flow, thereby causing a damage to the ammeter.
> Therefore, make certain to place a 12V bulb in series.

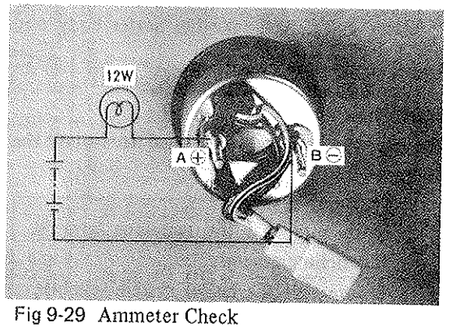


Fig 9-29 Ammeter Check

HEATER (Option)

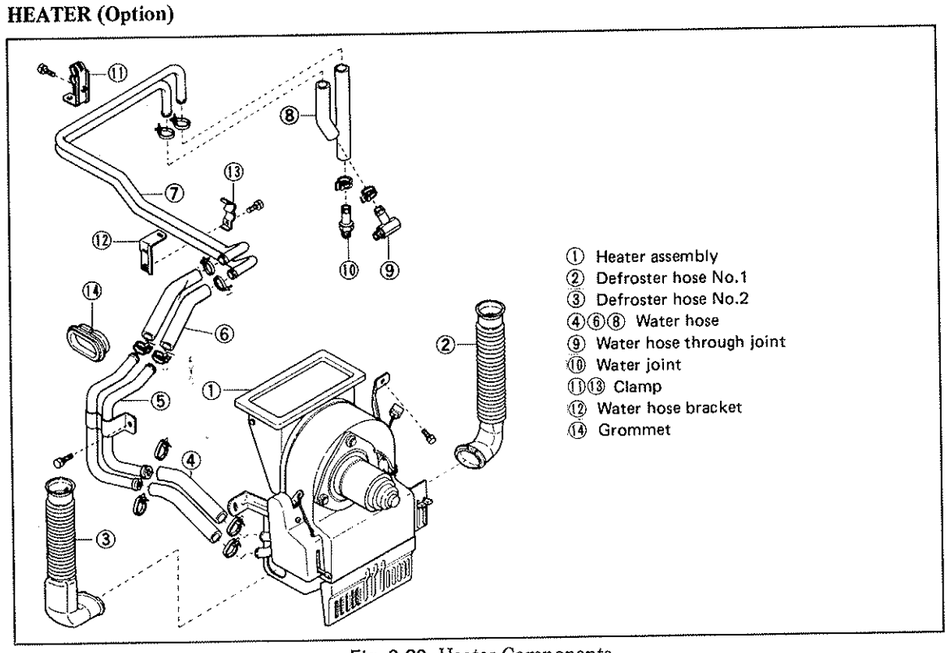


Fig. 9-30 Heater Components

Heater Assembly

Removal

1. Drain the cooling water.
2. Disconnect the water hose ① at the heater body side.
3. Disconnect the defroster hose ② and the connector wiring ③ for fan motor use.
4. Remove the glove compartment and ash receptacle.
5. Remove the three attaching bolts ④ of the heater body. And take the heater body out toward the left seat.

Installation

Reverse the removal procedure to install the heater.

Note
1. Make sure that the switching lever is functioning properly.
2. Ensure that the heater system exhibits no water leakage.

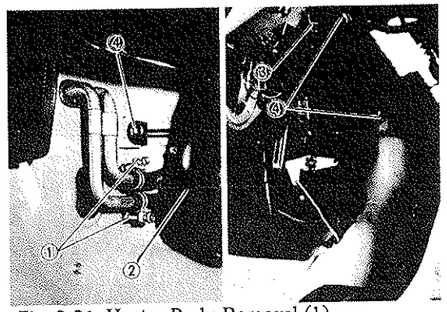


Fig. 9-31 Heater Body Removal (1)

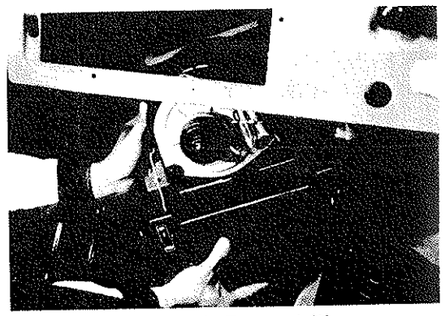


Fig. 9-32 Heater Body Removal (2)

WIRING HARNESSES

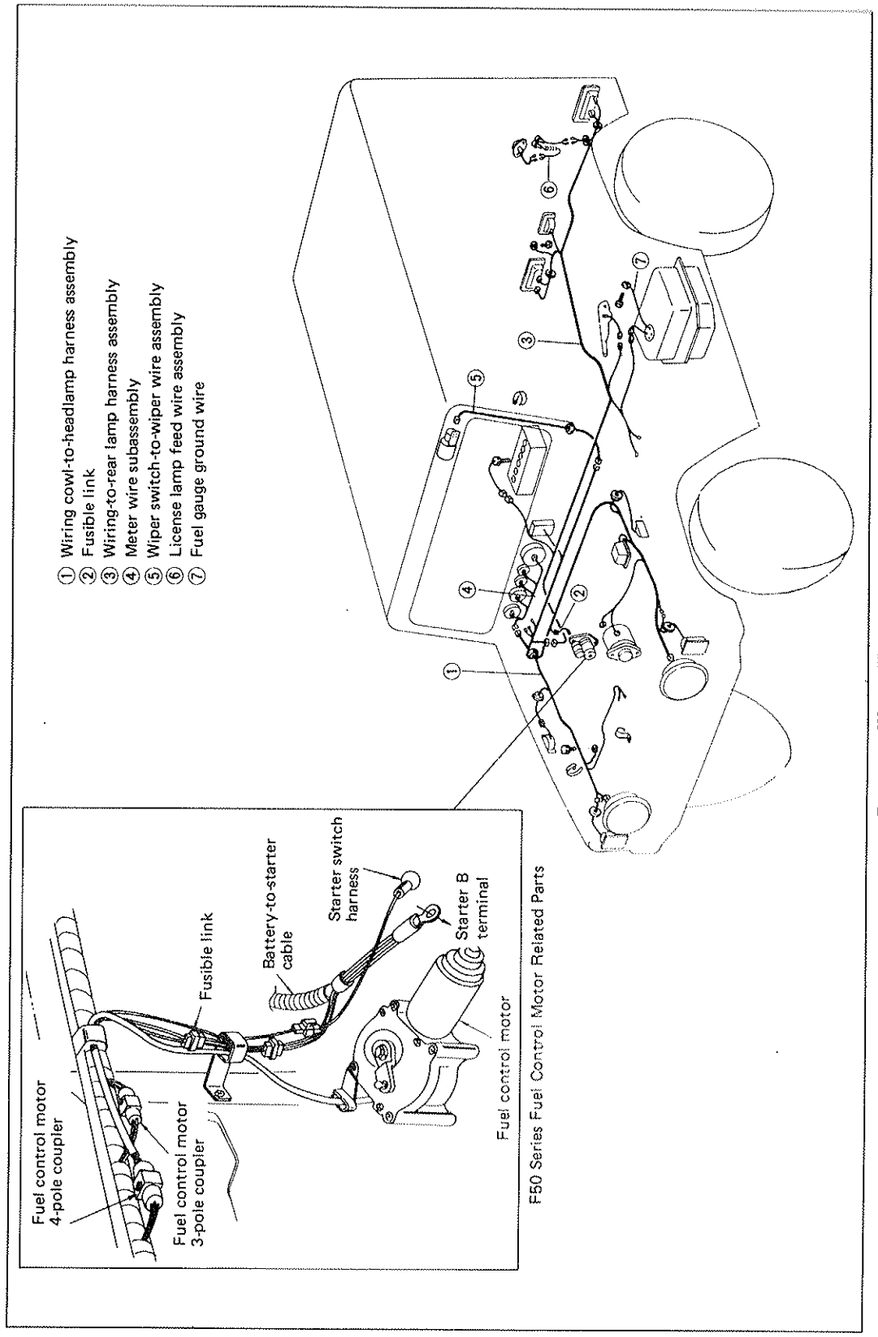


Fig. 9-33 Wiring Harness Diagram

4 DAIHATSU WHEEL DRIVE

SECTION 10
SERVICE SPECIFICATIONS

10

SERVICE SPECIFICATIONS

[Transmission]

Vehicle model			F50, F55	F20, F25
Transmission type			4VB	←
Type			(Forward) Constant mesh type (Reverse) Select sliding type	←
Gear ratio		1st	3.717 (Synchromesh)	←
		2nd	2.177 (Synchromesh)	←
		3rd	1.513 (Synchromesh)	←
		4th	1.000 (Synchromesh)	←
		Reverse	4.434	←
Gear backlash mm (inch)	1st gear	Specified value	0.06~0.20	(0.0024~0.0079)
		Allowable limit	0.25	(0.0098)
	2nd gear	Specified value	0.06~0.20	(0.0024~0.0079)
		Allowable limit	0.25	(0.0098)
	3rd gear	Specified value	0.06~0.20	(0.0024~0.0079)
		Allowable limit	0.25	(0.0098)
	4th gear	Specified value	0.06~0.20	(0.0024~0.0079)
		Allowable limit	0.25	(0.0098)
	Reverse gear	Specified value	0.08~0.28	(0.0031~0.0110)
		Allowable limit	0.33	(0.0130)
Thrust clearance mm (inch)	1st gear	Specified value	0.12~0.28	(0.0047~0.0110)
		Allowable limit	0.35	(0.0138)
	2nd gear	Specified value	0.10~0.30	(0.0039~0.0118)
		Allowable limit	0.35	(0.0138)
	3rd gear	Specified value	0.13~0.57	(0.0051~0.0224)
		Allowable limit	0.60	(0.0236)
Output shaft run-out allowable limit mm (inch)			0.03	(0.0012)
1st gear bush [Inner race] mm (inch)		Specified value	47.970~47.985	(1.8886~1.8892)
		Allowable limit	47.97	(1.8886)
1st gear thrust washer thickness mm (inch)		Specified value	3.9~4.1	(0.1535~0.1614)
		Allowable limit	3.85	(0.1516)
Gear inner diameter mm (inch)	1st gear	Specified value	54.0~54.030	(2.1260~2.1272)
		Allowable limit	54.05	(0.1279)
	2nd gear	Specified value	54.0~54.030	(2.1260~2.1272)
		Allowable limit	54.05	(0.1279)

Transmission

Vehicle model			F50, F20, F25, F55	
Gear inner diameter mm (inch)	3rd gear	Specified value	45.0~45.025	(1.7717~1.7726)
		Allowable limit	45.04	(1.7732)
	Reverce gear	Specified value	32.0~32.025	(1.2598~1.2608)
		Allowable limit	32.10	(1.2638)
Gear oil clearance mm (inch)	1st gear	Specified value	0.015~0.070	(0.0006~0.0028)
		Allowable limit	0.07	(0.0028)
	2nd gear	Specified value	0.015~0.070	(0.0006~0.0028)
		Allowable limit	0.07	(0.0028)
	3rd gear	Specified value	0.015~0.065	(0.0006~0.0026)
		Allowable limit	0.065	(0.0026)
	Reverce gear	Specified value	0.08~0.125	(0.0031~0.0049)
		Allowable limit	0.2	(0.0079)
Idler gear shaft outer diameter mm (inch)		Specified value	31.9~31.92	(1.2559~1.2567)
		Allowable limit	31.89	(2.2555)
Shift fork front end thickness mm (inch)	For 1st & 2nd	Specified value	6.8~6.9	(0.2677~0.2717)
		Allowable limit	6.4	(0.2520)
	For 3rd & 4th	Specified value	6.8~6.9	(0.2677~0.2717)
		Allowable limit	6.4	(0.2520)
Shift fork-to-groove clearance mm (inch)	For 1st & 2nd	Specified value	0.1~0.258	(0.0039~0.0102)
		Allowable limit	0.8	(0.031)
	For 3rd & 4th	Specified value	0.1~0.258	(0.0039~0.0102)
		Allowable limit	0.8	(0.031)
Shift arm front end diameter mm (inch)		Specified value	11.85~11.95	(0.4665~0.4705)
		Allowable limit	11.5	(0.4528)
Shift arm front end-to-groove clearance mm (inch)		Specified value	0.05~0.22	(0.0020~0.0087)
		Allowable limit	0.6	(0.0236)
Synchronizer ring-to-gear clearance mm (inch)	1st	Specified value	1.3~1.7	(0.0512~0.0669)
		Allowable limit	0.8	(0.031)
	2nd	Specified value	1.3~1.7	(0.0512~0.0669)
		Allowable limit	0.8	(0.031)
	3rd	Specified value	1.3~1.7	(0.0512~0.0669)
		Allowable limit	0.8	(0.031)
	4th	Specified value	1.3~1.7	(0.0512~0.0669)
		Allowable limit	0.8	(0.031)

[Transfer]

Type			Constant mesh type	
Gear ratio		Low	1.300	
		High	2.407	
Each gear backlash mm (inch)	Low	Specified value	0.06~0.20	(0.0024~0.0079)
		Allowable limit	0.25	(0.0098)
	High	Specified value	0.06~0.20	(0.0024~0.0079)
		Allowable limit	0.25	(0.0098)
	Output	Specified value	0.06~0.20	(0.0024~0.0079)
		Allowable limit	0.25	(0.0098)
Input gear [Inner race] mm (inch)	Outer diameter	Specified value	42.98~42.99	(1.6921~1.6925)
		Allowable limit	42.98	(1.6921)
Low, High gear mm (inch)	Inner diameter	Specified value	48.00~48.02	(1.8898~1.8905)
		Allowable limit	48.04	(1.8913)
Shift fork-to-gear clearance		Specified value	0.15~0.26	(0.0059~0.0102)
		Allowable limit	0.35	(0.0138)
Low, High gear end play		Specified value	0.17~0.33	(0.0067~0.0130)
		Allowable limit	0.40	(0.0157)
Input gear thrust washer thickness mm (inch)		Specified value	3.95~4.05	(0.1555~0.1594)
		Allowable limit	3.85	(0.1516)

[Propeller shaft]

Vehicle model			F50, F55	F20, F25
Propeller shaft	Front	Length mm (inch)	518 (20.39)	←
		Outer diameter mm (inch)	65 (2.56)	32 (1.26)
		Inner diameter mm (inch)	61.8 (2.43)	←
		Universal joint type	Cross piece type	←
	Rear	Length mm (inch)	518 (20.39)	←
		Outer diameter mm (inch)	65 (2.56)	←
		Inner diameter mm (inch)	61.8 (2.43)	←
		Universal joint type	Cross piece type	←
Spider outer diameter mm (inch)			16.826~16.844 (0.6624~0.6631)	←
Needle roller number (one cup)			25	←

Vehicle model		F50, F55	F20, F25
Propeller shaft run-out allowable limit mm (inch)		0.5 (0.020)	←
Spider axial direction clearance mm (inch)		0.05 (0.0020)	←
Spider bearing cup fitting bore inner diameter mm (inch)		28.000~28.021 (1.1024~1.1032)	←
Spider bearing cup outer diameter mm (inch)		28.025~28.035 (1.1033~1.1037)	←

[Defferential]

* . . . The value is added to 0.4~0.9 kg on drive pinion bearing preload value.

Vehicle model		F50, F55	F20, F25
Differential size (inch)		7.5	←
Number of tooth	Ring gear	39	43
	Drive pinion	11	9
Reduction gear ratio		3.545	4.777
Number of tooth	Differential pinion	10	←
	Differential side gear	18	←
Gear type		Hypoid gear	←
Axle housing type		Bilt-up	←
Allowable limit of run-out at back surface of ring gear mm (inch)		0.05 (0.0020)	←
Drive pinion x ring gear backlash mm (inch)		0.1~0.2 (0.0039~0.0079)	←
Drive pinion bearing preload [Starting torque] (at bolt hole of flange) kg (lb)	New bearing	1.5~4.5 (3.3~9.9)	←
	Original bearing reused	1.5~4.5 (3.3~9.9)	←
Total preload [Starting torque] (at bolt hole of flange) kg (lb)	New bearing	*1.9~5.4 (4.2~11.9)	←
	Original bearing reused	*1.9~5.4 (4.2~11.9)	←

[Rear Axle]

Rear axle shaft

Type	Semi floating axle tube type
Flange surface run-out allowable limit mm (inch)	0.2 (0.0079)
Run-out-of center unmachined section mm (inch)	2.0 (0.079)

[Front Axle]

Camber		Specified value	1.°30′±1°
Caster		Specified value	$0°30' \begin{smallmatrix}+1°30' \\ -0°30'\end{smallmatrix}$
Toe-in	mm (inch)	Specified value	3~5 (0.118~0.197)
Side slip	mm (inch)	Specified value	In 3.0 (0.118) ~ Out 3.0 (0.118)
Tire turning angle		Inner	$28°0' \begin{smallmatrix}+1° \\ -2°\end{smallmatrix}$
		Outer	$26°0' \begin{smallmatrix}+1° \\ -2°\end{smallmatrix}$

[Tire air inflation]

[option]

Vehicle model		F20, F50						F25, F55
Front	Tire size	6.00-16-4 (Lug tire)	6.00-16-6 (Rib lug tire)	6.50-16-4 (Sand tire)	H78-15 (Wide tire)	HR78-15 (Radial tire)	[6.00-16-6] (Lug tire)	6.50-16-6 [6.50-16-8] (Rib lug tire)
	Air inflation kg/cm²(psi)	1.6 (23)	1.8 (26)	1.4 (20) (On sand: 1.0 (14))	1.2 (17)	1.2 (17)	1.8 (26)	1.8 (26)
Rear	Tire size	6.00-16-4	6.00-16-6	6.50-16-6	H78-15	HR78-15	[6.00-16-6]	6.50-16-8
	Air inflation kg/cm²(psi)	2.1 (30)	2.3 (33)	1.9 (28) (On sand: 1.3 (18))	1.7 (24)	1.7 (24)	2.7 (38)	2.4 (34) (Loaded condition: 4.25 (60))

[Steering]

Steering wheel	Free play mm (inch)	15~30 (0.591~1.181) [Measured at outer periphery of steering wheel]
Gear box type		Ball-nut type
Sector shaft outer diameter	mm (inch)	31.966~31.991 (1.2585~1.2595)
Sector shaft-to-bush clearance	mm (inch)	0.009~0.059 (0.0004~0.0023)
Sector shaft thrust clearance	mm (inch)	No more than 0.1 (0.0039)
Worm shaft preload [starting torque] (at serration portion) kg (lb)	Without sector shaft	3.75~6.25
	With sector shaft	6.25~10.0
Oil to be used		Gear oil SAE 90
Oil amount	cc	280 (For L.H. vehicles 270 cc)

[Brake]

Parking brake

Type		Mechanically-operated, internal expanding type with braking force applied to propeller shaft
Drum inner diameter mm (inch)	Specified value	160 (6.2992)
	Allowable limit	162 (6.3779)
Lever specified working travel		8~7 notches (with operation force of 30kg (66 lb) applied)
Lining thickness mm (inch)	Specified value	4.0 (0.16)
	Allowable limit	1.0 (0.04)
Drum-to-lining clearance adjustment		After expanding the brake shoe fully to the drum, back-off the adjusting camshaft one notch.

Brake pedal

Pedal installation height	mm (inch)	177~192 (6.97~7.56)
Pedal free play	mm (inch)	3~8 (0.12~0.31)
Reserve travel	mm (inch)	No less than 80 (3.15) [With force of 50kg (110 lb) applied]

Master Cylinder

Type			Tandem
Stroke	mm (inch)	All	29.3 (1.1535)
		Front	15.8~16.8 (0.6220~0.6614)
		Rear	12.5~13.5 (0.4921~0.5315)
Cylinder inner diameter		mm (inch)	23.810~23.862 (0.937~0.939)
Piston outer diameter		mm (inch)	23.753~23.790 (0.935~0.937)

Front brake and rear brake

Item			Front	Rear
Type			Two leading	Leading & trailing
Wheel cylinder	mm (inch)	Inner diameter	25.40~25.452 (1.0000~1.0020)	22.22~22.272 (0.8748~0.8768)
		Piston outer diameter	25.348~25.380 (0.9980~0.9992)	22.167~22.20 (0.8727~0.8740)
Drum inner diameter	mm (inch)	Specified value	254 (10.00)	←
		Allowable limit	256 (10.08)	←
Lining thickness	mm (inch)	Specified value	5.0 (0.20)	←
		Allowable limit	1.0 (0.04)	←

Brake booster (Option except EC & ECE, Australia)

Type			Direct acting
Size		(inch)	6
Diaphragm effective diameter		mm (inch)	155 (6.10)
Stroke		mm (inch)	More than 40 (1.57)
Piston-to-push rod clearance		mm (inch)	0.1~0.5 (0.004~0.020) [with load of 500 mmHg applied]
Non-boosting performance test kg/cm² (psi)	Application force	10 kg (22 lb)	More than 4 (57)
		30 kg (66 lb)	More than 26 (370)
Boosting performance test kg/cm² (psi)	Application force	5 kg (11 lb)	0~8 (0~114)
		15kg (33 lb)	19~31 (270~441)
		25 kg (55 lb)	42~54 (597~768)
		35 kg (77 lb)	55~67 (782~953)

Vacuum pump (Option except EC & ECE, Australia)

Engine type		DG
Type		Vane type (4 blades)
Casing inner diameter mm (inch)	Specified value	58.00~58.06 (2.283~2.286)
	Allowable limit	58.16 (2.290)
Blade height mm (inch)	Specified value	13.4~13.6 (0.528~0.535)
	Allowable limit	12 (0.472)
Blade width mm (inch)	Specified value	7.03~7.09 (0.277~0.279)
	Allowable limit	6.92 (0.272)
Blade length mm (inch)	Specified value	35.01~35.04 (1.378~1.380)
	Allowable limit	34.98 (1.377)

TIGHTENING TORQUES

[Table of general standard bolt tightening torque]

Kind	diameter	Pitch	Standard tightening torque kg-m (ft-lb)	
			Standard value	Tightening range
4T (Bolt bearing mark of 4 at bolt head) (Example of part number 91○○○-4○○○○)	6	1	0.47 (3.4)	0.4~ 0.7 (2.9~ 5.1)
	8	1.25	1.11 (8.0)	1.0~ 1.6 (7.2~ 11.6)
	10	1.25	2.25 (16.3)	1.9~ 3.1 (13.7~ 22.4)
	10	1.5	2.14 (15.5)	1.8~ 3.0 (13.0~ 21.7)
	12	1.25 (ISO)	4.40 (31.8)	3.5~ 5.5 (25.3~ 39.8)
	12	1.5	3.89 (28.1)	3.5~ 5.5 (25.3~ 39.8)
	12	1.75	3.74 (27.1)	3.0~ 5.0 (21.7~ 36.2)
	13	1.5	5.08 (36.7)	4.5~ 7.0 (32.5~ 50.6)
	14	1.5	6.33 (45.8)	5.0~ 8.0 (36.2~ 57.9)
	14	2	5.93 (42.9)	4.7~ 7.7 (34.0~ 55.7)
	16	1.5	9.57 (69.2)	7.5~11.0 (54.2~ 79.6)
	16	2	9.10 (65.8)	7.1~10.6 (51.4~ 76.7)
5T (Bolt bearing mark of 5 at bolt head) (Example of part number 91○○○-5○○○○)	6	1	0.71 (5.1)	0.6~ 0.9 (4.3~ 6.5)
	8	1.25	1.66 (12.0)	1.5~ 2.3 (10.8~ 16.6)
	10	1.25	3.37 (24.4)	3.0~ 4.5 (21.7~ 32.5)
	10	1.5	3.20 (23.1)	2.7~ 4.2 (19.5~ 30.4)
	12	1.25 (ISO)	6.60 (47.7)	5.0~ 8.0 (36.2~ 57.9)
	12	1.5	5.84 (42.2)	5.0~ 7.0 (36.2~ 50.6)
	12	1.75	5.60 (40.5)	4.8~ 6.8 (34.7~ 49.2)
	13	1.5	7.63 (55.2)	6.5~ 9.0 (47.0~ 65.1)
	14	1.5	9.50 (68.7)	7.5~11.0 (54.2~ 79.6)
	14	2	8.90 (64.4)	7.0~10.5 (50.6~ 75.9)
	16	1.5	14.36 (103.9)	12.0~17.0 (86.8~123.0)
	16	2	13.58 (98.2)	11.5~16.5 (83.2~119.3)
6T (Bolt bearing mark of 6 at bolt head) (Example of part number 91○○○-6○○○○)	6	1	0.71 (5.1)	0.6~ 0.9 (4.3~ 6.5)
	8	1.25	1.66 (12.0)	1.5~ 2.2 (10.8~ 15.9)
	10	1.25	3.37 (24.4)	3.0~ 4.5 (21.7~ 32.5)
	10	1.5	3.20 (23.1)	2.7~ 4.2 (19.5~ 30.4)
	12	1.25 (ISO)	6.60 (47.7)	5.0~ 8.0 (36.2~ 57.9)
	12	1.5	5.84 (42.2)	5.0~ 7.0 (36.2~ 50.6)
	12	1.75	5.61 (40.6)	4.8~ 6.8 (34.7~ 49.2)
7T (Bolt bearing mark of 7 at bolt head) (Example of part number 91○○○-7○○○○)	6	1	0.95 (6.9)	0.8~ 1.2 (5.8~ 8.7)
	8	1.25	2.20 (15.9)	2.0~ 3.0 (14.5~ 21.7)
	10	1.25	4.50 (32.5)	4.0~ 5.5 (28.9~ 39.8)
	10	1.5	4.30 (31.1)	3.7~ 5.2 (26.8~ 37.6)
	12	1.25 (ISO)	8.80 (63.7)	7.5~10.5 (54.2~ 75.9)
	12	1.5	7.78 (56.3)	7.0~ 9.0 (50.6~ 65.1)
	12	1.75	7.48 (54.1)	6.0~ 8.5 (43.4~ 61.5)
	13	1.5	10.17 (73.6)	8.0~12.0 (57.9~ 86.8)
	14	1.5	12.67 (91.6)	10.0~15.0 (72.3~108.5)
	14	2	11.86 (85.8)	9.5~14.0 (68.7~101.3)
	16	1.5	19.15 (138.5)	15.0~23.0 (108.5~166.4)
	16	2	18.11 (131.0)	14.0~22.0 (101.3~159.1)

NOTE: Example 91111-40620

- Bolt length below head (ℓ) mm
- Diameter of bolt (d) mm

Example Bolt (40620)
4 stands for mark bearing at bolt head
06 stands for diameter of bolt
20 stands for length below head

Standard tightening torque denotes value when tightening the materials made of steel.
In case that the materials other than steel made are tightened or, heat or stress such as vibration load etc. is applied to a bolt, standard tightening torque should be changed as required.

[Clutch related parts]

kg-m (ft-lb)

Tightening component \ Engine type	DG	12R
Clutch cover x Flywheel	1.5~2.5 (10.8~18.1)	←
Release fork support x clutch housing	3.0~5.0 (21.7~36.2)	—
Release lever yoke x release lever shaft	—	3.0~5.0 (21.7~36.2)
Rear end plate x clutch housing	1.5~2.5 (10.8~18.1)	0.6~0.9 (4.3~6.5)
Cylinder block x clutch housing	5.0~7.0 (36.2~50.6)	3.0~5.0 (21.7~36.2)
Starter tightening bolt	5.0~7.0 (36.2~50.6)	2.0~3.1 (14.5~22.4)

[Transmission, Transfer]

kg-m (ft-lb)

Tightening component	All models	
Clutch housing x transmission case	5.0~8.0	(36.2~50.6)
Tansmission case cover x transmission case	3.0~5.0	(21.7~36.2)
Back-up lamp switch x transmission case	3.0~5.0	(21.7~36.2)
Transmission case x transfer case	3.0~5.0	(21.7~36.2)
Parking brake backing plate x transfer case	3.0~5.0	(21.7~36.2)
Speedometer sleeve lock plate x output shaft bearing rear retainer	0.6~0.9	(4.3~6.5)
Output shaft x lock nut	10~14	(72.3~101.3)
Universal joint flange yoke x universal joint flange	6.0~8.0	(43.4~57.9)
Engine mounting insulater x engine mounting support rear	3.0~5.0	(21.7~36.2)
Transfer output shaft x front lock nut	15~20	(108.5~144.7)
Transfer output shaft x rear lock nut	10~14	(72.3~101.3)
Transfer case x transfer case cover	3.0~4.5	(21.7~32.5)
Transfer case x output shaft bearing rear retainer	3.0~4.5	(21.7~32.5)
Transfer case x hexagon bolt (for interlocking mechanism)	3.0~5.0	(21.7~32.5)
Drain plug x transmission case	3.0~5.0	(21.7~32.5)
Transmission position detect switch x transmission case	3.0~5.0	(21.7~32.5)

[Propeller shaft, Differential]

kg-m (ft-lb)

Tightening component	All models	
Universal joint flange yoke x drive pinon companion flange	6.0~8.0	(43.4~57.9)
Differential drive pinion x drive pinion companion flange	20~25	(144.7~180.8)
Differential case x differential ring gear	9.0~11	(65.1~79.6)
Differential case x differential bearing cap	8.0~12	(43.4~86.8)
With head straight screw plug x rear axle housing cover	4.0~6.0	(28.9~43.4)
Differential case right x differential case left	3.0~5.0	(21.7~32.5)
Rear axle housing cover x rear axle housing	1.8~2.4	(13.0~17.4)

[Rear axle]

Tightening component	All models	
Rear axle shaft x disc wheel	9.0~12.0	(65.1~86.8)
Rear axle bearing case x rear axle housing	4.0~5.5	(28.9~39.8)

[Front axle]

kg-m (ft-lb)

Tightening component	All models	
Steering knuckle bearing cap x steering knuckle	1.5~2.2	(10.8~15.9)
Steering knuckle x backing plate	4.0~5.5	(28.9~39.8)
Front axle hub x disc wheel	9.0~12	(65.1~86.8)
Steering knuckle spindle x front hub bearing lock nut	10~15	(72.3~108.5)
Axle outer shaft flange x front axle hub	3.0~4.0	(21.7~28.9)
Tie-rod end x steering knuckle	3.5~5.0	(25.3~36.2)

[Suspension, Frame]

kg-m (ft-lb)

Tightening component	F20, F50	F25, F55
Front axle housing x front spring U bolt	5.0~8.0 (36.2~57.9)	←
Rear axle housing x rear spring U bolt	5.0~8.0 (36.2~57.9)	11.0~14.0 (79.6~101.3)
Spring shackle x shackle plate (fram side)	3.0~4.5 (21.7~32.5)	←
Spring shackle x shackle plate (leaf spring side)	7.5~11 (54.2~79.6)	13.0~16.0 (94.0~115.7)
Spring pin x spring bracket	3.0~4.5 (21.7~32.5)	←
Shock absorber upper x frame	3.5~5.5 (25.3~39.8)	←
Shock absorber lower x spring U bolt seat	3.5~5.5 (25.3~39.8)	←

[Steering]

kg-m (ft-lb)

Tightening component	All models
Sector shaft x pitman arm	12~17 (86.8~123.0)
Steering gear housing x sector shaft end cover	4.0~5.5 (28.9~39.8)
Sector shaft adjusting screw x sector shaft adjusting nut	2.0~3.5 (14.5~25.3)
Worm bearing adjusting lock nut x worm bearing adjusting screw	23~26 (166.4~188.1)
Steering gear housing x frame	5.0~8.0 (36.2~57.9)
Relay rod x tie rod end	7.0~14.0 (50.6~101.3)
Steering wheel x steering main shaft	4.0~6.0 (28.9~43.4)
Pitman arm x relay rod	7.0~14.0 (50.6~101.3)
Bleeder plug x gear housing	0.2~0.4 (1.45~2.89)

[Brake]

kg-m (ft-lb)

Tightening component	F20, F50	F25, F55
Front wheel cylinder x backing plate	1.5~2.2 (10.8~15.9)	2.0~3.0 (14.5~21.7)
Rear wheel cylinder x backing plate	1.5~2.2 (10.8~15.9)	2.0~3.0 (14.5~21.7)
Master cylinder fluid outlet plug	5.5~6.5 (39.8~47.0)	←
Master cylinder reserver set bolt	3.0~3.5 (21.7~25.3)	←
Brake booster x master cylinder	1.0~1.6 (7.2~11.6)	←
Rod adjuster screw	0.3~1.2 (2.2~8.7)	←
Booster band screw x nut	0.8~1.2 (5.8~8.7)	←
Bleeder plug x wheel brake cylinder	0.9~1.3 (6.5~9.4)	←
Brake tube union nut	1.3~1.8 (9.4~13.0)	←
Flexible hose x 3 way	2.0~2.7 (14,5~19.5)	←

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March 1990
Printed in Japan 6

DAIHATSU

Printed in Japan