TOYOTA LAND CRUISER
CHASSIS & BODY

REPAIR MANUAL

TOYOTA MOTOR SALES CO., LTD.
EXPORT-TECHNICAL DEPARTMENT

F O R E W O R D

This manual has been published to provide comprehensive information on the Chassis and the Body for Toyota Land Cruiser.

It is recommended that mechanics should understand thoroughly the detailed structure and operation of this Toyota Land Cruiser in order to maintain the performance designed and built in this vehicle.

The main subjects dealt with are listed on the following page and an individual content is provided on the first page of each section.

The company reserves the right to make changes in the specifications without previous notice at any time.

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DESCRIPTION

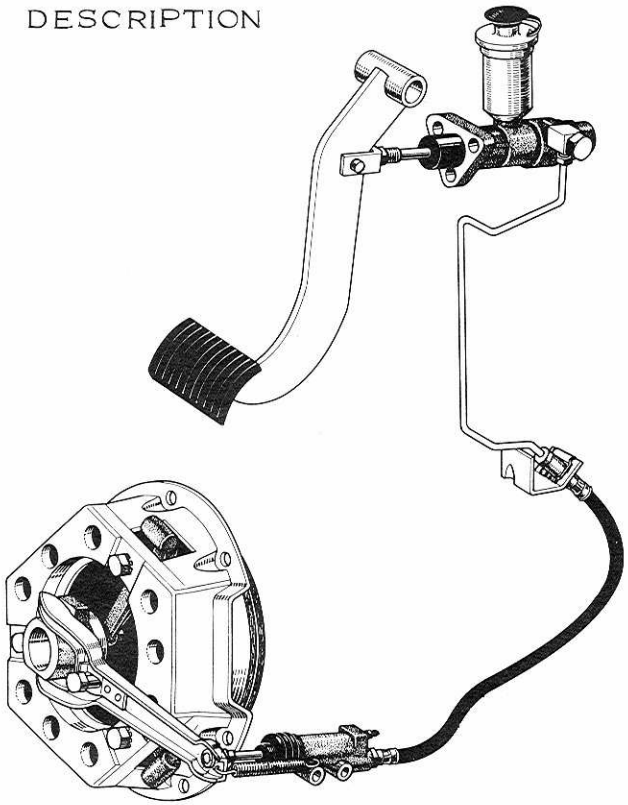


Fig.1-1 Clutch Construction Y5724

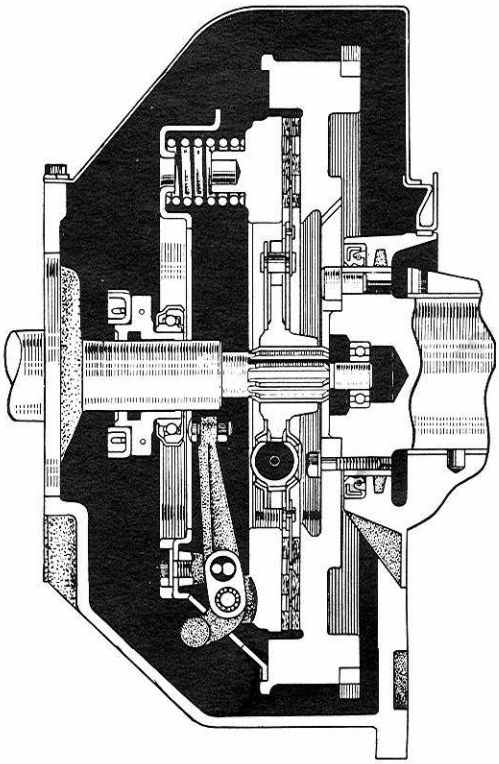


Fig.1-2 Clutch Cross Section View G2363

The clutch equipped on the FJ series is a dry single disc type with hydraulic release mechanism.

The construction of the clutch mechanism consists of the clutch disc, clutch cover, clutch bearing hub, and the clutch release fork assemblies.

The hydraulic release mechanism consists of the clutch pedal, clutch master cylinder, clutch release cylinder, and the inter-connecting hydraulic lines and connections.

The clutch cover assembly consists of the clutch cover, clutch pressure plate, clutch springs, and three release levers.

The clutch release bearing is fitted onto the release bearing hub. This hub is installed on the hub portion of the front bearing retainer of the transmission, and slides over the hub portion by means of the clutch release fork.

The clutch cover assembly is bolted onto the flywheel surface, and the disc is installed between the pressure plate and the flywheel surface.

When the release levers are depressed, the pressure plate moves away from the clutch disc, disengaging the engine torque to the transmission.

TROUBLE SHOOTING

Symptoms & Probable Causes	Remedies
1. Slippage	
The clutch slipping will appear gradually with the followings.	
a. No speed gains	
b. Fuel consumption increases	
c. Engine overheats	
d. Not enough acceleration relative to engine rpm when the accelerating pedal is depressed suddenly	
e. Loss in power is evident when climbing a slope	

The clutch slippage can be detected immediately in case of "d" and "e", but as for the symptoms of "a", "b" and "c", they are sometimes taken for engine troubles. Thus, diagnosis must be carefully made. Try not to operate the car with a slipping clutch which may lead to excessive wear or burning of clutch facing.

INSPECTION: Pull the parking brake fully and lock the wheels completely. Disengage the clutch by depressing the clutch pedal, the engage transmission gear in the first speed position. Slowly engage the clutch while increasing the engine rpm gradually. If the engine begins to stall, the clutch is in good condition. If the car does not move and the engine does not stall, the clutch is slipping.

a. No clutch pedal play	Adjust
b. No play at release fork end	Adjust
c. Oil adhering to clutch facing	Replace
d. Clutch facing worn out	Replace
e. Unequal height of pressure levers	Adjust or replace
f. Sticking pressure lever	Repair or replace
g. Weak compression spring	Replace
h. Deformed pressure plate and or flywheel	Repair or replace

2. Improper Disengagement

This symptom causes unpleasant noise (crunch or gear clash) when shifting the transmission gears into mesh, and makes the gear shift difficult. Especially this appears when shifting into low and reverse gears.

INSPECTION: Depress the clutch pedal and engage the gears, next, position in neutral. Accelerate the engine, then engage the gears again. At this time keep the clutch pedal depressed. If the noise is still present, the clutch may be defective.

a. Excessive clutch pedal play	Adjust
b. Excessive play at release fork end	Adjust
c. Defective input shaft front bearing	Replace bearing
d. Worn splines of clutch disc hub	Replace disc assembly
e. Excessive clutch disc run-out	Repair or replace
f. Weak or deformed master cylinder cup	Replace cylinder cup
g. Fluid leakage from master cylinder cup	Replace cylinder cup

h. Fluid leakage from release cylinder cup	Replace cylinder cup
i. Air in clutch hydraulic system	Bleed air
j. Unequal height of pressure levers	Adjust or replace

3. Chattering
Upon starting out the vehicle with the clutch engaged half-way, entire body may vibrate.

a. Clutch facing glazed	Recondition the facing with sand-paper or replace
b. Oil or grease on facing	Replace disc assembly
c. Damaged or weak disc torsion rubbers	Replace disc assembly
d. Poor facing contact or excessive disc run-out	Replace disc assembly
e. Warped pressure plate or flywheel	Repair or replace
f. Loose or worn engine mounting	Tighten or replace
g. Loose rivets in clutch disc	Replace disc assembly
h. Unequal height of pressure levers	Adjust or replace
i. Sticking or binding pressure levers	Repair or replace

4. Noisy
Find the origin of the noisy clutch by disengaging the clutch for "a" and "b"; or engaging the clutch for "c", "d" and "e".

a. Damaged, worn or improperly lubricated release bearing	Replace
b. Damaged or worn input shaft front bearing	Replace
c. Loose disc hub	Replace disc assembly
d. Cracked disc plate	Replace disc assembly
e. Weak or damaged disc torsion rubbers	Replace disc assembly

5. Jerking
Upon starting out the vehicle with the clutch engaged half-way, the vehicle jerks and is not accelerated smoothly.

a. Oil or grease on facing	Replace
b. Worn facing or loose rivets rubbers	Replace disc assembly
c. Damaged or weak disc torsion rubbers	Replace disc assembly

* *

ADJUSTMENT

Clutch Pedal

1. Adjust the clutch pedal height with the pedal stopper bolt to specified height which should be 170 mm (6.69") for only FJ 55V series or 245 mm (9.65") for others. From the dash board to the top center of the pedal pad.

2. Adjust the clutch pedal free travel by loosening the lock nut and turning the push rod in either direction, and then retighten the lock nut. Perform this adjustment with the tension spring in place.
The clutch pedal free travel should be 35 mm (1.38") for only FJ 55V series or 25 mm (0.98") for others.

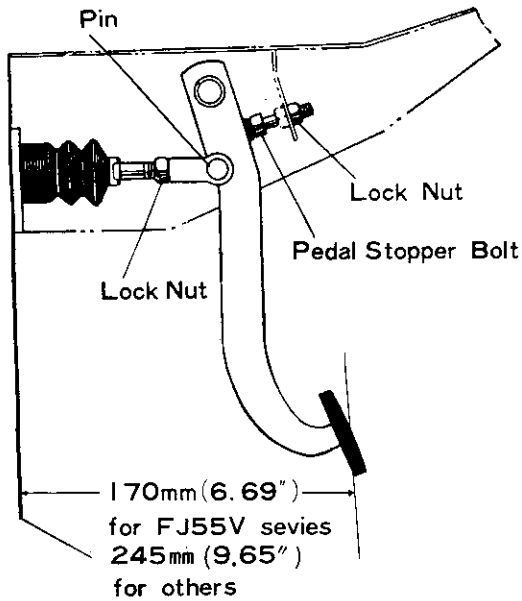


Fig.1-3 Clutch Pedal Adjustment G2447

3. Check the small hole of the master cylinder boot if it is at underneath.

Clutch Release Fork

In order to obtain the specified clearance between the clutch release bearing in operation, and the pressure lever, the adjustment should be made with the release cylinder push rod adjuster.
Turn the release cylinder push rod adjuster so that the release fork will have the specified clearance at its end.
The clearance should be 5.3 mm (0.21") for only FJ 55V series or 3.0 mm (0.12") for others.

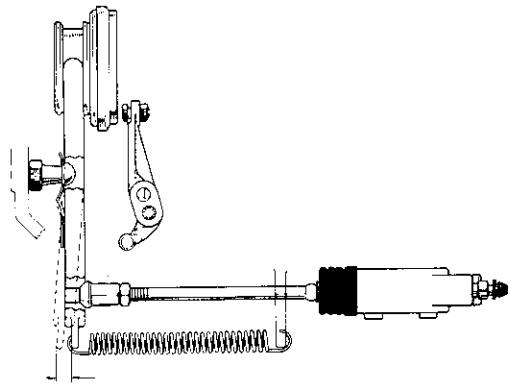


Fig.1-4 Clearance at Release Fork End G236

Air Bleeding

Be sure that the reservoir does no run short of brake fluid during the air bleeding operation, and brake fluid does not drip on painted surface.

1. Connect a vinyl pipe to the release cylinder bleeder plug and put the other end of the pipe into a jar filled half with brake fluid.

2. Pump the clutch pedal to bleed air from the system. With the clutch pedal depressed, loosen the bleeder plug one third to one half turn and bleed the air. Tighten the plug immediately.

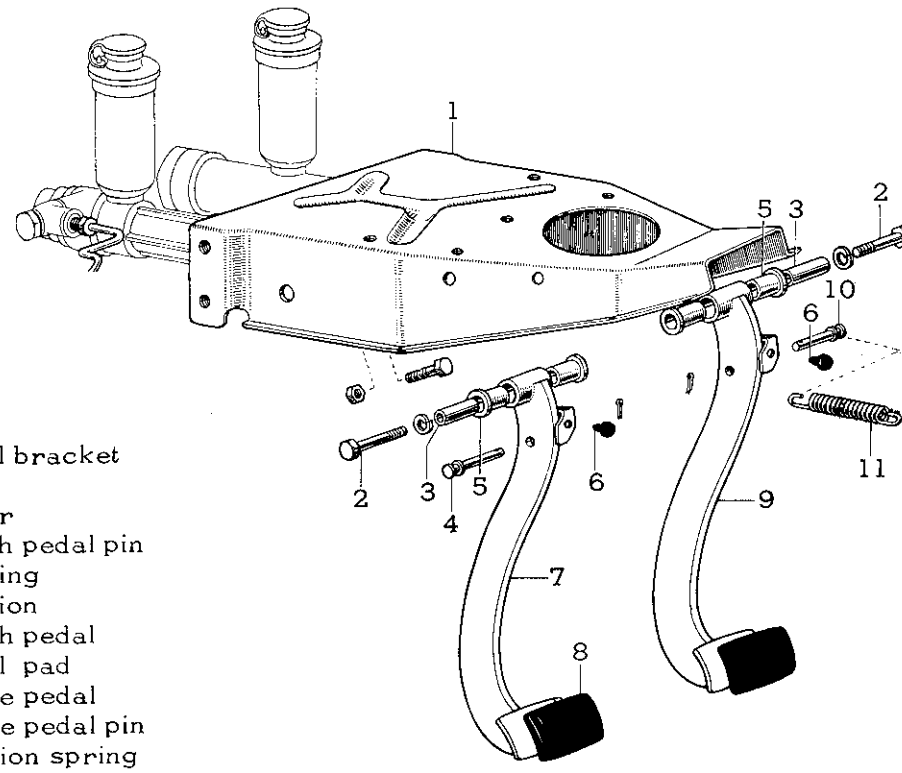
3. Repeat this operation until brak fluid runs into the jar without any trace of air. Always depress the clutch pedal after returning to the pedal stopper.

4. Install the bleeder plug cap on the

plug. Fill the clutch master cylinder reservoir with brake fluid.

5. After above procedures, check if the oil leakage is not present.

CLUTCH PEDAL



1. Pedal bracket
2. Bolt
3. Collar
4. Clutch pedal pin
5. Bushing
6. Cushion
7. Clutch pedal
8. Pedal pad
9. Brake pedal
10. Brake pedal pin
11. Tension spring

Fig.1-5 Clutch Pedal & Brake Pedal Components G2365

Removal

1. Remove the tension spring of the clutch pedal.

2. With the cotter pin removed, then remove the pin from the master cylinder push rod clevis and the clutch pedal.

3. Remove the bolt securing the pedal onto the pedal bracket, then remove the clutch pedal.
   Remove the bushings and the collar from the clutch pedal.

Inspection

Inspect the followings, and repair or replace the part/s if necessary.

1. Check the pedal bushings for wear, scores and damage.

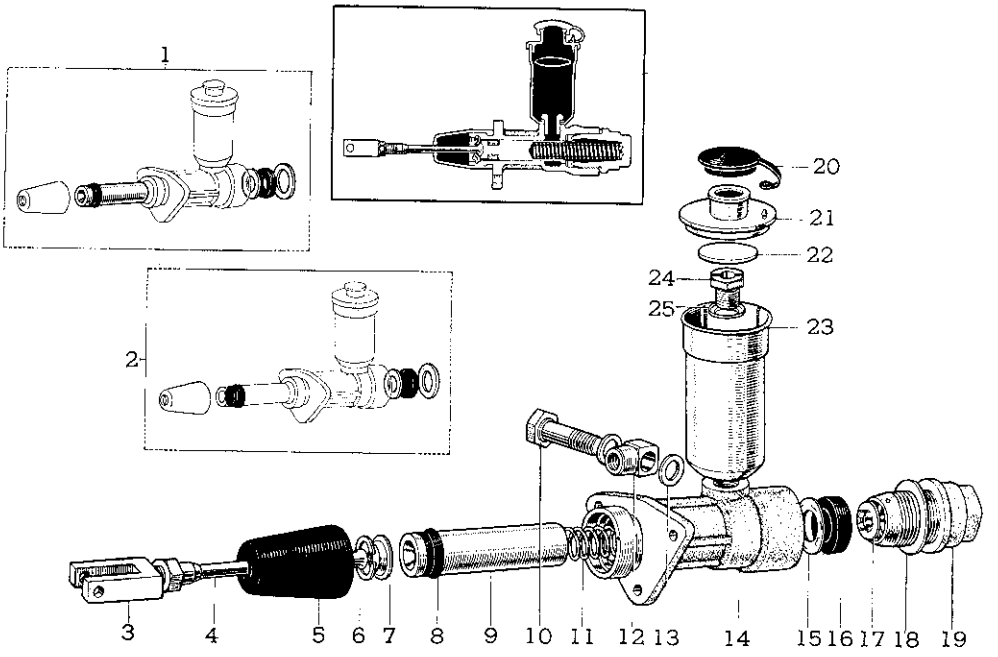
2. Inspect the shaft collars and push rod pins for wear and rough surface.

3. Check the pedal for twist and bend.

Installation

Follow the removal procedures in the reverse order.
When the bushings are assembled, apply sufficient grease.
For adjustment of the clutch pedal, refer to the clutch pedal Adjustment on page 1-4.

CLUTCH MASTER CYLINDER



1. Clutch master cylinder kit
2. Clutch master cylinder piston cup kit
3. Push rod clevis
4. Push rod
5. Master cylinder boot
6. Hole snap ring
7. Piston stop plate
8. Cylinder cup
9. Master cylinder piston
10. Union bolt
11. Piston return spring
12. Union
13. Gasket
14. Master cylinder body
15. Piston cup spacer
16. Cylinder cup
17. Spring seat
18. Gasket
19. Master cylinder cap
20. Reservoir filler cap
21. Reservoir cap
22. Float
23. Master cylinder reservoir
24. Reservoir set bolt
25. Set bolt washer

Fig.1-6 Clutch Master Cylinder Components G2366

Removal

1. Remove the pin connecting the master cylinder push rod onto the clutch pedal.
2. Plug the master cylinder reservoir inlet.
3. Loosen and remove the union bolt, and disconnect the clutch pipe from the master cylinder body.
4. Remove three bolts retaining the clutch master cylinder onto the dash board, and then remove the clutch master cylinder assembly.

Do not spill any brake fluid onto the painted surface.

Disassembly

1. Remove the reservoir cap, and drain the fluid from the reservoir, Remove the float.
2. Loosen and remove the bolt attaching the reservoir onto the master cylinder body, and remove the reservoir.
3. Disconnect the boot from the cylinder body.
   Remove the hole snap ring with

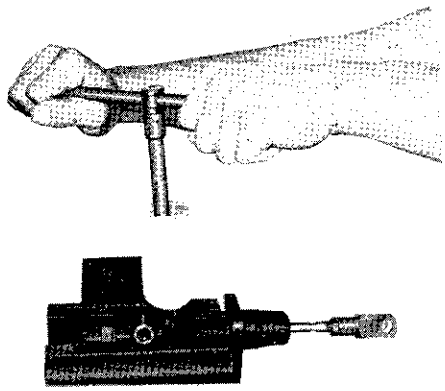


Fig.1-7 Removing Reservoir V5053
Attaching Bolt

pliers, and then remove the push rod, piston stop plate and the boot.

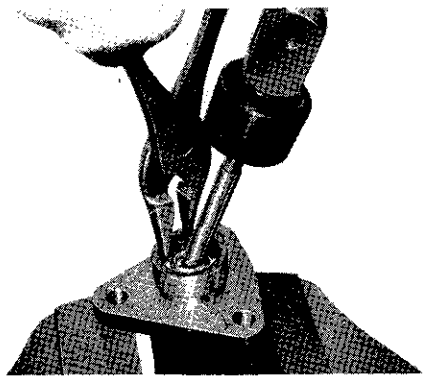


Fig.1-8 Removing Snap Ring V5054

4. Remove the piston and return spring from the cylinder.
Remove the cylinder cup from the piston.

5. Secure the cylinder cap in a vise,

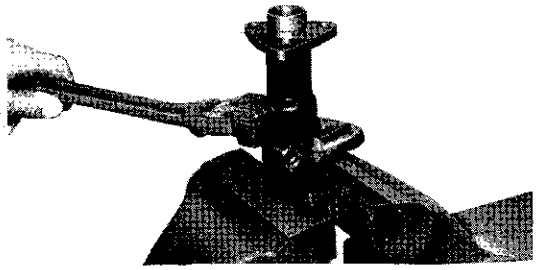


Fig.1-9 Removing Cylinder Cap V5055

and with a pipe wrench, remove the cylinder cap from the cylinder body. Next, remove the cylinder cup spacer from the cylinder.

Inspection

Wash all disassembled parts thoroughly in brake fluid or alcohol, and inspect for wear and scores.
Replace any defective part.

1. Inspect the master cylinder bore for wear or scores.

2. Check the cylinder to piston clearance.
If the clearance exceeds the limit, replace the piston and/or the cylinder body.

Cylinder bore:
19.05 ~ 19.102 mm
(0.75 ~ 0.752")
Piston diameter:
18.977~ 19.01 mm
(0.747~ 0.748")
Specified clearance:
0.04 ~ 0.125 mm
(0.0016~0.0049")
Limit of clearance:
0.15 mm (0.006")

3. Inspect the piston exterior for abnormal wear or scores.

4. Inspect the cup spacer for scores, distorsion or wear.

5. Inspect the piston return spring for proper spring tension.
If too weak, replace the spring.

Installed load:
2.05 kg (4.5 lb)
Installed length:
84.2 mm (3.31")

6. Inspect the reservoir for scores, and deformation at the base.

Assembly

Before assembly, soak the component parts in clean brake fluid.

It is recommended to replace the cylinder cups when disassembling the master cylinder.

1. Assemble the piston stop plate, push rod and boot onto the master cylinder body. Next, install the hole snap ring.

2. Install new cylinder cup onto the piston, and insert the piston into the cylinder through the front end of the cylinder bore.

3. Assemble the cup spacer, and cylinder cup into the cylinder.

4. Insert the piston return spring with the spring seat into the cylinder and onto the piston, then install the cylinder cap with new gasket onto the cylinder body.
   Tighten the cylinder cap securely.

5. Secure the reservoir with the bolt and washer onto the cylinder, and tighten the bolt to 1.4 ~ 1.8 m-kg (10 ~ 13 ft-lb) torque.

6. Position the float into the reservoir, and install the reservoir cap.

Installation

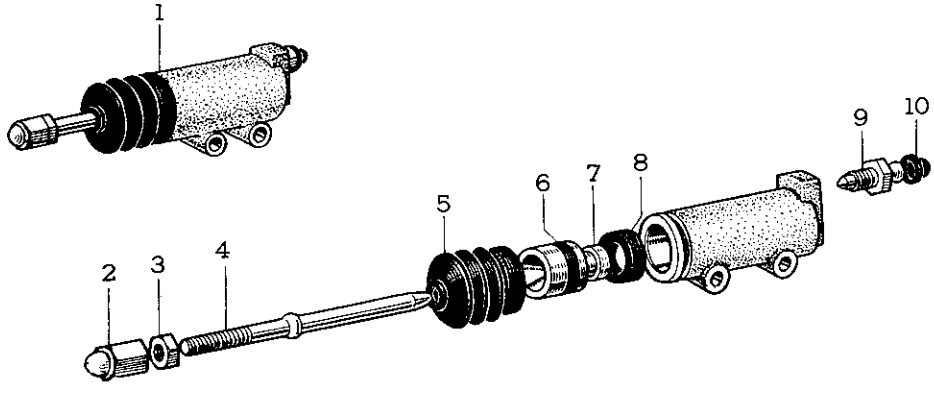
Follow the removal procedures in the reverse order.

1. Bleed the air from the hydraulic line.

2. Adjust the clutch pedal height and the free travel.

3. Check the operation of the clutch during road test.

CLUTCH RELEASE CYLINDER



1. Clutch release cylinder assembly
2. Push rod No.2
3. Lock nut
4. Push rod No.1
5. Boot
6. Cylinder cup
7. Piston
8. Cylinder cup
9. Bleeder plug
10. Plug cap

Fig.1-10 Clutch Release Cylinder Components G2367

Removal

1. Plug the master cylinder reservoir filler cap.

2. Unhook the clutch release fork spring from the spring hanger.

3. Remove the nut, and disconnect the high and low shift link lever from the link lever shaft.

4. Disconnect the flexible hose from the master cylinder to flexible hose tube, and then pull out the clip.

5. Loosen and remove the bolts retaining the clutch release cylinder onto the engine mounting rear bracket, and take out the release cylinder.

Disassembly

1. Remove the release cylinder push rod No.1 together with the push rod No.2, and the boot from the release cylinder body.

2 Remove the release cylinder piston with the cylinder cup from the piston.

3. Loosen and remove the bleeder plug.

Inspection

Wash all disassembled parts thoroughly, and inspect for wear and scores. Replace any defective part.

Inspect the release cylinder bore for abnormal wear and scores.

2. Inspect the piston surface for abnormal wear and scores.

Cylinder bore:
19.05 ~ 19.102 mm
(0.75 ~ 0.752")
Piston diameter:
18.995~ 19.02 mm
(0.748~ 0.749")
Cylinder to piston clearance:
0.03 ~ 0.107 mm
(0.001~ 0.004 mm
Limit of clearance:
0.15 mm (0.006")

3. Inspect the spring for weak spring tension.

4. Check the bleeder plug and its seating portion for damage or deformation.

Assembly

Follow the disassembly procedures in the reverse order.

1. Before assembly, soak the components in brake fluid.

2. It is recommended that the cylinder cup should be replaced when disassembling the clutch release cylinder.

Installation

Follow the removal procedures in the reverse order.

1. Bleed the air from the hydraulic line.

2. Adjust the clutch release fork end play, by adjusting the length of the push rods.

CLUTCH COVER ASSEMBLY

Removal

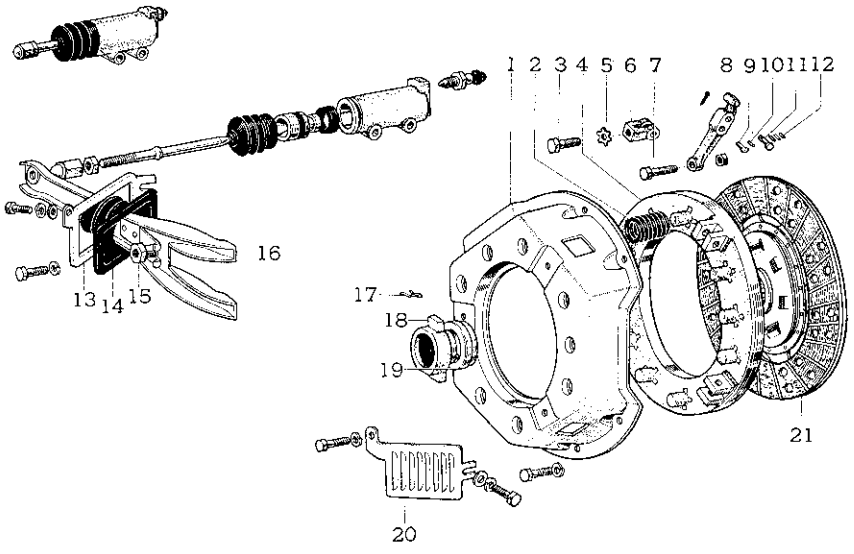
1. Remove the transmission assembly. Refer to the Transmission Removal on page 2-10.

2. Unhook the clutch release fork spring, and disconnect the high and low shift link, and the clutch release cylinder from the engine mounting rear bracket.

3. Remove the release bearing hub clips, and then remove the clutch release bearing hub together with the bearing.

4. Remove the clutch release fork assembly.

5. Punch mating marks on the clutch cover and the flywheel to facilitate in relocating the original position upon assembly.
Next, insert the Clutch Guide Tool 09301-55021 to support the clutch disc.
Loosen the bolts retaining the clutch cover onto the flywheel a turn at a time until the clutch spring pressure is released.
Remove all retaining bolts, and



1. Clutch cover
2. Clutch spring
3. Bolt
4. Pressure plate
5. Washer
6. Release lever yoke
7. Adjusting bolt
8. Release lever
9. Lever pin
10. Roller
11. Pressure plate pin
12. Pin roller
13. Boot plate
14. Boot
15. Release fork ball
16. Clutch release fork
17. Bearing hub clip
18. Bearing hub
19. Bearing
20. Cover plate
21. Clutch disc assembly

Fig.1-11 Clutch Cover Assembly Components G236

dismantle the Clutch Guide Tool, clutch cover assembly, and the clutch disc.
Do not allow the disc to be soaked with oil to prevent the clutch from slipping.

Disassembly

1. Punch mating marks on the clutch cover and the clutch pressure plate.
   The mating marks will enable proper alignment upon assembly.

2. With a piece of wood placed on the top of the clutch cover, compress the clutch cover slightly with a press.
   Hold the press in compressed condition while removing the bolts retaining the release lever yokes onto the clutch cover, then slowly release the pressure of the press to prevent the springs from flying out.

3. Separate the clutch cover, clutch springs, and the clutch pressure plate.

4. Remove the cotter pin from the clutch pressure plate pin, and then drive out the pin.
   Remove the clutch pressure plate pin rollers.

Inspection

Wash all disassembled parts, and inspect for wear, scores and other defects.
Repair or replace if necessary.
Never wash the clutch disc in cleaning solvent.
The release bearing is impregnated with lubricant, and should not be immersed in the solvent.

Clutch Disc

1. Inspect the facing for wear, glazed surfaces, oil soaked condition or warpage.

If the depth from the facing surface to the rivet head is less than 0.3 mm (0.012") or if the rivet holes are enlarged or the rivets are loose, replace the clutch disc assembly.
If the glazed surface is slight, the facing surface may be dressed with an emery cloth to remove the glaze.
If the facing is oil soaked slightly, the facing surface may be washed with gasoline.

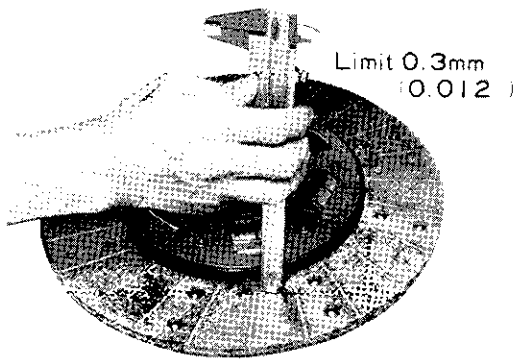


Fig.1-12 Checking Facing Wear V5056

2. Check the clutch disc facing run-out with a dial gauge.
If the run-out exceeds 1.0 mm or 0.04", replace the clutch disc assembly.

3. Check the torsion rubbers (1) for damage or deformation.

4. Check the splines (2) in the hub and assure that the hub will slide freely on the transmission input shaft splines.
If worn, replace the disc assembly.

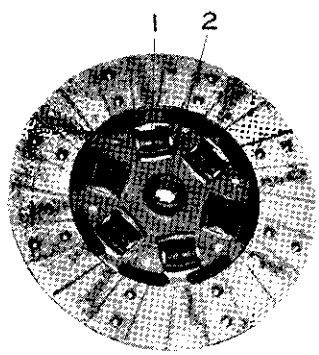


Fig.1-13 Clutch Disc V5057

Clutch Pressure Plate & Release Lever

1. Inspect for perfect uniform contact with the clutch disc facing.
If the contacting surface is scored or worn, the surface may be dressed with a fine enery cloth, or finished on a surface grinder if necessary.
At this time, also check the flywheel clutch disc contacting surface for cracks, scores and other defects.

2. Inspect the contacting portions with the clutch cover for abnormal wear.

3. Check the clutch release levers for distortion and warpage.
Check the contacting portion of the pressure lever adjusting bolt with the bearing for abnormal wear.

4. Inspect the clutch pressure plate pins, pin rollers, pressure lever pins, lever rollers and the pin bores of the clutch release levers for excessive wear.

Clutch Spring

1. Inspect the springs for specified limit.
The compression test should be measured with a spring tester, and the specified limit or value must be as follows:

Installed length:
42.9 mm (1.69")
Installed load:
42.5 ~ 45.5 kg
(93.5 ~ 100.1 lb)
Installation load limit:
40 kg (88 lb)

2. Inspect the spring for squareness

by placing the spring on a surface plate and using a steel square against the coils of the spring.
The spring should not deflect more than 2.5 mm (0.1") out of the perpendicularity at the spring free length:
If this limit exceeds, replace the spring/s.

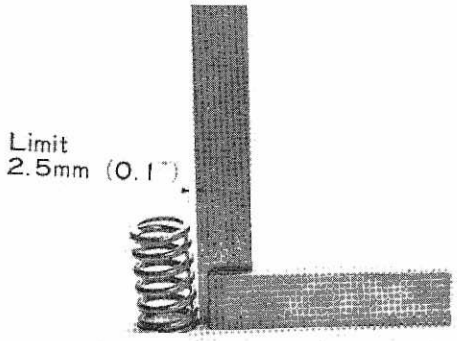


Fig.1-14 Squareness Test V5058

Bearing & Release Fork

1. Check the clutch release bearing.
Hold the inner race while applying pressure, if rough or noisy, replace the bearing.
Also check the contacting surface of the bearing with the release lever adjusting bolts.
Next, check the bearing with the hub, and if loose, the hub or the bearing should be replaced.

2. Check the contacting portions of the clutch release bearing hub for excessive wear.

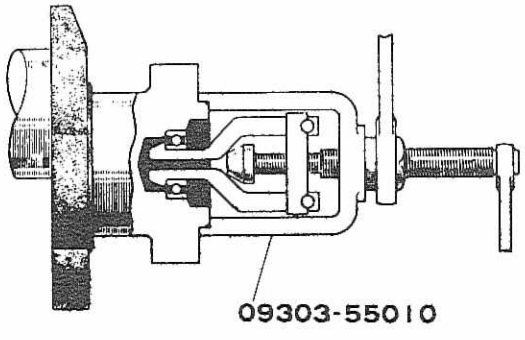


Fig.1-15 Clutch Pilot Bearing Removal G1569

3. Inspect the clutch pilot bearing for wear and noise.
If necessary, replace the bearing.
To remove, use the Input Shaft Front Bearing Puller 09303-55010

4. Inspect the contacting portions of the clutch release fork and the release fork ball for excessive wear.

5. Check the fork ball spring on the clutch release fork for sagging.

Assembly

Before assembly, all rotating or sliding parts should be lubricated with multipurpose grease.

1. Install the clutch pressure plate pin rollers into the clutch release lever pin hole, then assemble the release lever and the clutch pressure plate pin.
Next, install the cotter pin.
Assemble the other release levers in the same manner.

2. Install the release lever yokes onto the clutch release levers.

3. Place the clutch pressure plate on a press, and then place the clutch springs onto the bosses.
Next, align the mating marks on the clutch cover, and the pressure plate, and install the clutch cover carefully over the pressure plate and the clutch springs.

4. Place the piece of wood on the top of the clutch cover and press down carefully.
Be sure that the pressure plate and the clutch cover are fitted properly.
Next, install the bolts with lock washers, and retain the release lever yokes onto the clutch cover.
Tighten the bolts to 3.0 ~ 4.5 m-kg (22 ~ 32 ft-lb) torque.

Installation

Follow the removal procedures in the reverse order.

1. Using the Clutch Guide Tool 09301-55021, install the clutch disc and the clutch cover assembly.
   Align the mating marks on the flywheel and the clutch cover, then, tighten the clutch cover retaining bolts a little at a time.
   Clutch cover retaining bolts tightening torque is 1.5 ~ 2.2 m-kg or 11 ~ 16 ft-lb.

2. Check and adjust the clutch release lever height, using the Clutch Pressure Lever Height Gauge 09302-55011.
   If necessary, turn the adjusting bolts on the clutch release levers until the specified height is obtained, and tighten the lock nuts securely.
   The specified clutch release lever height is 74.5 mm (2.93").
   The height difference between the levers should not exceed 0.5 mm (0.002").

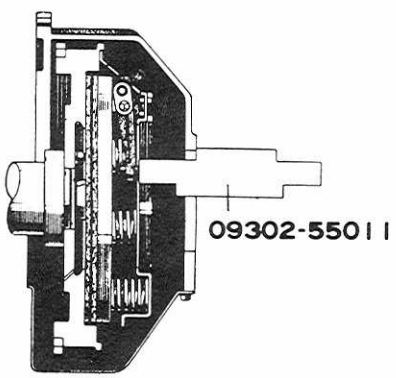


Fig.1-16 Clutch Release Lever Height G1572

3. Lubricate the contacting or sliding portions of the clutch release bearing, bearing hub, clutch release fork and the release fork ball with multipurpose grease, and assemble them onto the clutch housing.
   Next, install the release bearing hub clips and retain the bearing hub onto the clutch release fork.

4. Apply multipurpose grease on the transmission front bearing retainer and the input shaft splines, and then install the transmission assembly onto the clutch housing. Refer to Transmission for installation on page 2-26.

5. Adjust the clutch release fork end play with the clutch release cylinder push rod.
   Refer to Clutch Release Fork Adjustment on page 1-4.

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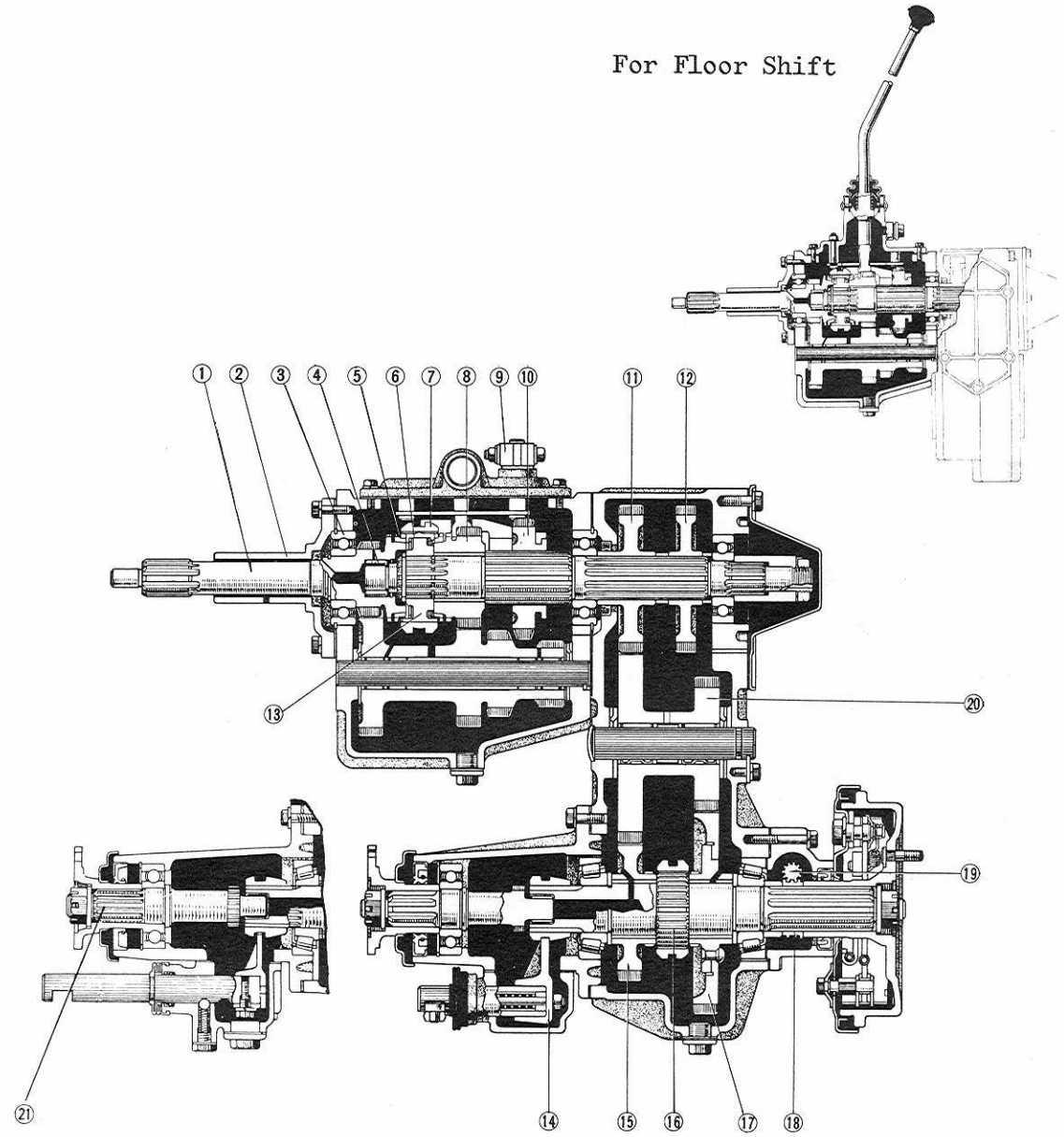
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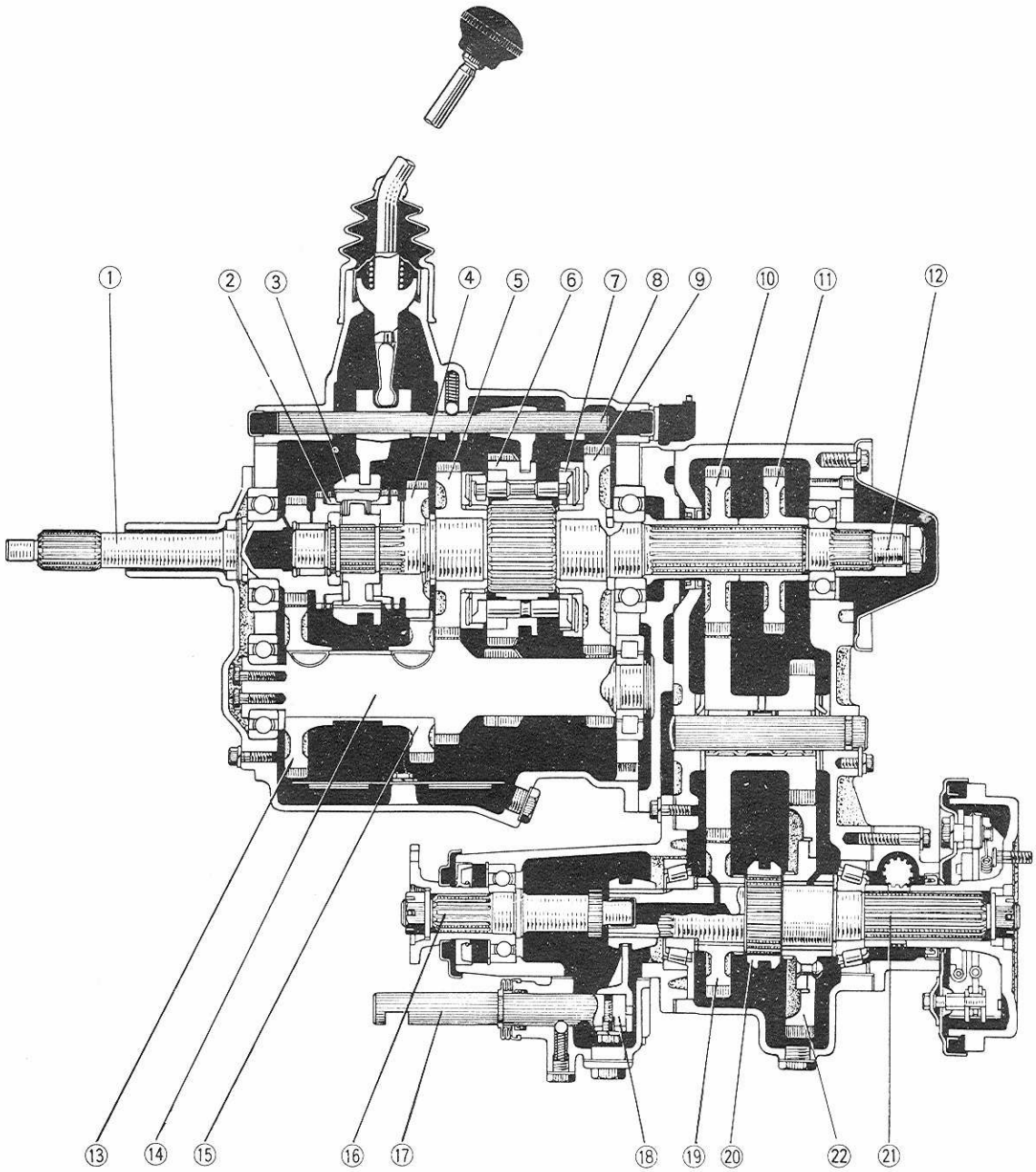
2

DESCRIPTION



1. Input shaft
2. Front bearing retainer
3. Front bearing
4. Bearing roller
5. Synchronizer ring No.2
. Synchronizer ring shifting key No.2
7. Clutch hub sleeve
8. Second gear
9. Gear select outer lever
10. First & reverse gear
11. Transfer input gear
12. Power take-off drive gear
13. Transmission clutch hub No.2
14. Transfer front drive shift fork
15. Transfer high speed output gear
16. Transfer output shaft
17. Transfer low speed output gear
18. Speedometer drive gear
19. Speedometer driven gear
20. Transfer idler gear
21. Transfer output front shaft

Fig.2-1 Transmission & Transfer Cross Section View (3-speed) Y5725



1. Input shaft
2. Synchronizer ring
3. Hub sleeve
4. Third gear
5. Second gear
6. Synchronizer ring (reverse gear)
7. Synchronizer outer ring
8. Shift fork shaft
9. First gear
10. Transfer input gear
11. Power take-off drive gear
12. Transmission output shaft
13. Counter shaft drive gear
14. Counter shaft
15. Counter shaft third speed gear
16. Transfer output front shaft
17. Transfer front drive shift shaft
18. Transfer front drive shift fork
19. Transfer output gear (High speed)
20. Transfer clutch sleeve
21. Transfer output shaft
22. Transfer output gear (Low speed)

Fig. 2-2 Transmission & Transfer Cross Section View (4-speed) Y5357

Two types of transissions are available on the Toyota Land Cruisers; the three speeds forward and one reverse, and the other four speeds forward and one reverse.

The three-speed transmission provides smooth synchromesh operation in second and top speeds, while the first and reverse gears are of a sliding mesh type. The forward gears on the four-speed transmission are all of constant mesh, synchromesh type, while the reverse gear is of a sliding mesh type.

The three-speed transmission is available with two types of gear shift controls. One is with the remote control gear shift mechanism, and the other is a direct gear shift control type, but the four-speed transmission is available only with the direct gear shift control mechanism.

The transfer case is installed behind the transmission, and the transfer gear can be shift into high and low speeds an auxiliary unit of the transmission.
The front drive mechanism is mounted at the front of the transfer case, and the transfer case front drive control mechanism is available with a vacuum control shifiting mechanism and a mechanical shifting mechanism.

Specification

	Three-speed transmission	Four-speed transmission
Shifting device:		
Direct control type		Direct control type
Remote control type		N/A
Front drive shifting device:		
Mechanical shifting type (direct control type only)		Mechanical shifting type
Vacuum control type		N/A
Gear ratio:		
First	2.75	5.30
Second	1.69	2.84
Third	1.00	1.63
Fourth	----	1.00
Reverse	3.67	5.30
Transfer gear ratio:		
High	1.00	1.00
Low	2.30	2.30
Lubricant capacity:		
Transmission	1.7 liters (1.8 US qts., 1.5 Imp qts)	3.1 liters (3.3 US qts., 2.7 Imp qts)
Transfer	1.7 liters (1.8 US qts., 1.5 Imp qts)	1.7 liters (1.8 US qts., 1.5 Imp qts)

TROUBLE SHOOTING

1. Transmission noise.

The noise seemingly produced by the transmission is often caused by other assemblies such as the axle, propeller shaft, or the clutch. Therefore, prior the replacing the transmission and the transfer due to the noise, make sure that the trouble does not exist elsewhere.
If a noise that may be a growl or hum can be stopped by depressing the clutch pedal, and the noise is from the transmission.
In case of gear or bearing failure, and the noise is of a growl or hum, the gear or the bearing may often be in a stage of worn condition, but if a bump or thud noise is present, it indicates a broken or bearing.
Before removing the transmission and the transfer for correction of gear noise, determine by road test which gear is noisy under load, and also the transmission gear noise can be checked without shifting the transfer into high or low by positioning the shift lever in the neutral position so that these parts can be thoroughly inspected when removed.
When the noise develops in the transmission or transfer, first check the lubricant level.

2. Gear jumping out.

a. Jumps out in all gears.
   (1) Engine mounting loose or broken.
   (2) Control shaft linkage out of adjustment, worn or loose.
   (3) Misalignment or loose transmission case and/or clutch housing.
   (4) Loose, weak or worn of gear shift mechanism within the transmission case cover.
   (5) Worn or damaged countershaft or output shaft bearing/s.
   (6) Loose transmission case cover attaching bolts.
   (7) Transfer shift linkage out of adjustment, worn or loose.
   (8) Transfer shift mechanism worn.
   (9) Propeller shaft bent or out of balance.

b. Jumps out in first gear.
   (1) Insufficient spring tension of lock ball spring.
   (2) Worn shift fork shaft or shift fork.
   (3) Worn synchronizer gear on synchronizer ring No.1 or first gear (four-speed transmission)

c. Jumps out in second gear.
   (1) Insufficient spring tension of lock ball spring.
   (2) Worn shift fork shaft or shift fork.
   (3) Worn synchronizer unit splines or synchronizer gear on second gear (three-speed transmission)
   (4) Worn second gear bushing (three-speed transmission)
   (5) Worn synchronizer gear on second gear.
   (6) Worn second gear thrust washer (four-speed transmission)

d. Jumps out in third gear.
   (1) Insufficient spring tension of lock ball spring.
   (2) Worn shift fork shaft or shift fork.
   (3) Worn synchronizer unit splines or synchronizer gear on input shaft. (three-speed transmission)

(4) Input shaft bearing or pilot bearing in the crankshaft worn or damaged.
(5) Roller bearing in input shaft worn or damaged.
(6) Worn synchronizer unit splines or synchronizer gear on third gear. (four-speed transmission)

e. Jumps out in fourth gear.
(1) Insufficient spring tension of lock ball spring.
(2) Worn shift fork shaft or shift fork.
(3) Worn synchronizer unit splines or synchronizer gear on input shaft.
(4) Input shaft bearing or pilot bearing in crankshaft worn or damaged.
(5) Roller bearing in input shaft worn or damaged.

f. Jumps out in reverse gear.
(1) Insufficient spring tension of lock ball spring.
(2) Worn shift fork shaft or shift fork.
(3) Reverse shift arm out of adjustment. (four-speed transmission)

g. Jumps out in high and low gears of transfer.
(1) Shift linkage out of adjustment.
(2) Transfer output shaft bearing/s worn or damaged.
(3) Insufficient spring tension of lock ball spring.
(4) Worn shift fork shaft or shift fork.
(5) Worn clutch sleeve splines.

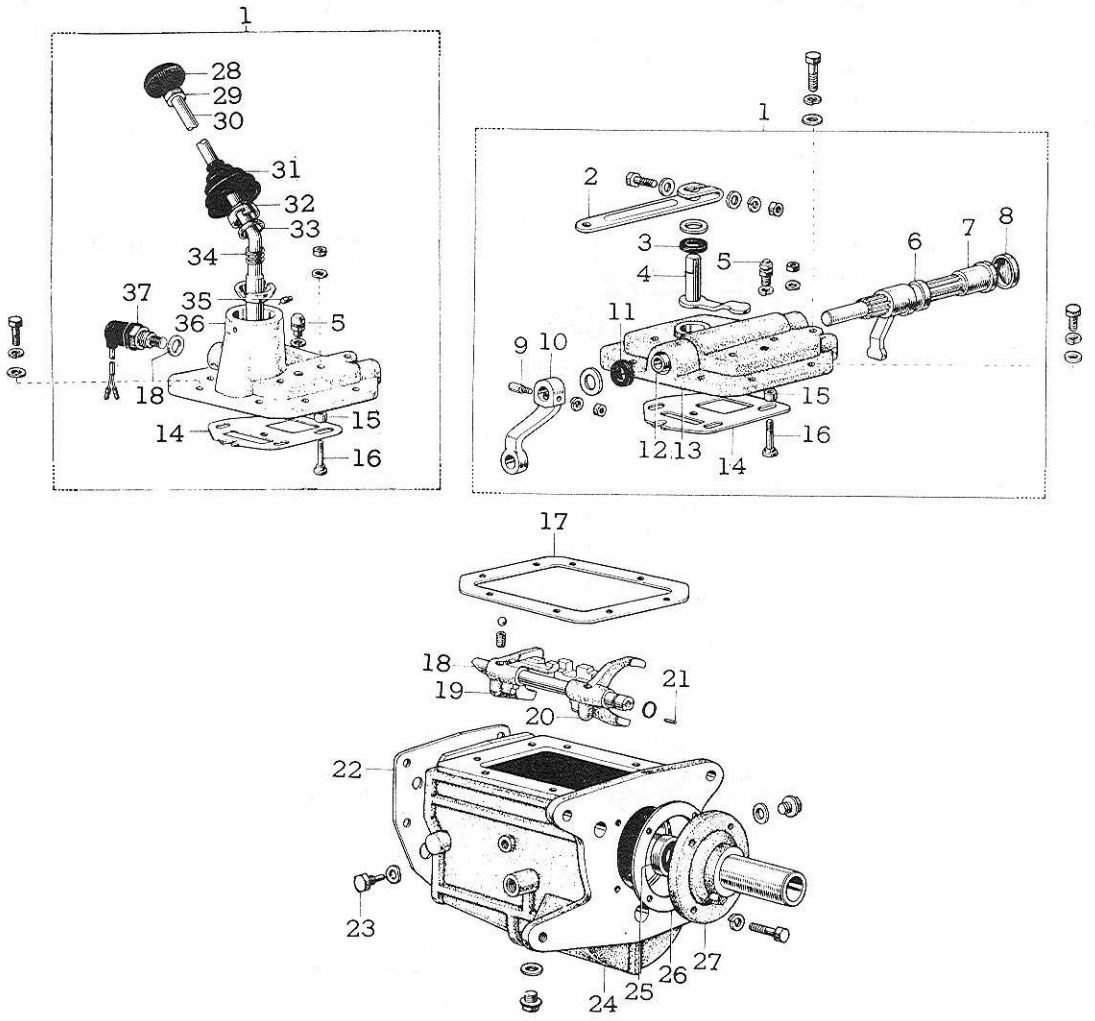
3. Hard shifting.

a. Transmission
If a clashing unpleasant sound is produced, and the gears are exceedingly difficult to shift.
Hard shifting is caused from shift linkage or transmission trouble, but often are results from improper clutch releasing.
(1) Control shaft linkage out of adjustment.
(2) Control shaft linkage bent, damaged or loose.
(3) Worn or damaged shift or inter-lock mechanism in the transmission case cover.
(4) Synchronizer mechanism worn or broken.
(5) Incorrect gear lubricant viscosity.
(6) Loose transmission case cover.

b. Transfer.
(1) Shift linkage bent, damaged or loose.
(2) High and low clutch sleeve splines damaged.
(3) Shift linkage out of alignment.
(4) Loose transfer case cover.

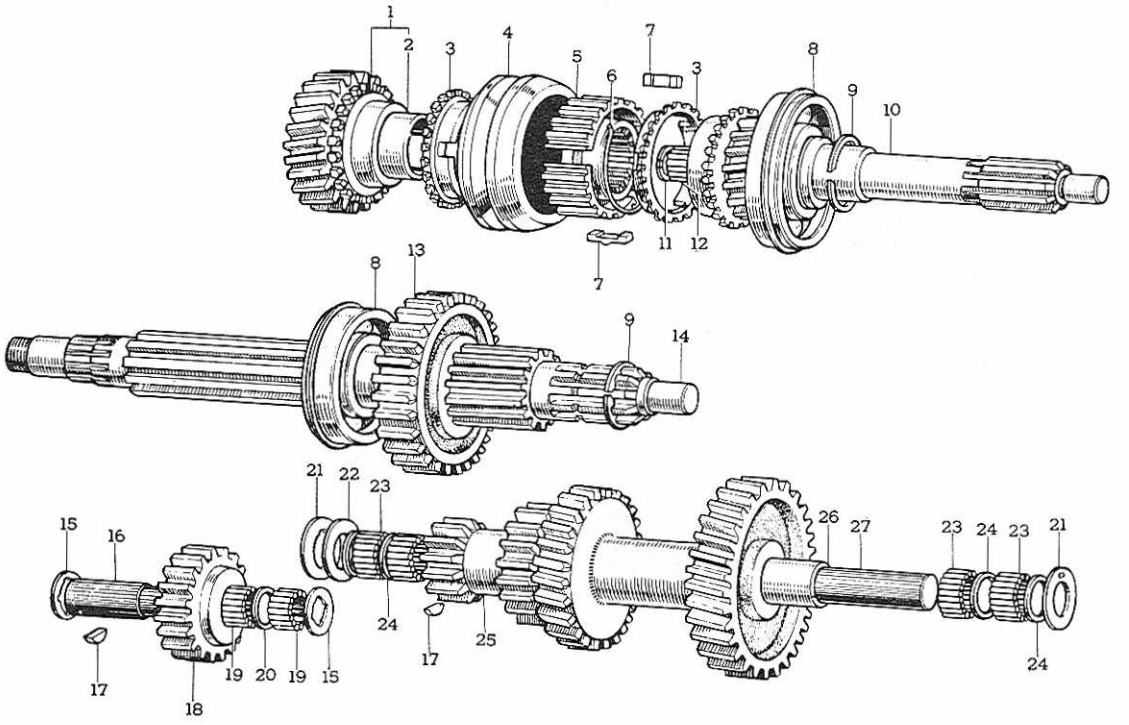
c. Front drive.
(1) Loose front drive shift shaft guide or diaphragm cylinder.
(2) Shift linkage out of alignment.
(3) Vacuum shift valve or diaphragm damaged.
(4) Loose vacuum line connection/s.
(5) Front drive clutch inner gear damaged.
(6) Worn bearing in transfer output shaft front end.

3-SPEED TRANSMISSION & TRANSFER



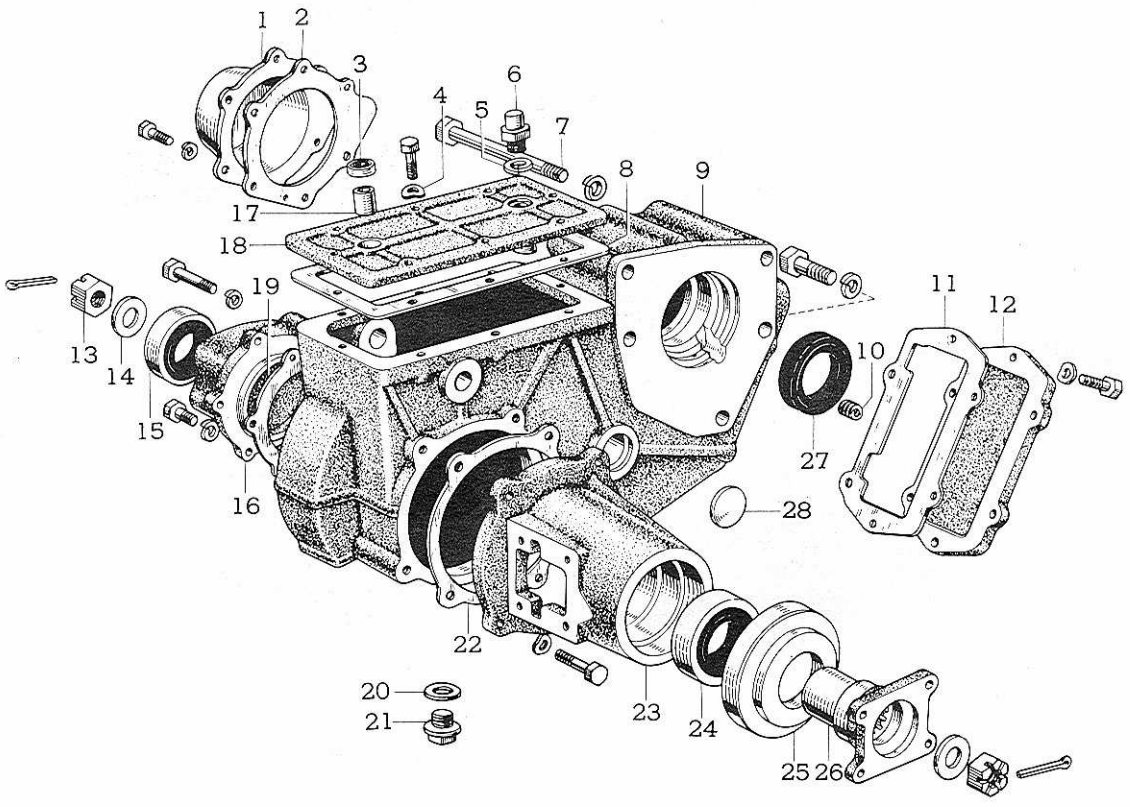
1. Transmission case cover assembly
2. Gear select outer lever
3. Oil seal
4. Select lever shaft
5. Breather plug
6. Sliding shift lever
7. Shift lever shaft
8. Tight plug
9. Lever lock pin
10. Outer shift lever
11. Oil seal
12. Bushing
13. Transmission case cover
14. Shift inter-lock plate
15. Spacer
16. Inter-lock plate set bolt
17. Case cover gasket
18. Shift fork shaft
19. Reverse and first shift fork
20. Second and third shift fork
21. Straight pin
22. Gasket
23. Shift fork stopper
24. Transmission case
25. Oil seal
26. Gasket
27. Front bearing retainer
28. Shift lever knob
29. Nut
30. Shift lever
31. Shift lever cap boot
32. Shift lever cap
33. Shift lever spring seat
34. Spring
35. Dowel pin
36. Transmission case cover
37. Back-up light switch

Fig.2-3 Transmission Case & Cover Components Y7184



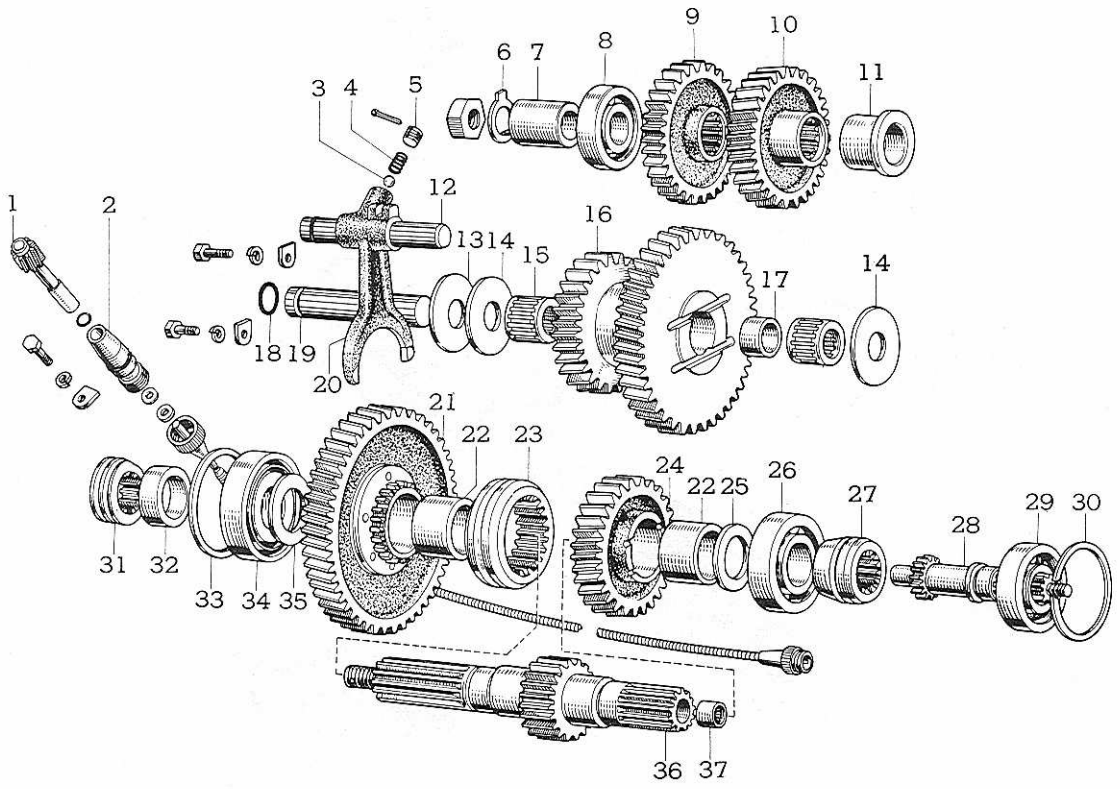
1. Second gear
2. Second gear bushing
3. Synchronizer ring No.2
4. Clutch hub sleeve
5. Clutch hub No.2
6. Shifting key spring
7. Shifting key No.2
8. Bearing
9. Shaft snap ring
10. Input shaft
11. Hole snap ring
12. Bearing roller
13. First & reverse gear
14. Output shaft
15. Reverse idler thrust washer
16. Reverse idler gear shaft
17. Woodruff key
18. Reverse idler gear
19. Bearing roller
20. Washer
21. Counter gear case side thrust washer
22. Counter gear side thrust washer
23. Bearing roller
24. Washer
25. Counter shaft drive gear
26. Counter shaft tube
27. Counter shaft

Fig.2-4 Transmission Gear Components G2370



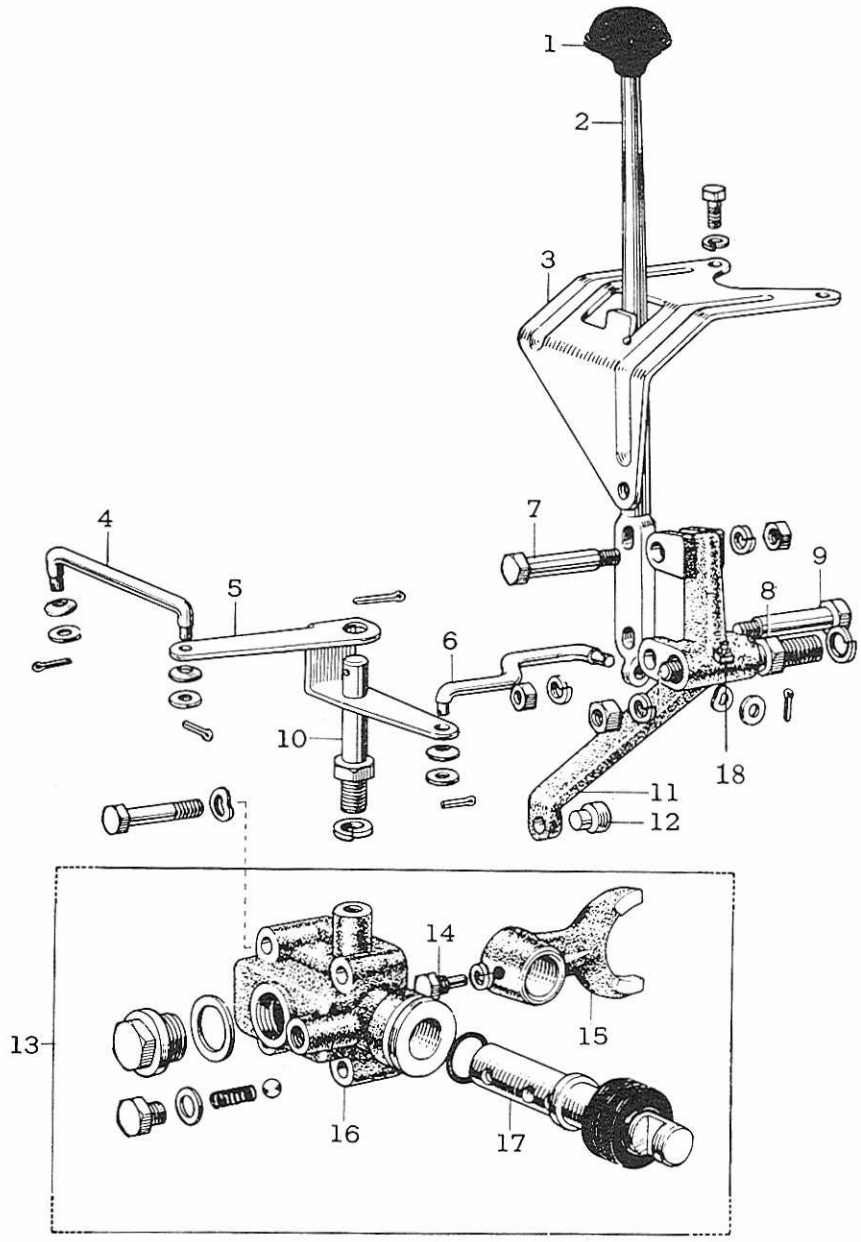
1. Transfer case cover No.2
2. Gasket
3. Oil seal
4. Wave washer
5. Lock washer
6. Breather plug
7. Bolt
8. Gasket
9. Transfer case
10. Compression spring
11. Gasket
12. Transfer power take-off cover
13. Retaining nut
14. Washer
15. Oil seal
16. Output shaft bearing rear retainer
17. Bushing
18. Transfer case cover
19. Gasket
20. Plug gasket
21. Plug
22. Gasket
23. Transfer extension housing
24. Oil seal
25. Dust deflector
26. Universal joint flange
27. Oil seal
28. Expansion plug

Fig.2-5 Transfer Case & Cover Components G2371



1. Speedometer driven gear
2. Speedometer shaft sleeve
3. Shift fork lock ball
4. Compression spring
5. Straight screw plug
6. Lock washer
7. Transfer input shaft spacer
8. Bearing
9. Power take-off drive gear
10. Transfer input gear
11. Transfer input gear stopper (4-speed T/M)
12. Transfer high & low shift fork shaft
13. Transfer idler gear spacer
14. Washer
15. Needle roller bearing
16. Transfer idler gear
17. Spacer
18. "O" ring
19. Transfer idler gear shaft
20. Transfer high & low shift fork
21. Transfer low speed output gear
22. Bushing
23. Transfer high & low clutch sleeve
24. Transfer high speed output gear
25. Washer
26. Bearing
27. Front drive clutch sleeve
28. Transfer output front shaft
29. Bearing
30. Hole snap ring
31. Speedometer drive gear
32. Spacer
33. Adjusting shim
34. Bearing
35. Washer
36. Transfer output shaft
37. Needle roller bearing

Fig. 2-6 Transfer Gear & Shift Fork Components G2372



1. Shift lever knob
2. Front drive shift lever
3. Shift lever guide
4. High and low shift rod No.3
5. High and low shift link lever
6. High and low shift rod No.1
7. Shift lever pin No.1
8. Shift link support shaft
9. Shift lever pin No.2
10. Link support shaft
11. Front drive shift link lever
12. Link lever shoe
13. Transfer front drive shift shaft guide assembly
14. Fork shaft pin
15. Front drive shift fork
16. Shift shaft guide
17. Front drive shift shaft
18. Grease nipple

Fig.2-7 Transfer Shift Lever & Link Components G2384

Removal

1. Remove the transmission under cover, and disconnect the front and rear propeller shafts from the transfer output shaft.

2. Drain the gear lubricant from the transmission and the transfer.

3. Remove the transmission cover.

4. Disconnect the parking brake cable from the parking brake link lever.

5. Pull up the shift lever cap boot, and then remove the shift lever from the transmission case cover with the Transmission Gear Shift Lever Remover 09305-60010.
   To remove the shift lever, hold down the gear shift lever cap, then turn the Transmission Gear Shift Lever Remover clockwise.
   Cover the shift lever retainer hole with a clean shop towel to prevent dropping any foreign matter into the transmission case cover.
   Loosen and remove the knob on the transfer front drive shift lever.



Fig.2-8 Shift Lever Removal G2400 2-10

6. Loosen and remove the speedometer drive cable from the speedometer shaft sleeve.
   Disconnect the wires from the front drive indicator switch.

7. Remove the hole pin, and disconnect the high and low shift rod from the transfer high and low shift inner lever on the transfer case cover.

8. Disconnect the gear shifting rod No.3 and the gear selecting rod from the gear select outer lever and the gear shift outer lever on the transmission case cover. (for R.C.)

9. Loosen the clamp screws, and desconnect the vacuum hoses from the connections on the diaphragm cylinder body cover and the diaphragm cylinder body. (for R.C.)

10. Remove the flywheel housing under cover, and then remove the bolts retaining the transmission onto the clutch housing.

11. Slide the transmission assembly rearward until the transmission input shaft completely clears the clutch housing, and carefully withdraw it downward from the vehicle.

Disassembly

1. Remove the transfer shift lever quide (1), cotter pin (2), and the lock bolt (3), then remove the shift lever and the lever linkage.
   Do not lose the link lever shoe (4), connecting the front drive shift link lever to the transfer front drive shift shaft.

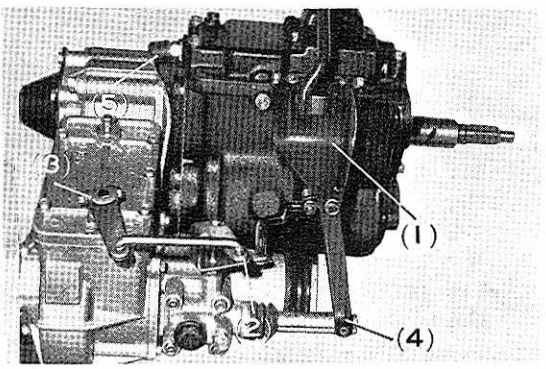


Fig.2-9 Shift Lever & Linkage Removal V5062

2. Loosen and remove the back-up light switch (5), and the gasket from the transmission case cover.

3. Remove the transfer case cover No.2 and the gasket.

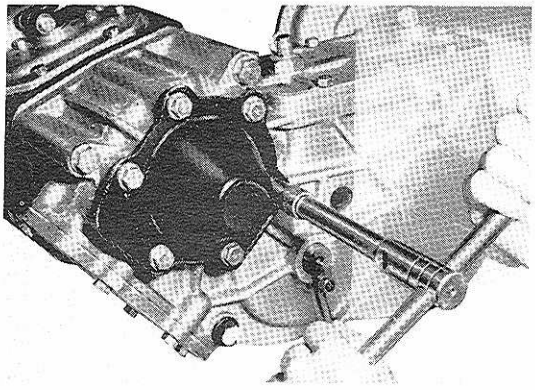


Fig.2-10 Removing Case Cover Attaching Bolts V0433

4. Remove the transfer power take-off cover and the gasket.

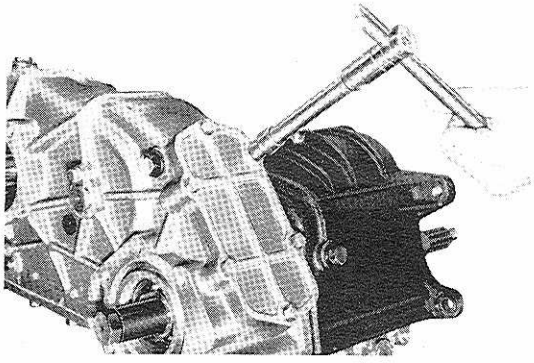


Fig.2-11 Removing Power Take-off Cover Attaching Bolts V0434

5. Straighten the input shaft nut lock washer, and remove the nut at the end of the shaft, then slide out the spacer.
   To loosen the nut, use a brass rod or a wooden block and lock the power take-off drive gear or the transfer input gear to prevent the rotation of the shaft.

6. Loosen and remove the five bolts retaining the transfer case onto the transmission case.
   Two bolts are short, which should be removed from the inside of the transfer case.

7. Install an universal puller onto the transfer case, and separate the transfer assembly from the transmission case.
   At this time, retain the power take-off drive gear, spacers and the transfer input gear with the hand, and being careful not to drop the gears and spacers.
   Take out the spring in the transfer case.

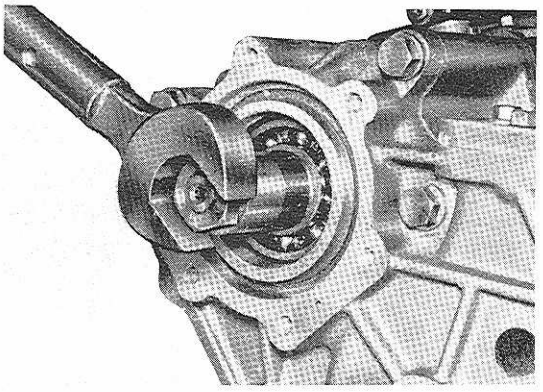


Fig.2-12 Removing Nut V0435

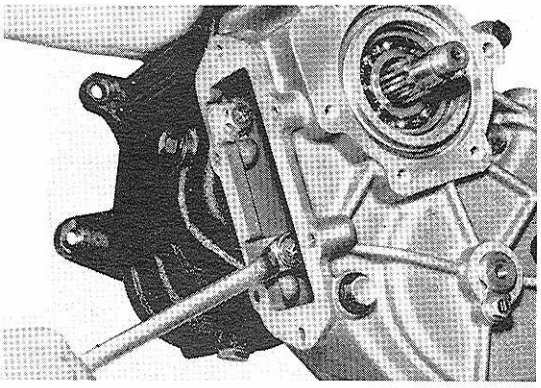


Fig.2-13 Removing Transfer Case Retaining Bolts V0436

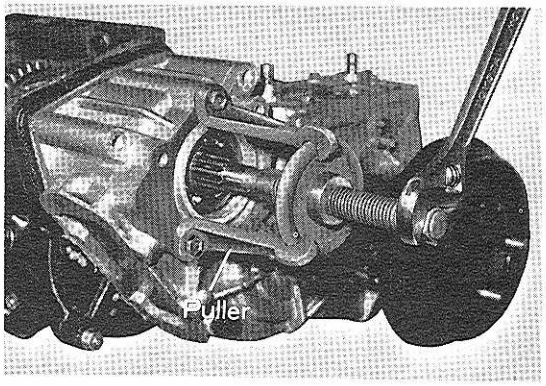


Fig.2-14 Removing Transfer Assembly V0437

8. Transmission disassembly.

a. Remove the bolt, and take out the gear select outer lever.

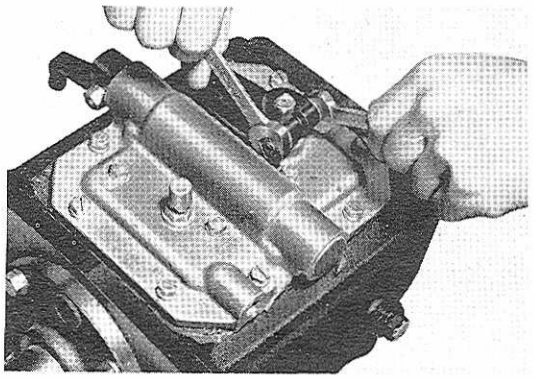


Fig.2-15 Removing Gear Select Outer Lever V0438

b. Remove the transmission case cover and the gasket.

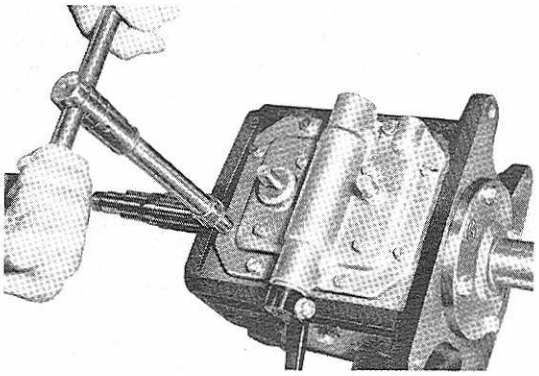


Fig.2-16 Removing Transmission Case Cover V0439

c. Remove the transmission front bearing retainer and the gasket.

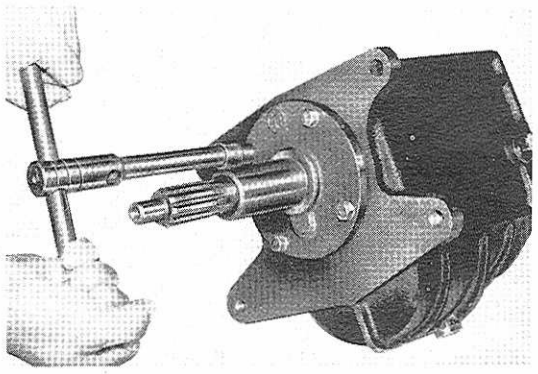


Fig.2-17 Removing Front Bearing Retainer V0440

d. Carefully drive out the shift fork shaft towards the front of the transmission case with a brass rod and a hammer.
At this time, be careful not to lose the gear shift fork lock balls, springs and the straight pin.

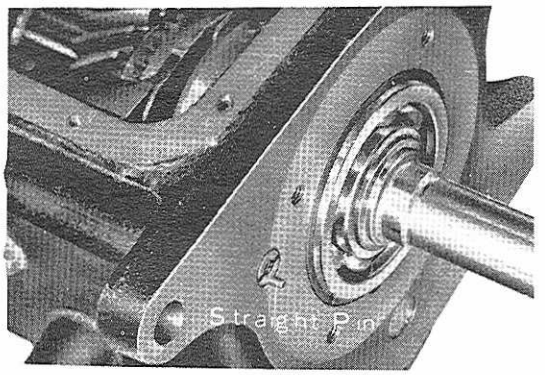


Fig.2-18 Gear Shift Fork Shaft Straight Pin V0441

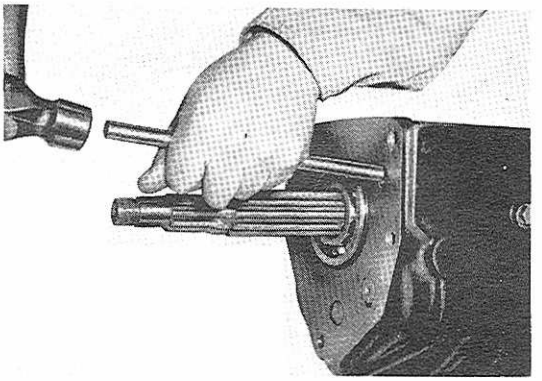


Fig.2-19 Removing Gear Shift Fork Shaft V0442

e. Take out the reverse and first shift fork, and the second and third shift fork from the transmission case.
Remove the two gear shift fork lock balls and springs.

f. Using a brass rod, drive out the counter shaft towards the rear of the transmission case.
Remove the woodruff key from the rear end of the counter shaft.
After removing the counter shaft, the counter shaft drive gear should remain in the transmission case.

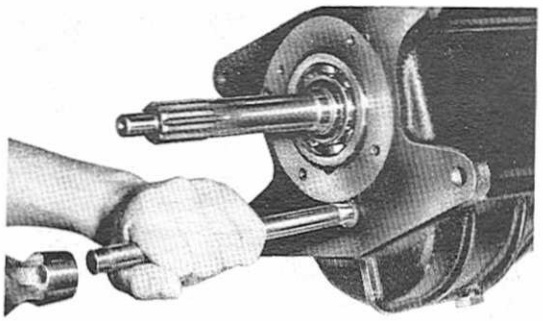


Fig.2-20 Removing Counter Shaft V0443

g. Install the Puller Set 09910-00013 onto the input shaft front end, and drive out the input shaft together with the bearing from the transmission case.

h. Using a brass rod, gently tap the output shaft towards the rear until the output shaft rear bearing is driven out of the transmission case.

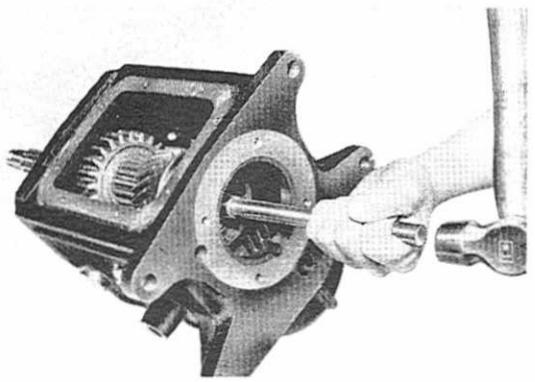


Fig.2-21 Output Shaft Removal No.1 V0444

i. Using the Universal Puller 09950-20010, remove the rear bearing from the output shaft.
Next, take out the output shaft together with the gears, clutch hub and clutch hub sleeve, and the synchronizer ring from the transmission case.

j. Remove the shaft snap ring from the output shaft front end with a snap ring expander, and slide the clutch hub No.2 and clutch hub sleeve, synchronizer ring second gear, and the first and reverse gear out of the output shaft.

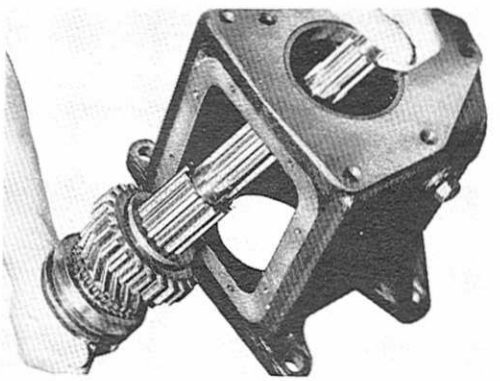


Fig.2-22 Output Shaft Removal No.2 V0445

k. Remove the counter shaft drive gear with the tube, bearing rollers and washers, and the side thrust washers.
At this time, note the position of the gear side thrust washers.
When removing the counter shaft drive gear, be careful not to lose the bearing rollers in the gear.

l. Remove the washers, bearing rollers and the tube from the counter shaft drive gear.

m. Using a brass rod, drive out the reverse idler gear shaft towards the rear, and remove the

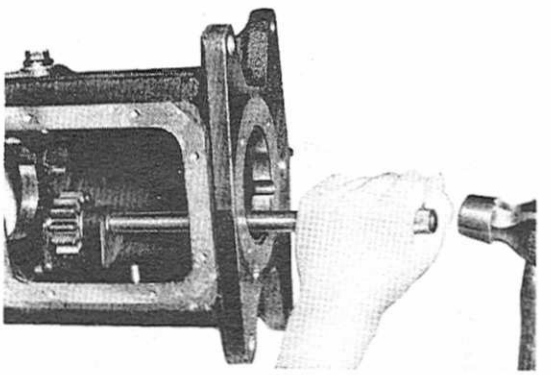


Fig.2-23 Removing Reverse Idler Gear Shaft V0446

woodruff key from the shaft.

n. Next, take out the reverse idler gear with the bearing rollers and the thrust washers from the transmission case.

9. Transfer disassembly.

a. Remove the cotter pin, and loosen the parking brake drum retaining nut.

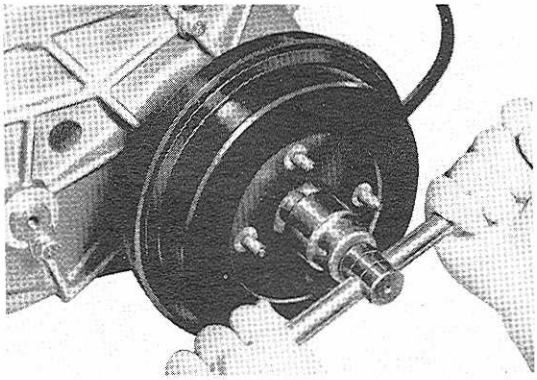


Fig.2-24 Removing Parking Brake Retaining Nut V0447

b. Slide the parking brake drum out of the transfer output shaft, then remove the parking brake plate assembly from the output shaft rear bearing retainer No.1.

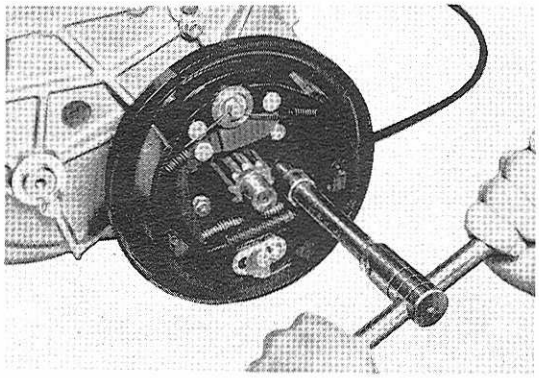


Fig.2-25 Removing Parking Brake Plate Assembly V0448

c. Remove the speedometer sleeve lock plate, then remove the speedometer shaft sleeve assembly from the output shaft rear bearing retainer No.1.

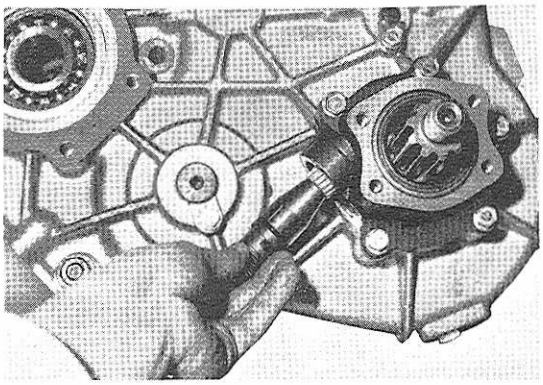


Fig.2-26 Removing Speedometer Shaft Sleeve Assembly V0449

d. Remove the output shaft rear bearing retainer No.1 and the gasket.

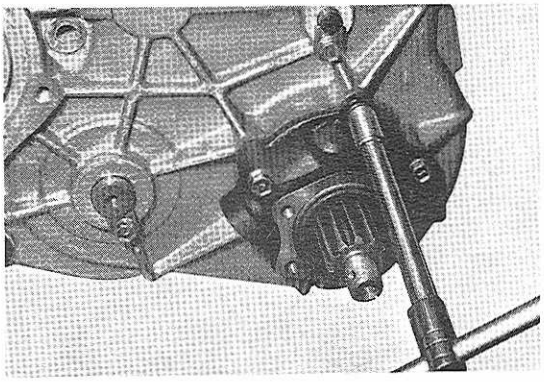


Fig.2-27 Removing Rear Bearing Retainer V0450

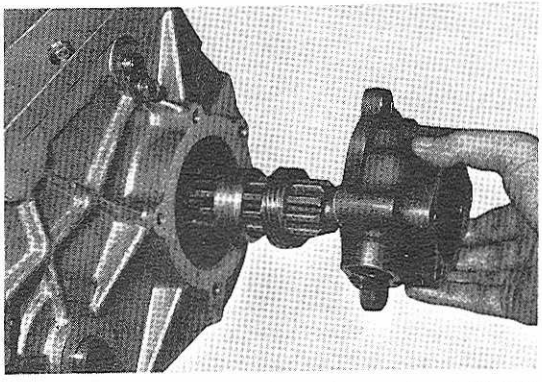


Fig.2-28 Removing Speedometer Drive Gear and Spacer V0451

e. Slide the speedometer drive gear and the spacer out of the transfer output shaft.

f. Remove the diaphragm cylinder or shift shaft guide and transfer front drive fork assemble and the gasket from the transfer extension housing.

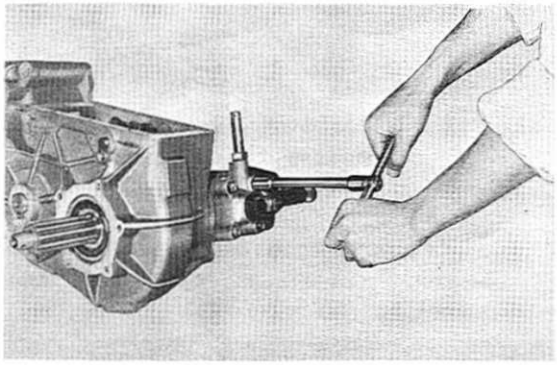


Fig.2-29 Removing Shift Shaft Guide

g. Remove the cotter pin, and retain the transfer output front shaft flange with the Universal Joint Flange Holding Tool 09330-00010, and remove the flange retaining nut.

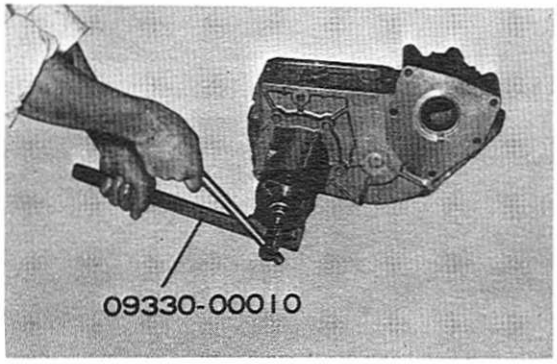


Fig.2-30 Removing Flange

h. Remove the transfer extension housing and the gasket together with the internal parts from the transfer case.

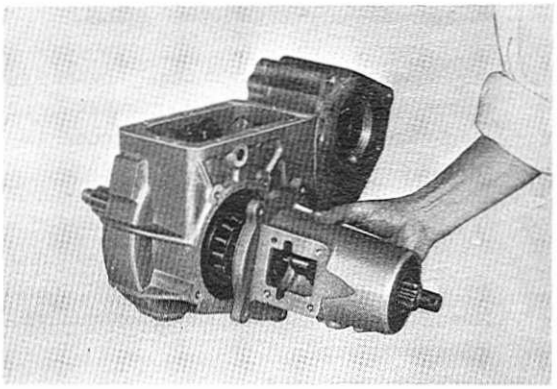


Fig.2-31 Removing Transfer Extension Housing V0453

Remove the flange from the transfer output front shaft, then drive out the front shaft with the front drive clutch sleeve towards the rear.

i. Pry out the oil seal from the transfer extension housing. Next, remove the hole snap ring within the housing.
Remove the transfer extension housing front bearing with the Transmission & Transfer Bearing Replacer 09316-60010 and a press.

j. Remove the transfer case cover assembly and the gasket.

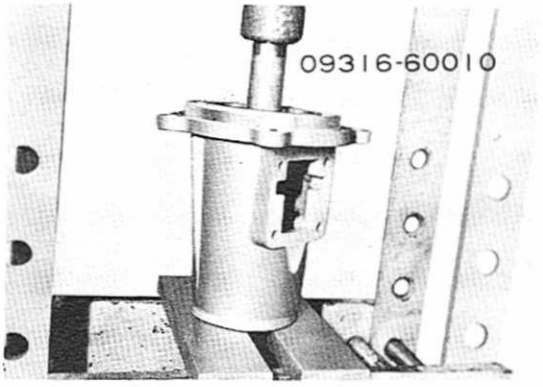


Fig.2-32 Removing Front Bearing V5081

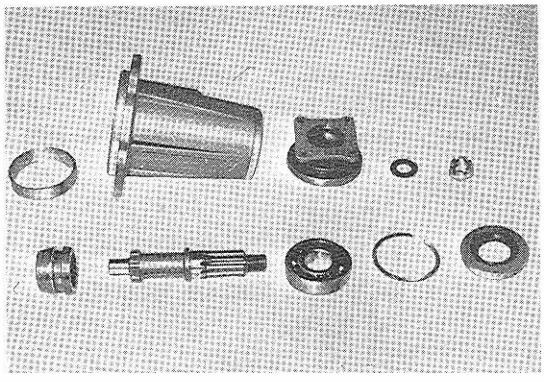


Fig.2-33 Disassembled Parts

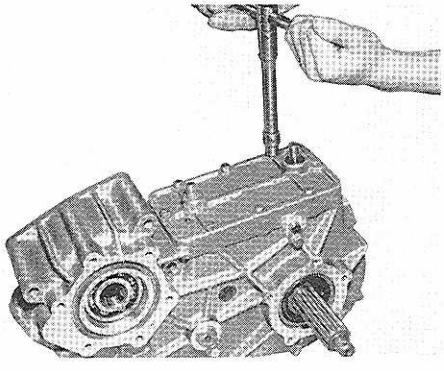


Fig.2-34 Removing Case Cover V0456

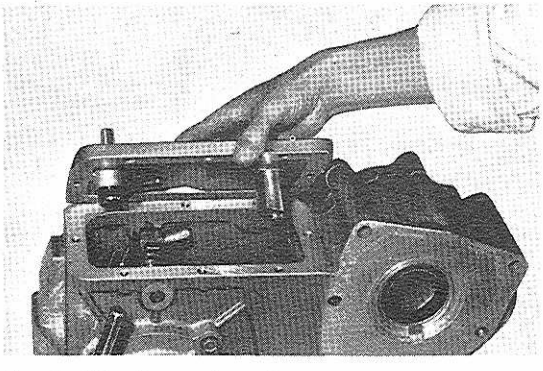


Fig.2-35 Removing Case Cover

k. Remove the cotter pin, and screw out the straight screw plug, then invert the transfer case, and remove the gear shift fork lock ball and the spring from the transfer high and low shift fork.

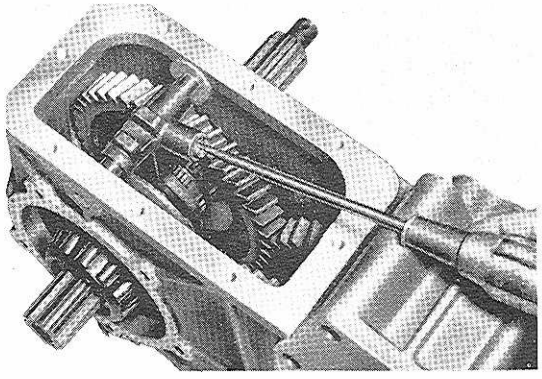


Fig.2-36 Removing Straight Screw Plug V0457

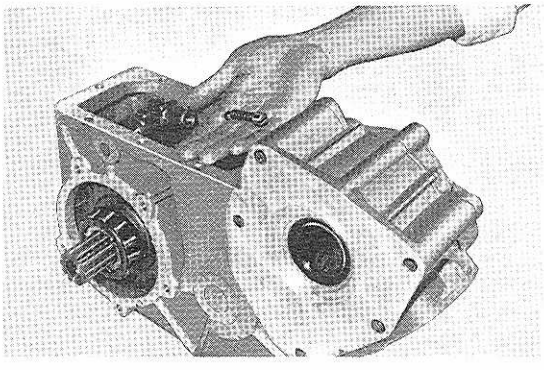


Fig.2-37 Removing Spring & Ball

l. Remove the lock plate, and drive out the transfer high and low shift fork shaft with a brass rod towards the rear from the transfer case, and then take out the transfer high and low shift fork.

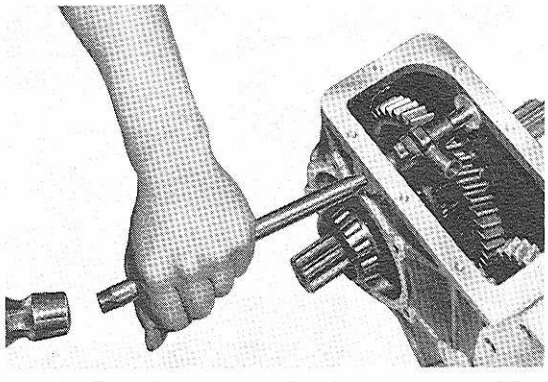


Fig.2-38 Removing Shift Fork Shaft V0458

m. Install the Transfer Low Speed Gear Holding Tool 09318-60010 between the low speed gear and the

front inside of the case to prevent the gear from moving forward, then remove the shaft together with the transfer high speed output gear and the transfer high and low clutch sleeve by press from the transfer case. Next, remove the transfer low speed output gear from the case.

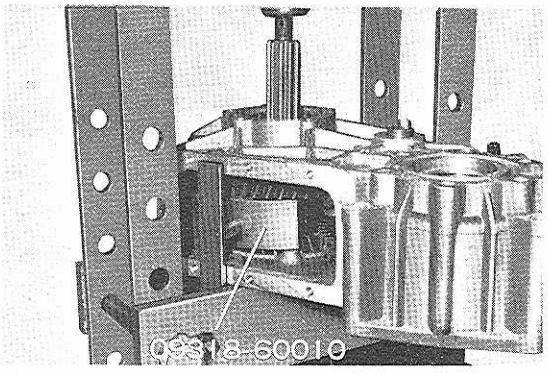


Fig.2-39 Removing Transfer Output Shaft V0495

n. Place the transfer high speed output gear on the anvils,and press out the transfer output shaft.

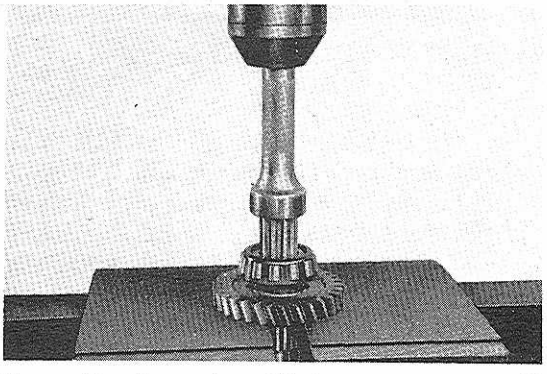


Fig.2-40 Removing High Speed Output Gear and Bearing V0460

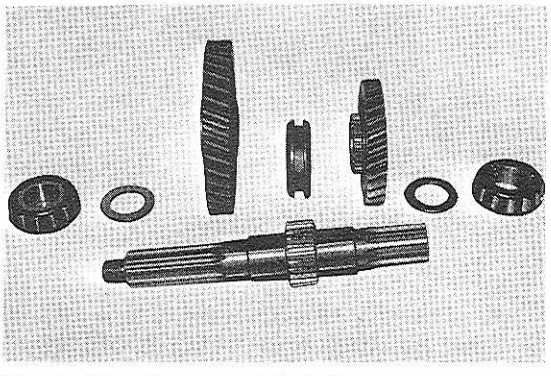
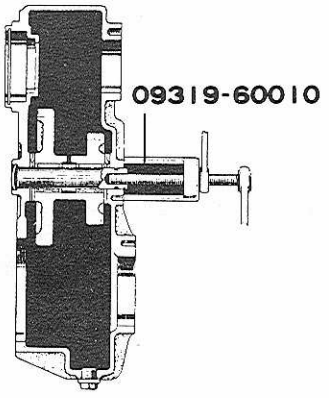


Fig.2-41 Disassembled Parts

o. Remove the transfer idler gear shaft lock plate, then install the Transfer Idler Gear Shaft Remover 09319-60010 into the idler gear shaft, and remove the idler gear shaft from the transfer case.



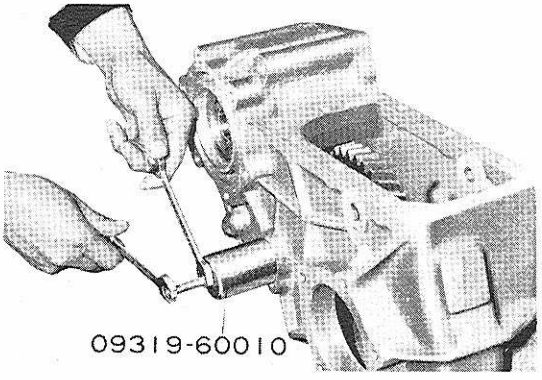


Fig.2-42 Removing Transfer Idler Gear Shaft V5080 G2373

p. Take out the transfer idler gear with the bearings, spacer and the thrust washers.
Prior to removal, note the position of installation of the thrust washers.

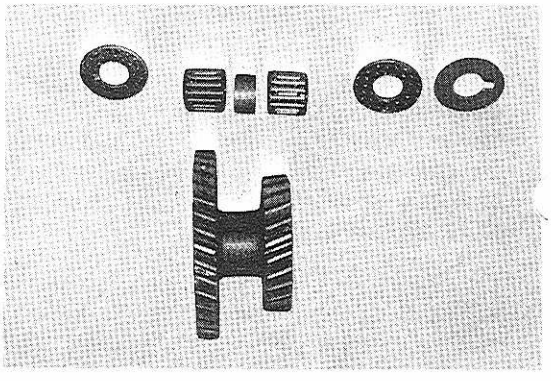


Fig.2-43 Disassembled Parts

Inspection

After disassembling, wash all parts thoroughly, and inspect for the following.

Transmission Case & Transfer Case

Check the transmission and transfer cases for cracks, and the gasket or other contacting surfaces for burrs and nicks.
Replace the case/s if cracked or burred excessively.

Gears

1. Check the gears for tooth wear or damage. Also check the tooth contact condition which may result in noisy operation.
   If defective, replace the necessary gear/s.

2. Check the synchronizer ring contacting surface of the gear cone for uneven wear or roughness.

3. Check the bushings or bearings in the gears for wear or damage, and the gear to shaft fitting conditions.

   Specified gear backlash:
   Between input shaft gear to counter shaft drive gear:
   0.11 mm (0.00433")
   Between second gear to counter shaft gear:
   0.11 mm (0.00433")
   Between first & reverse gear to counter shaft gear:
   0.20 mm (0.00787")
   Between first & reverse gear to reverse idler gear:
   0.20 mm (0.00787")
   Between counter shaft gear to reverse idler gear:
   0.20 mm (0.00787")
   Between transfer input gear to transfer idler gear:
   0.15 mm (0.00591")
   Between transfer idler gear to transfer high speed output gear:
   0.15 mm (0.00591")
   Between transfer idler gear to transfer low speed output gear:
   0.15 mm (0.00591")

4. Check the bearing roller contact surface for scores or damage. If necessary, replace the gear/s.

Synchronizer Rings

1. Check the synchronizer rings for external tooth wear or damage. Also check the internal surface for wear or damage.

2. Check the contacting surface of the synchronizer ring for uneven wear or damage.
   Place the synchronizer ring onto the respective gear cone and check the clearance between the gear and the synchronizer ring.
   If the clearance is less than the limit, replace the synchronizer ring or the gear.

   Specified clearance:
   1.5 ~ 1.85 mm
   (0.059 ~ 0.073")
   Clearance limit:
   1.0 mm (0.039")

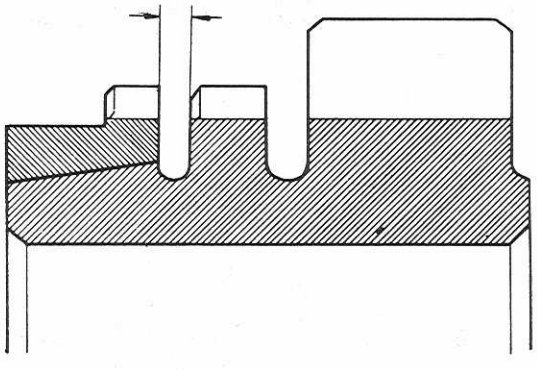


Fig. 2-44 Synchronizer Ring G2374 Inspection

Shifting Keys & Springs

1. Check the shifting keys for improper wear or warpage.
   Replace the key as a set if defective.

2. Check the shifting key springs for weakness or bent condition.
   Replace if necessary.

Bearings & Bushings

1. Check the bearings for roughness and wear.
   Check for noise or damage by rotating the bearing after applying few drops of oil.
   Replace the bearing/s if necessary.
   To remove the bearing cup/s from the transfer case, use the Transmission & Transfer Bearing Replacer 09316-60010.

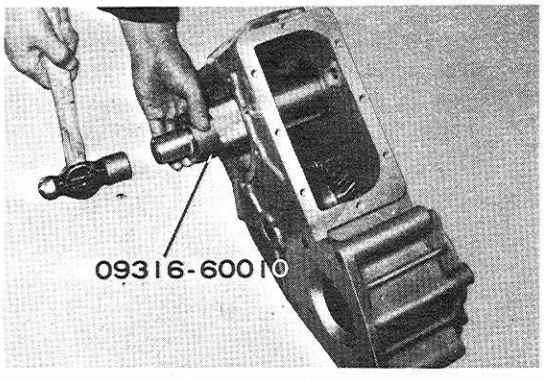


Fig. 2-45 Removing Bearing Cup

   If the transmission input shaft bearing is to be removed, remove the shaft snap ring with a snap ring expander. Next, remove the bearing from the input shaft with the Universal Puller 09950-20010.

2. Check the bushing and the bearing rollers for abnormal wear.
   If the wear is excessive, replace the bushing/s or the bearing rollers.
   The bearing rollers should be replaced as a set.

Oil Seal

It is recommended that all oil seals and dust seals be replaced at the time of the assembly.
If no oil seal is available for replacement, check the lip of the seal for wear or damage.
If the seals are serviceable, re-install them, but recheck after installing the transmission onto the vehicle for oil leak.

Gear Shift Mechanism

1. Inspect each shift fork and the lever thrust surfaces for wear and distortion. Replace if defective.
   Check the clearance between each shift fork and the sleeve, and if it exceeds the service limit, replace the fork/s or sleeve/s.
   Second & third shift fork to clutch hub sleeve clearance:
   0.15 ~ 0.30 mm
   (0.0059 ~ 0.0118")
   Reverse & first shift fork to first & reverse gear clearance:
   0.10 ~ 0.30 mm
   (0.0039 ~ 0.0118")
   Transfer high & low shift fork to transfer high & low clutch sleeve clearance:
   0.10 ~ 0.30 mm
   (0.0039 ~ 0.0118")
   Transfer front drive shift fork to front drive clutch sleeve clearance:
   0.10 ~ 0.30 mm
   (0.0039 ~ 0.0118")

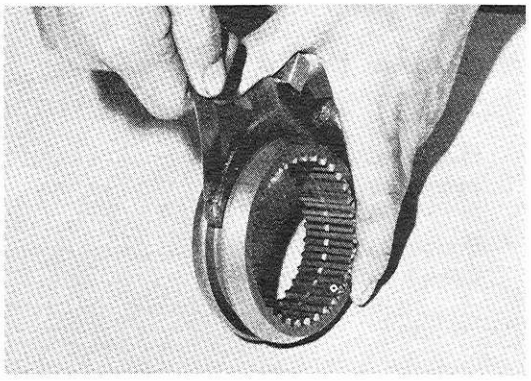


Fig. 2-46 Checking Clearance V5171

2. Inspect the splines of the clutch hubs and hub sleeves for wear or damage, and for smooth operation. The hub sleeve and the hub must be replaced as a set if required.

3. Inspect the contacting surfaces of the shift forks and the shift lever heads for wear. Replace if necessary.

4. Check each shift fork or shift fork shaft for smooth movement and for damage or distortion.

Shaft

Check the shaft splines, snap ring grooves, bearing contact surfaces, bearing fitting portions and the oil seal lip contact surfaces for wear, scores or damage.
If necessary, replace the shaft.

Speedometer Drive & Driven Gears

Check the speedometer drive and driven gears for scores and wear. Replace if necessary.

Assembly

Always install new gaskets, and apply liquid sealer or gasket cement upon assembly.
To provide initial lubrication, apply a thin coating of transmission lubricant on all parts before installation.

1. Transmission assembly.

a. Apply grease in the bore of the reverse idler gear, and install the bearing rollers and the washer into the reverse idler gear.
Place the reverse idler gear and the two thrust washers, and gently drive the reverse idler gear shaft into the transmission case from the rear.

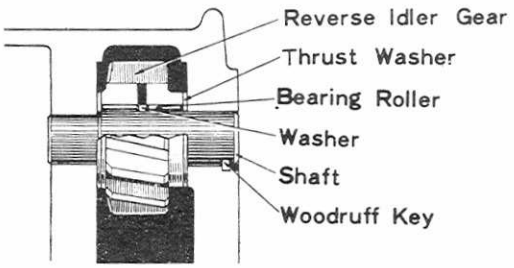


Fig. 2-47 Reverse Idler Gear Assembly G2375

Next, lock the shaft with the woodruff key at the rear end.

b. Apply grease in the bore of the counter shaft drive gear, and install the tube and the Counter Gear Needle Roller Guide Shaft 09311-60010 into the bore of the counter shaft drive gear.
Next, install the bearing rollers and the washers into the bore of the counter shaft drive gear.
Place the counter shaft drive gear, gear thrust washer and the counter gear case side thrust washers in position in the transmission case.

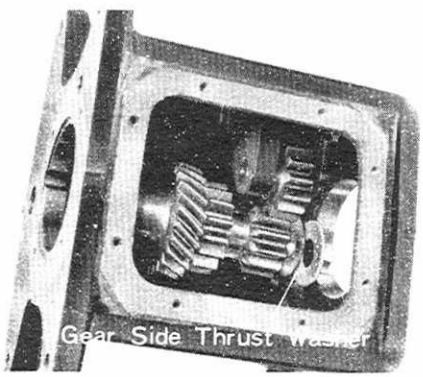


Fig. 2-48 Counter Shaft Drive Gear & Thrust Washer Installation V0461

c. If the input shaft bearing was removed, install the bearing onto the input shaft with the Transmission & Transfer Bearing Replacer 09316-60010 and a press.

d. Next, select and install the proper shaft snap ring to obtain minimum thrust play on the input shaft.

Shaft snap ring thickness:
Part No. 90520-33010
Thickness: 2.43 ~ 2.60 mm
(0.0957 ~ 0.1024")
Part No. 90520-33011
Thickness: 2.30 ~ 2.42 mm
(0.0905 ~ 0.0953")

e. Apply grease in the bore of the input shaft, and install the bearing rollers into the input shaft, then install the hole snap ring.

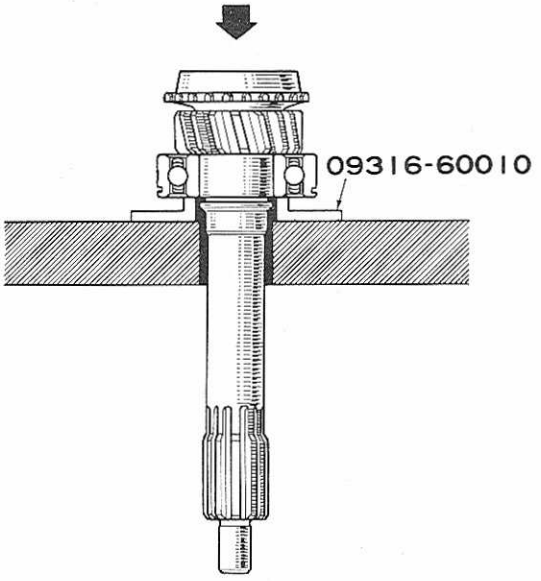


Fig. 2-49 Input Shaft Bearing Installation G2376

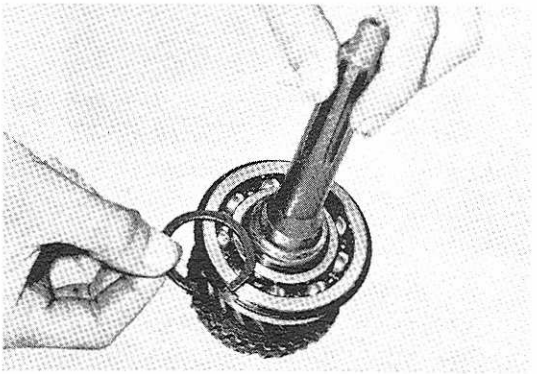


Fig. 2-50 Selecting Shaft Snap Ring V5172

f. Using the Transmission and Transfer Bearing Replacer 09316-60010, install the input shaft assembly into the transmission case.

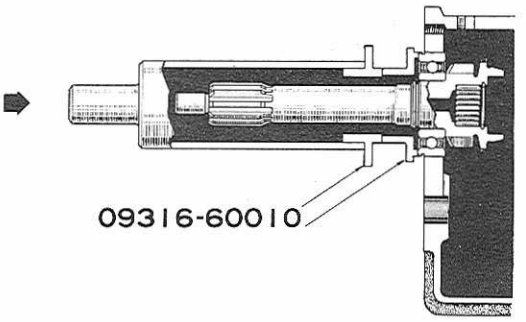


Fig. 2-51 Input Shaft Installation G2377

g. Lifting the counter shaft drive gear within the transmission case, install the counter shaft into the gear from the rear of the transmission case.
Secure the counter shaft in the transmission case with the woodruff key to prevent turning of the shaft.

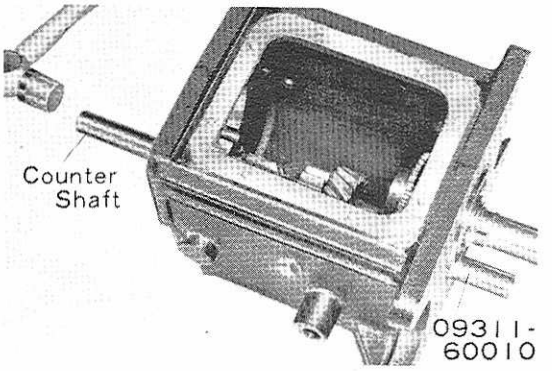


Fig. 2-52 Installing Counter Shaft V0462

h. Measure the counter shaft drive gear thrust clearance with a feeler gauge.
The specified clearance is 0.05 to 0.20 (0.002 ~ 0.008"), and if necessary, select and install the counter gear side thrust washer

at the rear end of the counter shaft drive gear to obtain the specified clearance.

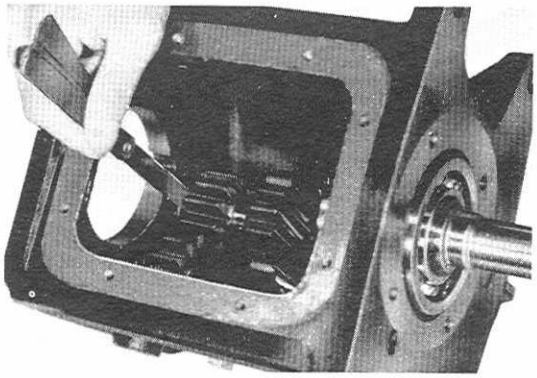


Fig.2-53 Measuring Counter Drive Gear Thrust Clearance V0463

Counter gear side thrust washer thickness:

Part No. 33441-61010
Thickness: 1.45 ~ 1.50 mm (0.0578 ~ 0.0590")
Part No. 33442-61010
Thickness: 1.50 ~ 1.55 mm (0.0590 ~ 0.0610")
Part No. 33443-61010
Thickness: 1.55 ~ 1.60 mm (0.0610 ~ 0.0630")

i. Assemble the synchronizer units by installing the two synchro-mesh shifting key springs onto the clutch hub, and placing the three shifting keys into the clutch hub key slots.
In installing the key springs, the open ends of the springs should be kept at 120° spart as shown in figure 2-43, so that the spring tension on each key will be uniform.

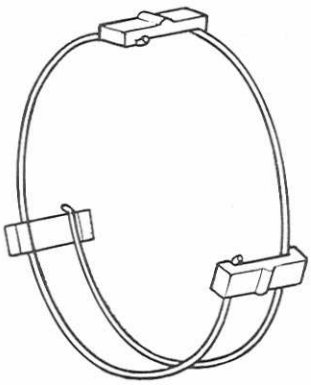


Fig.2-54 Key Spring Installation G2389

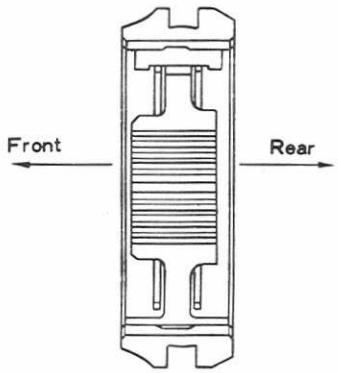


Fig.2-55 Synchronizer Unit Assembly G1164

Next, slide the clutch hub sleeve onto the clutch hub.
The clutch hub and the clutch sleeve are of a selected assembly, therefore, should be kept together for smooth operation.

j. Assemble the second gear, synchronizer ring No.2, and the assembled synchronizer unit onto the transmission output shaft, and then measure the second gear thrust clearance with a feeler gauge.
The clearance should be 0.08 to 0.23 mm (0.0031 ~ 0.0090").
If necessary, select and install the shaft snap ring at the front end of the transmission output shaft to obtain the specified clearance.

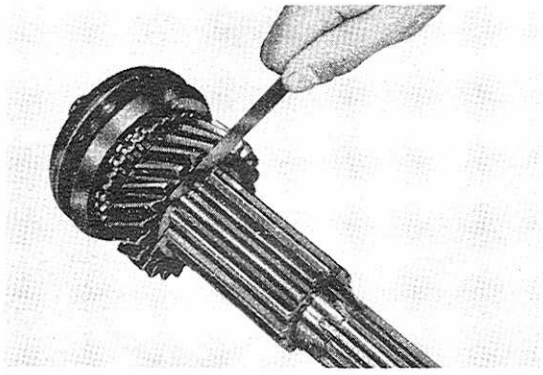


Fig. 2-56 Measuring Second Gear Thrust Clearance V0465

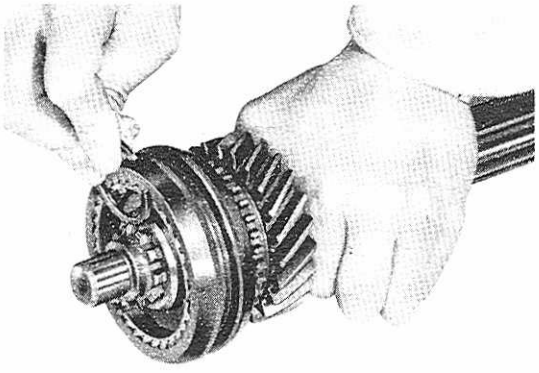


Fig. 2-57 Selecting Shaft Snap Ring V0466

Shaft snap ring thickness:
Part No. 90520-33010
Thickness: 2.43 ~ 2.60 mm
(0.0957 ~ 0.1024")
Part No. 90520-33011
Thickness: 2.30 ~ 2.42 mm
(0.0905 ~ 0.0953")

k. Slide the first and reverse gear onto the transmission output shaft from the rear.
Place the transmission output shaft assembly and the synchronizer ring No.2 into the transmission case.

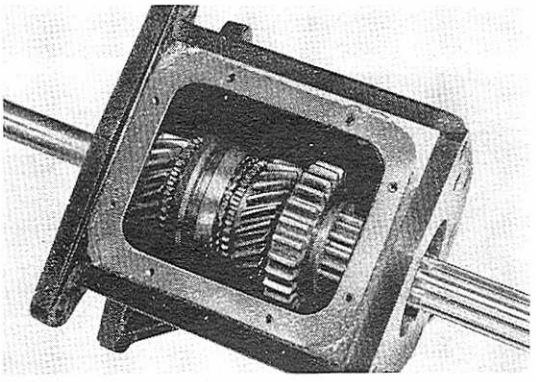


Fig. 2-58 Transmission Output Shaft Assembly V0464

l. Using the Transmission and Transfer Bearing Replacer 09316-60010, install the output shaft rear bearing onto the shaft within the case.

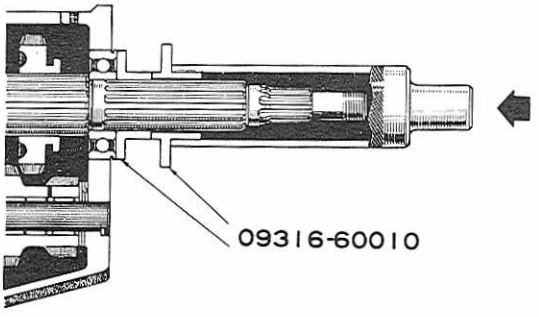


Fig. 2-59 Output Shaft Rear Bearing Installation G2390

m. Place the reverse and first shift fork and the second and third shift fork.
Install the gear shift fork lock springs and the balls into each hole of the shift fork.

Pushing down on the gear shift fork lock balls with a screwdriver, drive in the shift fork shaft gently into the transmission case and the shift forks.
The "O" ring on the shift fork shaft should be replaced with a new ring, and lock the shaft with the straight pin.

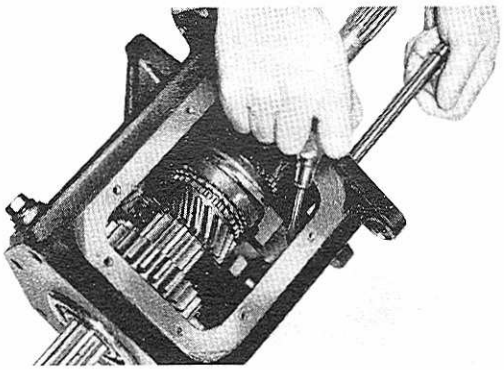


Fig. 2-60 Installing Shift Fork Shaft V0467

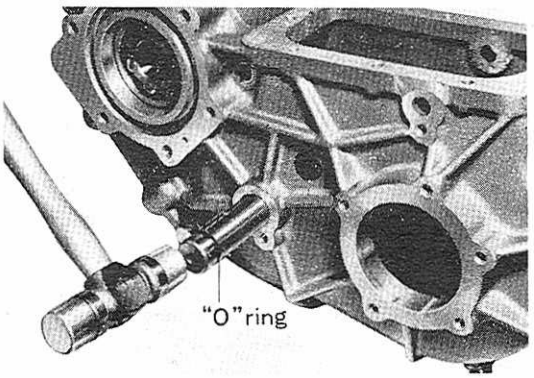


Fig. 2-61 Installing Idler Gear Shaft V0468

n. Coat the liquid sealer on the gasket, and install the front bearing retainer onto the transmission case.
Tighten the bearing retainer attaching bolts to 1.5 ~ 2.0 m-kg (11 ~ 14 ft-lb) torque.

o. Check the input shaft and the output shaft for free movement, and the synchronizer unit for smooth operation.

2. Transfer assembly.

a. Install the bearing spacer and the two needle roller bearings into the transfer idler gear.
Place the transfer idler gear and the two transfer idler gear washers and the spacer in position in the transfer case.
Install the new "O" ring onto the transfer idler gear shaft, and then drive in the shaft into the transfer case from the rear.

b. After installing the shaft, measure the transfer idler gear thrust clearance with a feeler gauge. The thrust clearance should be 0.15 ~ 0.40 mm or 0.0059" to 0.0157", and if it exceeds this specified clearance, select and install the other spacer to obtain the specified clearance.
The spacer should be installed at the rear end of the idler gear.
Transfer idler gear spacer thickness:

Part No. 36261-60010
Thickness: 1.20 ~ 1.30 mm (0.047 ~ 0.051")
Part No. 36262-60010
Thickness: 1.30 ~ 1.40 mm (0.051 ~ 0.055")

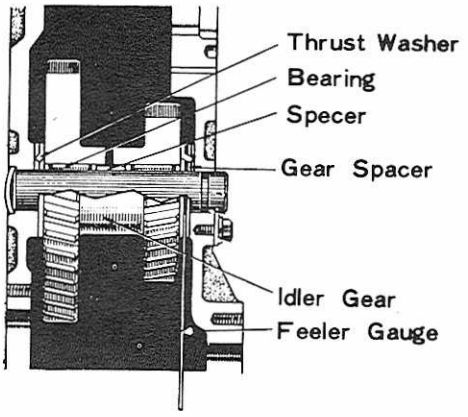


Fig. 2-62 Transfer Idler Gear Thrust Clearance G2391

Part No. 36263-60010
Thickness: 1.40 ~ 1.50 mm (0.055 ~ 0.059")
Part No. 36264-60010
Thickness: 1.50 ~ 1.60 mm (0 059 ~ 0.063")
Part No. 36265-60010
Thickness: 1.60 ~ 1.70 mm (0.063 ~ 0.067")
Part No. 36266-60010
Thickness: 1.70 ~ 1.80 mm (0.067 ~ 0.071")

Secure the transfer idler gear shaft with the lock plate.

c. Slide the transfer high speed output gear onto the transfer output shaft.
Position the washer, and install the output shaft front bearing onto the shaft with the Transmission & Transfer Bearing Replacer 09316-60010 and a press.

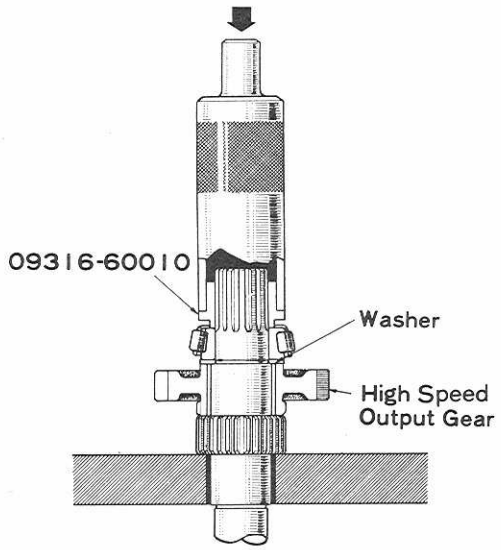


Fig.2-63 Transfer Output Shaft Front Bearing Installation G2392

d. Place the transfer low speed output gear and the transfer high and low clutch sleeve in position within the transfer case.
Next, install the transfer output shaft together with the transfer high speed output gear and the bearing into the transfer case. Install the washer and the transfer output shaft rear bearing onto the transfer output shaft with the Transmission & Transfer Bearing Replacer 09316-60010.

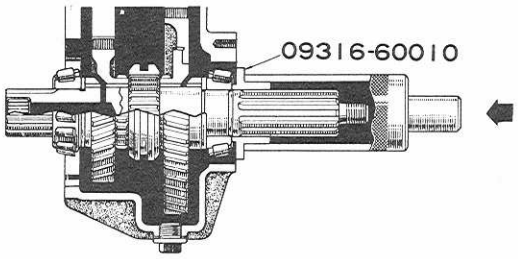


Fig.2-64 Transfer Output Shaft Rear Bearing Installation G2393

e. Using the Transmission and Transfer Bearing Replacer 09316-60010, install the transfer output shaft front and rear bearing cups into the transfer case.

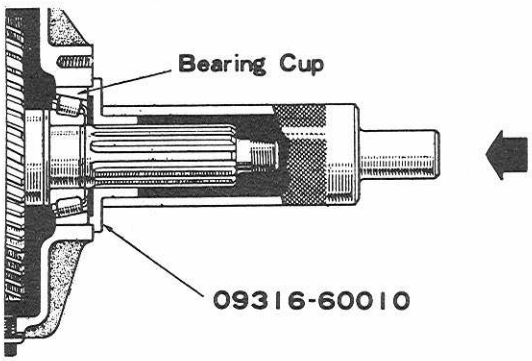


Fig.2-65 Transfer Output Shaft Bearing Cup Installation G2394

f. Transfer extension housing assembly.
(1) Install the transfer output front shaft bearing into the transfer extension housing with the Transmission & Transfer Bearing Replacer 09316-60010, and then install the hole snap ring.
(2) Install the oil seal into the transfer extension housing.

(3) Install the transfer output front shaft into the transfer extension housing, then install the transfer joint flange.
Position the washer, and tighten the flange retaining nut to 14 ~ 17 m-kg (101 ~ 123 ft-lb) torque.
Install the cotter pin.

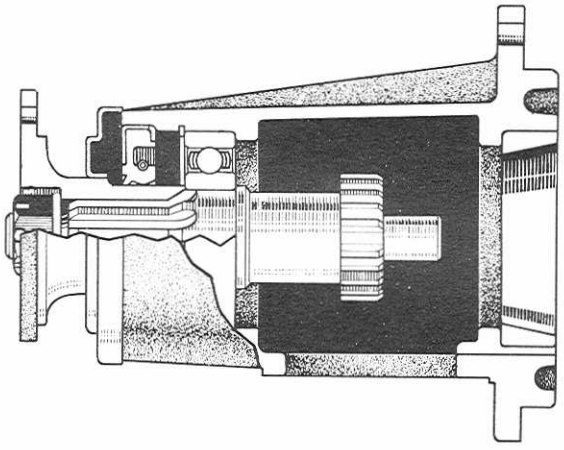


Fig. 2-66 Transfer Extension G2395 Housing Assembly

g. Coat the gasket with the liquid sealer, and install the transfer extension housing assembly and the front drive clutch sleeve onto the transfer case.
Tighten the extension housing retaining bolts to 1.0 ~ 1.6 m-kg (7 ~ 11 ft-lb) torque.
When assembling the front drive clutch sleeve, the tapered side of the clutch sleeve should be towards the rear.

h. Slide the spacer and the speedometer drive gear onto the transfer output shaft.

i. Place the bearing adjusting shim in position on the transfer output shaft rear bearing cup, and then install the output shaft rear bearing retainer with the gasket. Tighten the bearing retainer securing bolts to 1.0 ~ 1.6 m-kg (7 ~ 11 ft-lb) torque.
Next, install the parking brake drum, and tighten the retaining nut to 14 ~ 17 m-kg (101 ~ 123 ft-lb) torque.
Check the transfer output shaft bearing pre-load by hooking the pull-scale at the parking brake drum bolt with the transfer high and low clutch sleeve in neutral position, and the front drive disengaged.
The pull-scale reading should be 4.7 ~ 5.9 kg (10 ~ 13 lb). If necessary, adjust the bearing pre-load by selecting the adjusting shim.

Adjusting shim thickness:
Part No. 90564-64017
Thickness: 0.10 mm (0.0039")
Part No. 90564-64023
Thickness: 0.15 mm (0.0059")
Part No. 90564-64024
Thickness: 0.20 mm (0.0079")
Part No. 90564-64025
Thickness: 0.25 mm (0.0098")

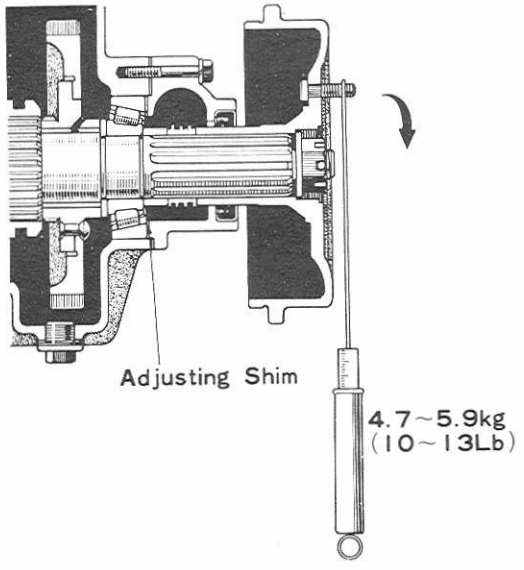


Fig. 2-67 Bearing Pre-load G2396 Adjustment

j. After adjusting the transfer output shaft bearing pre-load, remove the parking brake drum.
Place the transfer high and low shift fork into the transfer case, and then drive the shift fork shaft

with the "O" ring into the transfer case.
Secure the shift fork shaft with the lock plate.

k. Insert the gear shift fork lock ball and the spring into the transfer high and low shift fork, and screw in the straight screw plug. Lock the straight screw plug with the cotter pin.

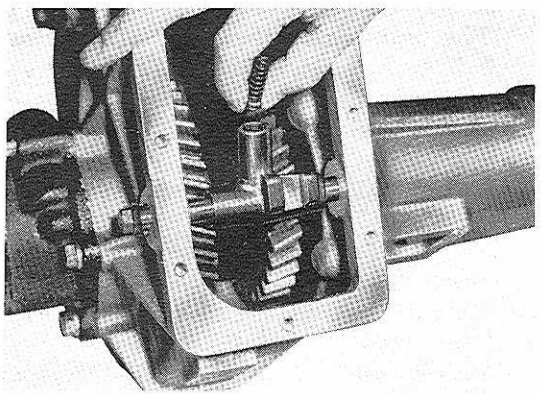


Fig. 2-68 Installing Lock Ball & Spring V0469

l. Assemble the high and low inner lever, and the outer lever onto the transfer case cover.
Install the transfer case cover with the gasket.

3. Install the Transfer Guide Shaft 09323-60010 onto the transmission output shaft.
Place the transfer input gear, power take-off drive gear and the two spacers onto the Transfer Guide Shaft in position inside the case through the transfer power take-off cover hole.
Be careful and install the transfer assembly onto the transmission case.

Caution:
At this time, do not forget to install the transfer case front gasket between the transmission case and the transfer case.
Coat the gasket with the liquid sealer to prevent oil leak.

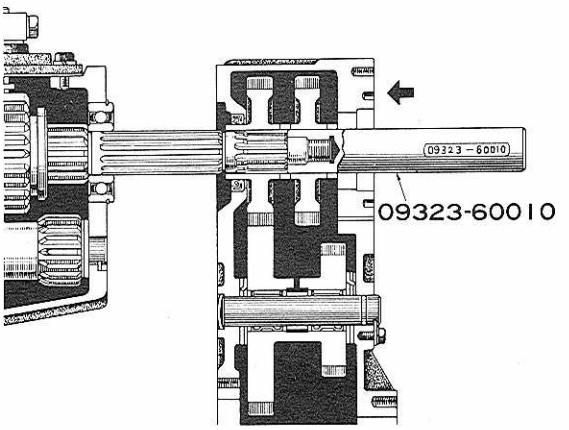


Fig. 2-69 Transfer Assembly Installation G2397

4. Tighten the bolts retaining the transfer case onto the transmission case to 3.5 ~ 4.1 m-kg (25 ~ 30 ft-lb) torque.
Two of the bolts are short, and these should be secured from the inside of the transfer case.

5. Remove the Transfer Guide Shaft 09323-60010 from the transmission output shaft.
Install the bearing onto the end of the transmission output shaft in the transfer case with the Transmission & Transfer Bearing Replacer 09316-60010.

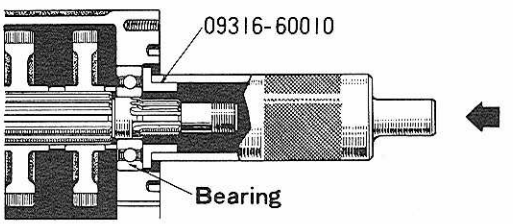


Fig. 2-70 Bearing Installation G2398

6. Install the transfer input shaft spacer, and tighten the bearing retaining nut to 14 ~ 15 m-kg or 101 ~ 108 ft-lb torque.
   Secure the retaining nut with the lock washer.
   Install the transfer case cover No.2 with the gasket.

7. Apply the liquid sealer onto the gasket, and install the transfer power take-off cover.

8. Install the diaphragm cylinder and the transfer front drive fork assembly with the gasket onto the transfer extension housing.

9. Install the speedometer shaft sleeve together with the speedometer driven gear into the transfer output shaft rear bearing retainer.
   Secure the speedometer shaft sleeve with the lock plate.

10. Install the parking brake plate assembly.

11. Install the parking brake drum, and tighten the retaining nut to 14 to 17 m-kg (101 ~ 123 ft-lb) torque.

Installation

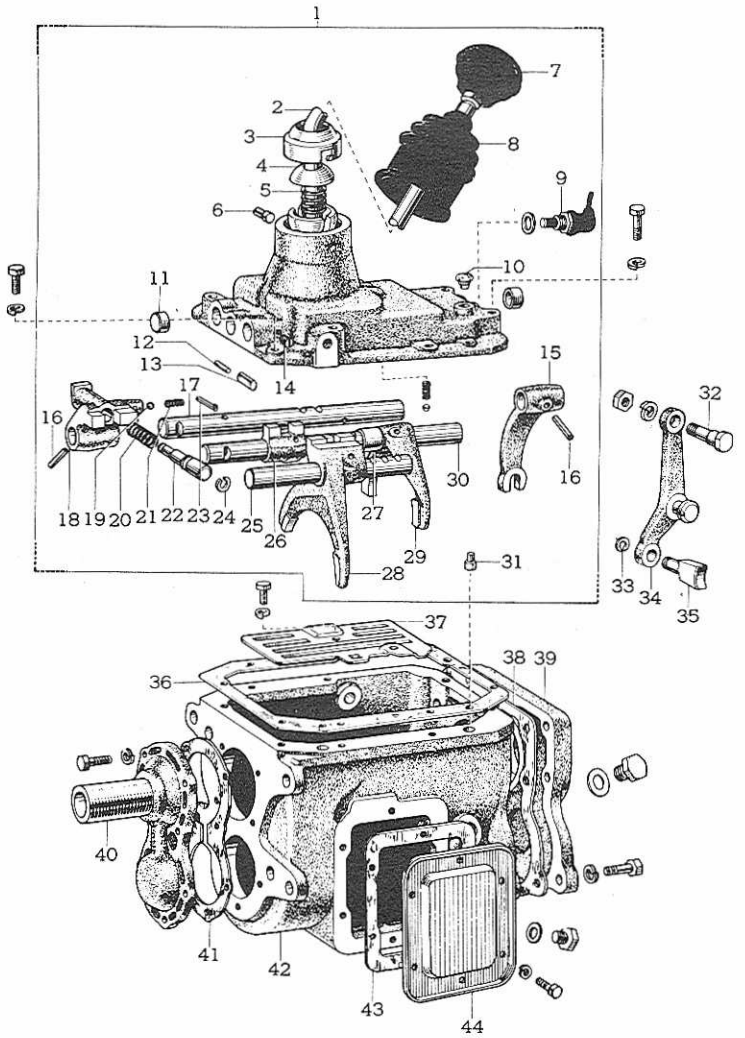
Follow the removal procedures in the reverse order.

1. Fill the transmission and transfer with the lubricant SAE 90.
   Capacities:
   Transmission case:
   1.7 liters (1.8 US qts., 1.5 Imp qts.)
   Transfer case:
   1.7 liters (1.8 US qts., 1.5 Imp qts.)

2. Check the remote control linkage and clutch for correct movement, and adjust if required.

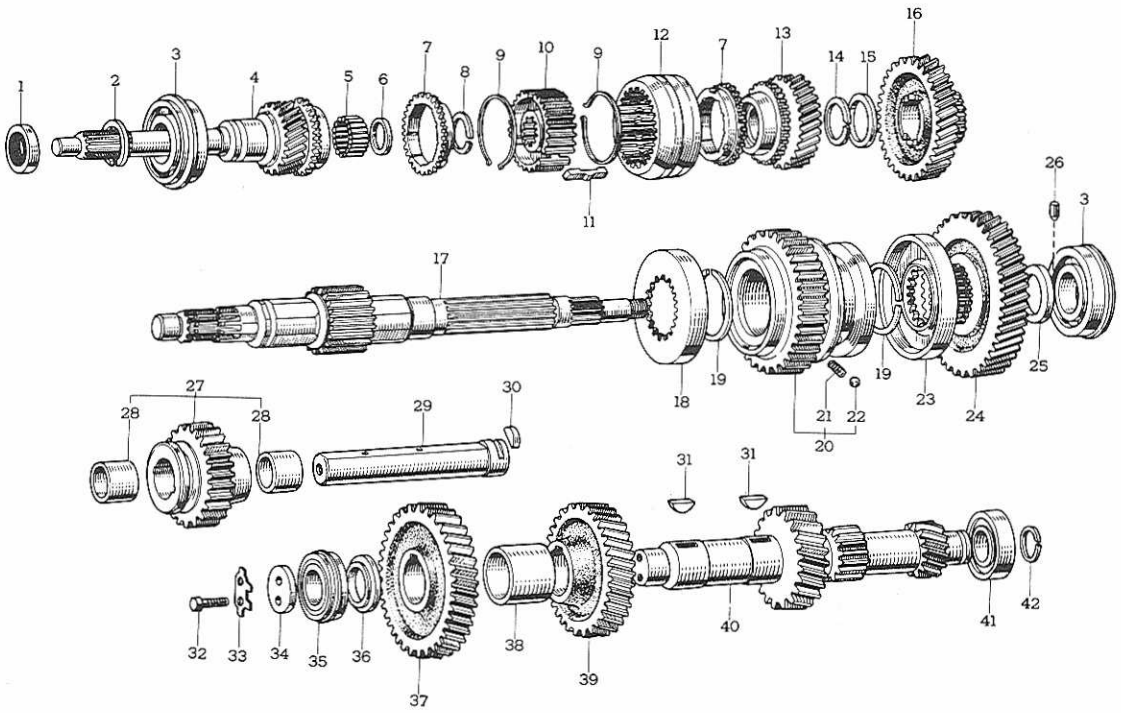
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4-SPEED TRANSMISSION



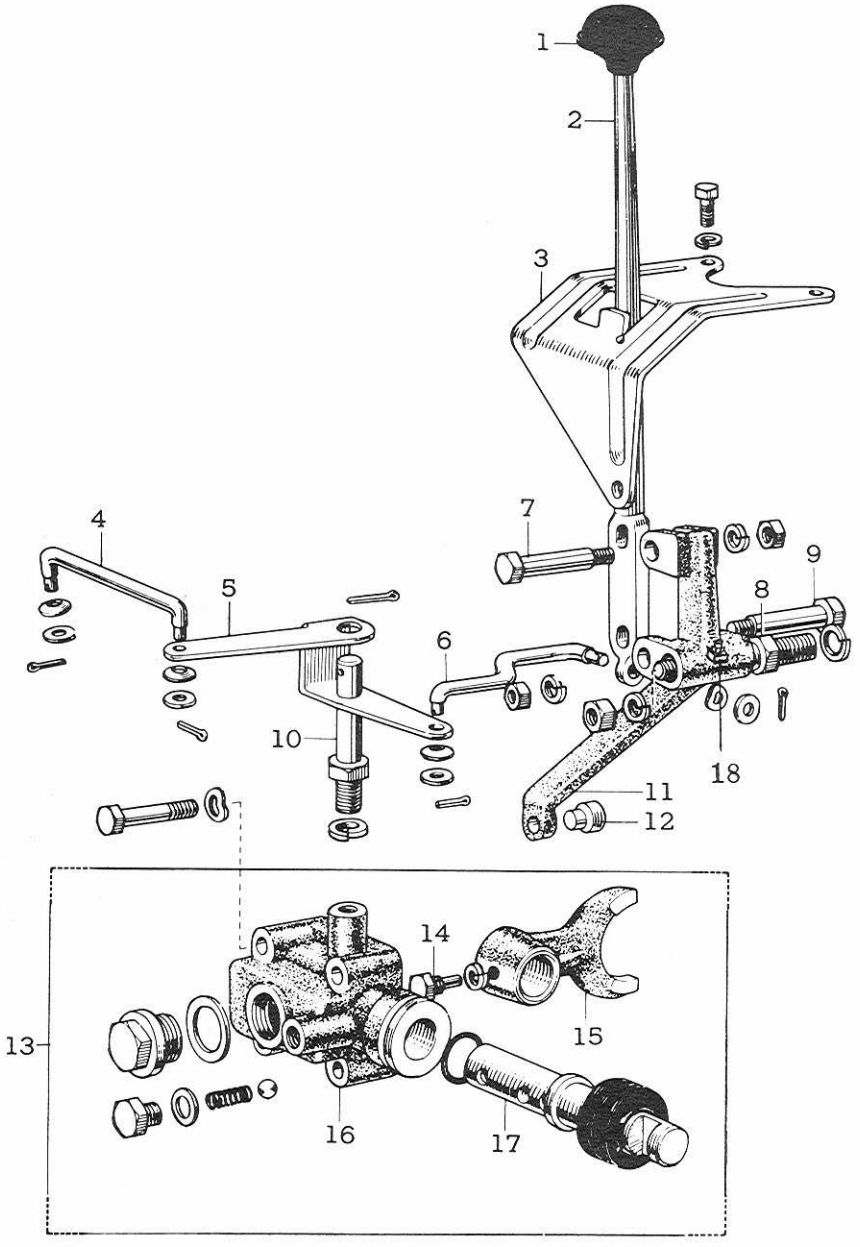
1. Transmission case cover assembly
2. Shift lever
3. Shift lever cap
4. Shift lever spring seat
5. Spring
6. Dowel pin
7. Shift lever knob
8. Shift lever cap boot
9. Back up lamp switch
10. Breather plug
11. Tight plug
12. Straight pin
13. Roller
14. Screw plug
15. Reverse shift fork
16. Slotted spring pin
17. Reverse shift fork shaft
18. Reverse shift head
19. Lock ball
20. Spring
21. Spring
22. Reverse shift return plunger
23. Cotter pin
24. "C" washer
25. Third and fourth shift fork shaft
26. First and second shift head
27. Spacer
28. Third and fourth shift fork
29. First and second shift fork
30. First and second shift fork shaft
31. Dowel pin
32. Shift arm pivot
33. Shaft snap ring
34. Reverse shift arm
35. Shift arm shoe
36. Case cover gasket
37. Transmission oil filter plate
38. Gasket
39. Rear bearing retainer
40. Front bearing retainer
41. Gasket
42. Transmission case
43. Gasket
44. Power take-off cover

Fig. 2-71 Transmission Case & Cover Components Y7185



1. Oil seal
2. Shaft snap ring
3. Bearing
4. Input shaft
5. Bearing roller
6. Bearing spacer
7. Synchronizer ring No.2
8. Shaft snap ring
9. Shifting key spring
10. Clutch hub No.2
11. Shifting key No.2
12. Hub sleeve
13. Third gear
14. Shaft snap ring
15. Second gear thrust washer
16. Second gear
17. Output shaft
18. Second synchronizer outer ring
19. Shaft snap ring
20. Synchronizer ring No.1
21. Compression spring
22. Lock ball
23. First synchronizer outer ring
24. First gear
25. First gear thrust washer
26. Straight pin
27. Reverse idler gear
28. Bushing
29. Reverse idler gear shaft
30. Woodruff key
31. Woodruff key
32. Bolt
33. Lock bolt washer
34. Lock bolt plate
35. Bearing
36. Front bearing spacer
37. Counter shaft drive gear
38. Spacer
39. Counter shaft third speed gear
40. Counter shaft
41. Bearing
42. Shaft snap ring

Fig.2-72 Transmission Gear Components G2383



1. Shift lever knob
2. Front drive shift lever
3. Shift lever guide
4. High and low shift rod No.3
5. High and low shift link lever
6. High and low shift rod No.1
7. Shift lever pin No.1
8. Shift link support shaft
9. Shift lever pin No.2
10. Link support shaft
11. Front drive shift link lever
12. Link lever shoe
13. Transfer front drive shift shaft guide assembly
14. Fork shaft pin
15. Front drive shift fork
16. Shift shaft guide
17. Front drive shift shaft
18. Grease nipple

Fig.2-73 Transfer Shift Lever & Link Components G2384

4-SPEED TRANSMISSION & TRANSFER

Removal

1. Remove the transmission under cover, and disconnect the front and rear propeller shafts from the transfer output shafts.

2. Drain the gear lubricant from the transmission and the transfer.

3. Pull up the shift lever cap boot, and then remove the shift lever from the transmission case cover with the Transmission Gear Shift Lever Remover 09305-60010.
   To remove the shift lever, hold down the gear shift lever cap, then turn the Transmission Gear Shift Lever Remover clockwise.
   Cover the shift lever retainer hole with a clean shop towel to prevent dropping any foreign matter into the transmission case cover.
   Loosen and remove the knob on the transfer front drive shift lever.

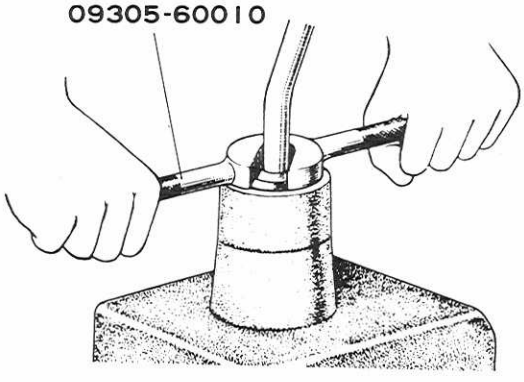


Fig. 2-74 Shift Lever Removal G2400

4. Remove the transmission cover.
   Disconnect the back-up light switch wires on the transmission case cover.
   Loosen and disconnect the speedometer drive cable from the speedometer shaft sleeve.

5. Remove the hole pin, and disconnect the parking brake cable from the parking brake link lever.

6. Remove the flywheel housing under cover, and then remove the bolts retaining the transmission onto the clutch housing.

7. Slide the transmission assembly rearward until the transmission input shaft clears the clutch housing and carefully withdraw it downward from the vehicle.

Disassembly

1. Remove the transfer shift lever guide (1), cotter pin (2), and the lock bolt (3), then remove the shift lever and the lever linkage.
   Do not lose the link lever shoe (4), connecting the front drive shift link lever to the transfer front drive shift shaft.

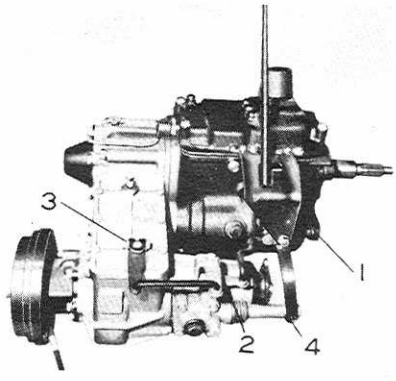


Fig. 2-75 Shift Lever & Linkage Removal V5062

2. Loosen and remove the back-up light switch and the gasket from the transmission case cover.

3. Remove the transmission case cover assembly.

4. Remove the transfer case cover No. 2 and the gasket.
   Straighten the lock washer, and remove the transfer rear bearing retaining nut and the transfer input shaft spacer.

5. Remove the transfer power take-

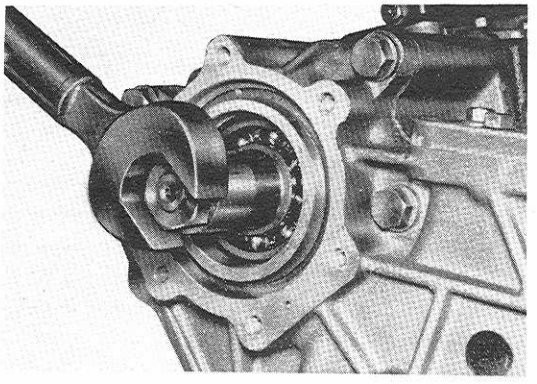


Fig. 2-76 Removing Rear Bearing Retaing Nut V0435

off cover and the gasket. Remove the five bolts retaining the transfer case onto the transmission case. Two of the bolts are shorter and these two should be removed from the inside of the transfer case.

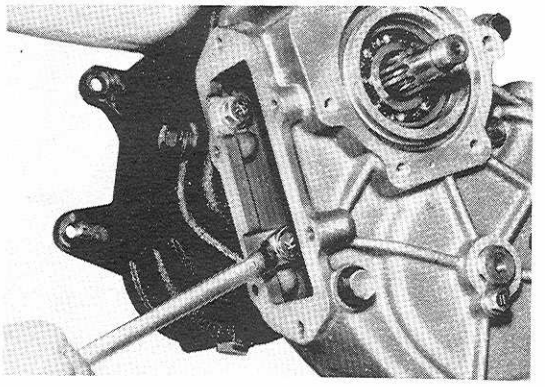


Fig. 2-77 Removing Transfer Case Retaining Bolts V0436

6. Install the universal puller onto the transfer case. and remove the transfer assembly from the transmission case. At this time, take out the power take-off drive gear and the transfer input gear from the transfer case.
Remove the transfer input gear stopper in the transmission rear bearing retainer.

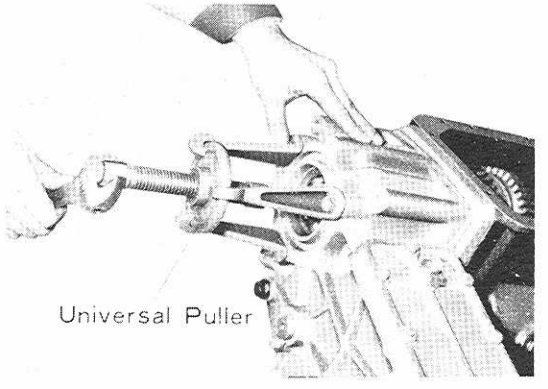


Fig. 2-78 Removing Transfer Assembly V5063

7. Transmission disassembly.

a. Remove the transmission rear bearing retainer and the gasket.

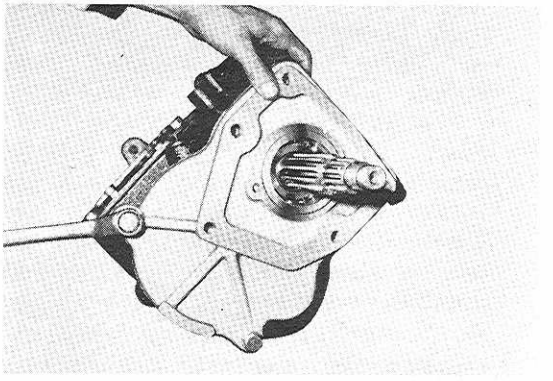


Fig. 2-79 Removing Rear Bearing Retainer V5064

b. Remove the front bearing retainer and the gasket.

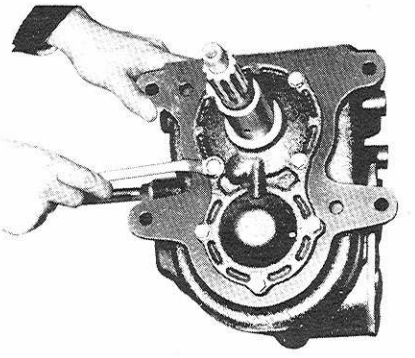


Fig. 2-80 Removing Front Bearing Retainer V5065

c. Using the Puller Set 09910-00013, remove the input shaft together with the bearing from the transmission case.
Before removing the input shaft, be sure to locate the synchronizer gear cut portion of the input shaft

with the counter drive gear. Also the needle bearings and the bearing spacer in the input shaft will drop into the transmission case if these are not carefully watched. At this time, remove the synchronizer ring.

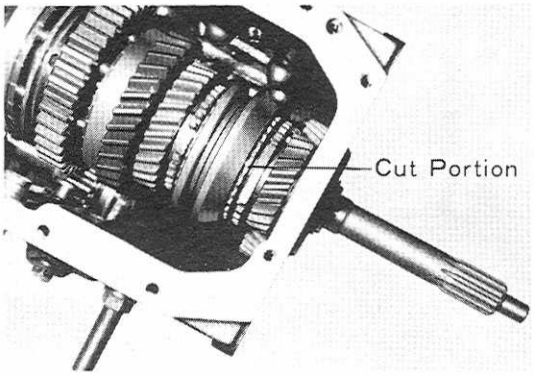


Fig. 2-81 Synchronizer Gear V5066 Cut Portion

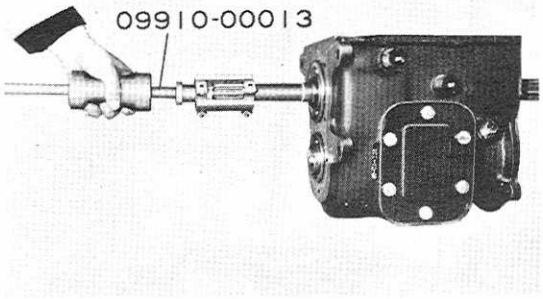


Fig. 2-82 Removing Input Shaft V5067

d. Remove the snap ring on the output shaft rear bearing. Next using the rear bearing Puller (09334-36010), remove the output shaft rear bearing in the same manner as the counter shaft bearing removal.

e. Take out the output shaft and gears assembly from the transmission case.

f. Straighten the lock washer on the counter shaft front bearing retaining plate, and remove the bolts. Remove the counter shaft front bearing retaining plate and the lock washer.

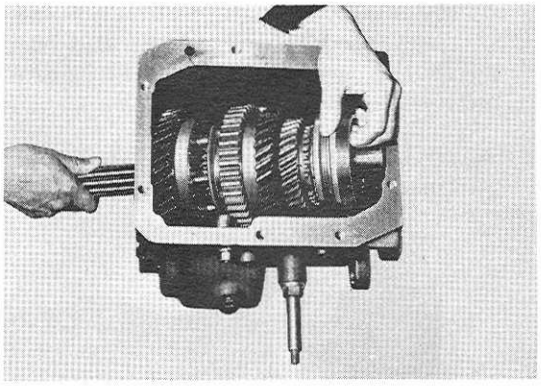


Fig. 2-83 Removing Output Shaft & Gear Assembly V5068

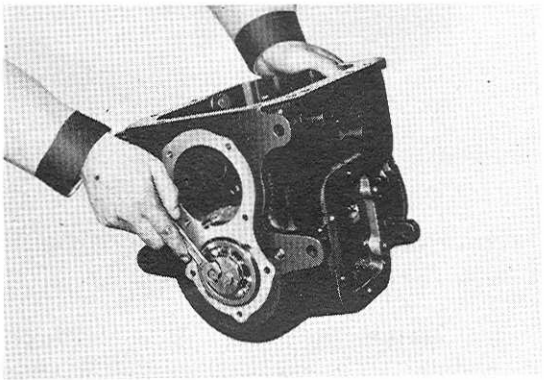


Fig. 2-84 Removing Bearing Retaining Bolts V5069

g. Remove the counter shaft front bearing with the Universal Puller 09950-20010.
Remove the front bearing spacer at this time.

h. Insert the Universal Puller

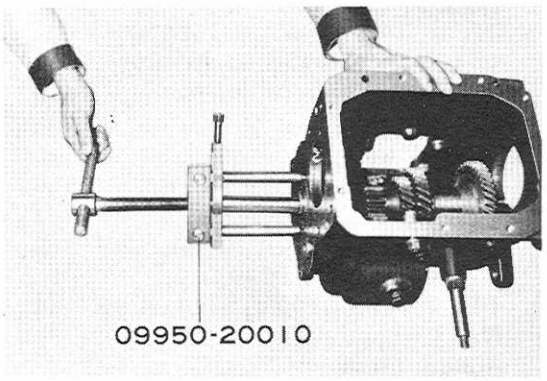


Fig. 2-85 Removing Counter Shaft Rear Bearing V5070

09950-20010 into the service holes of the transmission case, and remove the counter shaft rear bearing.

i. Take out the counter shaft assembly from the transmission case.

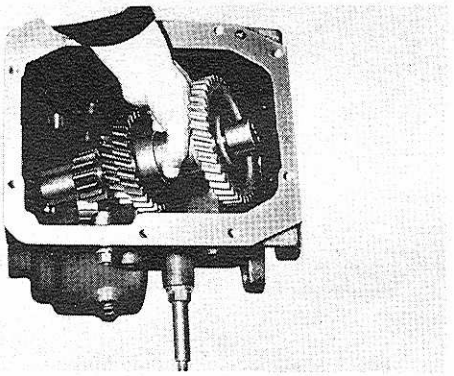


Fig. 2-86 Removing Counter Shaft Assembly V5071

j. Remove the shift arm pivot and the reverse shift arm.

k. Install the Idler Gear Shaft Puller 09312-55010 into the reverse idler gear shaft end, and pull out the reverse idler gear shaft and the key from the transmission case.

l. Take out the reverse idler gear from the transmission case.

m. Output shaft and gears disassembly.
(1) Slide the first gear thrust washer and the first gear out of the output shaft rearward.
(2) Remove the shaft snap ring at the front end of the output shaft, and remove the clutch hub with the hub sleeve, synchronizer ring and the third gear from the output shaft.
(3) Remove the shaft snap ring, and then slide out the second gear and the thrust washer.
(4) Remove the synchronizer ring No.1 (reverse gear) from the output shaft.

n. Counter shaft disassembly.
(1) Using a press, remove the counter shaft drive gear, and then remove the woodruff key and spacer from the counter shaft.

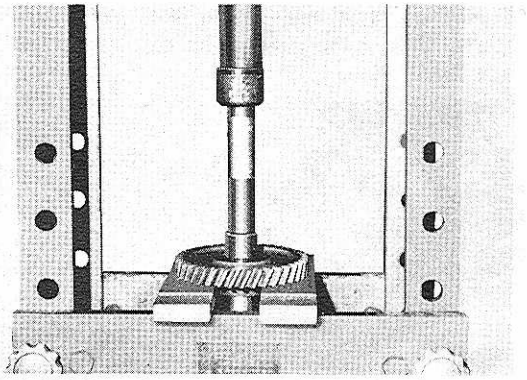


Fig. 2-87 Counter Shaft Drive Gear Removal V5072

(2) Using a press, remove the counter shaft third speed gear from the counter shaft.
Remove the woodruff key.

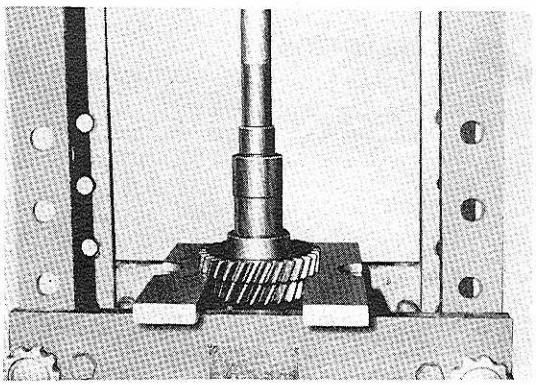


Fig. 2-88 Third Speed Gear Removal V5073

o. Transmission case cover disassembly.
To remove the shift fork shafts, be sure to shift the shift fork into neutral position, and do not apply excessive force against the shaft.
(1) Drive out the slotted spring pin from the third and fourth shift fork with a long drift punch.
Next, drive out the third and fourth shift fork shaft together with the tight plug forward with a brass rod.

Remove the shift fork, lock ball and the spring.

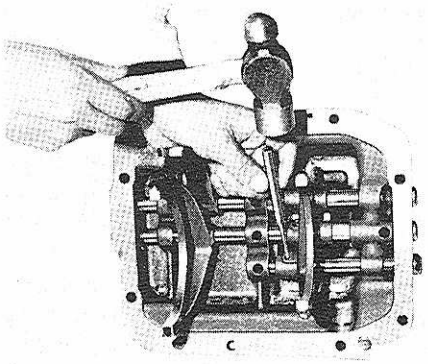


Fig. 2-89 Removing Slotted V5074 Spring Pin

(2) Using a long drift punch, drive out the slotted spring pins from the first and second shift fork and the first and second shift head.
Remove the tight plug at the rear end of the transmission case cover, and then drive out the first and second shift fork shaft together with the tight plug forward with a brass rod.
Remove the shift fork, shift head, lock ball and the spring.
Remove the straight pin in the first and second shift fork shaft front end.
(3) Using a long drift punch, remove the slotted spring pins from the reverse shift fork and the reverse shift head.
Take out the reverse shift fork, shift head, lock ball and the spring.
(4) Remove the two inter-lock rollers in the transmission case cover.
If difficult to remove the inter-lock rollers, loosen and remove the taper screw plug on the transmission case cover, and push them out with a long drift punch.
(5) Remove the cotter pin, and take out the spring and lock ball from the reverse shift head.
Next, remove the "C" washer, and pull out the reverse shift return plunger and the spring from the reverse shift head.

8. Transfer disassembly.
To disassemble the transfer, refer to 3-speed transmission & transfer procedures.

Inspection

After disassembling, wash all parts thoroughly, and inspect for the following.

Transmission case.

Check the transmission and transfer cases for cracks, gasket or other contacting surfaces for burrs and nicks.

Gears

1. Check the gears for tooth wear or damage.
Also check the tooth contact condition which may result for noisy operation.
If defective, replace the necessary gear/s.

2. Check the synchronizer ring contacting surface of the gear cone for uneven wear or roughness.

3. Check the bushings or bearings in the gears for wear or damage. and fitting conditions of the gear with the shaft.
The specified oil clearance of the output shaft to first, second and third gears is 0.08 ~ 0.121 mm (0.003 ~ 0.005"), and the reverse idler gear to shaft is 0.115 to 0.153 mm (0.0045 ~ 0.0060").

Specified gear backlash:
Between input shaft gear to counter shaft drive gear:
0.090 mm (0.00354")
Between third gear to counter shaft gear:
0.090 mm (0.00354")
Between second gear to counter shaft gear:
0.108 mm (0.00425")

Between first gear to counter shaft gear:
0.109 mm (0.00429")
Between reverse gear to reverse idler gear:
0.120 mm (0.00472")

4. Check the bearing rollers contacting surface for scores or damage. If necessary, replace the gear/s.

Synchronizer Rings

1. Check the synchronizer rings for external tooth wear or damage. Also check the internal surface for wear or damage.

2. Check the contacting surface of the synchronizer ring for uneven wear or damage.
Place the synchronizer ring onto the respective gear cone, and check the clearance between the gear and the synchronizer ring.
If necessary, replace the gear/s or the synchronizer ring/s.

Specified clearance:
Input shaft to synchronizer ring No.2
0.97 ~ 1.59 mm (0.038 ~ 0.063")
Third gear to synchronizer ring No.2
0.87 ~ 1.69 mm (0.034 ~ 0.067")

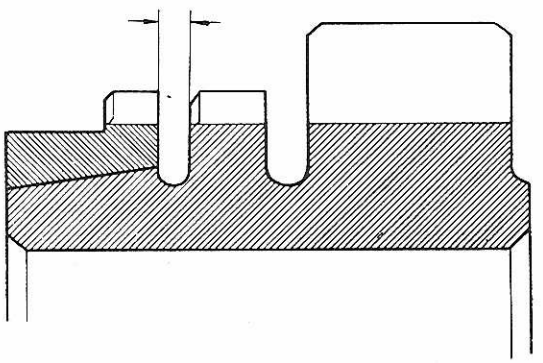


Fig.2-90 Synchronizer Ring Inspection G2374

3. Apply a thin coat of red-lead onto the synchronizer outer rings, and place the synchronizer ring No.1 into the outer rings.
Apply light pressure onto the synchronizer ring and turn it to check the synchronizer ring contacting condition.

If necessary, lap the synchronizer outer ring and the synchronizer ring No.1 lightly with a lapping compound to match.
Remove all compound thoroughly from the outer ring and the synchronizer ring No.1 after lapping.
Place the synchronizer ring No.1 into the synchronizer outer ring, and check the distance between the end of the synchronizer ring No.1 and the end of the synchronizer outer ring.
If necessary, replace the synchronizer outer ring or the synchronizer ring No.1 assembly.

Specified distance:
Synchronizer ring No.1 to second synchronizer outer ring:
0.1 ~ 0.5 mm (0.004 ~ 0.020")
Synchronizer ring No.1 to first synchronizer outer ring:
0.1 ~ 0.5 mm (0.004 ~ 0.020")

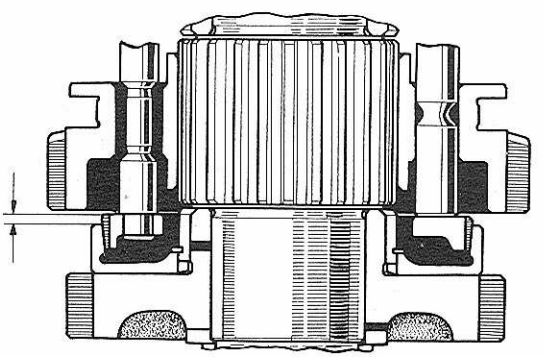


Fig.2-91 Synchronizer Ring Inspection G2385

Shifting Keys & Springs

1. Check the shifting keys for improper wear or warpage.
Replace the key as a set if defective.

2. Check the shifting key springs for weakness or bent condition.
   Replace if necessary.

Bearing & Bushings

1. Check the bearings for roughness and wear.
   Check for noise or damage by rotating the bearing after applying few drops of oil.
   Replace the bearing/s if defective.
   If the transmission input shaft bearing is to be removed, remove the shaft snap ring with a snap ring expander, then remove the bearing from the input shaft with the Universal Puller 09950-20010.

2. Check the bushings and the bearing rollers for abnormal wear.
   If the wear is excessive, replace the bushing/s or the bearing rollers.
   The bearing rollers should be replaced as a set.

Oil Seals

It is recommended that all oil seals and dust seals should be replaced at the time of assembly.
If no oil seal is available for replacement, check the lip of the seal for wear or damage.

Gear Shift Mechanism

1. Inspect each shift fork and the shift head thrust surfaces for excessive wear and distortion.
   Replace if defective.

2. Check the clearance between each shift fork and the sleeve, and if it exceeds the specified clearance, replace the shift fork/s, sleeve or the gear/s.

   Specified clearance:
   0.10 ~ 0.30 mm (0.0039 ~ 0.0118")

3. Inspect the splines of the clutch hub and the hub sleeve for wear or damage, and for smooth operation.
   The hub and the hub sleeve should be replaced as a set.

4. Check each shift fork or shift fork shaft for smooth movement and for damage or distortion.

Shaft

Check the shaft splines, snap ring grooves, bearing contacting surfaces, bearing fitting portions, gear fitting portions and the oil seal lip contacting portions for wear, scores or damage.
If necessary, replace the shaft.

Speedometer Drive & Driven Gears

Check the speedometer drive and driven gears for scores and wear.
Replace if necessary.

Assembly

All gaskets and oil seals should be replaced when assembling the transmission and the transfer.
Always install new gaskets, and apply the liquid sealer upon assembly.
To provide initial lubrication, lubricate all parts before installation.

1. Transmission assembly.

   a. Install the reverse idler gear with the fork groove towards the front, and gently drive the reverse idler gear shaft with the woodruff key through the holes in the transmission case, through the reverse idler gear, aligning the key groove in the shaft with the slot in the case.

Note:
If the bushings in the reverse idler gear have been removed, install the two bushings into the gear.
In installing the bushings, the open end of the bushing should be kept at 90° apart.
The installation of the bushings must

be as illustrated in figure 2-91..

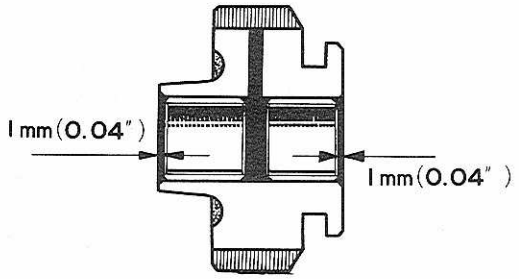


Fig.2-92 Bushing Installation G2386

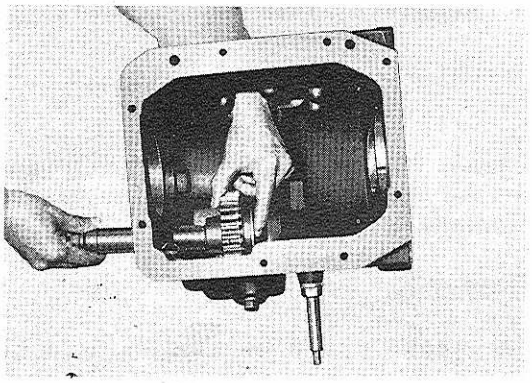


Fig.2-93 Assembling Reverse Idler Gear V5149

b. Reverse shift arm assembly.
(1) Install the reverse shift arm and the shift arm pivot and tighten finger tight.
(2) Make three gauges with a cardboard as illustrated in figure 2-109.
(3) Install the gauge "B" into the shift groove of the reverse idler gear, and adjust the gear position (reversely shifted position) by turning the shift arm pivot to obtain the distance of 114 mm or 4.49" between the outer rear end of the transmission case to the gear front end as figure 2-94. Tighten the shift arm pivot lock nut securely.
(4) Next, install the gauge "A" onto the reverse shift arm pin, and the gauge "C" into the shift groove of the gear, and check the gear neutral position.
The distance between the gear front end to outer rear end of the transmission case should be 69 mm (2.71").
If necessary, re-adjust the gear position by rotating the shift arm pivot.

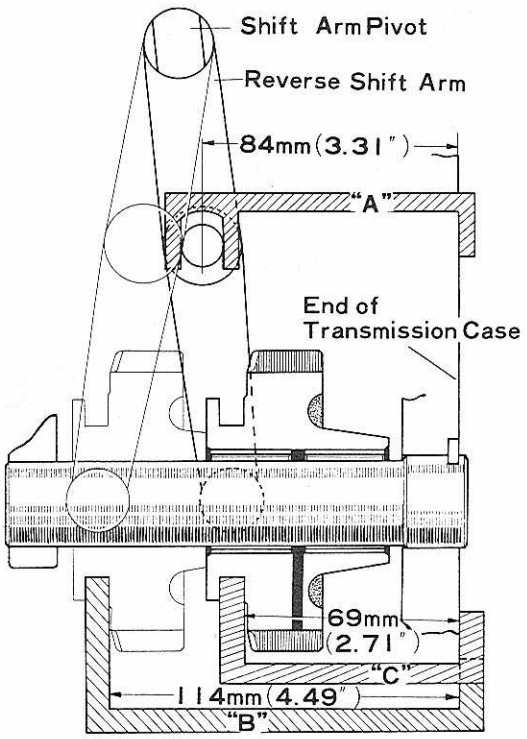


Fig.2-94 Reverse Shift Arm Adjustment G2387

c. Counter shaft assembly.
(1) Position the woodruff key into the groove of the counter shaft aligning the key way with the counter shaft third speed gear, and press on the gear with the long hub towards the front.
(2) Slide the spacer onto the counter shaft, and install the woodruff key into the key groove of the counter shaft.
Aligning the key way with the counter shaft drive gear, press the gear firmly onto the counter shaft with the long hub towards the rear.

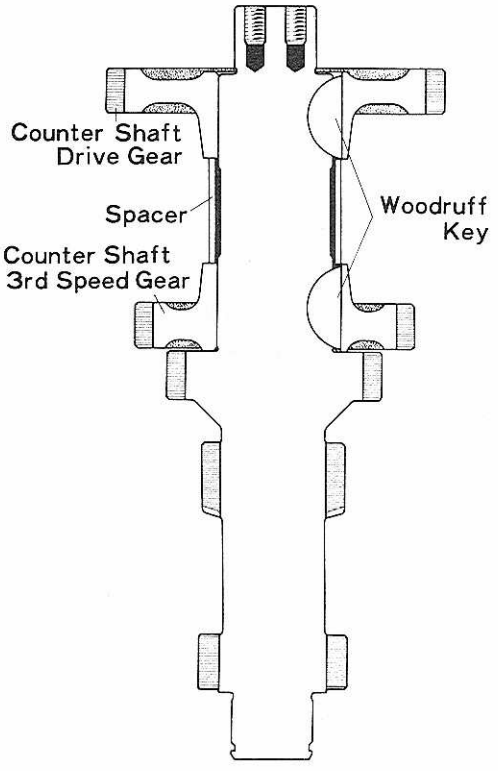


Fig. 2-95 Counter Shaft G2388

d. Position the assembled counter shaft into the transmission case, then install the counter shaft rear bearing with the Transmission & Transfer Bearing Replacer 09316-60010 and a press.
Install the shaft snap ring onto the rear end of the counter shaft.

e. Install the front bearing spacer onto the counter shaft with the protruded surface towards the front.
Next, press in the counter shaft front bearing until the snap ring on the front bearing contacts firmly against the transmission case using the Transmission & Transfer Bearing Replacer 09316-60010.
To prevent damage to the bearing, apply the pressure onto the outer race of the bearing only.
Place the bearing retaining plate and the lock washer onto the counter shaft front end, and tighten the bolts to 1.5 ~ 2.2 m-kg (11 ~ 16 ft-lb) torque.
After installation, check the counter shaft for smooth rotation.
Secure the bolts by bending the lock washers.

f. Output shaft assembly.
(1) Slide the second gear onto the output shaft with the synchronizer outer ring to the rear, then install the second gear thrust washer.
Next, select and install the shaft snap ring to obtain the proper second gear thrust clearance.
The specified thrust clearance is 0.1 ~ 0.3 mm (0.004 ~ 0.012").

Shaft snap ring thickness:
Part No. 90520-41103
Thickness: 2.5 mm (0.0984")
Part No. 90520-41104
Thickness: 2.6 mm (0.1024")

(2) Slide the third gear onto the output shaft with the synchronizer ring cone towards the front of the shaft.
(3) Assemble the synchronizer unit by installing the two shifting key springs onto the clutch hub, and place the three shifting keys into the hub key slots.
When installing the shifting key springs, these should be kept at 120° apart so that the spring tension on each key will be uniform.

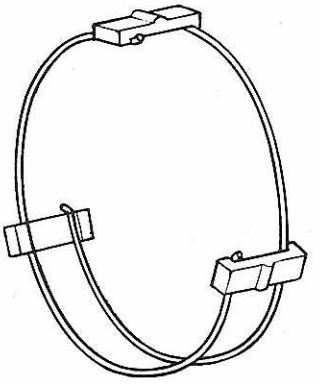


Fig. 2-96 Shifting Key Spring Installation G2389

Next, install the hub sleeve onto

the clutch hub. After assembling the synchronizer unit, check the hub sleeve for smooth movement.

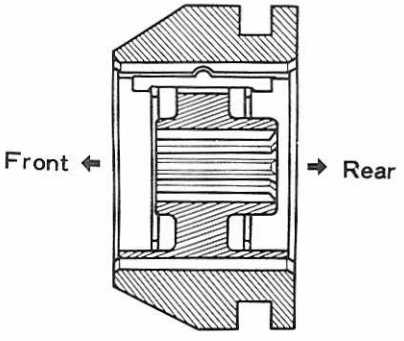


Fig. 2-97 Clutch Hub & Hub Sleeve Direction G2432

(4) Install the synchronizer ring No. 2, then slide the assembled synchronizer unit onto the output shaft.
The direction of the synchronizer unit should be as shown in figure 2-112 when the synchronizer unit is assembled onto the output shaft.
(5) Select and install a proper shaft snap ring to obtain the thrust clearance of the clutch hub which should be 0 ~ 0.2 mm (0.008").

Snap ring thickness:
Part No. 90520-32101
Thickness: 2.4 mm (0.0945")
Part No. 90520-32102
Thickness: 2.5 mm (0.0984")

(6) Slide the synchronizer ring No. 1 assembly (reverse gear) onto the output shaft.
The direction of the synchronizer ring No. 1 should be as shown in figure 2-113 when the synchronizer ring No. 1 is assembled onto the output shaft.
After installation, check the synchronizer ring No. 1 for smooth movement.
(7) Install the first gear onto the output shaft.

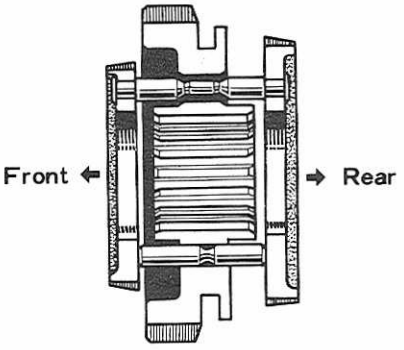


Fig. 2-98 Synchronizer Ring No. 1 Direction G2433

g. Position the output shaft and the gear assembly into the transmission case.

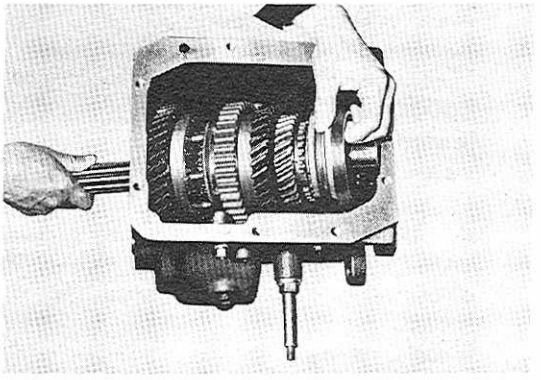


Fig. 2-99 Installing Output Shaft & Gear Assembly V5068

h. Place the first gear thrust washer onto the output shaft aligning the thrust washer slot with the straight pin on the output shaft.

i. After aligning the output shaft with the gears assembly, then in-

stall the output shaft rear bearing. To prevent damage to the bearing, apply the pressure onto the outer race of the bearing only.
For installation of the output shaft rear bearing, use SST 09309-36010 Transmiaaion Rear Bearing Replacer and 09317-36010 Transmission Rear Bearing Puller Attachment together with a press.

j. Next, install the rear bearing retainer with the gasket.

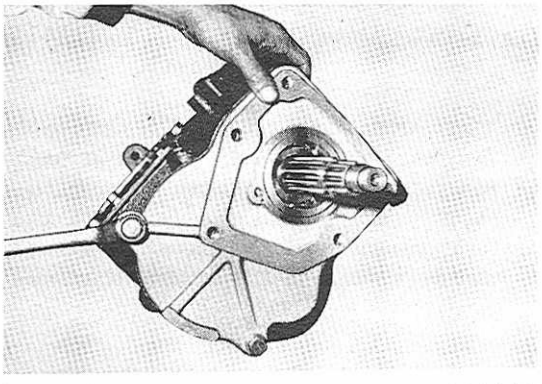


Fig. 2-100 Installing Rear Bearing Retainer V5064

k. Input shaft assembly.
(1) Using the Transmission and Transfer Bearing Replacer 09316-60010, press the bearing onto the input shaft.

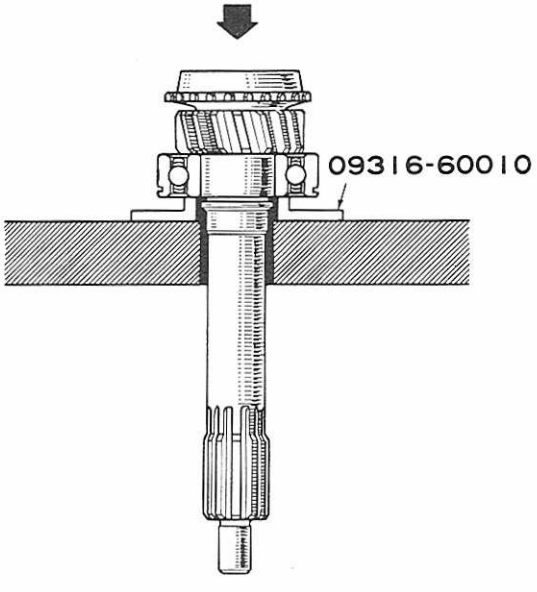


Fig. 2-101 Installing Input Shaft Bearing G2376

(2) Apply grease onto the bearing rollers, and install the eighteen bearing rollers into the bearing hole of the input shaft.

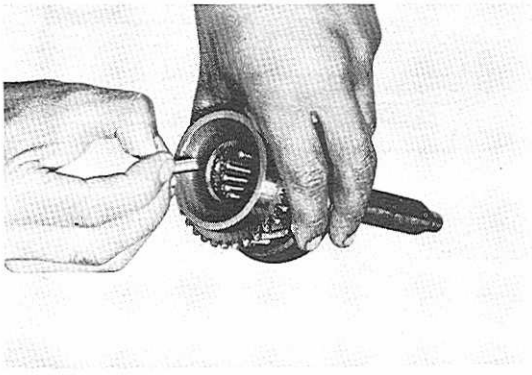


Fig. 2-102 Installing Bearing Rollers V3807

l. Install the input shaft into the transmission case with the synchronizer ring No. 2 aligning the key ways with the shifting keys. At this time, do not forget to install the bearing spacer into the input shaft bearing hole.
Do not permit the bearing rollers and the bearing spacer to drop into the transmission case when installing the input shaft.

m. Install the front bearing retainer with the gasket.
Tighten the bearing retainer attaching bolts to 1 ~ 1.6 m-kg or 7 ~ 11 ft-lb torque.
Check the transmission operation in all gears.

n. Transmission case cover assembly.
Make sure that all shift fork shafts are in neutral positions when assembling.
(1) Install the spring and the reverse shift return plunger into the reverse shift head, and secure with the "C" washer.
Put in the ball and spring, and install the cotter pin.
(2) Place the reverse shift head and the reverse shift fork onto the transmission case cover.

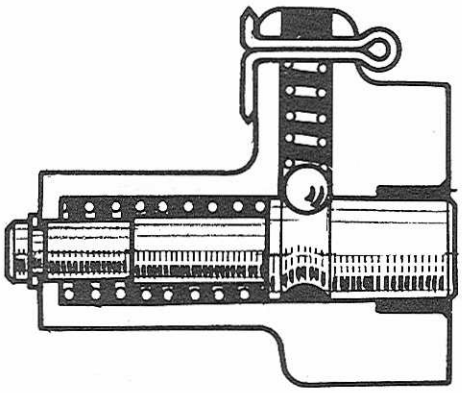


Fig. 2-103 Reverse Shift Head Assembly G2434

Install the fork lock spring and the ball in place in the case cover, then assemble the reverse shift fork shaft from the front of the case cover through the shaft bores, reverse shift fork and the reverse shift head while pushing down the fork lock ball with a screwdriver.

(3) Align the holes and drive in the slotted spring pins into the reverse shift fork and the reverse shift head to connect with the reverse shift fork shaft.

(4) Apply the roller with grease, and install the roller into the interlock hole of the case cover.

(5) Place the first and second shift head, and the first and second shift fork onto the case cover. Place the fork lock spring and the ball into the case cover.

Install the straight pin into the hole of the first and second shift fork shaft, and then assembled the fork shaft with the spacer from the front of the case cover while pushing down the fork lock ball with a screwdriver.

(6) Drive in the slotted spring pins into the shift head and the shift fork to connect with the shift fork shaft.

(7) Install the roller into the interlock hole of the case cover.

(8) Install the fork lock spring and the ball, and then assemble the third and fourth shift fork and the third and fourth shift fork shaft. Drive in the slotted spring pin.

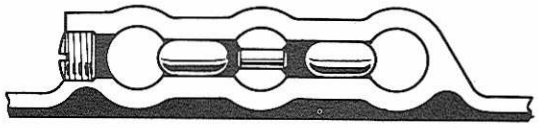


Fig. 2-104 Inter-lock Mechanism G2435

(9) After assembling the shift fork mechanism, check all shift fork mechanism for smooth operation. Apply the liquid sealer onto the tight plugs and the threads on the screw plug, and tighten them securely.

2. Install the transfer input gear stopper onto the transmission output shaft with the flanged side towards the front (output shaft bearing side).

3. Install the Transfer Guide Shaft 09323-60010 onto the transmission output shaft.
   Place the transfer input gear and the power take-off drive gear in position in the transfer case through the transfer power take-off cover hole. Be carefull, and install the transfer assembly onto the transmission.
   At this time, do not forget to install the transfer case front gasket between the transmission rear bearing retainer and the transfer case.

4. Tighten the bolts retaining the transfer case onto the transmission case to 3.5 ~ 4.1 m-kg (25 ~ 30 ft-lb) torque. Two bolts are shorter, therefore, these must be secured from the inside of the transfer case.

5. Remove the Transfer Guide Shaft 09323-60010 from the transmission output shaft.
Install the bearing onto the end of the transmission output shaft in the transfer case with the Transmission & Transfer Bearing Replacer 09316-60010.

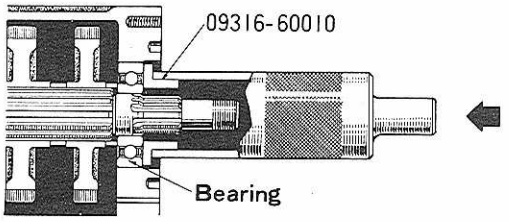


Fig. 2-105 Bearing Installation G2398

6. Slide the transfer input shaft spacer onto the transmission output shaft. Install the lock washer, and tighten the retaining nut to 14 ~ 15 m-kg (101 ~ 108 ft-lb) torque.

7. Install the transfer power take-off cover with the gasket.

8. Install the speedometer shaft sleeve together with the speedometer driven gear into the transfer output shaft rear bearing retainer. Secure the speedometer shaft sleeve with the lock plate.

Install the parking brake plate assembly.
Tighten the plate retaining bolts to 1.5 ~ 2.2 m-kg (11 ~ 16 ft-lb) torque.

10. Install the parking brake drum, and tighten the drum retaining nut to 14 ~ 17 m-kg (101 ~ 123 ft-lb) torque.

11. Position the transmission hub sleeve, synchronizer ring No.1, and the reverse idler gear in neutral position, and also set all shift forks on the transmission case cover in neutral position.
Next, assemble the transmission case cover with the gasket onto the transmission case.

12. Install the transfer shift lever linkage and the shift lever guide.
Lubricate the connecting or sliding portion with grease.
Do not forget the front drive link lever shoe when assembling the linkage.

13. After assembling the transmission and the transfer, check the transmission and transfer in all gears.

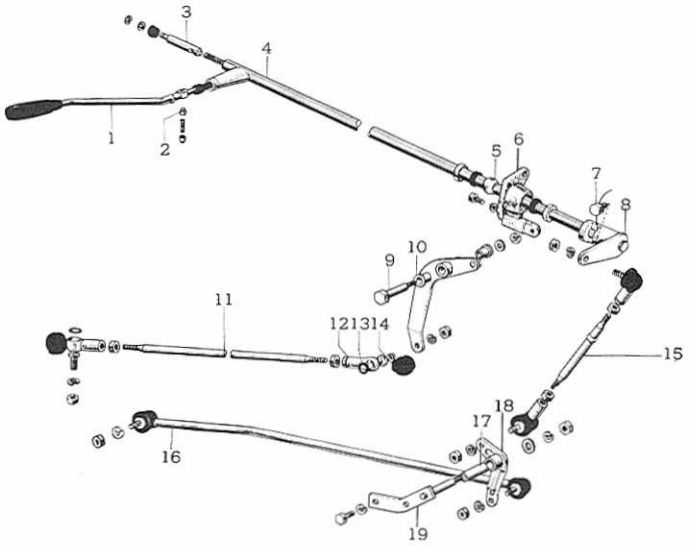
Installation

Follow the removal procedures in the reverse order.

1. Fill the transmission and transfer cases with gear lubricant up-to the filler holes.
Lubricant grade; SAE 90
Capacity:
Transmission case: 3.1 liters (3.3 US qts., 2.7 Imp qts)
Transfer case: 1.7 liters (1.8 US qts., 1.5 Imp qts)

2. Using the Transmission Gear Shift Lever Remover 09305-60010, assemble the shift lever onto the transmission case cover.

CONTROL SHAFT & LINKAGE (FJ55V series - OLD)



1. Shift lever
2. Shift lever pin
3. Control shaft upper shaft
4. Control shaft
5. Control shaft lower bushing
6. Control shaft lower bracket
7. Shift fork lock bolt
8. Control shift lever
9. Control select lever shaft
10. Bushing
11. Gear selecting rod
12. Connecting rod end
13. Hole snap ring
14. Dust seal
15. Gear shifting rod No.1
16. Gear shifting rod No.3
17. Bushing
18. Shifting bell crank
19. Shift link lever support

Fig.2-106 Control Shaft & Linkage Components G2378

Removal

1. Remove the three screws attaching the steering wheel pad onto the steering wheel, and remove the steering wheel pad.

2. Remove the steering wheel retaining nut.
   Using the Steering Wheel Puller 09609-20010, remove the steering wheel.

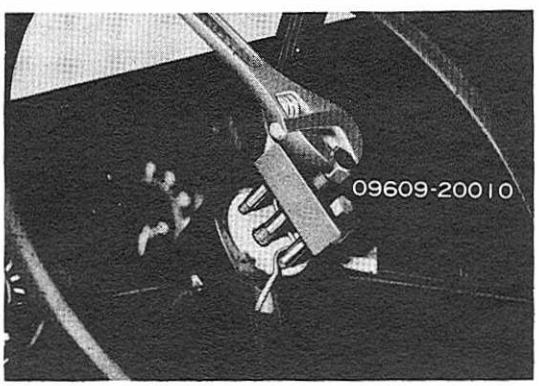


Fig.2-107 Removing Steering Wheel V5136

3. Disconnect the wirings at the wiring connections.
   Loosen the three screws, and remove the turn signal switch.

4. Remove the "E" ring and the washer at the end of the control shaft upper shaft.
   Next, loosen and remove the two square bolts mounting the contact ring housing onto the steering column tube, then remove the contact ring housing.
   At this time, remove the control shaft upper shaft and the spring from the control shaft.

5. Disconnect the wirings, and remove the back-up light switch together with the bracket.

6. Disconnect the gear selecting rod from the control select lever.
   Loosen and remove the control select lever shaft, and remove the control select lever with the bushings.

7. Disconnect the gear shifting rod No.1 from the control shift lever. Cut the lock wire and loosen the shift fork lock bolt. Slide the control shift lever out of the control shaft.

8. Pull out the control shaft assembly towards the interior.

9. Push in the shift lever pins, and remove the shift lever from the control shaft.
   Do not lose the pins and the spring as they may pop out upon removal.

10. Disconnect the gear selecting rod from the select outer lever on the transmission, and remove it.
    Also disconnect the gear shifting rod No.3 from the shift outer lever on the transmission.

11. Remove the nut on the gear shift link lever support, then remove the shifting bell-crank together with the gear shifting rod No.3 and the gear shifting rod No.1 towards the transmission.

Inspection

Wash the disassembled parts thoroughly, and check for wear and damage. Replace the defective part/s if necessary.

1. Inspect the control select lever and the control shift lever for wear and scores at the portions where the bushings fit in, and the cut portion of the control shift lever.

2. Inspect the shift lever, control shaft upper shaft, shift lever pins, springs and the "E" ring for wear, scores, grooves, and other defects.

3. Check the bushings at the control select lever and the shifting bell-crank for wear.

4. Check the control shaft lower bushing for wear.

5. Check the connecting rod ends for wear.

Installation

Follow the removal procedures in the reverse order.

1. In case the connecting rod end/s of the gear shifting rod No.1 is replaced, adjust the length of the gear shifting rod No.1 so that the shift lever may be horizontal in the neutral position.

2. Apply grease onto the control shaft upper shaft, shift lever fitting portion, control shaft lower bushing, control select lever bushing, shifting bell-crank bushing and the control shift lever cut portion before installation.

3. After installing the shift fork lock bolt, secure the bolt with the lock wire.

4. After installation, check the gear shift for smooth movement.
   Also check the turn signal switch operation.

* *

CONTROL SHAFT & LINKAGE (FJ40, 43,45 series - OLD)

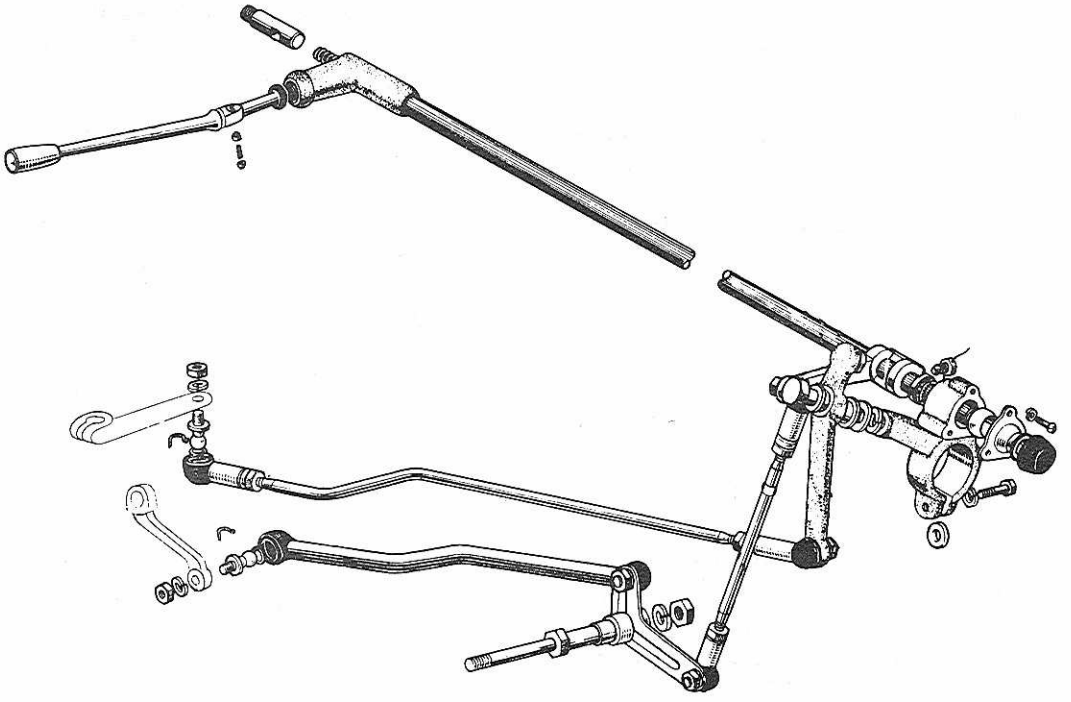


Fig.2-108 Control Shaft and Linkage

Removal & Disassembly

1. Remove the steering wheel using Steering Wheel Puller 09609-20010.
2. Disconnect the gear shifting lever by pressing the lever pins.
3. Remove the turn-signal switch from the mast jacket. Disconnect the horn wiring. The shaft spring can be taken out.
4. Remove the mast jacket lower clamp and also remove the mast jacket hole cover rubber set plate and hole cover rubber.
5. Disconnect the gear shifting rod No.1 and gear selecting rod at the end of the control shift lever and control select lever.
6. Remove the control shaft lower bracket.
7. Unloosen the bolts holding the st eering gear box bracket cap.

Note: On the left hand drive vehicles, it is recommended to remove or raise the oil cleaner to facilitate removal of the control shaft.

8. Pull the control shaft with the control select and shift levers attached out through the engine compartment.

9. Disconnect the control select and shift levers and control select lower bracket from the control shaft.

10. Removal procedure of the shift linkage down from the control select shift levers is self explanatory.

Inspection & Adjustment

Clean all parts thoroughly in cleaning solvent and inspect for wear or other damages. Repair or replace the defective parts.

Assembly & Installation

1. Assemble the shift linkage down from the control select and shift levers.

2. Install the turn signal switch on the mast jacket with the control shaft upper bracket shaft.
Make sure that the hole provided on the shaft be positioned correctly.

3. Assemble the control select and shift levers and the control shaft lower bracket to the control shaft.

4. Place the control shaft with the control levers attached in correct position on the mast jacket.
Connect the control shaft with the control shaft upper bracket shaft on the turn signal switch after installing into the control shaft.

5. Assemble the control lever to lever housing.

6. Tighten the control shaft lower bracket clamp.

7. Tighten the bolts holding the steering gear box bracket clamp.

8. Keeping the levers in the neutral position, connect the gear shifting rod No.1 and gear selecting rod.

9. Install the mast jacket lower clamp and also install the mast jacket hole cover rubber set plate and hole cover rubber.

10. Install the steering wheel.

11. Connect the horn wiring connector.

12. Operate the control lever and check if the gear shifting is performed properly.

* *

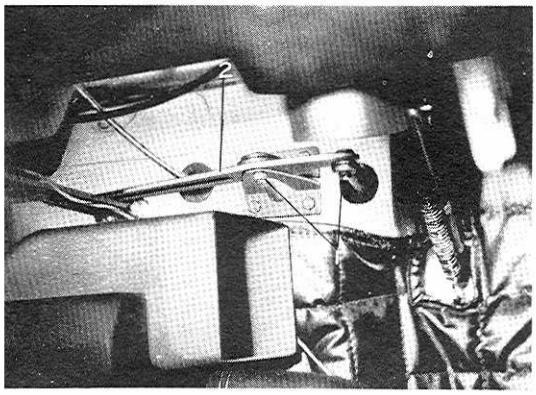


Fig.2-110 Guide Lever No.2 Removal V5137

shaft, and then remove the shift link lever No.1 (2), and the high and low shift rod No.1 (3).

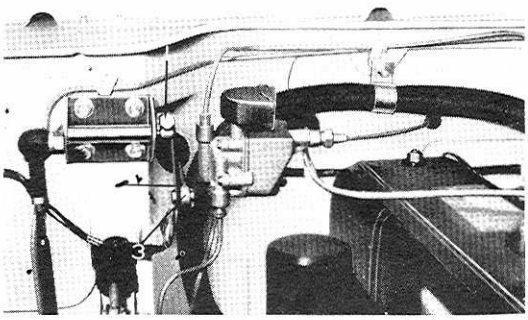


Fig.2-111 Shift Link Lever No.1 & Shift Rod No.1 V5138

5. Disconnect the high and low shift rod No.2 from the high and low shift link lever, and remove the shift link lever.

6. Disconnect the high and low shift rod No.3 from the transfer high and low shift outer lever.

7. Loosen and remove the nut retaining the shifting bell-crank to the gear shift link lever stopper, then withdraw the shift rod No.2 together with the shifting bell-crank and the shift rod No.3.

Inspection

Wash the disassembled parts, and check for wear and damage. Replace the defective part/s if required.

1. Check the connecting rod ends for wear and stickiness.

2. Check the pins for excessive wear.

3. Check the bushing for wear at the shifting bell-crank.

4. Inspect the transfer high and low shift lever for cracks, scores, rust and distortion, and check for smooth movement.

Installation

Follow the removal procedures in the reverse order.

1. Before installing, lubricate all sliding or connecting portions with grease.

2. After installing the transfer shift linkages, check and adjust the length of the shift rod No.2 or the shift rod No.3.
   To adjust, disconnect the shift rod No.2 and No.3 from the shifting bell-crank and the high and low shift link lever.
   Next, shift the transfer high and low shift outer lever on the transfer and the transfer high and low shift lever at the instrument panel to the transfer high speed position. In this condition, adjust the length of the shift rod No.2 and the No.3 by turning the connecting rod ends to obtain correct connection and proper shifting.

3. After installation, check the movement of the transfer high and low shift lever in the L (low), N (neutral) and H (high) positions.

TRANSFER SHIFT LEVER & LINKAGE (FJ40, 43, 45 series)

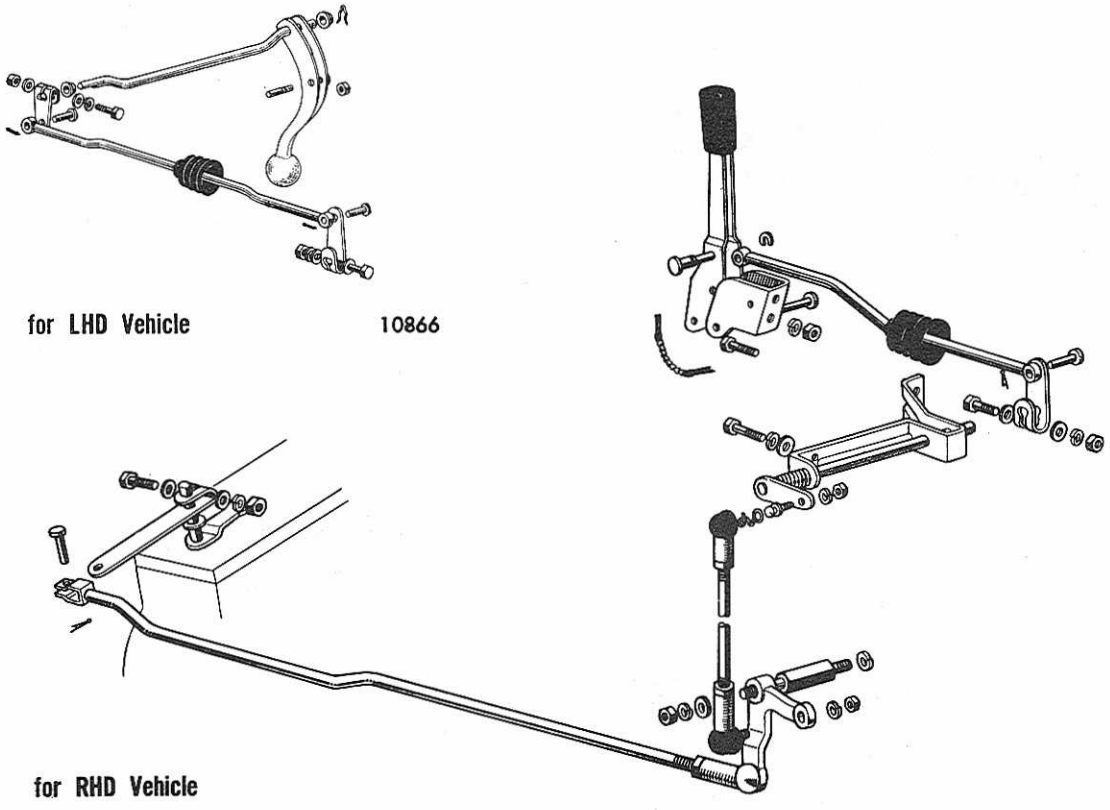
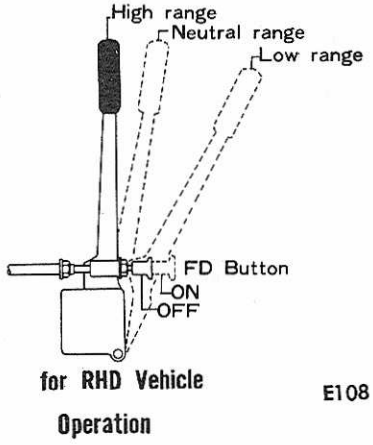


Fig.2-112 Transfer Gase Gear Shift Linkage

Transfer Gear Shift & Front Drive Shift Operation



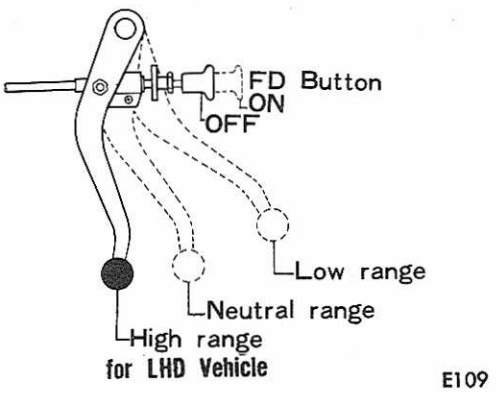


Fig.2-113 Operation

TRANSFER FRONT DRIVE CONTROL

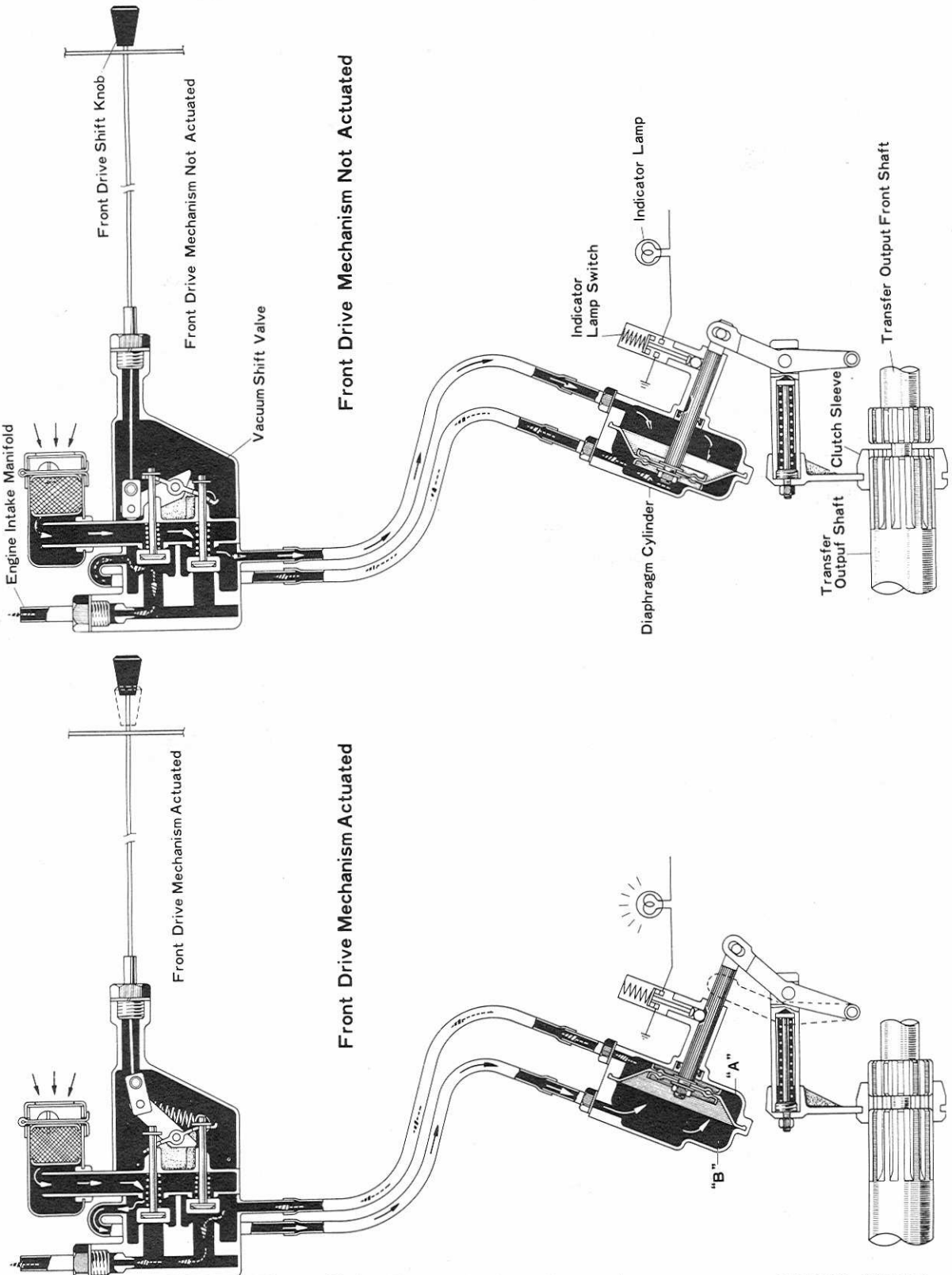
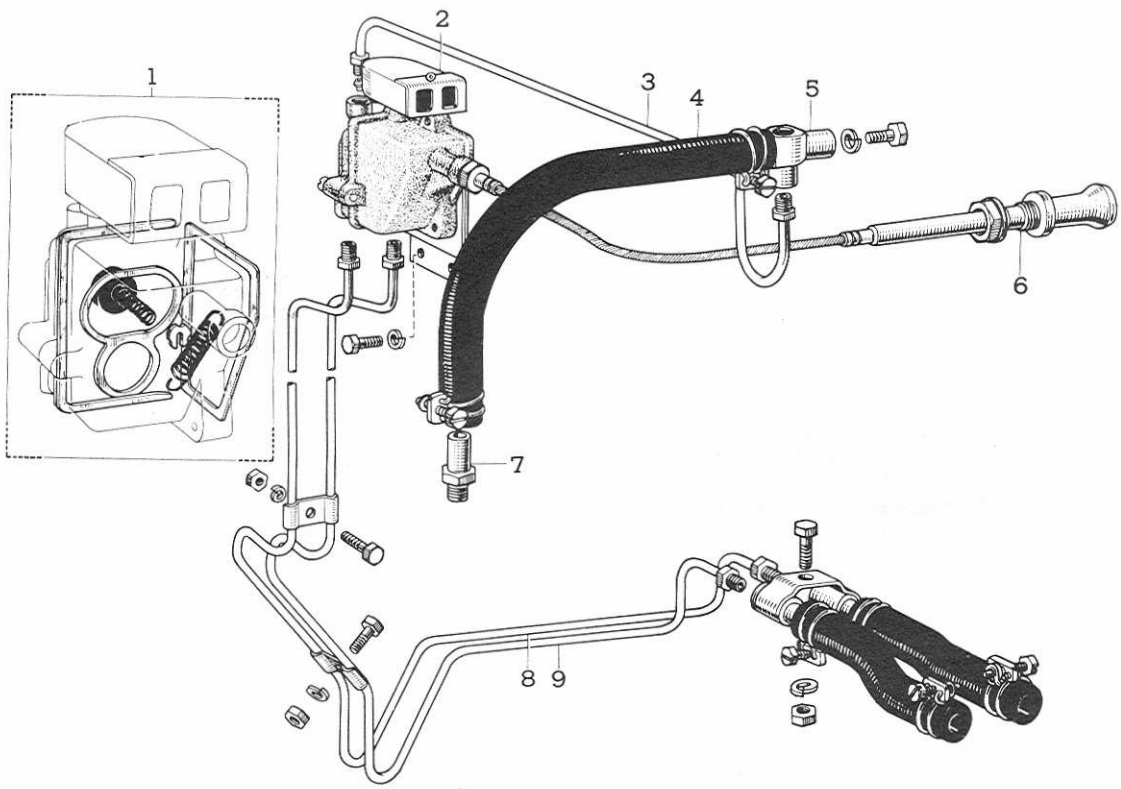


Fig. 2-114 Front Drive Operation Y5730 Y5731

Description

The transfer front drive control mechanism consists of the vacuum shift wire with front drive shift knob, vacuum shift valve, diaphragm cylinder and the vacuum connections.

The front drive is operated utilizing the vacuum in the engine intake manifold, which is indiced to the diaphragm cylinder provided on the transfer extension housing.



1. Vacuum shift valve kit
2. Vacuum shift valve
3. Front drive vacuum tube No.3
4. Vacuum hose
5. Vacuum check valve
6. Vacuum shift valve wire
7. Union
8. Front drive vacuum tube No.1
9. Front drive vacuum tube No.2

Fig.2-115 Transfer Front Drive Control Components G2380

Operation

The vacuum shift valve is operated by the front drive shift knob on the instrument panel.
When the front drive shift knob is pulled out, atmospheric pressure actuates on the diaphragm cylinder "B" and the vacuum in the engine intake manifold actuates on the diaphragm cylinder "A"
As a result, the transfer front drive shift fork slides the front drive clutch sleeve to mesh with the transfer output front shaft to engage the front drive.
At the same time, the front drive indicator lamp switch ball seats on the slot provided on the diaphragm push rod to light the indicator lamp.
In case the front drive shift knob is pushed in, the front drive mechanism functions in reverse manner as the operations described above, and the front drive is disengaged.

Removal

1. Disconnect the front drive vacuum tube No.1, No.2 and the No.3 from the vacuum shift valve.
2. Remove the two bolts retaining the vacuum shift valve onto the dash panel.
3. Remove the cover from the vacuum shift valve, and then loosen the vacuum shift valve wire lock screw in the vacuum shift valve.
   Next, loosen the nut, and disconnect the vacuum shift valve wire from the vacuum shift valve, and remove the vacuum shift valve.
4. Loosen and remove the straight pin on the vacuum shift valve wire rod under the instrument panel.
5. Loosen the nut attaching the vacuum shift valve wire tube onto the instrument panel, and then pull out the vacuum shift valve wire.
6. Disconnect the vacuum hose from the vacuum check valve, and remove the check valve and the vacuum tube No.3.
7. Disconnect the vacuum tubes No.1 and No.2 from the vacuum tube unions.
   Loosen the vacuum tube clamps, and remove the vacuum tubes No.1 and No.2.

Inspection

1. Check the vacuum shift valve wire for proper operation.
   If it sticks and will not move smoothly by pulling the shift knob, replace the vacuum shift valve wire assembly.
2. Check the vacuum tubes for cracks and rusty condition.
3. In case the front drive is hard to shift, check the vacuum shift valve and the vacuum check valve operation.
   Check the operation of the vacuum shift valve for air tightness, worn or damaged condition.
   If the valve is found to be defective, disassemble the vacuum shift valve, and replace the valve/s.
   The vacuum shift valve kit is available as follows.
   Part No. 04411-55011.
   Inspect the vacuum check valve operation, and if necessary, replace the assembly.
4. Check the vacuum hoses for cracks and other defects.
   If defective, replace with a new part.

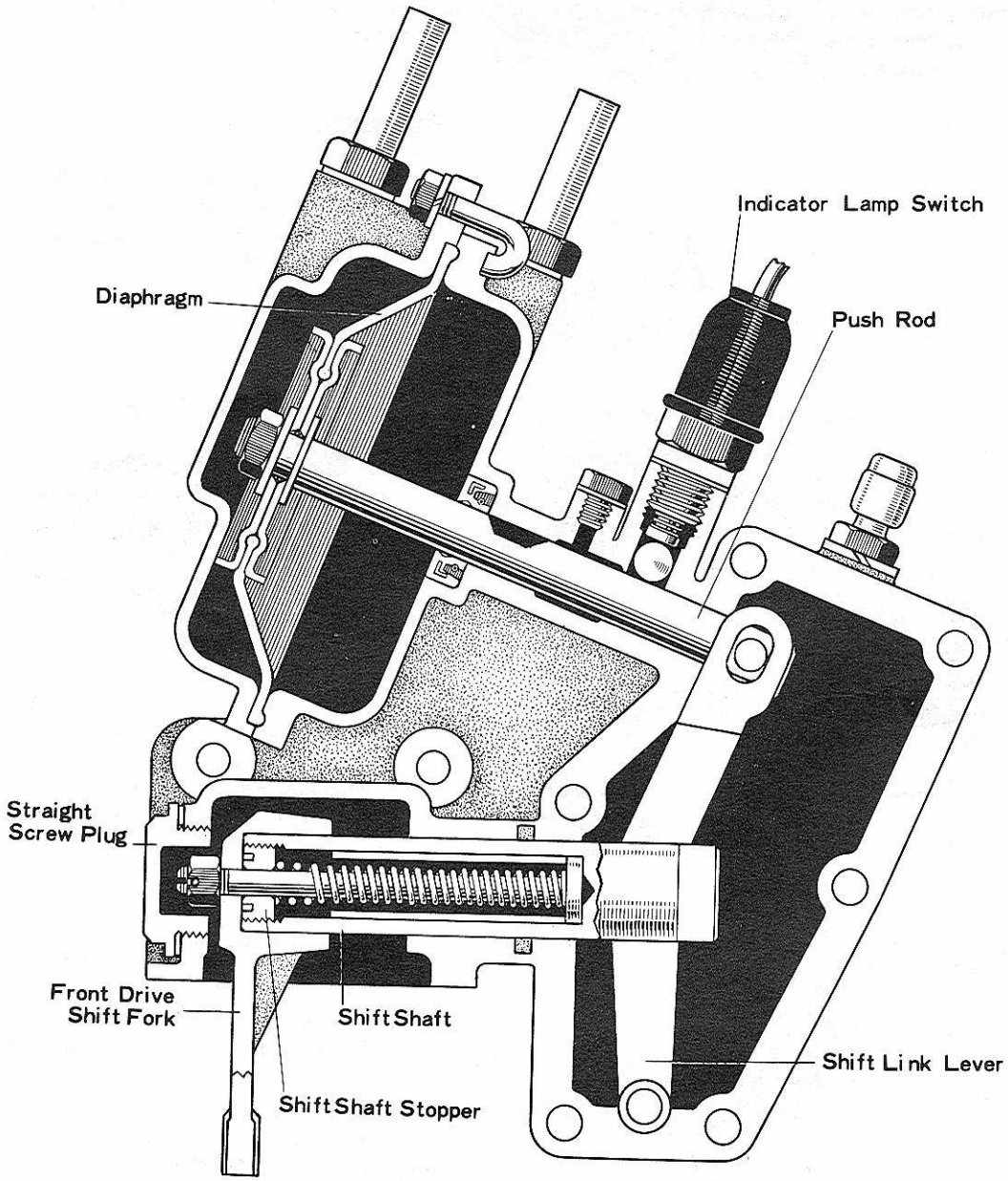
Installation

Follow the removal procedures in the reverse order.

1. Lubricate the vacuum shift valve wire with grease when installing the wire.
2. Do not forget to install the straight pin onto the shift valve wire rod.
3. After installing, check the operation of the front drive control mechanism during road test.
   Do not test on dry and hard surface road.

* *

DIAPHRAGM CYLINDER & TRANSFER FRONT DRIVE FORK



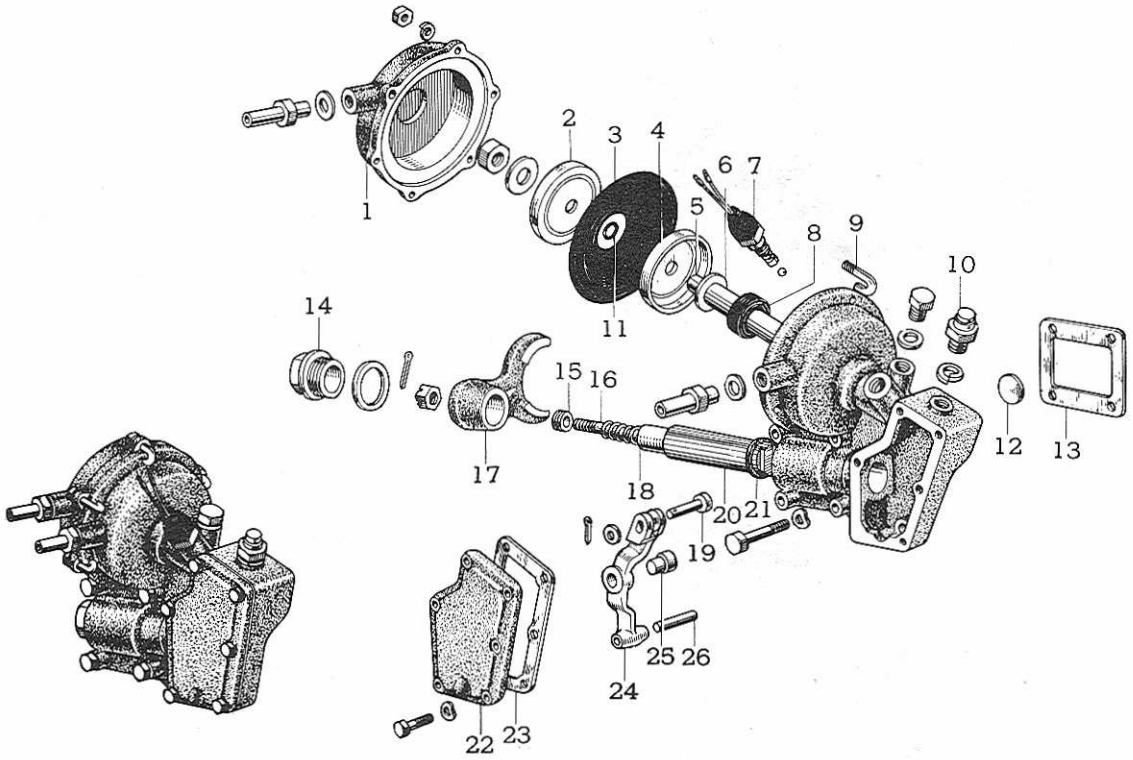
Y7021

Fig.2-116 Cross Section of Diaphragm Cylinder & Transfer Front Drive Fork

Removal

1. Remove the transmission under cover.
2. Remove the plug, and drain the gear lubricant from the transfer case.
3. Remove the cotter pin, and disconnect the high and low shift rod No.3 from the transfer high and low shift outer lever.
4. Loosen the clamps, and disconnect the two vacuum hoses from the unions on the diaphragm cylinder body and the cover.
5. Disconnect the wirings from the front drive indicator lamp switch.
6. Loosen and remove the bolts, and dismantle the diaphragm cylinder and transfer front drive fork assembly from the transfer extension housing.

Disassembly



1. Diaphragm cylinder body cover
2. Diaphragm plate
3. Diaphragm
4. Diaphragm plate
5. Diaphragm push rod
6. Washer
7. Front drive indicator switch
8. Oil seal
9. Diaphragm cylinder set bolt
10. Breather, plug
11. "O" ring
12. Expansion plug
13. Gasket
14. Straight screw plug
15. Shift shaft stopper
16. Push rod bolt
17. Transfer front drive shift fork
18. Spacer
19. Pin
20. Transfer front drive shift shaft
21. Dust seal
22. Diaphragm cylinder cover
23. Cover gasket
24. Front drive shift link lever
25. Link lever shoe
26. Straight pin

G2381

Fig.2-117 Diaphragm Cylinder & Transfer Front Drive Fork Components

1. Loosen and remove the front drive indicator light switch and the steel ball from the diaphragm cylinder body.

2. Remove the diaphragm cylinder body cover.

3. Remove the diaphragm cylinder cover and the gasket.

4. Remove the straight pin from the front drive shift link lever. Remove the cotter pin and the washer at the end of the front drive shift link lever.

5. Remove the pin, and then take out the front drive shift link lever as shown in figure 2-69.

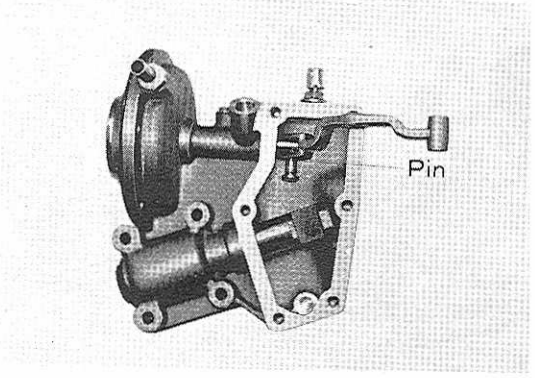


Fig.2-118 Front Drive Shift Link Lever Removal V5059

6. Slide the diaphragm push rod together with the diaphragm out of the diaphragm cylinder body.

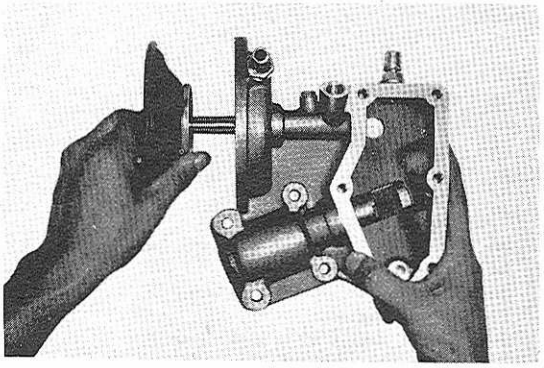


Fig.2-119 Removing Diaphragm Push Rod & Diaphragm V5060

7. Loosen and remove the straight screw plug with the gasket, and then remove the cotter pin and the nut from the push rod bolt. Next, remove the transfer fror drive shift fork from the transfer front drive shift shaft.

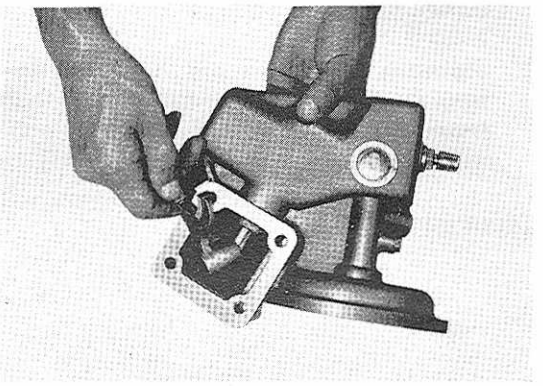


Fig.2-120 Removing Front Drive Shift Fork V5061

8. Slide the transfer front drive shift shaft out of the diaphragm cylinder body.

9. Loosen and remove the shift shaft stopper with a suitable tool, and take out the push rod bolt together with the spring and the spacer from the front drive shift shaft.

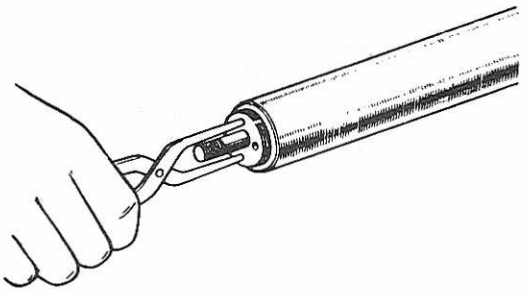


Fig.2-121 Removing Shift Shaft Stopper G2399

10. Loosen and remove the diaphragm attaching nut, then remove the diaphragm plates, diaphragm and the washer from the diaphragm push rod.

Inspection

Wash all disassembled parts thoroughly except the diaphragm in cleaning solvent.

1. Inspect the diaphragm for air tightness, damaged, swollen or torn conditions.
   If any of these conditions exists, replace the diaphragm.

2. Check the oil seal, and replace if excessively worn.

3. Install the diaphragm push rod, and the transfer front drive shift shaft into the diaphragm cylinder body, and check the shafts for smooth movement.

4. Check the groove of the transfer front drive shift shaft, and the front drive link lever shoe for excessive wear.
   Replace if necessary.

Assembly

Follow the disassembly procedures in the reverse order.

1. Take care to keep the push rod position correctly so that the slot on the diaphragm push rod will face the front drive indicator lamp switch side.

2. After assembling the transfer front drive shift shaft, lock the shift shaft stopper in place by punching at two places.

3. When assembling the diaphragm push rod, transfer front drive shift shaft and the front drive shift link lever into the diaphragm cylinder body, apply multipurpose grease onto the sliding surfaces and connecting portion of these items.

Installation

Follow the removal procedures in the reverse order.

1. When installing the diaphragm cylinder and transfer front drive fork assembly, coat the liquid sealer onto the gasket to prevent oil leak.

2. Fill the transfer case with gear lubricant.
   Transfer case lubricant capacity: 1.7 liters (1.8 US qts., 1.5 Imp qts.).

3. After installation, check the operation of the front drive mechanism during road test.
   Do not test on dry and hard surface road.

* *

PROPELLER SHAFT

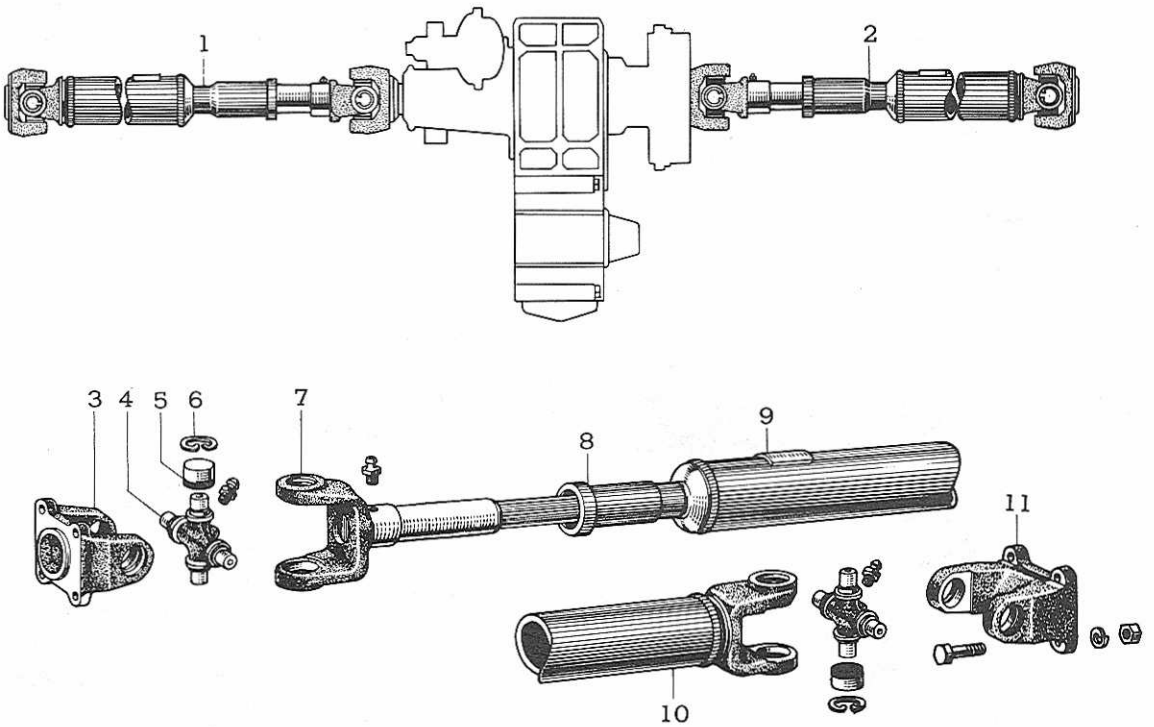
Removal ..... 3 - 1

Disassembly ..... 3 - 1

Inspection ..... 3 - 2

Assembly ..... 3 - 3

Installation ..... 3 - 4



1. Front propeller shaft
2. Rear propeller shaft
3. Universal joint flange yoke
4. Universal joint spider
5. Spider bearing
6. Hole snap ring
7. Universal joint slide yoke
8. Sliding shaft dust cover
9. Balance piece
10. Front propeller shaft
11. Universal joint flange yoke

Fig.3-1 Front & Rear Propeller Shafts Components G2401

Removal

1. To remove the front propeller shaft, remove the bolts retaining the universal joint flange yoke onto the differential, and disconnect the propeller shaft from the differential. Remove the bolts retaining the universal joint flange yoke onto the transfer joint flange on the transfer output front shaft.
   Next, withdraw the front propeller shaft assembly.

2. Remove the rear propeller shaft in the same manner.

Disassembly

The components of the rear and front propeller shaft are very similar. Therefore, disassembling operations and procedures are to be performed in the same manner.

1. Slide the universal joint slide yoke assembly out of the propeller shaft.

2. Punch the mating marks on both universal joint flange yoke and the universal joint slide yoke.

3. Remove the hole snap rings from

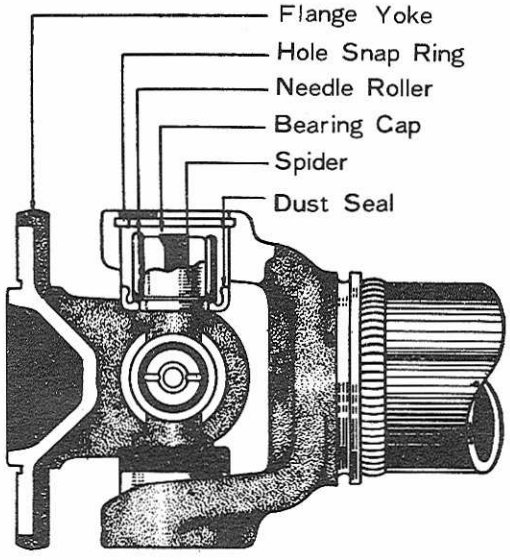


Fig.3-2 Section of Universal Joint G2402

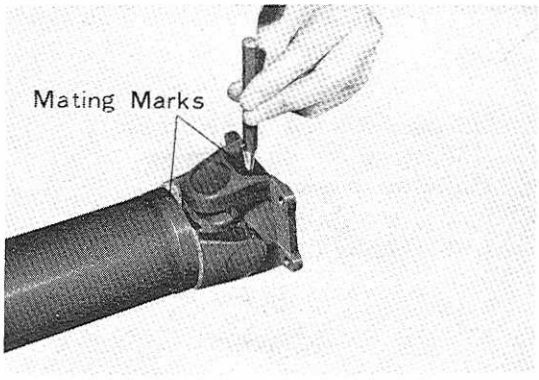


Fig.3-3 Punching Mating Marks V5086

the bearing holes of the yoke.

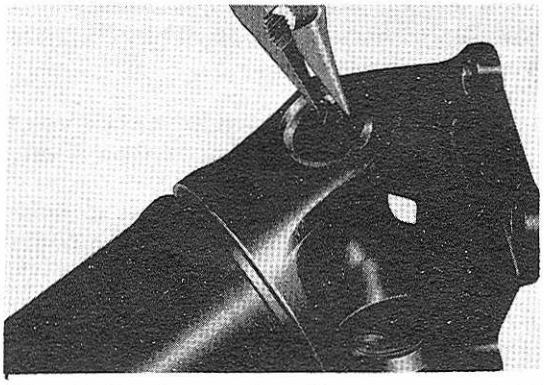


Fig.3-4 Removing Snap Ring V5087

4. Holding the yoke in one hand, and tap lightly with a mallet on the radius of the lug of the yoke.
   The bearing will gradually emerge and can finally be removed.

5. Remove the opposite side bearing, and disconnect the universal joint flange yoke from the universal joint slide yoke.
   Next, remove the universal joint spider.

6. Disassemble the other universal joint in the same manner.

7. Remove the sliding shaft dust cover from the propeller shaft.

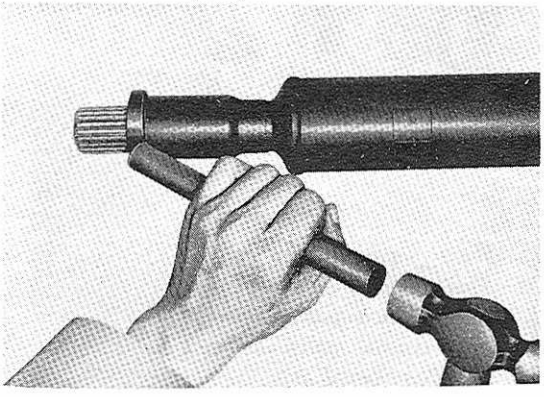


Fig.3-5 Removing Dust Cover V5139

Inspection

Wash all disassembled parts thoroughly, and inspect for damage, wear and rusty condition.
Repair or replace part/s if necessary.

1. Inspect the splines in the universal joint slide yoke for wear or evidence of twist.

2. Inspect the universal joint spider journals for rust and wear.
   Blow out the grease passages for cloggage.

3. Check the spider bearings for rusty condition, wear and damage.

4. Inspect the propeller shaft for run-

out, scores and balancing condition. Check the splines and bearing bores for wear, warpage and cracks.

Assembly

It is recommended that spider bearing seals, and the hole snap rings are replaced upon assembly.

1. Repack the spider bearing cups with multipurpose grease, and assemble the needle bearing rollers into the cups, then install new bearing seals.

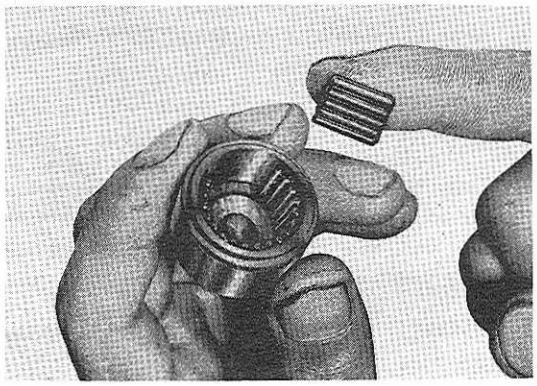


Fig.3-6 Assembling Needle Roller Bearings V5125

2. Position the universal joint spider into the flange yoke, and press the bearing into the bearing hole of the yoke and onto the journal of the joint spider, then install the hole snap ring to secure the bearing.

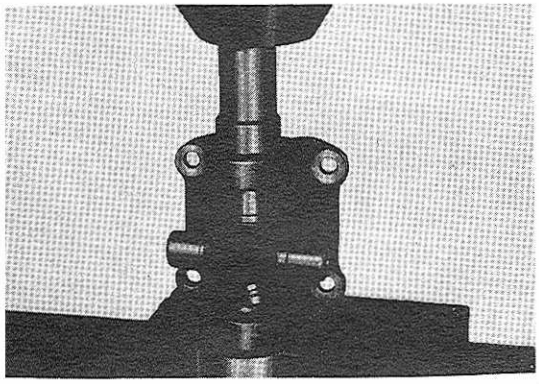


Fig.3-7 Assembling Spider Bearing V5088

The grease fitting on the universal joint spider should face towards the slide yoke.

3. Install the opposite side bearing into the bearing bore of the flange yoke and onto the journal of the joint spider, then install the hole snap ring.

4. Install the other bearings into the bearing bores of the slide yoke in the same manner.

Note:

If any of the bearing, flange yoke, slide yoke, and the propeller shaft requires replacement, select the proper part as per the following table.

If the drilled mark/s is near the bearing hole, use the red marked (oversize) bearing to obtain proper fit.

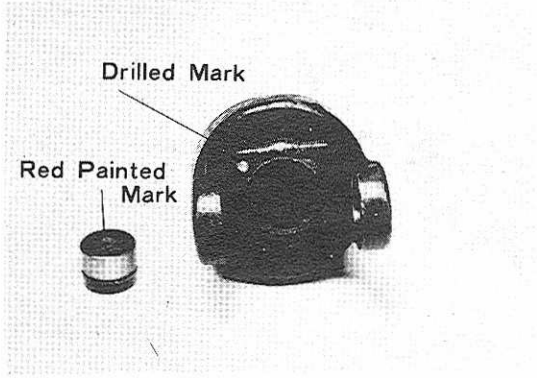


Fig.3-8 Mark Indication V5089

Spider bearing identification:
Part No. 37402-60020 - No mark
Part No. 37402-60030 - Red mark

5. After assembling the universal joints, check the universal joint spider thrust play.
Select and install a new snap ring so that the spider thrust play will be less than 0.05 mm (0.002").
Use the same thickness snap rings for both sides.
Hole snap ring thickness:
Part No. 90521-31038
1.40 mm (0.055")

Part No. 90521-31039
1.45 mm (0.057")
Part No. 90521-31040
1.50 mm (0.059")
Part No. 90521-31041
1.55 mm (0.061")

6. Check the universal joints for smooth movement.

7. Align the grease fitting on the slide yoke, and the arrow mark on the propeller shaft, and insert the slide yoke into the propeller shaft. Check the sliding joint for smooth movement.

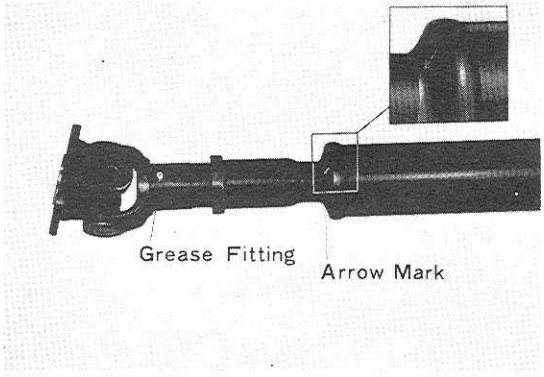


Fig.3-9 Propeller Shaft Assembly V5090

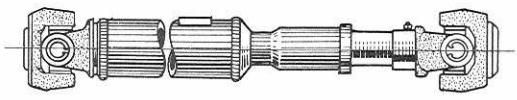


Fig.3-10 Yoke Alignment G2403

8. Both grease fittings on the universal joints should face towards the inside, facing each other to facilitate lubrication.

Installation

Follow the removal procedures in the reverse order.
Lubricate the universal joints and the sliding joint with multipurpose grease.

Tightning torque of the universal joints bolts;
till F No.12552;
1.5~2.2 m-kg (11~16 ft-lb)
from F No.12553;
4.0~5.5 m-kg (29~40 ft-lb)

REAR AXLE & REAR SUSPENSION

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4

DESCRIPTION

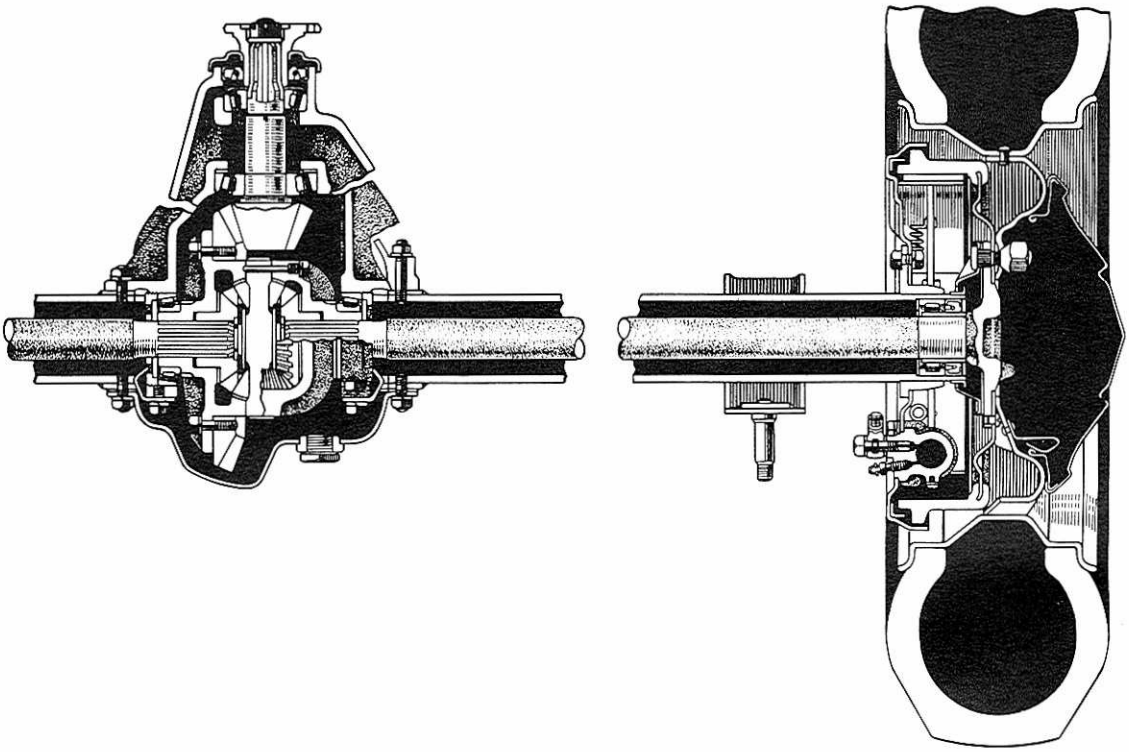


Fig.4-1 Cross Sectional View of Rear Axle G2404

The rear axle shaft is a semi-floating, banjo-housing, hypoid gear, hotchkiss drive type.

The rear driving system is of the hotchkiss type, and the motion is transmitted to the frame through the leaf springs.

The rear suspension consists mainly of the leaf springs and the double acting telescopic type hydraulic shock absorbers. The leaf springs and shock absorbers are mounted through the rubber bushings.

The rear axle housing is of a steel plate construction, and the brake backing plates are installed at the ends of the axle housing. Leaf spring seats are welded onto the lower side of the axle housing.

The differential carrier is mounted onto the axle housing, and the differential gears are of hypoid type to obtain the most efficient torque and also the durability. As the differential gears are of hypoid type, it requires the use of hypoid gear lubricant. This differential carrier internal parts consist of the ring gear, drive pinion, side gears, differential pinions with respective bearings.

The outer end of the rear axle shaft is mounted in the axle housing with roller bearing, while the inner end is splined to mate with the differential side gear splines.

Specifications:

Axle housing type	Banjo	
Rear axle type	Semi-floating	
Differential:		
Gear type	Hypoid	
Reduction ratio	3.7	4.11
Number of gear teeth:		
Drive pinion	10	9
Ring gear	37	37
Differential pinion	10	10
Differential side gear	16	16
Lubricant capacity	Hypoid gear oil SAE 90 2.5 liters (2.6 US qts., 2.2 Imp qts)	

Rear Spring

	FJ40(L)	FJ43(L)	FJ45(L)	FJ55(L)
Number of leaf springs	6	6+3	6+3	7+1
Span of spring at no load	1100 mm (43.3")	1310 mm (51.2")	1314 mm (51.7")	1200 mm (47.2")
Width	70 mm (2.76")	←	←	←
Thickness	6 mm (0.24")	7 mm (0.28")	←	←
Thickness (Sub-leaf)	———	11 mm (0.43")	←	13 mm (0.51")
Camber at no load	160 mm (7.87")	168 mm (6.61")	203 mm (7.99")	118 mm (4.64")
Spring constant	4.6 kg/mm (258 lb/in)	5.2 kg/mm (291 lb/in)	←	7.7 kg/mm (431 lb/in)
Spring constant (Total)	———	11.2 kg/mm (627 lb/in)	11.1 kg/mm (622 lb/in)	10.7 kg/mm (600 lb/in)

Rear Shock Absorber

	FJ40(L)	FJ43(L)	FJ45(L)	FJ55(L)
Stroke	200 mm (7.87")	230 mm (9.06")	←	←
Maximum length	508 mm (20.00")	568 mm (22.36")	←	←
Minimum length	308 mm (12.13")	338 mm (13.40")	←	←
Damping force at 0.3 m/sec:				
In compression	29 kg (63.8 lb)	36 kg (29.2 lb)	←	←
In rebound	97 kg (213 lb)	110 kg (242 lb)	←	←

TROUBLE SHOOTING

An unusual noise is usually the first indication of improper functioning of the axle driving parts. Although some mechanical failures of the rear axle are relatively easy to locate, noises in the rear axle are a little more difficult to diagnose and repair. When noise is experienced in the rear axle assembly, it is advisable to make a thorough test and search for the location of the noise. Noises which seem to come from the rear axle may be caused by some other units such as engine, transmission, transfer case, tire, or other parts of the vehicle. These noises originating from other places cannot be corrected by adjustment and replacement of parts of the rear axle assembly.

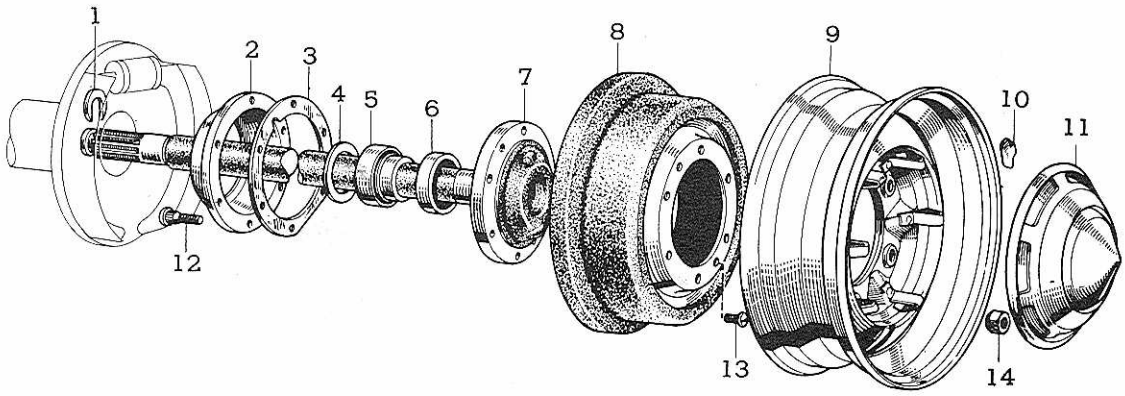
Even an experienced mechanic sometimes fails to make a correct diagnosis, so that the following methods of locating troubles should be carefully observed when necessary repairs arise in the rear axle.

Caution: To make the rear axle noise diagnosis, the vehicle should be road tested on a smooth level road. Before road-testing the vehicle, make sure that the tire inflation and the rear axle lubricant level are normal.

Symptoms & Probable Causes	Remedies
1. Excessive rear axle noise.	
The rear axle noise can be classified into two types; the gear noise, and the bearing noise. It is the first step of rear axle trouble diagnosis to quickly differentiate these two types of noise. Gear noise can be recognized since it produces a cycling pitch, and tends to peak in a narrow speed range, while the bearing noise will tend to remain constant in pitch, and produces a rough whine.	
a. Worn or damaged drive pinion bearing/s	Replace
b. Worn or damaged differential case bearing/s	Replace
c. Worn or damaged rear axle shaft bearing/s	Replace
d. No pre-load of drive pinion bearings	Adjust
e. Incorrect adjustment of drive pinion, and ring gear	Check tooth pattern and backlash or replace
f. Worn splines of side gear and rear axle shaft	Replace
g. Worn or damaged teeth of pinion and side gear	Replace
h. Excessive backlash from worn side gear and pinion gear thrust washers	Replace
i. Defective tires	Replace
j. Incorrect assembling of propeller shaft	Correct propeller shaft

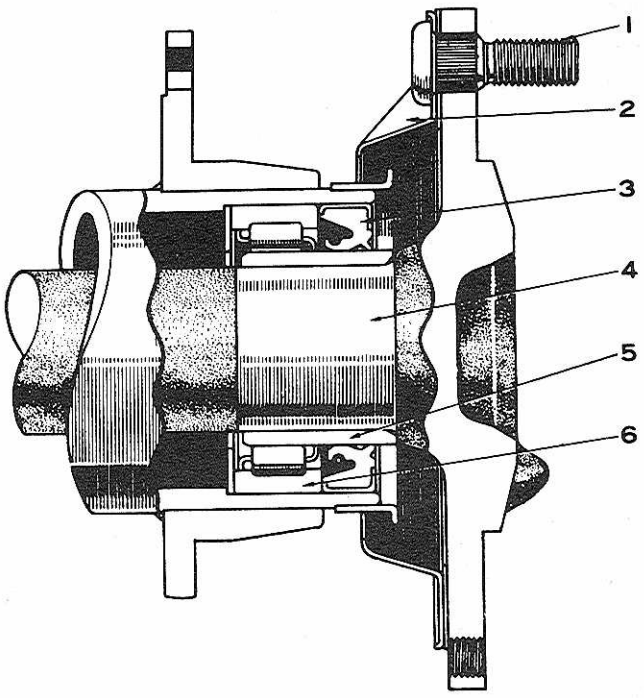
Symptoms & Probable Causes	Remedies
2. Differential heats	
a. Excessive pre-load of drive pinion bearings	Adjust or replace
b. Too little backlash of drive pinion, and ring gear	Adjust
c. Lack of lubricant or improper grade lubricant	Replenish or replace with proper grade lubricant
3. Lubricant leaks	
a. Damaged gasket or differential carrier or drain plug	Replace
b. Loose differential carrier attaching bolts	Tighten
c. Damaged "T" type oil seal of differential carrier or rear axle shaft	Replace
d. Damaged or worn drive pinion companion flange	Replace
e. Damaged breather plug	Repair or replace
4. Rear side inclination of car	
a. Weak leaf spring/s	Replace
b. Difference in camber of both leaf springs	Replace
c. Worn or damaged spring bushing	Replace
d. Loose U-bolt/s	Tighten
e. Broken leaf spring center bolt	Replace
5. Rear suspension noise	
a. Worn or damaged spring bushing/s	Replace
b. Damaged shock absorber	Replace
c. Loose U-bolt/s	Tighten

REAR AXLE SHAFT



1. Rear axle shaft lock
2. Brake drum oil deflector
3. Gasket
4. Washer
5. Bearing
6. Oil seal
7. Rear axle shaft
8. Brake drum
9. Disc wheel
10. Balance weight
11. Wheel cap
12. Hub bolt
13. Drum set bolt
14. Hub nut

Fig.4-2 Rear Axle Shaft & Disc Wheel Components G2405



1. Hub bolt
2. Oil deflector
3. Oil seal
4. Rear axle shaft
5. Bearing inner race
6. Bearing

Fig.4-3 Cross Sectional View of Axle Shaft, Bearing & Oil Seal G2406

Removal & Disassembly

1. Pry off the wheel cap, and loosen the hub nuts.

2. Jack up the rear axle housing, and support the housing with suitable stands.

3. Remove the hub nuts, and remove the wheel.

4. Loosen and remove the brake drum set bolts, and remove the brake drum.

5. Drain the differential gear lubricant and next, remove the rear axle housing cover.

6. Loosen and remove the differential pinion shaft pin, and remove the differential pinion shaft and the shaft spacer from the differential case.

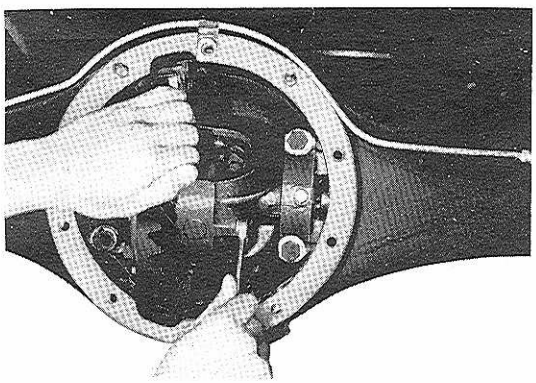


Fig.4-4 Removing Differential Pinion Shaft Pin V5091

7. Remove the rear axle shaft lock from the axle shaft.
   Tap the rear axle shaft flange towards the differential with a mallet to facilitate the axle shaft lock removal.

8 Pull the rear axle shaft out of the axle housing.

9. Using the Rear Wheel Bearing Puller 09514-35010, remove the axle shaft bearing together with the oil seal.

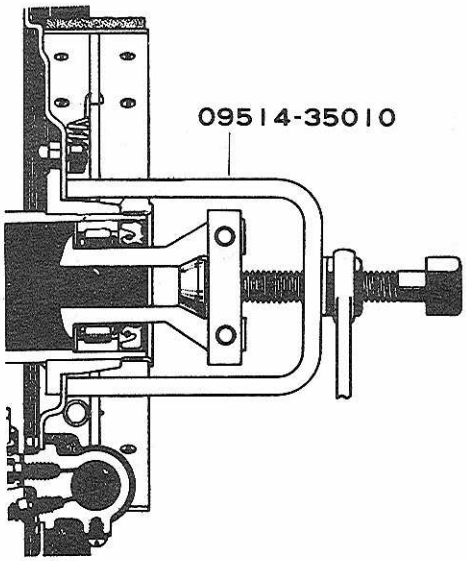


Fig.4-5 Bearing & Oil Seal Removal G2407

Inspection

Wash and clean the parts, and inspect the followings.
If any part found defective, replace as necessary.

1. Check the rear axle shaft for bend, crack or other damage.

2 Check the axle shaft splines for burrs, wear or damage.
Inspect the groove of the axle shaft for shaft lock installation for wear, or damage.

3. Inspect the machined surface of the axle shaft and the axle housing for rough spots or other irregularities which would affect the sealing of the oil seal.

4. Check the bearing for wear, abnormal noises or damage.
When replacing the bearing, also the bearing inner race on the axle shaft should be replaced.
To remove the bearing inner race, grind the bearing inner race with a grinder, and cut it with a chisel.

Installation

Follow the removal procedures in the reverse order.

1. To install the axle shaft bearing into the axle housing, use the Rear Wheel Bearing Replacer 09515-35010, and rivet in the position until it is in the original position, and next, install a new oil seal with the same tool (SST).

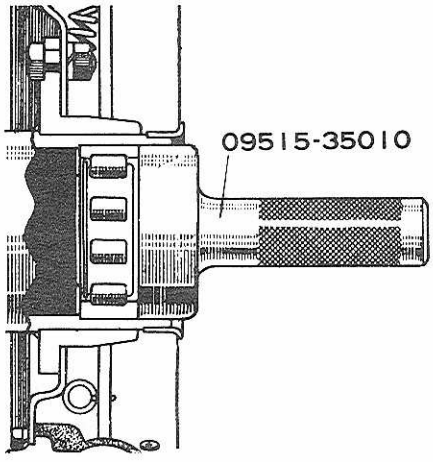


Fig.4-6 Bearing Installation G2408

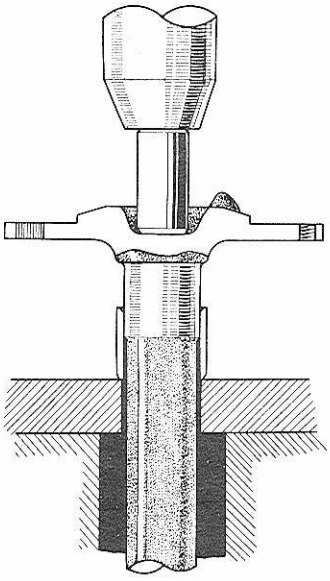


Fig.4-7 Bearing Inner Race Installation G2436

2. To install the bearing inner race onto the axle shaft, heat the bearing inner race to about 150° C or 302° F, and install it quickly onto the axle shaft with a suitable tool and a press.

3. After assembling the axle shaft, shaft lock, differential pinion shaft spacer and the pinion shaft, measure the clearance between the axle shaft end and the shaft spacer with a feeler gauge.
   This clearance should be 0.06 to 0.46 mm (0.0024 ~ 0.0181").
   If the clearance exceeds this specified clearance, replace the pinion shaft spacer to obtain the specified clearance.
   The pinion shaft spacers are available as follows.

Part No.	41344-35010
Thickness:	29.8 mm (1.173")
Part No.	41345-35010
Thickness:	30.2 mm (1.189")
Part No.	41346-35010
Thickness:	30.6 mm (1.204")

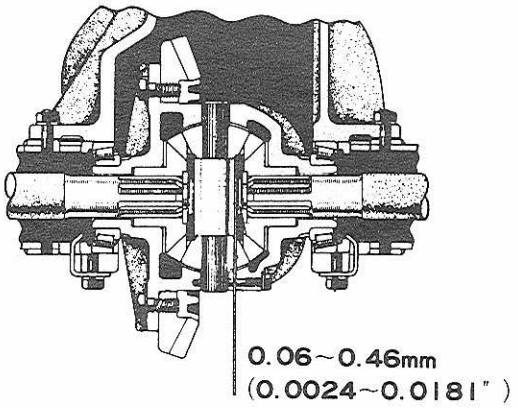


Fig.4-8 Shaft and Spacer Clearance G2409

4. Refill the axle housing with proper grade hypoid oil up-to the filler hole. Grade SAE 90, capacity is 2.5 l (2.6 US qts., 2.2 Imp qts.).

DIFFERENTIAL

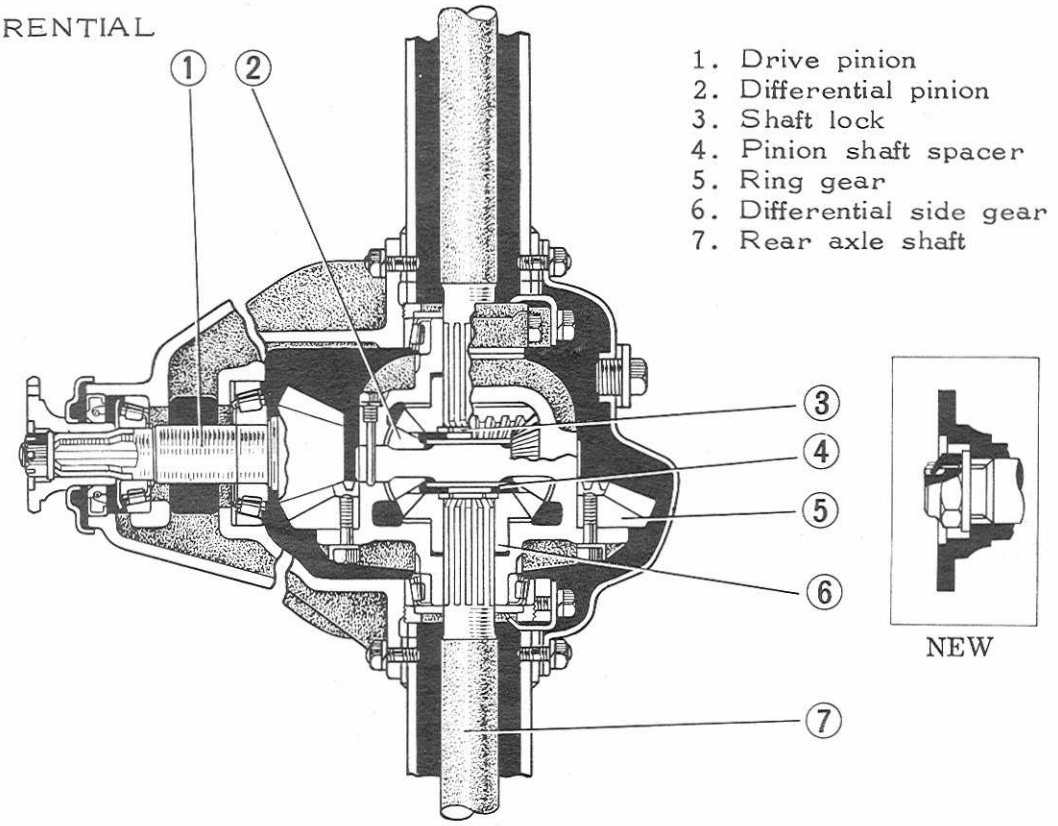


Fig.4-9 Cross Section of Rear Differential G1328

Removal

1. Pry off the wheel caps, and loosen the hub nuts.

2. Jack up the rear axle housing, and support the housing with suitable stands.

3. Remove the hub nuts, and remove the wheels.

4. Loosen and remove the brake drum set bolts, and remove the brake drums.

5. Drain the differential gear lubricant and next, remove the rear axle housing cover.

6. Loosen and remove the differential pinion shaft pin, and then pull the differential pinion shaft out of the differential case, and remove the shaft spacer.

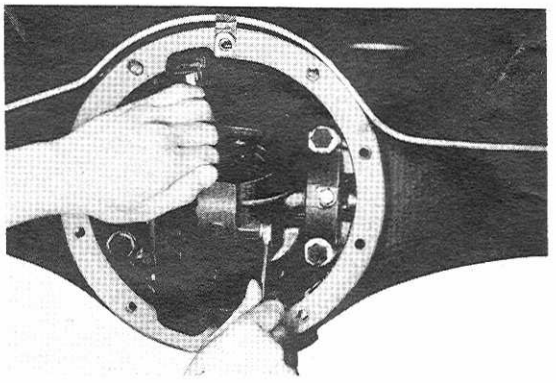


Fig.4-10 Removing Pinion Shaft Pin V5091

7. With the rear axle shafts slightly pushed toward the differential, remove the axle shaft locks from the rear axle shaft ends.

8. Pull the rear axle shafts out of the axle housing without damaging the axle shaft oil seals.

9. Remove the bolts, and disconnect

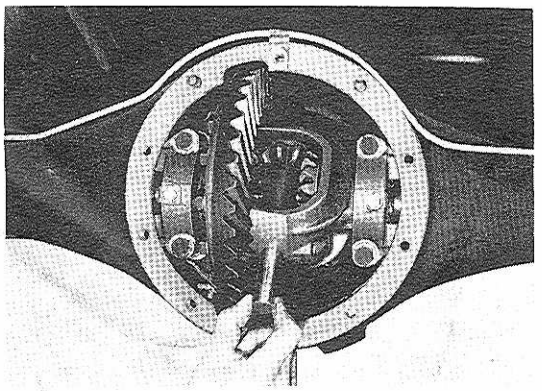
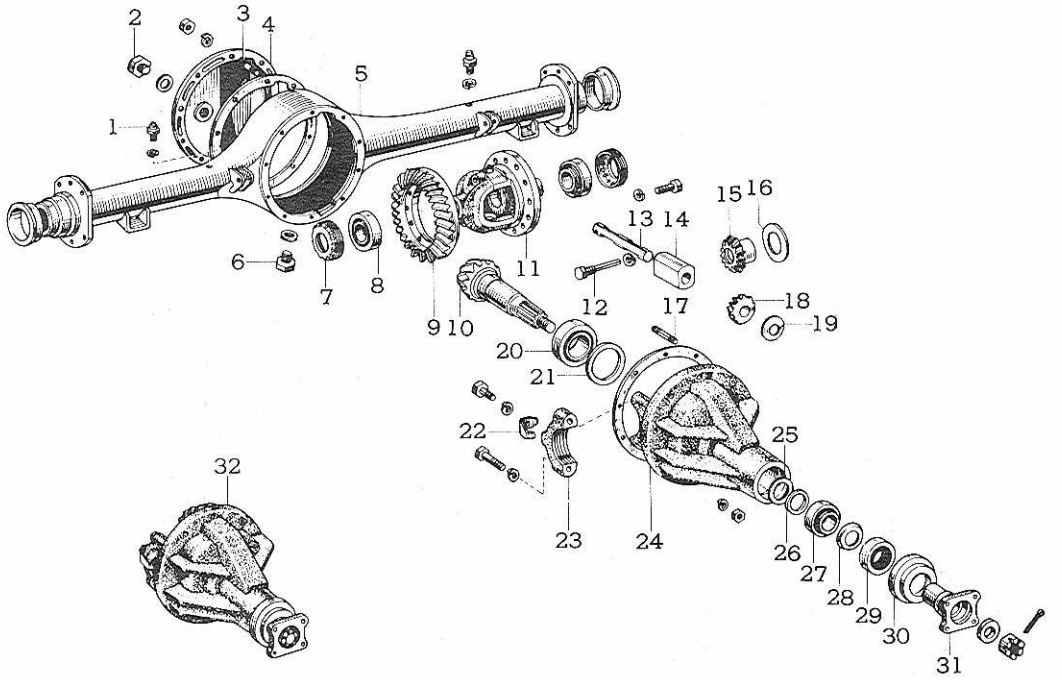


Fig.4-11 Removing Pinion Shaft V5092

the rear propeller shaft from the differential.

10. Remove the differential carrier retaining nuts, and remove the differential carrier assembly from the axle housing.

Disassembly



1. Breather plug
2. Filler plug
3. Stud bolt
4. Rear axle housing cover
5. Rear axle housing
6. Drain plug
7. Side bearing adjusting nut
8. Side bearing
9. Ring gear
10. Drive pinion
11. Differential case
12. Pinion shaft pin
13. Pinion shaft
14. Pinion shaft spacer
15. Side gear
16. Side gear thrust washer
17. Stud bolt
18. Differential pinion
19. Pinion thrust washer
20. Bearing
21. Adjusting shim
22. Adjusting nut lock
23. Bearing cap
24. Differential carrier
25. Adjusting spacer
26. Shim
27. Bearing
28. Oil slinger
29. Oil seal
30. Dust deflector
31. Universal joint flange
32. Differential carrier assembly

Fig.4-12 Differential & Rear Axle Housing Components G2410

1. Place the differential carrier assembly onto a work stand with a carrier adapter.

2. Punch the mating marks onto the bearing caps and the carrier.

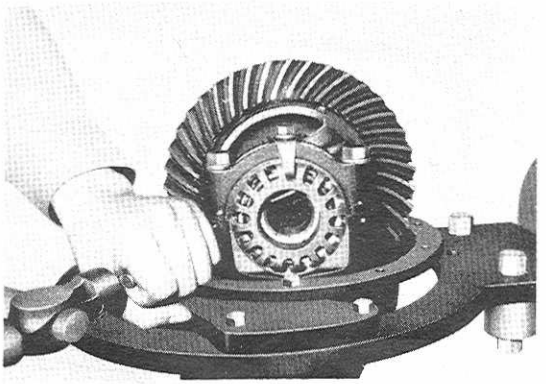


Fig.4-13 Punching Mating Marks V5140

3. Remove the bearing adjusting nut locks on the bearing caps. Next, loosen and remove the bolts retaining the bearing cap onto the differential carrier.
   Remove the bearing caps and the bearing adjusting nuts.
   Do not mix the mated parts with the others.

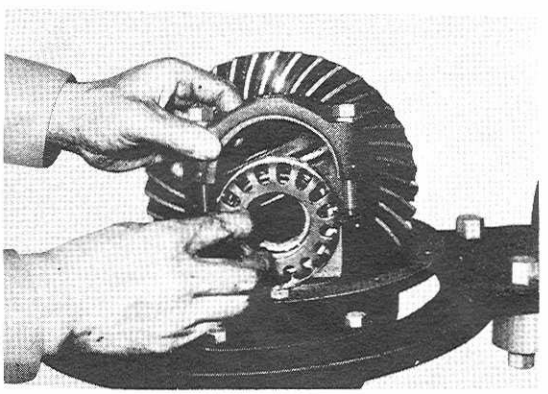


Fig.4-14 Removing Bearing Cap V5141

4. Remove the differential case assembly from the carrier together with the bearings.

5. Remove the cotter pin from the universal joint flange retaining nut. Using the Universal Joint Flange Holding Tool 09330-30010, retain the universal joint flange, and remove the nut with a socket wrench. When removing the nut, be careful not to allow the drive pinion to drop.

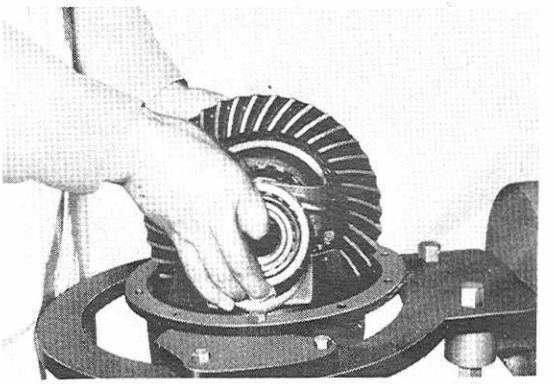


Fig.4-15 Removing Differential Case & Bearing V5142

09330-00010

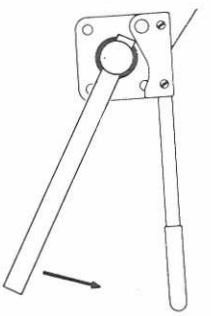


Fig.4-16 Removing Flange Nut V5143

6. Remove the universal joint flange, and then remove the drive pinion from the inside of the differential carrier with the drive pinion rear bearing and the adjusting shims.

7. Using the Oil Seal Puller 09950-10010, remove the drive pinion oil seal from the differential carrier.

8. Remove the drive pinion front bearing from the differential carrier.

9. Remove the drive pinion front and

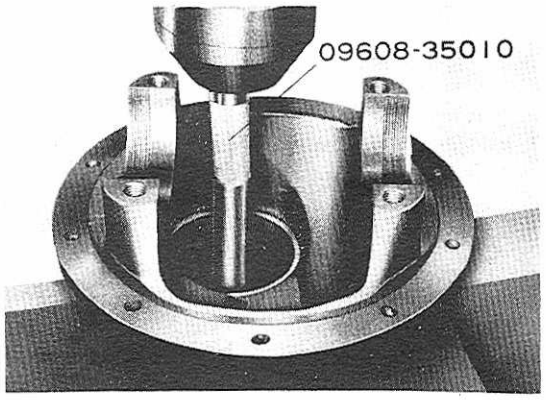


Fig.4-17 Removing Front Bearing Cup V3440

rear bearing cups using the Front Hub & Drive Pinion Bearing Tool Set 09608-35010 and a press.



Fig.4-18 Removing Rear Bearing Cup V3397

10. Remove the drive pinion rear bearing using the Universal Puller 09950-20010.

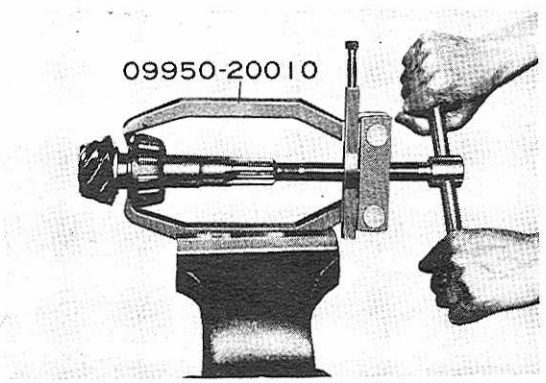


Fig.4-19 Removing Rear Bearing V3442

11. Remove the differential side gears with the thrust washers, and the differential pinions with the thrust washers from the differential case.

Inspection

Wash all disassembled parts thoroughly in cleaning solvent. Lubricate the bearings immediately after washing to prevent rusting.
Inspect the parts for wear, damage, and other defects.
The parts found defective should be repaired or replaced.

1. Check the bearings for scores or erratic wear pattern.
When operating the bearing in the bearing cup, the bearing must turn freely without any roughness.
Examine the roller ends for wear.

a. If necessary, replace the differential side bearings.
Using the Universal Puller 09950-20010, remove the bearings from the differential case.

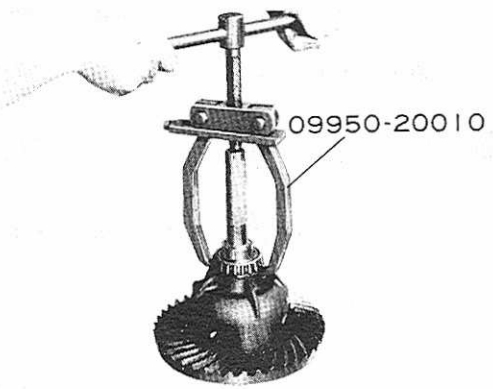


Fig.4-20 Removing Side Bearing V5093

b. To install, use the Differential Side Bearing Replacer 09505-20010, and fit the bearing onto the differential case.

2. Inspect the drive pinion and ring gear for scores or signs of excessive wear, and if necessary, replace the ring gear and drive pinion as a set.

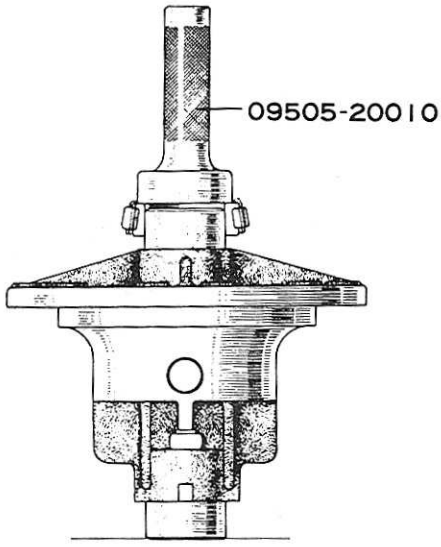


Fig.4-21 Side Bearing Installation G2411

The pattern taken during disassembly should be helpful in judging if the gears are suitable for reuse.

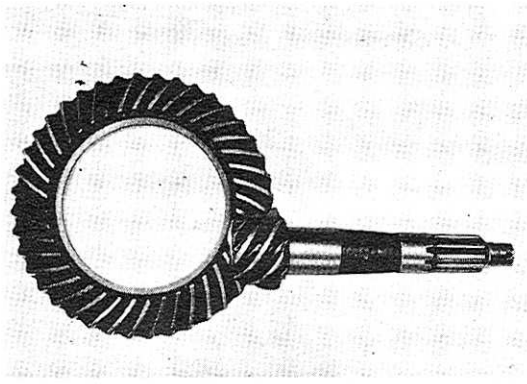


Fig.4-22 Gear Inspection V5144

To remove the ring gear from the differential case, punch the mating marks onto the differential case and the ring gear for assembly in the original position.
Next, loosen and remove the ring gear retaining bolts alternately.

3. Check the ring gear retaining bolts for stretch, and threads for damage.

4. Inspect the side gears, pinion gears, thrust washers, pinion shaft and the shaft spacer for wear, scores and other defects.
Inspect the gear teeth and thrust surface, and wear of splines, thrust surfaces or thrust washers can contribute to excessive drive line backlash.

5. Inspect the differential case for cracks and other defects.
Make sure the hub where the side bearings mount are smooth. Check the fit of the differential gears in the counter-bores.
Carefully examine the thrust surfaces.
Be sure that the mating surfaces of the case and the face of ring gear attaching flange are smooth and free from nicks or burrs.

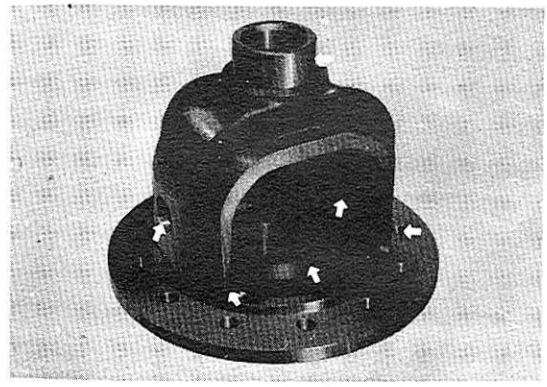


Fig.4-23 Differential Case Inspection V5094

6. Check the universal joint flange for score or defect.
The end of the flange contacting the oil seal or pinion front bearing must be smooth.

7. Check the threads of the differential side bearing adjusting nuts and bearing cap retaining bolts for damages.

Assembly & Adjustment

Clean all parts before assembly.
To provide initial lubrication, apply a thin coating of differential lubricant on all parts before installation.

1. Assemble the ring gear onto the differential case, aligning the mating marks punched upon disassembly, and tighten the ring gear retaining bolts evenly, then tighten them alternately across the ring gear to specified torque.
   Retaining bolts tightening torque:
   10 ~ 12 m-kg (72 ~ 87 ft-lb)

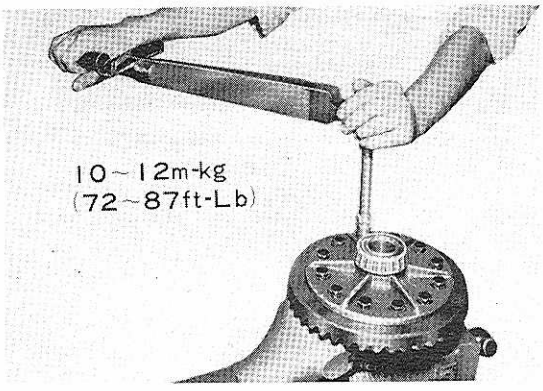


Fig.4-24 Assembling Ring Gear V5095

2. Place the differential side gears and the thrust washers with the oil grooves facing towards the side gears, and differential pinions and the thrust washers in the differential case.

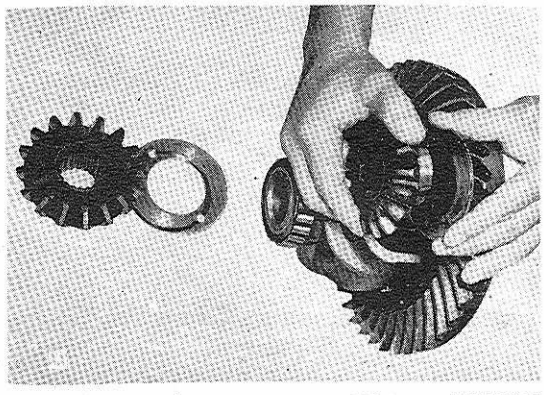


Fig.4-25 Assembling Side Gear & Thrust Washer V5096

3. Inspection of differential side gear thrust clearance.

   a. Insert the pinion shaft into the differential case through the pinion gears and the thrust washers.

   b. Check the clearance between the differential side gear and the differential case.
   The specified clearance is 0.15 to 0.35 mm (0.006 ~ 0.014"), and if the clearance is incorrect, replace the side gear thrust washers and the pinion thrust washers.

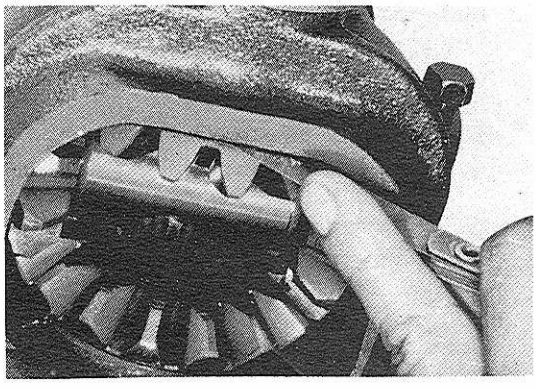


Fig.4-26 Measuring Side Gear Thrust Clearance V5097

   c. After adjusting the thrust clearance, remove the pinion shaft and the differential pinion with the thrust washers from the differential case.

4. Press the drive pinion front and rear bearing cups into the differential carrier using the Front Hub & Drive Pinion Bearing Tool Set 09608-35010.

5. Drive pinion depth and bearing pre-load adjustment.
   For proper adjustment, the Differential Drive Pinion Adjusting

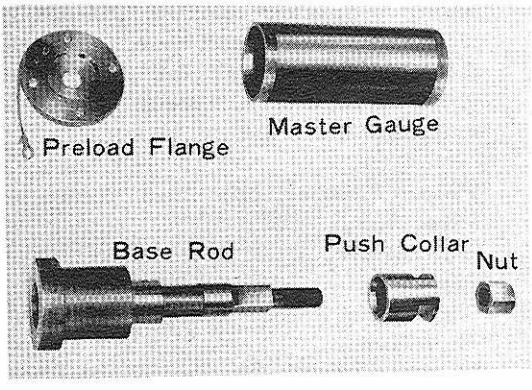


Fig.4-27 Differential Drive Pinion Adjusting Gauge V5098

Gauge 09530-35010 should be used.

a. Install the drive pinion rear bearing onto the adjusting gauge base rod, and then assemble the base rod with bearing into the differential carrier.
Next, install the drive pinion front bearing and adjusting gauge push collar into the differential carrier onto the base rod.
Tighten the adjusting gauge nut to 2 ~ 3 m-kg (14 ~ 22 ft-lb) torque.

b. Assemble the master gauge onto the differential carrier and secure it with the side bearing caps.
Tighten the bearing cap retaining bolts to 9.0 ~ 11 m-kg (65 ~ 79 ft-lb) torque.

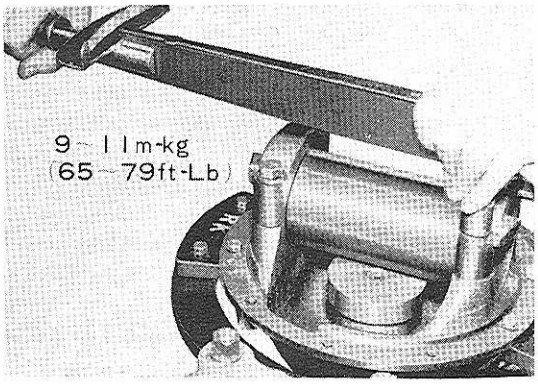


Fig.4-28 Assembling Master V5099 Gauge

c. Select proper thickness shim/s from the following four pinion locating adjusting shims so as to minimize the clearance between the master gauge and the shim when inserted between the base rod and the master gauge.

Pinion locating adjusting shim:
Part No. 90564-70101
Thickness: 0.25 mm (0.0098")
Part No. 90564-70102
Thickness: 0.30 mm (0.0118")
Part No. 90564-70103
Thickness: 0.35 mm (0.0138")
Part No. 90564-70104
Thickness: 0.45 mm (0.0177")

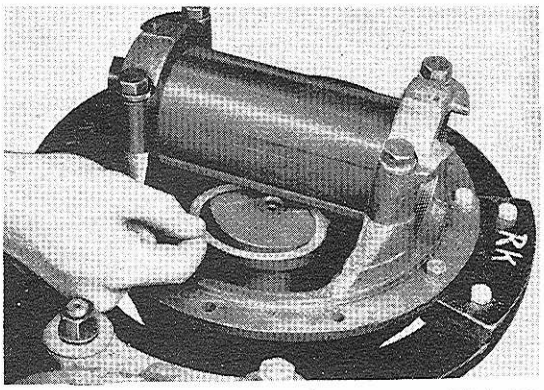


Fig.4-29 Selecting Adjusting V5100 Shim

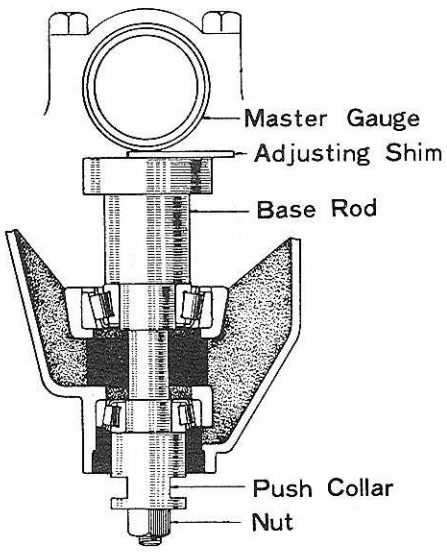


Fig.4-30 Adjusting Shim Selection G2412

d. After selecting the shim, remove the Differential Drive Pinion Adjusting Gauge.

e. Remove the drive pinion rear bearing cup from the differential carrier with the Front Hub and Drive Pinion Bearing Tool Set 09608-35010.
Next, install the selected pinion

locating adjusting shim into the differential carrier, and then reinstall the bearing cup.

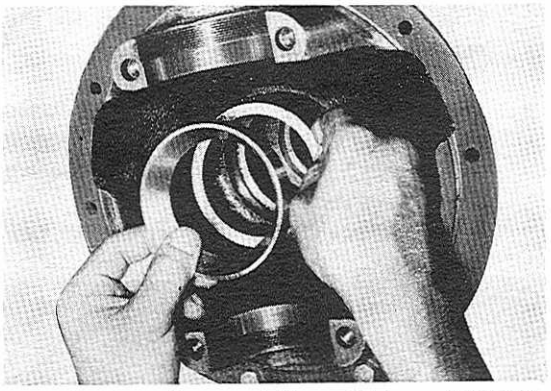


Fig.4-31 Assembling Shim & Bearing Cup V5101

f. Press the drive pinion rear bearing onto the drive pinion with the Differential Drive Pinion Rear Bearing Cone Replacer 09506-35010.

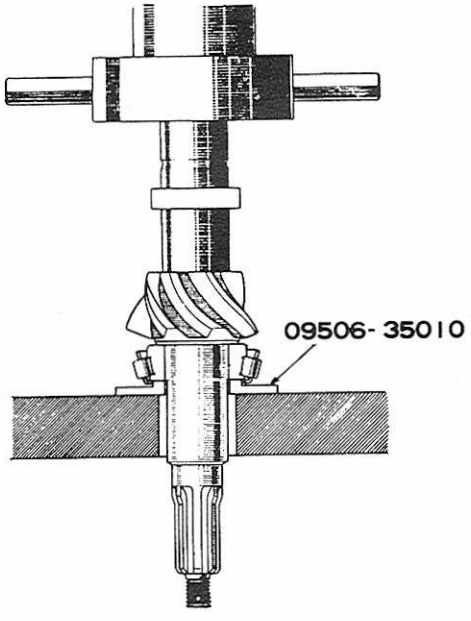


Fig.4-32 Rear Bearing Installation G2413

g. Install the bearing pre-load adjusting spacer and the shim which were removed during disassembly onto the drive pinion, and assemble into the differential carrier.
Install the drive pinion front bearing and the universal joint flange. Retain the universal joint flange with the Universal Joint Flange Holding Tool 09330-30010, and tighten the flange retaining nut to 20 ~ 24 m-kg (144 ~ 173 ft-lb) torque.
Do not assemble the oil seal at this time.

h. Attach the adjusting gauge pre-load flange to the universal joint flange, and check the pre-load of the drive pinion bearings.
The pull-scale reading should be 3.8 ~ 5.2 kg (8.4 ~ 11.4 lb) with a steady pull.

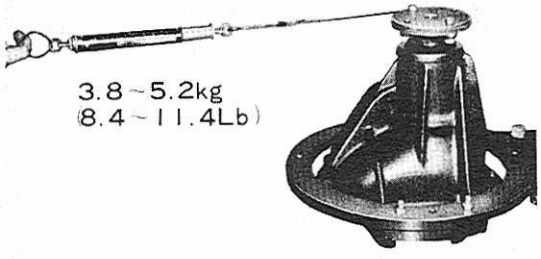


Fig.4-33 Checking Bearing V5102 Pre-load

In case the specific reading cannot be obtained, select the proper bearing pre-load adjusting spacer. If the pre-load is tight, select a thicker spacer, and if loose, use a thinner one.
Bearing pre-load adjusting spacer thickness:

Part No.	90560-30184
Thickness:	2.75 mm (0.108")
Part No.	90560-30185
Thickness:	2.78 mm (0.109")
Part No.	90560-30186
Thickness:	2.81 mm (0.111")

Part No. 90560-30187
Thickness: 2.84 mm (0.112")
Part No. 90560-30188
Thickness: 2.87 mm (0.113")
Part No. 90560-30190
Thickness: 2.90 mm (0.114")
Part No. 90560-30191
Thickness: 2.93 mm (0.115")
Part No. 90560-30192
Thickness: 2.96 mm (0.116")
Part No. 90560-30199
Thickness: 2.99 mm (0.118")

Repeat the above procedures until the specified pre-load is obtained by selecting the adjusting spacer.

i. After adjustment, remove the nut, universal joint flange and the drive pinion from the differential carrier.

6. Place the drive pinion oil slinger onto the drive pinion front bearing in the differential carrier.
Next, drive in the drive pinion oil seal into the differential carrier.
Lubricate the oil seal with differential gear lubricant.

7. Reinstall the selected adjusting spacer and shim onto the drive pinion, and then install the drive pinion into the differential case.
Install the universal joint flange and tighten the retaining nut to 20 to 24 m-kg (144 ~ 173 ft-lb) torque.
Turn the drive pinion, and check the rotating condition.
Calk the companion flange attaching nut

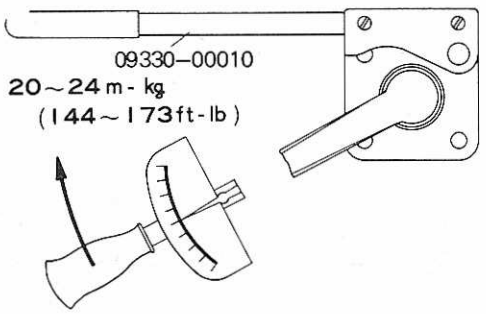


Fig. 4-34 Installing Companion Flange

8. Place the differential case assembly onto the differential carrier.
Position the side bearing adjusting nuts onto the carrier and to the side bearings.

9. Install the side bearing caps onto the differential carrier, alinging the mating marks punched during disassembly.
Next, install the bearing cap retaining bolts, and screw in with the fingers.
Carefully set the bearing caps in place so that the threads of the side bearing adjusting nuts and the caps fit snugly, and tighten the bolts to 9 ~ 11 m-kg (65 ~ 79 ft-lb) torque.

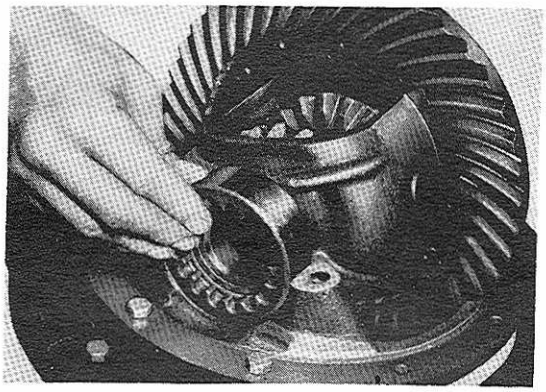


Fig.4-35 Assembling Bearing Adjusting Nut V5103

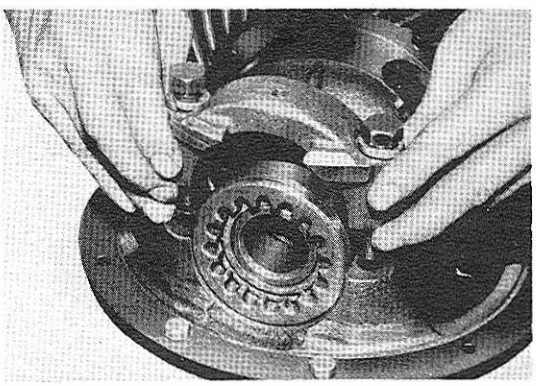


Fig.4-36 Installing Bearing Cap V5104

10. Side bearing pre-load and gears backlash adjustment.
Differential side bearing pre-load,

and drive pinion and ring gear backlash are adjusted after the drive pinion assembly is installed into the differential carrier.

a. Loosen the side bearing cap retaining bolts about 45° for adjustment of side bearing pre-load.

b. Using the Differential Adjusting Nut Wrench 09504-30010, loosen

the side bearing adjusting nut on the drive pinion side sufficiently, and then screw in the side bearing adjusting nut on the ring gear side until a slight backlash can be felt between the ring gear and the drive pinion.
During this operation, rotate the ring gear several turns in each direction to seat the bearings in the bearing cups.

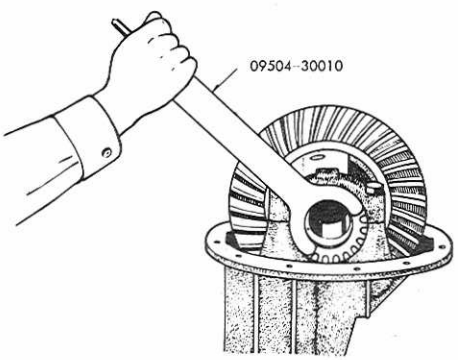


Fig.4-37 Adjusting Bearing Pre-load V5145

c. Install a dial gauge onto the differential carrier with the plunger against the rear face of the ring gear. Next, screw in the bearing adjusting nut on the drive pinion side reading the ring gear side play on the dial gauge until the side play is removed. Then from this zero side play position, tighten the side bearing adjusting nut one or two notches to pre-load the bearings.

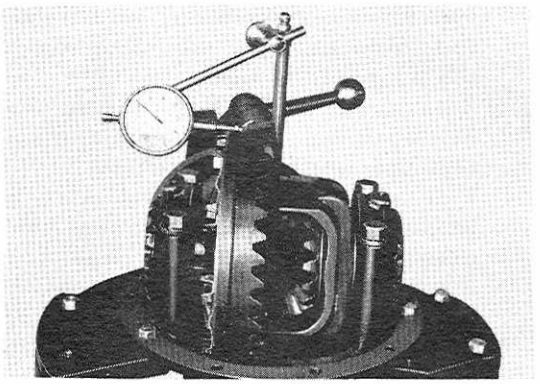


Fig.4-38 Adjusting Bearing Pre-load V5146

d. After adjusting the side bearing pre-load, rotate the ring gear one revolution, and also check the ring gear run-out with the dial gauge.
The specified limit is 0.1 mm or 0.004", if the total gauge reading exceeds the limit, recheck the ring gear and differential case mounting surfaces, and the side bearing installing condition.

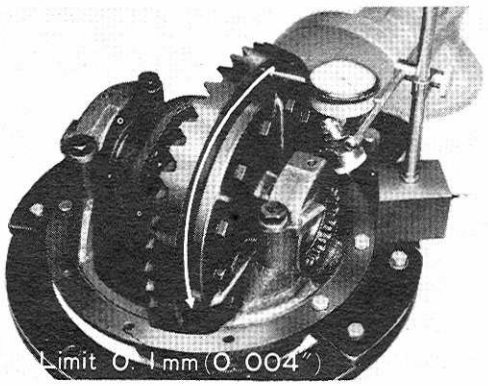


Fig.4-39 Measuring Ring Gear Run-out V5105

e. Mount the dial gauge, and contact the plunger against the ring gear tooth at right angle.
Hold the drive pinion and rock the ring gear to-and-fro, and read the dial gauge.
The specified backlash is 0.15 to 0.20 mm (0.006 ~ 0.008").
Adjust the backlash if incorrect to the above specification.
To decrease the backlash, loosen the side bearing adjusting nut on

the drive pinion side, and tighten the side bearing adjusting nut on the ring gear side.
The same number of notches must be loosened or tightened to maintain the correct pre-load.
For example; if one nut is to be loosened one notch, loosen it two notches, then tighten it one notch.
This method will assure that the adjusting nut is properly contacting the bearing cup, and that the bearing cup will not shift after being put into service.
Tighten the side bearing cap retaining bolts to 9 ~ 11 m-kg or 65 ~ 79 ft-lb torque, and recheck the gear backlash.

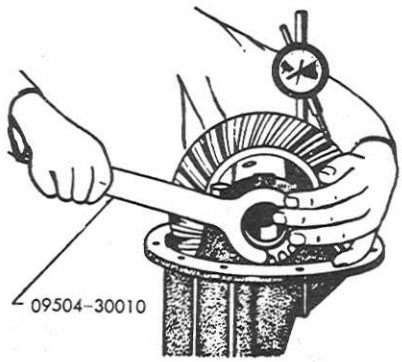


Fig.4-40 Measuring Gear Backlash V5147

11. Ring gear and drive pinion tooth contact pattern adjustment.
After the differential is completely assembled and adjusted, a tooth contact pattern should be checked.
The correct tooth contact is considered as a final check on the drive pinion depth and backlash adjustment.
As some minor differences will exist on individual gear sets, the following patterns should be considered as typical only, and should be used as a guide rather than a rigid standard.
Apply a thin coat of red-lead evenly on the ring gear teeth.
Rotate the ring gear back and forth until a clean tooth contact pattern is obtained, holding the drive pinion flange with the hand to act as a brake.

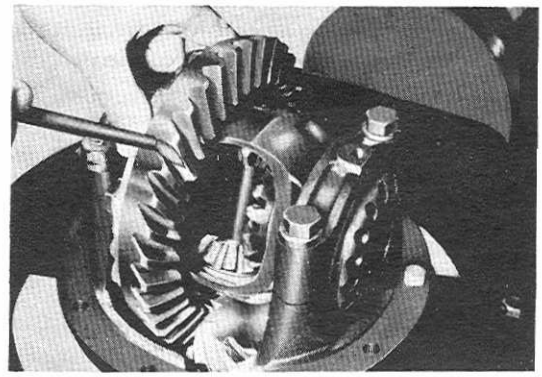


Fig.4-41 Applying Red-lead V5106

To adjust the drive pinion depth, select the pinion locating adjusting shim to be inserted between the drive pinion rear bearing and the differential carrier.
Refer to Drive Pinion Depth Adjustment on page 4-14.

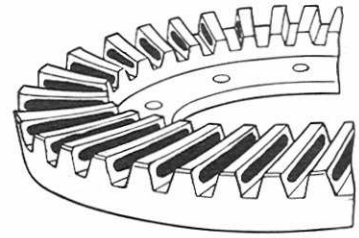


Fig.4-42 Correct Tooth Contact Y5525

a. Heel contact
To obtain the correct tooth pattern, move the pinion towards the ring gear by increasing the thickness of the pinion locating adjusting shim.
Adjust the backlash by moving the ring gear away from the drive pinion.

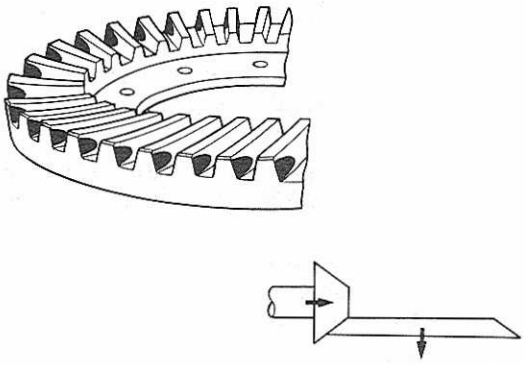


Fig.4-43 Heel Contact Tooth Pattern Y5527

b. Toe contact
Move the drive pinion away from the ring gear by reducing the thickness of the pinion locating adjusting shim.
Adjust the backlash by moving the ring gear towards the drive pinion.

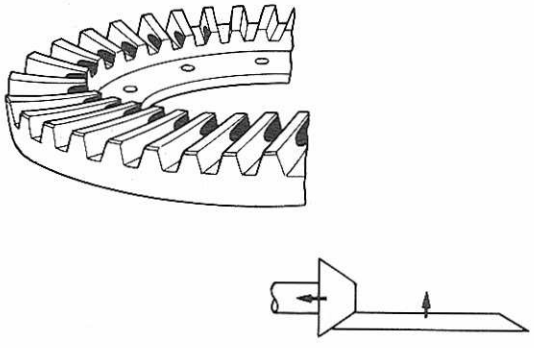


Fig.4-44 Toe Contact Tooth Pattern Y5528

c. Flank contact
To correct this contact, perform the same procedure as the Toe contact.

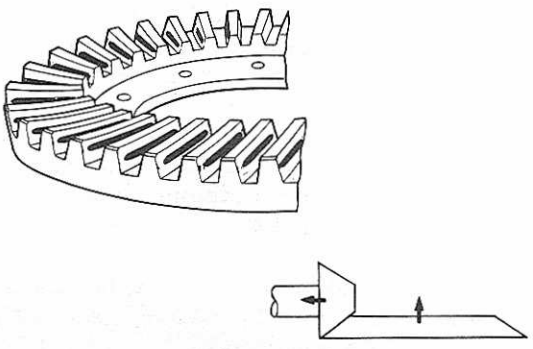


Fig.4-45 Flank Contact Tooth Pattern Y5526

d. Face contact
Adjust in the same manner as the Heel contact.

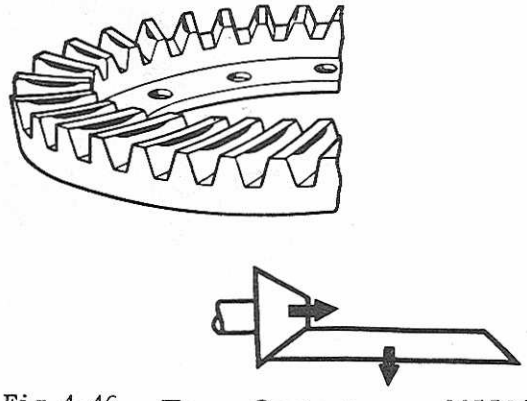


Fig.4-46 Face Contact Tooth Pattern Y5529

The tooth contacts shown above do not occur individually in the actual operation, but in most cases Heel & Face contacts or Toe and Flank contacts appear overlapping with each other.
Repeat the above adjustments until the correct pattern is obtained, and check the backlash to be in the same specifications.
Next, clean the gear teeth and install the bearing adjusting nut locks onto the bearing caps securely.

Installation

Follow the removal procedures in the reverse order.

1. When installing, all gaskets should be replaced.

2. To prevent oil leak, use liquid sealer for differential carrier gasket and the rear axle housing cover gasket.

3. The tightening torque of the differential carrier retaining nuts is 4 to 5.5 m-kg (29 ~ 40 ft-lb).

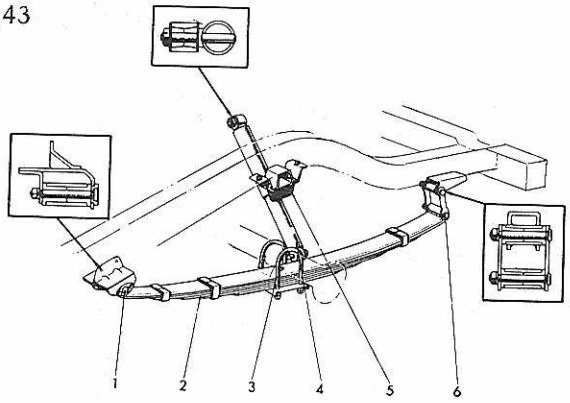
4. After installing the rear axle shafts, install the differential pinions with thrust washers.
   Next, install the differential pinion shaft and shaft spacer, then aligning the pinion shaft pin hole, install the pinion shaft pin.
   Tighten the pinion shaft pin to 1.5 to 2.2 m-kg (11 ~ 16 ft-lb) torque. To install the rear axle shaft refer to Rear Axle Shaft section

5. After installing the differential carrier assembly and the rear axle shaft, check and adjust the rear axle shaft thrust play.
   To adjust, refer to paragraph 3 in Rear Axle Shaft section on page 4-7.

6. Refill the axle housing with hypoid gear lubricant up-to the filler hole with SAE 90. The capacity is 2.5 liters (2.6 US qts., 2.2 Imp qts).

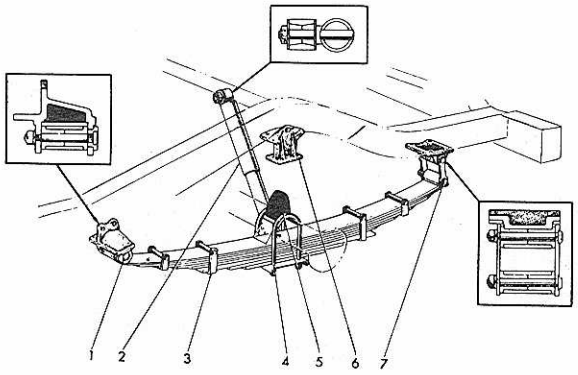
REAR SUSPENSION

FJ40, 43



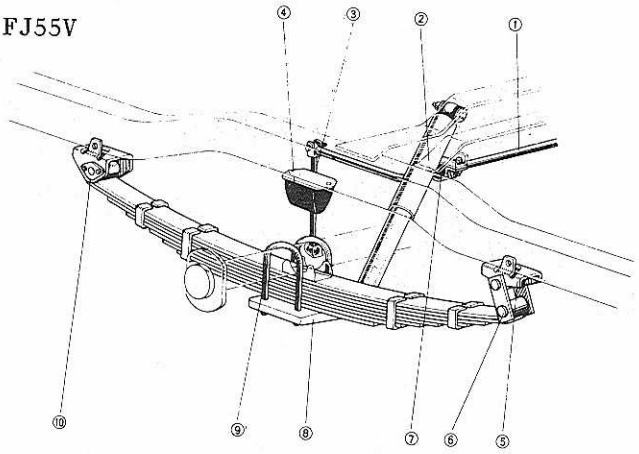
1. Hanger & shackle pin
2. Rear spring
3. U bolt
4. Rear shock absorber
5. Rubber cushion
6. Hanger & shackle pin

FJ45



1. Hanger & Shackle pin
2. Rear shock absorber
3. Rear spring
4. U bolt
5. Rubber cushion
6. Cushion stopper
7. Hanger & shackle pin

FJ55V



1. Rear stabilizer bar
2. Shock absorber
3. Stabilizer link
4. Spring bumper
5. Spring bracket
6. Spring shackle
7. Stabilizer bushing
8. Spring U-bolt seat
9. "U" bolt
10. Spring bracket pin

Fig.4-46 Rear Suspension Components

Y5734

Removal

1. Pry off the wheel cap, and loosen the hub nuts.
2. Raise the rear end of the vehicle, and place stands under the frame and under the rear axle housing.
3. Remove the hub nuts, and remove the wheel.
4. Remove the cotter pin and nut, and disconnect the lower end of the shock absorber from the pivot pin on the axle housing.
5. Remove the cotter pins and the nuts at lower end of the stabilizer links, and disconnect the stabilizer links from the axle housing. (55V)
   Remove the stabilizer bracket covers, and then withdraw the stabilizer bar with stabilizer links. (55V)
6. Loosen and remove the U-bolt nuts, and remove the U-bolts and the spring U-bolt seat.
7. Adjust the axle housing height with a jack until the weight is off the spring shackle.
   Remove the nuts, and take out the spring shackle inner plate. Next, pry the spring shackle with a suitable bar, and remove the spring shackle and the rubber bushings.
8. Remove the two bolts retaining the spring bracket pin onto the spring bracket, and then drive out the spring bracket pin.
   Remove the rear spring assembly.
9. Remove the cotter pin and the nut at the shock absorber upper end, and remove the shock absorber with the rubber bushings.

Inspection & Repair

1. Check the shock absorber operation, and oil leak.
2. Check the rubber bushings for cracks and wear or weakness.
3. Check the stabilizer bar for deformation and cracks. Also check the stabilizer links for wear or bent conditions.
4. Inspect the spring shackle and the spring bracket pin for wear or other defects.
5. Check the U-bolts for cracks and stripped threads.
6. Check the spring U-bolt seat for deformation, cracks or other defects.
7. Check the springs for breakage, cracks or weak leaves.

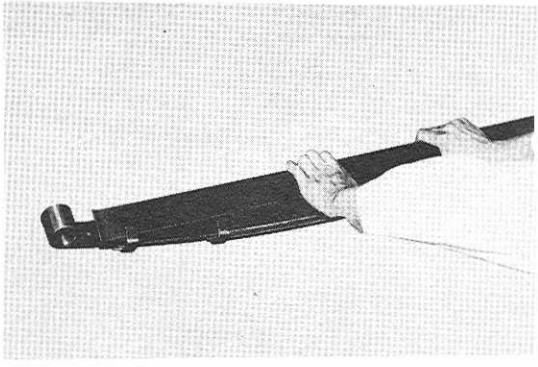


Fig.4-48 Prying Spring Clip V0825

If necessary, disassemble the rear springs and inspect, then reassemble as follows.

a. Pry the spring clips with a suitable tool, and then loosen and remove the spring center bolt from the springs.

b. Inspect the spring leaves, center bolt, and the spring clips for wear, cracks or other defects.

c. To remove the spring clip from the spring leaf, drill the rivetted head of the round head rivet with a drill, and then drive out the round head rivet with a long drift

punch. Remove the spring clip from the spring leaf.

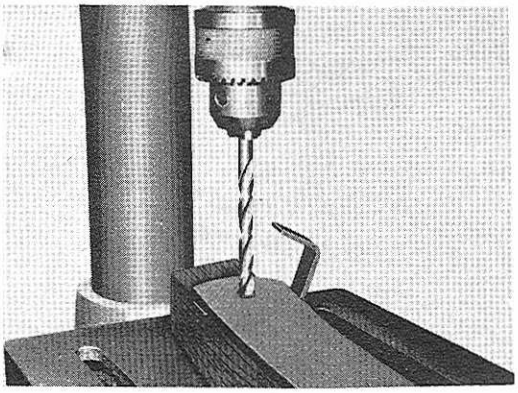


Fig.4-49 Removing Round Head Rivet V0827

d. Install a new rivet into the spring leaf and the spring clip, and then rivet with a press.

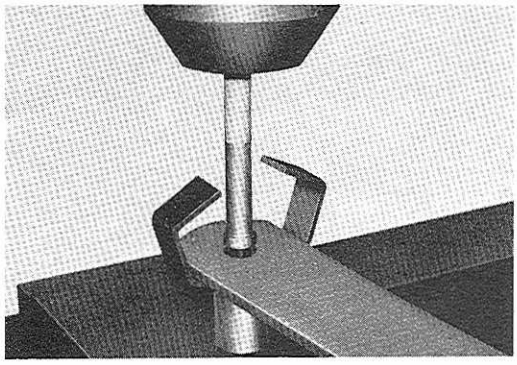


Fig.4-50 Installing Spring Clip V0828

e. Assemble the spring leaves, and tighten the spring center bolt securely.
Bend the spring clips to keep the spring leaves in place.

Installation

1. Install the rubber bushings into the front eye of the spring.
Connect the front eye of the spring with the spring bracket by installing the spring bracket pin.
Tighten the spring bracket pin retaining bolts.
Do not tighten the spring bracket pin nut at this time.

2. Install the rubber bushings into the rear eye of the spring and the rear spring bracket.
Mount the rear end of the spring by inserting the spring shackle pins through the rear spring bracket and the rear eye of the spring.
Install the spring shackle inner plate, and install the shackle pin nuts.
Do not tighten the nuts at this time.

3. Position the U-bolts over the axle housing, and install the spring U-bolt seat.

Tighten the U-bolt nuts to 6.9 to 9.7 m-kg (50 ~ 70 ft-lb) torque.
Make sure that the spring center bolt head is properly positioned into the hole provided in the spring seat on the axle housing.

4. Install the shock absorber with the rubber bushings and the cushion washers.
Tighten the shock absorber retaining nuts to 3.5 ~ 5.5 m-kg or 25 ~ 40 ft-lb) torque.
Secure the nuts with the cotter pins.

5. Raise the axle housing with a jack until the vehicle is free from the stands.
Next, tighten the spring bracket pin and the spring shackle nuts to 5 ~ 8 m-kg (36 ~ 58 ft-lb) torque.
If these nuts are tightened without any load on the spring, it may cause improper seating of the bushings with resultant of excessive wear of the bushings.

6. Install the wheel and the wheel cap.
Remove the stands and lower the vehicle.

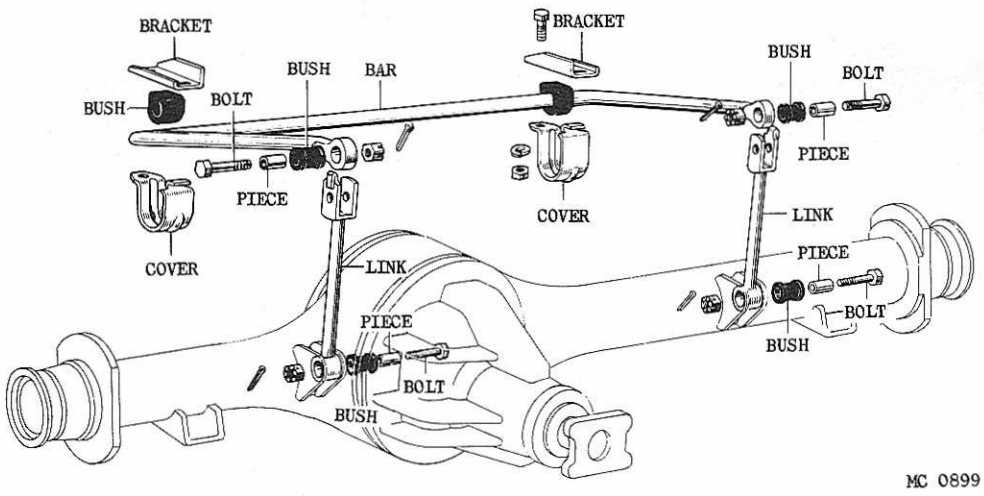


Fig.4-51 Stabilizer Component Parts (FJ55V series)

FRONT AXLE & FRONT SUSPENSION

DESCRIPTION ..... 5 - 1

TROUBLE SHOOTING ..... 5 - 2

STEERING KNUCKLE & AXLE SHAFT ..... 5 - 5

- Ball joint type ..... 5 - 5
  - Removal & disassembly ..... 5 - 7
  - Inspection & repair ..... 5 - 8
  - Adjustment ..... 5 -10
  - Assembly & installation ..... 5 -16
- Birfield constant velocity joint type ..... 5 -19
  - Removal & disassembly ..... 5 -21
  - Inspection & repair ..... 5 -23
  - Adjustment ..... 5 -26
  - Assembly & installation ..... 5 -26

DIFFERENTIAL ..... 5 -29

- Removal ..... 5 -29
- Installation ..... 5 -30

FRONT SUSPENSION ..... 5 -31

- Removal ..... 5 -32
- Inspection & repair ..... 5 -32
- Installation ..... 5 -32

DESCRIPTION

The front axle shaft is of the full-floating, banjo housing, hypoid gear hotchkiss drive type.
The front suspension consists mainly of the leaf springs and the double acting telescopic type hydraulic shock absorbers.
The leaf springs and the shock absorbers are mounted through the rubber bushings.

The front axle shaft is full-floating in which the load and the drive force of the front wheels are completely carried by the axle housing, and the front axle shafts serve only to transmit the driving torque.
The joints of the axle shafts are provided with two types; one is the ball joint type, and the other is the birfield constant velocity joint type.
The axle shaft and the joint have the construction as illustrated in figure 5-2 and figure 5-22.
The action of the axle shaft joints at the steering knuckles permit delivery of power to the wheels when they are turned from the straight ahead position.

The method of drive is the hotchkiss type in which the driving force is transmitted to the frame through the leaf springs, and has the advantages of simple construction, easy manufacturing and maintenance.
The differential is placed off center to the right side in order to provide more road clearance and to allow the front propeller shaft to be in the with the transfer case. The differential is almost identical with that used on the rear axle.
As the differential gear are of hypoid type, it requires the use of hypoid gear lubricant.

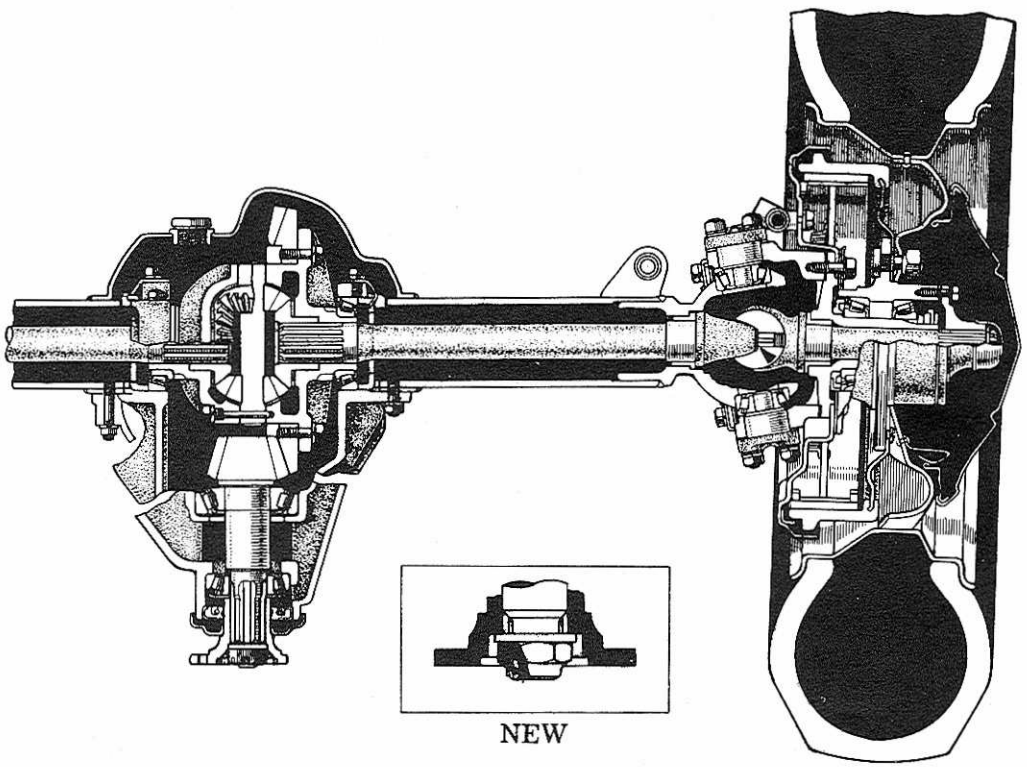


Fig.5-1 Cross Section of Front Axle (Ball Joint Type) G2437

Specifications:

Axle housing type	Banjo	
Front axle shaft type	Full-floating	
Front ball joint type	Ball joint Birfield constant velocity (optional)	
Differential:		
Gear type	Hoypoid	
Reduction ratio	3.7	4.11
Number of gear teeth:		
Drive pinion	10	9
Ring gear	37	37
Differential pinion	10	10
Differntial side gear	16	16
Lubricant capacity	Hypoid gear oil SAE 90 - 2.5 liters (2.6 US qts., 2.2 Imp qts)	

Front Spring

	FJ40(L), FJ43(L), FJ45(L)	FJ55(L)
Number of leaf springs	7	7
Span of spring at no load	1106 mm (43.5 ")	1100 mm (43.3 ")
Width	70 mm (2.76")	70 mm (2.76")
Thickness	6 mm (0.24")	6 mm (0.24")
Camber at no load	128.6 mm (5.06")	128 mm (5.04")
Spring constant	5.2 kg/mm (291 lb/in)	5.18 kg/mm (290 lb/in)

Front Shock Absorber

	FJ40(L), FJ43(L), FJ45(L)	FJ55(L)
Stroke	180 mm (7.09")	200 mm (7.87")
Maximum length	468 mm (18.43")	495 mm (19.49")
Minimum length	288 mm (11.34")	295 mm (11.61")
Damping force at o.3m/sec:		
In Compression	25 kg (55.1 lb)	55 kg (121.3 lb)
In Rebound	72 kg (158.8 lb)	160 kg (352.8 lb)

TROUBLE SHOOTING

The trouble shooting of the front axle covered in this part includes only those symptoms caused by the front wheel misalignment and the defective front axle parts.
The trouble shooting of the differential is excluded since the troubles are almost common to those of the rear axle differential.

Symptoms & Probable Causes — Remedies

1. Hard steering

Jack up the front end and check by turning the steering wheel with two front wheels off the ground.
If the steering is easy, check the tire inflation.
If the steering is hard, check the steering system.
For hard steering, disconnect the pitman arm from the sector shaft, then operate the steering wheel.
If the steering is easy, check the steering linkage.
If the steering is hard, check the steering gear housing assembly.

a. Low tire pressure	Inflate the tires to proper pressure
b. Incorrect front end alignment	Correct alignment
c. Lack of lubrication	Lubricate
d. Defective knuckle bearing/s	Replace bearing/s
e. Improper knuckle bearing pre-load	Adjust and correct pre-load
f. Steering gear housing improperly adjusted or damaged	Repair or replace
g. Bent steering main shaft	Replace main shaft
h. Improper adjustment of center arm shaft	Repair center arm shaft
i. Defective universal joint/s of intermediate shaft	Repair or replace universal joint/s

2. Steering shimmy

This is caused by excessive play in the steering wheel or wobbles in the front wheels.
The phenomenon becomes evident on rough road or at high speed operation. Tests should be made under various conditions.

a. Tires improperly inflated	Inflate tires to proper pressure
b. Incorrect front end alignment	Adjust alignment
c. Unbalanced wheel and tire	Check and balance wheel and tire
d. Loose hub nuts	Tighten
e. Bent wheel	Repair or replace
f. Damaged, worn or loose wheel bearing	Adjust or replace
g. Worn steering knuckle bearing	Replace bearing
h. Steering knuckle bearing pre-load defective	Adjust pre-load
i. Play between steering worm and sector shaft is excessive	Adjust play
j. Loose connection between steering gear housing & frame	Tighten bolts
k. Loose connection between steering knuckle & knuckle arm	Tighten nuts
l. Loose rod end	Tighten
m. Loose front axle U-bolts	Tighten
n. Front spring bracket pin or bushing worn	Replace
o. Worn steering gear	Replace
p. Excessive wear of rod end	Replace rod end
q. Worn center arm shaft or bushing	Replace shaft or bushing

3. Steering wheel pulls

While driving, the steering wheel may pull to one side causing difficulty to steer straight ahead.
This phenomenon is due to abnormal front suspension or axle which may have been caused by collision, skidding, or excessive bouncing on rocks or uneven road surface, and may lead to serious accident.

a. Uneven tire inflation	Inflate tires to proper pressure
b. Improper front end alignment	Adjust alignment
c. Broken or sagging front spring	Replace spring
d. Improperly adjusted brakes	Adjust brakes
e. Defective shock absorber	Replace shock absorber
f. Distorted or incorrectly installed suspension	Check and repair or replace
g. Deformed frame	Repair or replace
h. Deformed rear axle housing	Repair or replace
i. Wheel bearing tight or insufficiently lubricated	Adjust or lubricate
j. Improperly adjusted or worn steering gear.	Adjust or replace

4. Shock in steering wheel

When the front wheels bounce on uneven road surface, shocks are transmitted to the steering wheel.

a. Improper front end alignment	Adjust alignment
b. Over inflated tires	Reduce to proper tire pressure
c. Improperly adjusted steering gear	Adjust steering gear
d. Defective axle shaft joint	Repair or replace

5. Wheel tramps

a. Over inflated or uneven tire pressure	Inflate to proper tire pressure
b. Unbalanced wheel or tire	Check and balance wheel with tire
c. Defective shock absorber	Replace
d. Excessively worn tire	Replace tire
e. Excessively worn rod ends	Replace rod ends

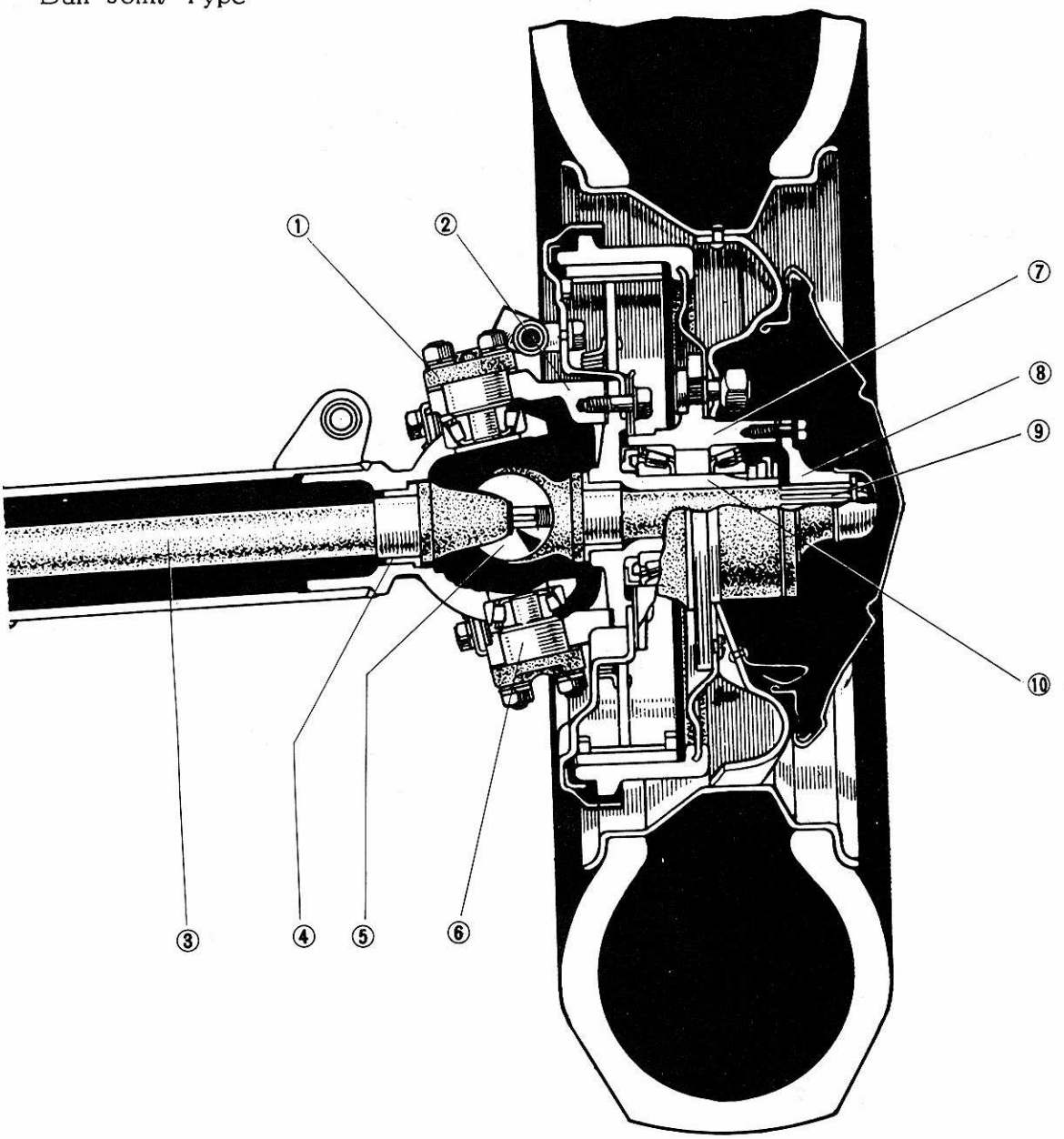
6. Excessive or abnormal tire wear

a. Improper tire pressure	Inflate or reduce to proper tire pressure
b. Improper front end alignment	Adjust alignment
c. Unbalanced wheel with tire	Check and balance
d. Excessive wheel bearing play	Adjust bearing
e. Wobbling wheel	Repair or replace wheel
f. Improper operation of vehicle	Correct operation
g. Excessive worn rod ends	Replace rod ends

* *

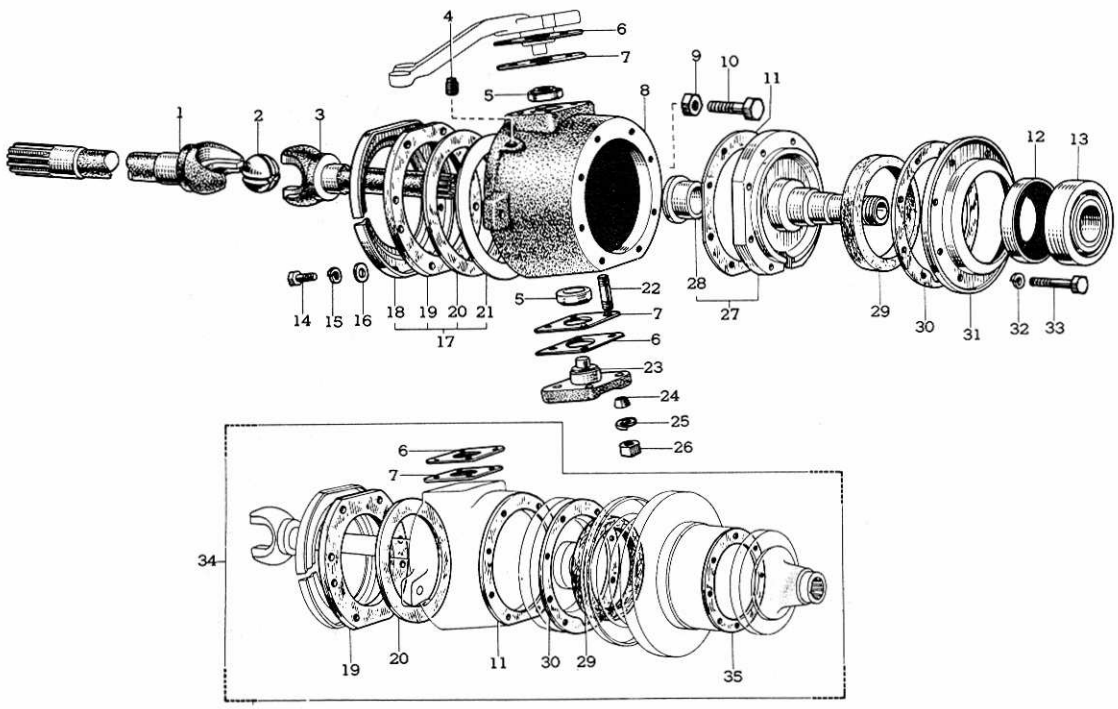
STEERING KNUCKLE & AXLE SHAFT

Ball Joint Type



1. Steering knuckle arm
2. Steering knuckle
3. Front axle inner shaft
4. Bushing
5. Front drive joint ball
6. Steering knuckle bearing cap
7. Front axle hub
8. Axle outer shaft flange
9. Front axle outer shaft
10. Steering knuckle spindle

Fig.5-2 Cross Section View of Steering Knuckle & Axle Shaft G2438



1. Front axle inner shaft
2. Front drive joint ball
3. Front axle outer shaft
4. Plug
5. Steering knuckle bearing
6. Steering knuckle adjusting shim No.1
7. Steering knuckle adjusting shim No.2
8. Steering knuckle
9. Nut
10. Bolt
11. Gasket
12. Oil seal
13. Front axle hub inner bearing
14. Bolt
15. Lock washer
16. Washer
17. Steering knuckle oil seal set
18. Oil seal cover
19. Outer oil seal
20. Inner oil seal
21. Oil seal inner ring
22. Stud bolt
23. Steering knuckle bearing cap
24. Dowel
25. Lock washer
26. Nut
27. Steering knuckle spindle
28. Knuckle spindle bushing
29. Dust seal
30. Oil retainer gasket
31. Oil retainer
32. Lock washer
33. Bolt
34. Front axle gasket kit
35. Axle outer shaft flange gasket

Fig.5-3 Steering Knuckle & Axle Shaft Components G2439

Removal & Disassembly

1. Pry off the wheel cap, and loosen the hub nuts.

2. Jack up the front axle housing, and support the housing with suitable stands.

3. Remove the hub nuts and remove the wheel.

4. Plug the brake master cylinder reservoir to prevent brake fluid from running out from the disconnected brake flexible hose.

5. Remove the axle outer shaft flange cap, and then remove the shaft snap ring on the outer shaft.

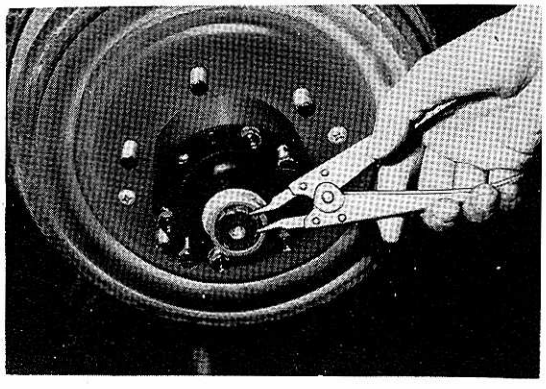


Fig.5-4 Removing Shaft Snap Ring V5107

6. Remove the bolts retaining the axle outer shaft flange onto the front axle hub, then screw in the two service bolts into the shaft flange alternately, and remove the shaft flange with the gasket.

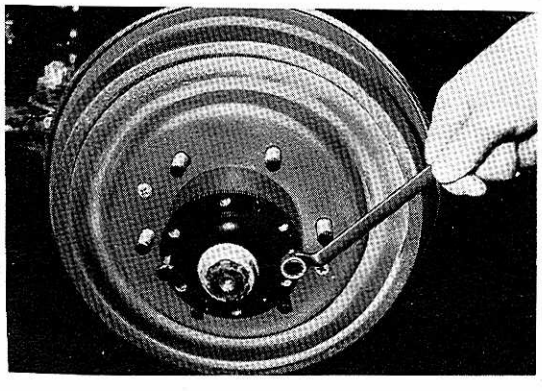


Fig.5-5 Axle Outer Shaft Frange Removal V5108

7. Remove the brake drum set screws and remove the brake drum.

8. Straighten the lock washer, and remove the front wheel adjusting nuts with the Front Wheel Adjusting Nut Wrench 09607-60010.

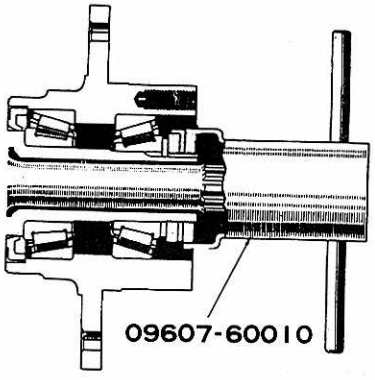


Fig.5-6 Front Wheel Adjusting Nut Removal G2414

9. Remove the front axle hub together with the claw washer, bearings and the oil seal.

10. Remove the clip, and disconnect the brake flexible hose from the brake tube.

11. Cut and remove the lock wire, and remove the bolts retaining the brake backing plate onto the steering knuckle.
Remove the brake backingplate together with the brake shoes, tension springs and the wheel cylinders.

12. Tap the steering knuckle spindle lightly with a mallet, and remove the steering knuckle spindle with the gasket.
Care should be exercise since the outer shaft and the joint ball will also come off at the same time.

13. Slide the front axle inner shaft out of the axle housing.

14. Remove the screws, and take out the steering knuckle oil seal covers.

15. Remove the nuts retaining the steering knuckle arm onto the steering knuckle.
Next, hold a short drift firmly onto the side of the dowel and strike it sharply to loosen the dowel.
Remove the dowels from the steering knuckle arm.

16. Using the Steering Knuckle Bearing Remover 09606-60010, remove the steering knuckle arm from the steering knuckle.

Caution:
Do not lose the steering knuckle adjusting shim/s that are installed between the steering knuckle arm and the steering knuckle.
Record the position and thickness of the shim/s so that they can be installed in their original position.

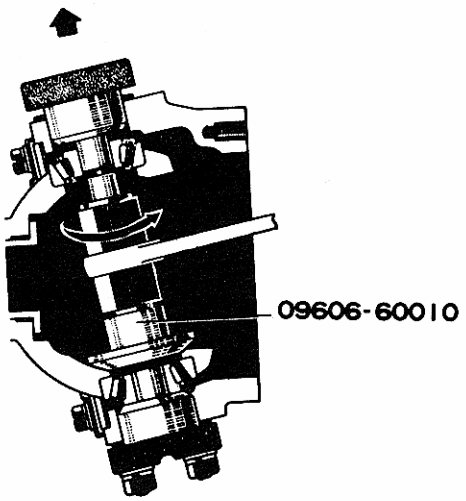


Fig.5-7 Steering Knuckle Arm Removal G2415

17. Remove the steering knuckle bearing cap retaining nuts, and the dowels in the same manner as paragraph 15.
Next, remove the steering knuckle bearing cap with the Steering Knuckle Bearing Remover 09606-60010 as illustration.
Remove the steering knuckle adjusting shim/s.

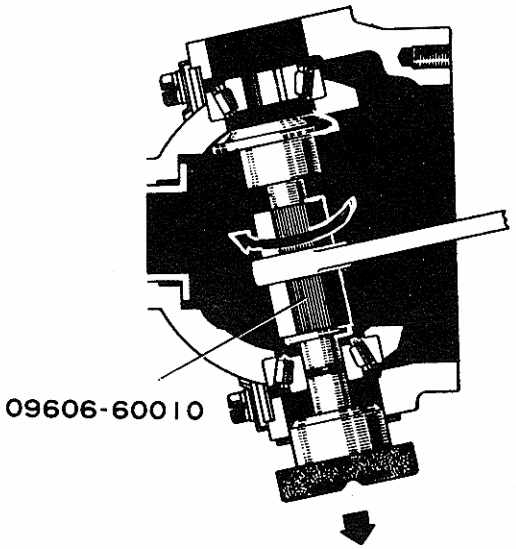


Fig.5-8 Steering Knuckle Bearing Cap Removal G2416

18. Be careful not to drop the bearings on the ground, and remove the steering knuckle with the bearings from the axle housing.

19. Remove the steering knuckle oil seals outer and inner from the axle housing.

20. Pry off the oil seal in the front axle hub with a screwdriver, and then remove the bearing from the front axle hub.

Inspection & Repair

Clean all parts thoroughly with cleaning solvent, and dry with compressed air.
Inspect the following parts, and replace if defective.

1. Inspect the grooves on the joint ball for abnormal wear, cracks or other defects.

2. Inspect the joint portions of the

axle inner shaft and the outer shaft for abnormal wear, chips, warpage or scores.

3. Inspect the splines on the axle inner shaft end for chips, nicks or excessive wear.

4. Inspect the machined surfaces of the axle inner shaft, and the outer shaft for scores or excessive wear. The specified diameter is 31.970 to 31.991 mm (1.2586 ~ 1.2595").

5. Inspect the bushing in the axle housing for scores, excessive wear or other defects. If necessary, replace the bushing.

   a. To remove, use the Front Axle Shaft Bearing Puller 09619-60010, and remove the bushing from the axle housing as illustrated.

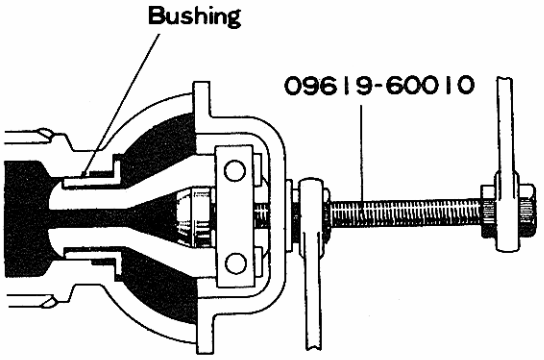


Fig.5-9 Bushing Removal G2417

   b. To install, drive the bushing into the axle housing with the Front Axle & Drive Shaft Bearing Replacer 09618-60010.

Caution:

The bushings are provided with two kinds; the right side bushing with Part No. 90999-70061, and the left side bushing with Part No. 90999-70062.

6. Inspect the bushing in the steering knuckle spindle for scores, excessive wear or other defects. If necessary, replace the bushing.

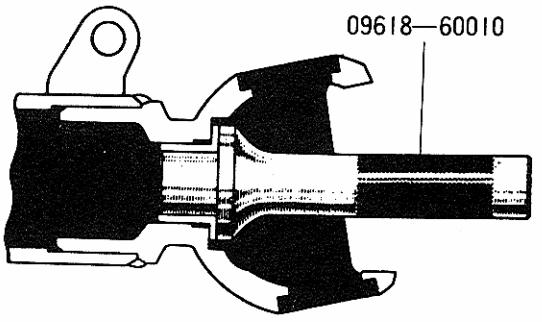


Fig.5-10 Bushing Installation G2418

   a. To remove, use the Steering Worm Bearing Puller 09612-65010, and remove the bushing from the steering knuckle spindle.

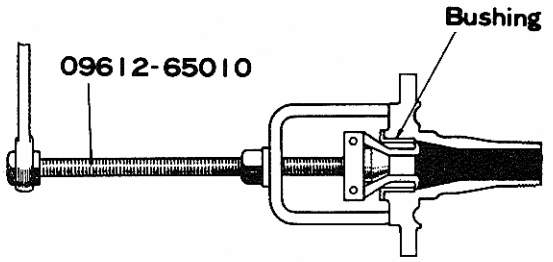


Fig.5-11 Bushing Removal G2419

   b. Install the bushing into the steering knuckle spindle with the Front Axle & Drive Shaft Bearing Replacer 09618-60010 and a press.

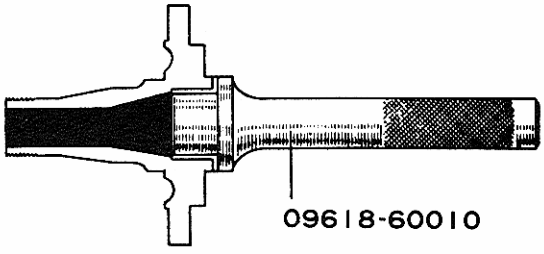


Fig.5-12 Bushing Installation G2420

7. Inspect the bearing fitting portions and the oil seal contact surface on the steering knuckle spindle for scores, pits or wear.

8. Check the steering knuckle arm, steering knuckle and the front alxe hub for cracks or other defects.

9. Check the bearings for roughness, wear and rusty condition.
Check the bearing for abnormal noise or damage by rotating the bearing after applying few drops of oil.

a. If necessary, remove the bearing cups from the axle housing with the Steering Worm Bearing Puller 09612-65010.

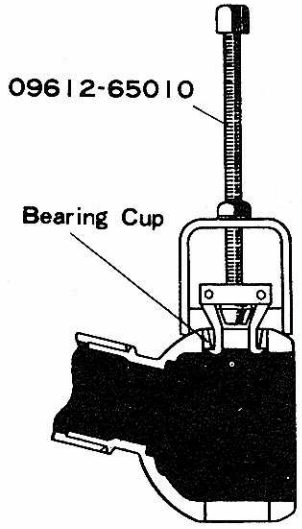


Fig.5-13 Knuckle Bearing Cup Removal G2421

b. To install, use the Steering Knuckle Bearing Cup Replacer 09605-60010 and drive the bearing cups into the axle housing.

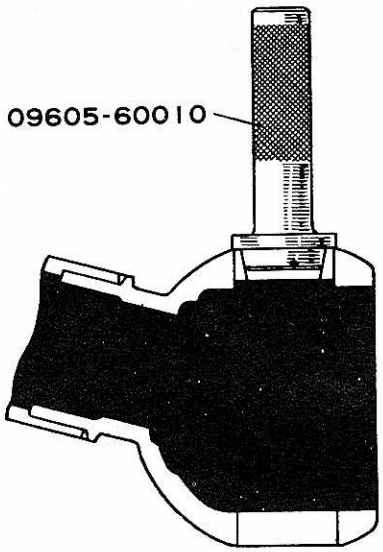


Fig.5-14 Knuckle Bearing Cup Installation G2422

c. Drive out the inside bearing cup from the front axle hub using a brass rod.
Next, drive out the outside bearing cup in the same manner.

d. Drive the bearing cups into the front axle hub with a brass rod.
Lubricate the inside bearing with multipurpose grease, and install it into the front axle hub.
Next, install a new oil seal into the front axle hub.

Adiustment

Before assembling the steering knuckle onto the axle housing, the following adjustment should be performed.
The purpose of using the Steering Knuckle Centering Gauge 09634-60012 is to obtain true horizontal and vertical alignments of the front axle with respect to the ball joint through the outer shaft, ball joint through the axle inner shaft, and the steering knuckle upper bearing through the ball joint and the steering knuckle lower bearing.
Effecting the adjustments using the Steering Knuckle Centering Gauge, premature wear of the axle inner shaft bushing and outer shaft bushing and abnormal vibra-

tions produced while making a sharp turn on a curve can be reduced to a great extent.
Before proceeding with the adjustments, remove all grease from the related parts. Dry and inspect each part for wear and other defects, and replace if necessary.

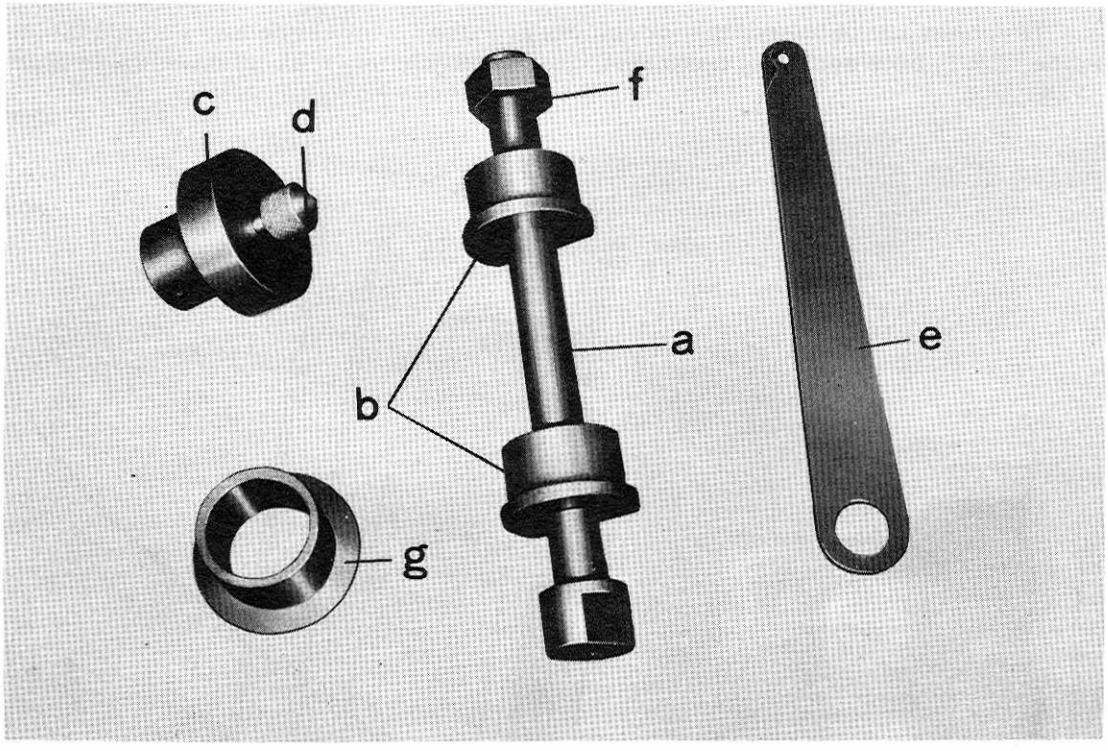


Fig.5-15 Steering Knuckle Centering Gauge V5148

1. Steering knuckle bearing pre-load.

a. Install the centering gauge adapter (c) with the plug (d) into the axle inner shaft bushing.
Caution:
The axle shaft of the birfield joint type is not provided with the bushing in the axle housing, therefore, before installing the centering gauge adapter (c), remove the oil seal in the axle housing end, and the centering gauge adapter (g) should be installed instead of the axle inner shaft bushing into the axle housing end, and then install the centering gauge adapter (c) with the plug (d) into the axle housing.

b. Install the centering gauge attachment (b) and the steering knuckle lower bearing onto the centering gauge rod (a), then assemble the centering gauge rod onto the axle housing end from the bottom as illustrated in figure 5-16.

c. Next, install the steering knuckle upper bearing, centering gauge attachment (b) and the centering gauge lever (e) onto the centering gauge rod (a), then install and tighten the centering gauge nut (f), but do not tighten excessively.

d. Attach a pull-scale to the end of the centering gauge lever (e), and while exerting a steady pull on the pull-scale at right angle to the lever, note the reading on the pull-scale.
If the reading is not within 2.0 ~ 2.5 kg (4.4 ~ 5.5 lb), loosen or tighten the nut until the specified pre-load is obtained.

e. After having obtained the specified pre-load, measure and record the distance "A" between the centering gauge attachments as illustrated in figure 5-16.

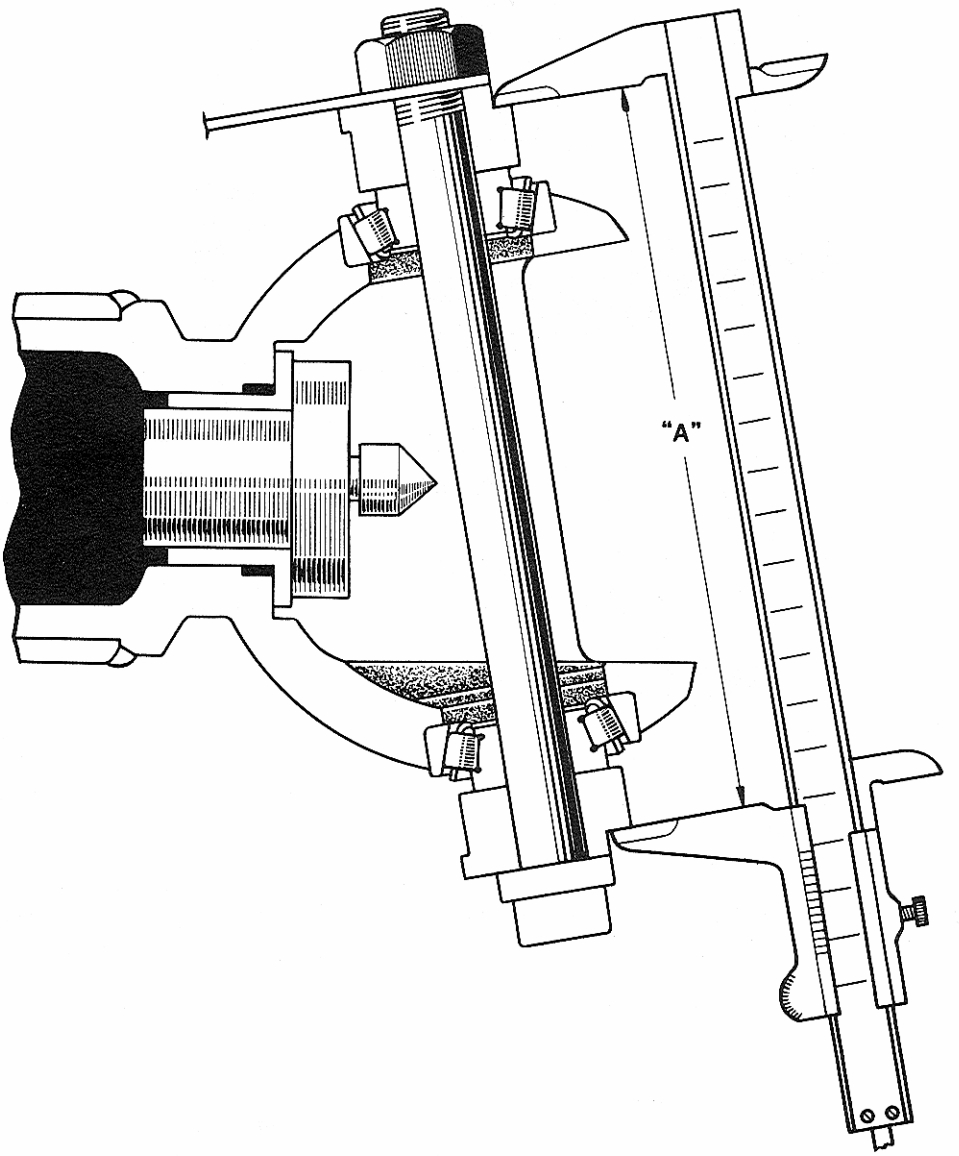


Fig.5-16 Measuring Distance "A" G2423

f. Measure and record the height "B" of the steering knuckle as illustrated in figure 5-17.

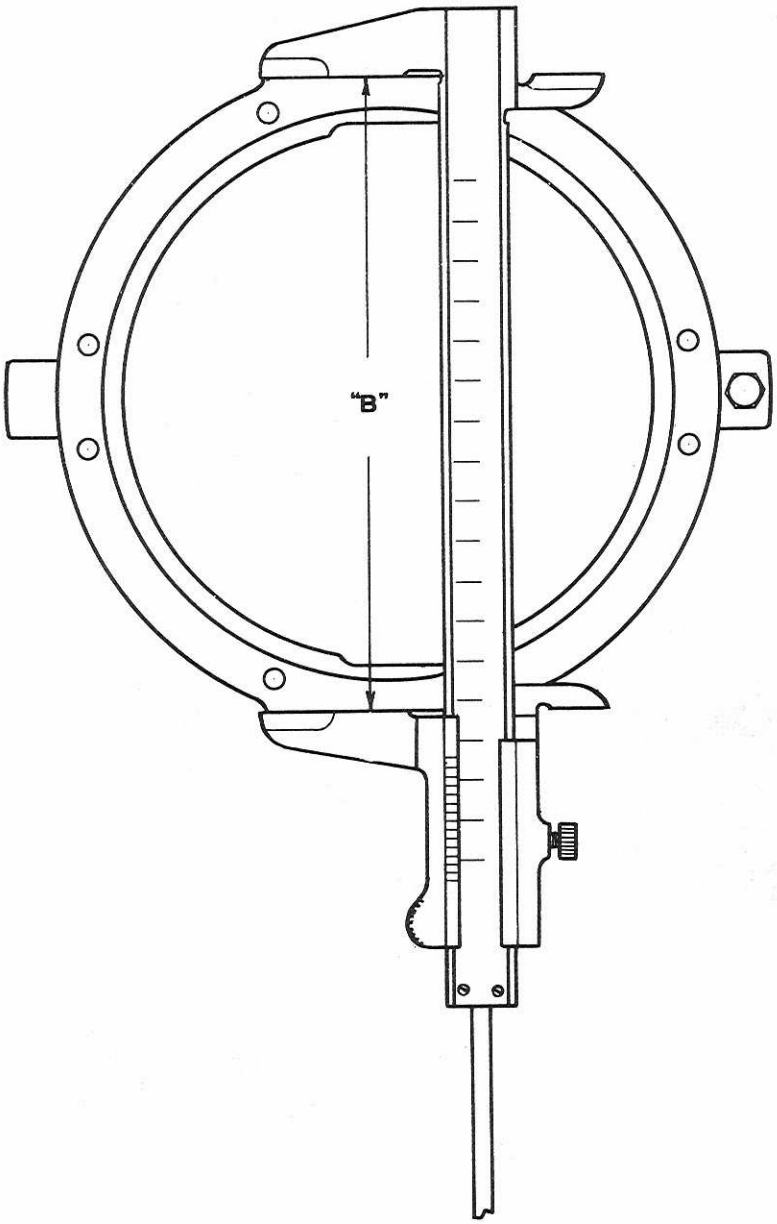


Fig.5-17 Measuring Height of Steering Knuckle G2424

g. The difference between "A" and "B" is the total adjusting shim thickness that is required to maintain the correct bearing pre-load.

Total adjusting shim thickness "C" equals "A" minus "B".

Adjustment of upper and lower adjusting shim thickness.

Perform the following procedure with the Steering Knuckle Centering Gauge 09634-60012 in the assembled condition as per the previous paragraph.

a. Apply thin coat of red-lead onto the middle part of the centering gauge

rod so that a line can be produced when the centering gauge rod is revolved with respect to the plug.
Now, revolve the centering gauge rod while pressing the plug against the centering gauge rod and adapter against the bushing to produce a clear line around the centering gauge rod as illustrated in figure 5-18.

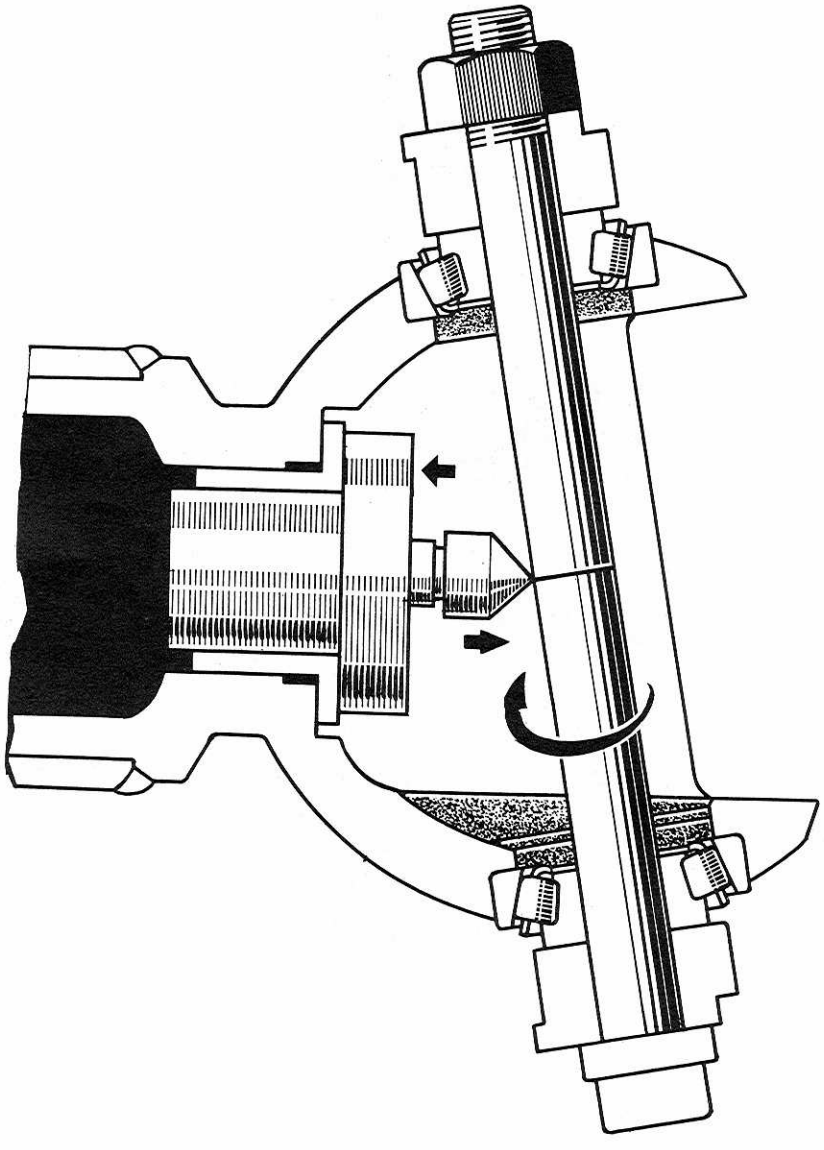


Fig.5-18 Scribing a Line on Centering Gauge Rod G2425

b. Taking care not to rub off the scribed line on the centering gauge rod, remove the Steering Knuckle Centering Gauge from the axle housing.

c. Install the steering knuckle spindle onto the steering knuckle, and tighten the bolts to 1.5 ~ 2.2 m-kg (11 ~ 16 ft-lb) torque.
Next, install the centering gauge adapter (c) with the plug (d) into the steer

ing knuckle spindle, and install the centering gauge rod (a) and attachments (b) into the steering knuckle as illustrated in figure 5-19, and tighten the nut (f).

d. Mark another line on the centering gauge rod by revolving the centering gauge rod in the steering knuckle in the same manner as performed in paragraph 2-a.

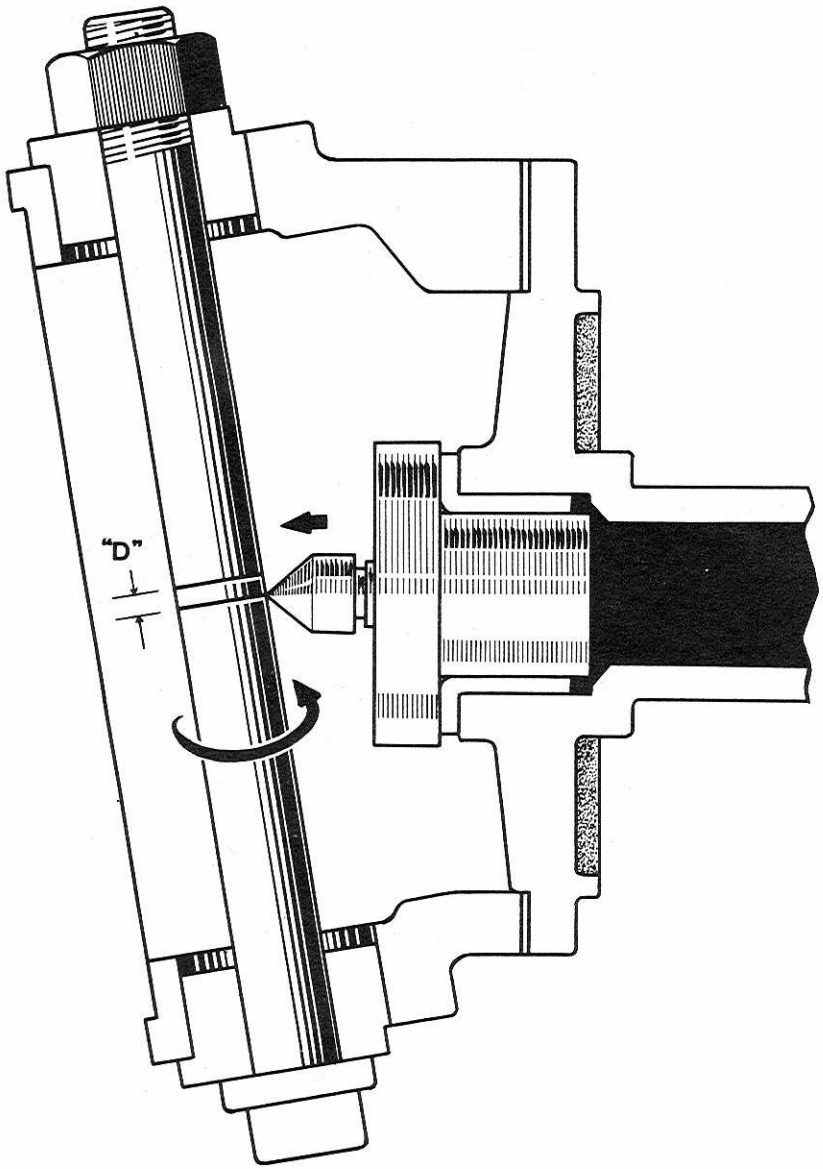


Fig.5-19 Scribing a Line on Centering Gauge Rod G2426

e. Measure and record the distance "D" between the two scribed lines on the centering gauge rod.
Subtract 3 mm from the distance "D" just obtained.
The difference will be the adjusting shim thickness required for the steering knuckle lower bearing.

Lower bearing adjusting shim thickness "E" equals "D" minus 3 mm.

f. Steering knuckle upper bearing adjusting shim thickness will be determined by subtracting "E" from the total adjusting shim thickness "C". Upper bearing adjusting shim thickness equal "C" minus "E".
The knuckle bearing adjusting shims are provided as follows.
Part No. 43233-60010 - Thickness: 0.2 mm (0.008")
Part No. 43234-60010 - Thickness: 0.5 mm (0.020")

3. Adjustment of the shaft thrust clearance.

a. To check the axle inner shaft thrust clearance, install the Steering Knuckle Centering Gauge 09634-60012 onto the axle housing as described in the previous paragraph 1, and check the clearance between the plug (d) and the centering gauge rod (a) with a feeler gauge. This clearance is the thrust clearance between the bushing and the axle inner shaft. This clearance should be 0.5 ~ 1.0 mm (0.02 ~ 0.04"). Select and fit the front axle shaft spacer to obtain the specified clearance. The front axle shaft spacers are special service parts, and are provided as follows.
Part No. 04002-20160 - Thickness: 1.0 mm (0.04")
Part No. 04002-20460 - Thickness: 1.5 mm (0.06")
Part No. 04002-20560 - Thickness: 2.0 mm (0.08")

b. To check the outer shaft thrust clearance, install the Steering Knuckle Centering Gauge onto the steering knuckle as described in the previous paragraph 2-c, and check the clearance between the plug (d) and the centering gauge rod (a) with a feeler gauge. This clearance should be also 0.5 ~ 1. mm (0.02 ~ 0.04"). If necessary, adjust by selecting the front axle shaft spacer to obtain the specified clearance.

Assembly & Installation

When assembling, the oil seals, gaskets and the lock washers should be replaced.
To provide initial lubrication, apply a thin coating of multipurpose grease on all rotating or sliding portions, and the bearings before installation.

1. Place the steering knuckle oil seal set onto the axle housing.

2. Place the steering knuckle upper and lower bearings onto the bearing cups in the axle housing, then install the steering knuckle.

3. Install the steering knuckle bearing adjusting shims which were determined during the previous adjustment onto the steering knuckle arm, and then install the steering knuckle arm with the adjusting shims onto the steering knuckle. Next, install the steering knuckle bearing cap and the bearing adjusting shims onto the steering knuckle into the bearing.

4. Insert the dowels into the steering knuckle arm, and the steering knuckle bearing cap, then tighten the retaining nuts to 6 ~ 7.5 m-kg (43 ~ 54 ft-lb) torque.

5. Next, check the bearing pre-load of the steering knuckle.
Attach a pull-scale to the end hole of the steering knuckle arm at right angle.
The reading of the pull-scale should be 1.8 ~ 2.3 kg (3.9 ~ 5.0 lb).
If necessary, re-adjust the bearing pre-load.

Caution:

1. Preload checking should be performed without the axle shaft, steering knuckle spindle, and etc.
2. Install the same number of steering knuckle bearing adjusting shims which were determined at the previous adjustment on both upper and lower of the steering knuckle.

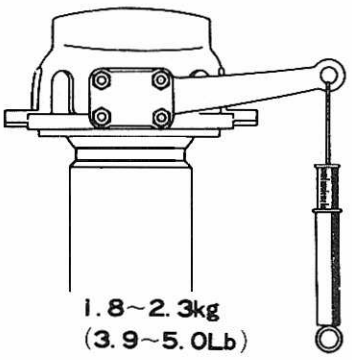


Fig.5-20 Checking Steering Knuckle Bearing Pre-load G2427

6. Install the front axle shaft spacer which were determined at the previous adjustment onto the axle inner shaft, and then install the axle inner shaft into position until the splines on the shaft end is fully meshed with the differential side gear splines.

7. Pack the steering knuckle with multupurpose grease to about 3/4 of the interior area.
   Place the front drive joint ball onto the axle inner shaft.

8. Install the outer shaft and the front axle shaft spacer into the steering knuckle spindle, and then install the steering knuckle spindle with the gasket onto the steering knuckle.

9. Assemble the brake backing plate with the knuckle spindle oil retainer and the gasket onto the steering knuckle spindle.
   Tighten the backing plate retaining bolts to 1.5 ~ 2.2 m-kg (11 ~ 16 ft-lb) torque, and secure with a steel wire.
   Install the steering knuckle oil seal covers and secure the retaining screws.

10. Pack the axle hub with multipurpose grease, and assemble the axle hub together with the brake drum onto the steering knuckle spindle, then install the axle hub outer bearing.

11. Install the claw washer and tighten the front wheel adjusting nut with the Front Wheel Adjusting Nut Wrench 09607-60010.
    Rotate the brake drum to-and-fro to seat the bearings into place. Next, loosen the adjusting nut 1/8 to 1/6 of a turn, and check the brake drum rotation.
    If the brake drum rotates properly, install the lock washer and tighten the lock nut with the Front Wheel Adjusting Nut Wrench 09607-60010. Bend the tabs of the lock washer, and lock the nuts.

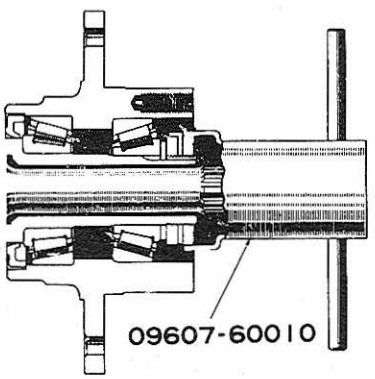


Fig.5-21 Tightening Lock Nut G2414

12. After the adjustment, install the

axle outer shaft flange with the gasket.
Tighten the flange retaining bolts to 1.5 ~ 2.2 m-kg (11 ~ 16 ft-lb) torque.

13. Install the shaft snap ring onto the outer shaft.
Install a bolt into the outer shaft end, and while pulling the outer shaft outward install the snap ring onto the shaft.
Install the axle outer shaft flange cap onto the outer shaft flange.

14. Check if the axle shaft is free from binding in the steering knuckle spindle by turning the steering knuckle from one extreme end to the other.

15. Connect the steering tie-rod end with the steering knuckle arm, and tighten the nut securely.
Install the cotter pin.

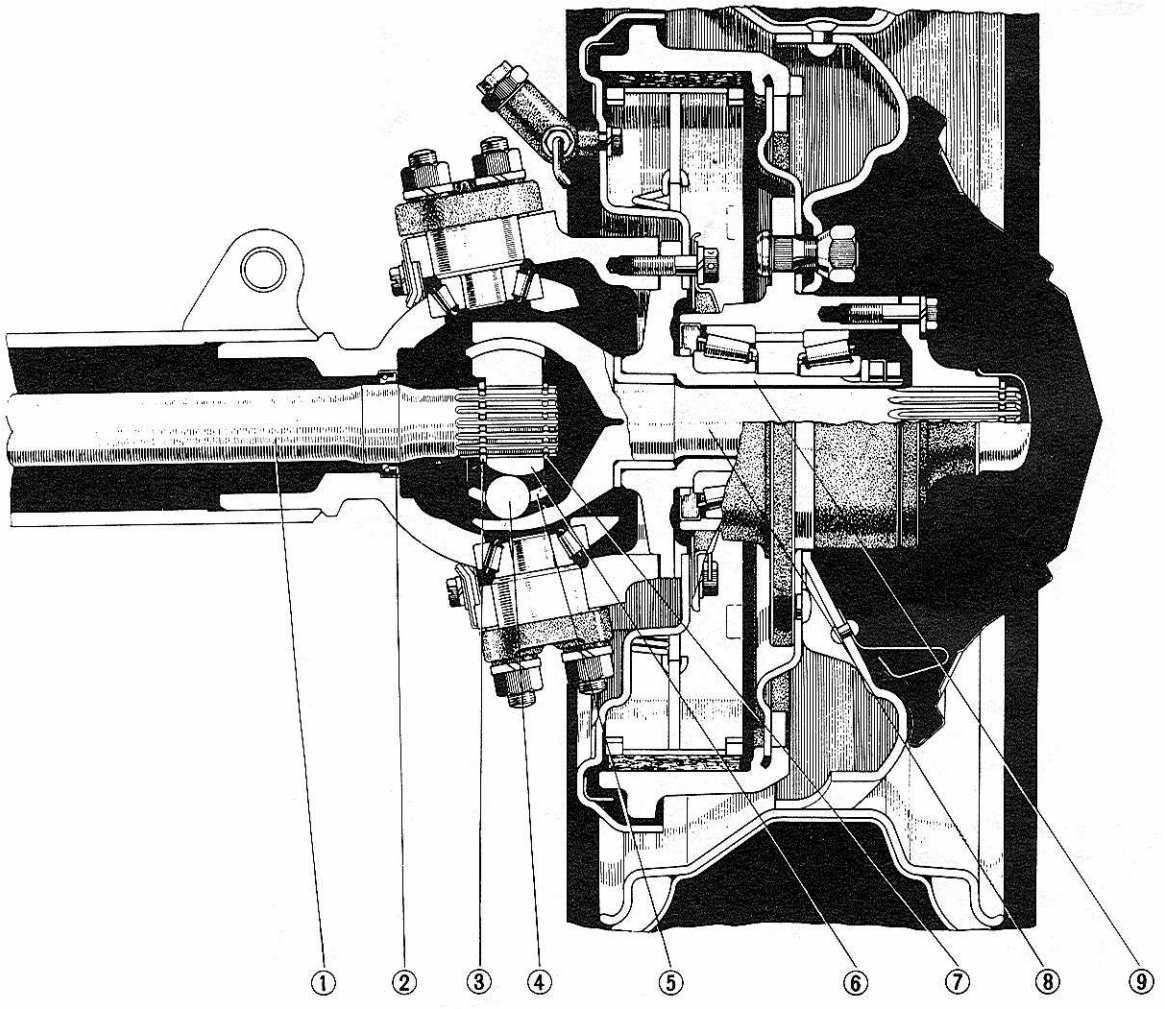
16. Connect the brake flexible hose with the brake tube.
Bleed the air from the hydraulic line.
Adjust the brakes. Refer to Brake Adjustment on page 7-5.

17. Install the wheel, remove the stands and lower the vehicle onto the ground.
Tighten the hub nuts securely, and fit the wheel cap.

18. During road testing of the vehicle, check the ease of the steering control, by turning the steering wheel to the right and to the left.

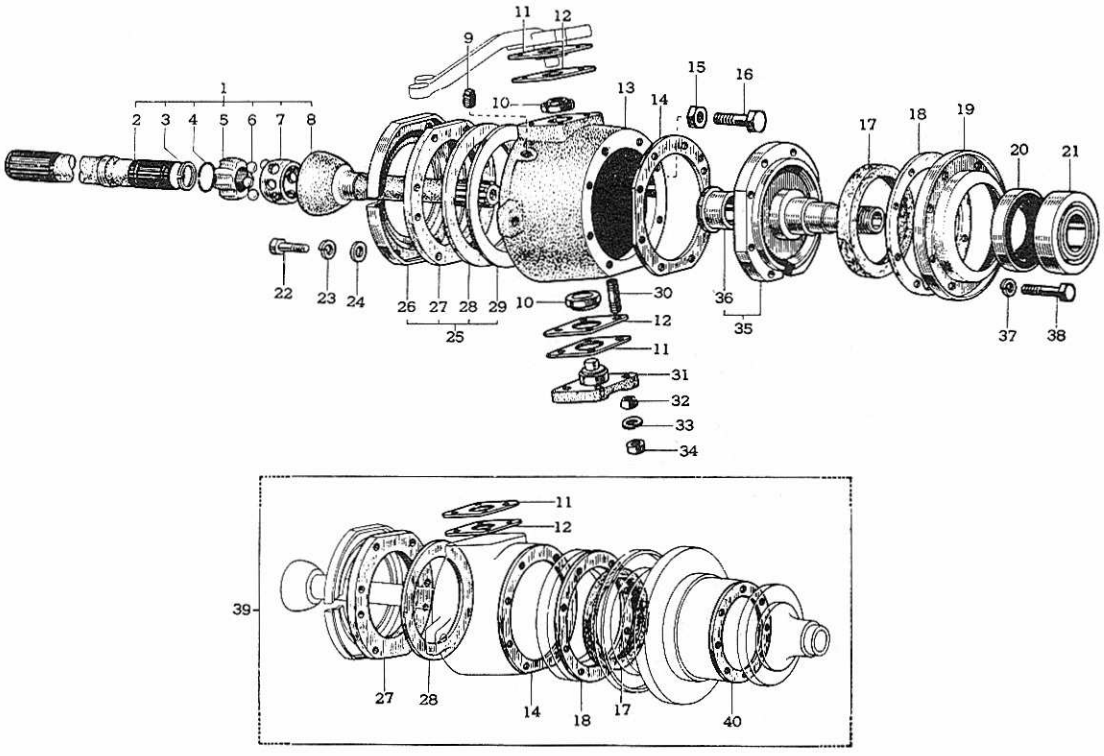
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Birfield Constant Velocity Joint Type



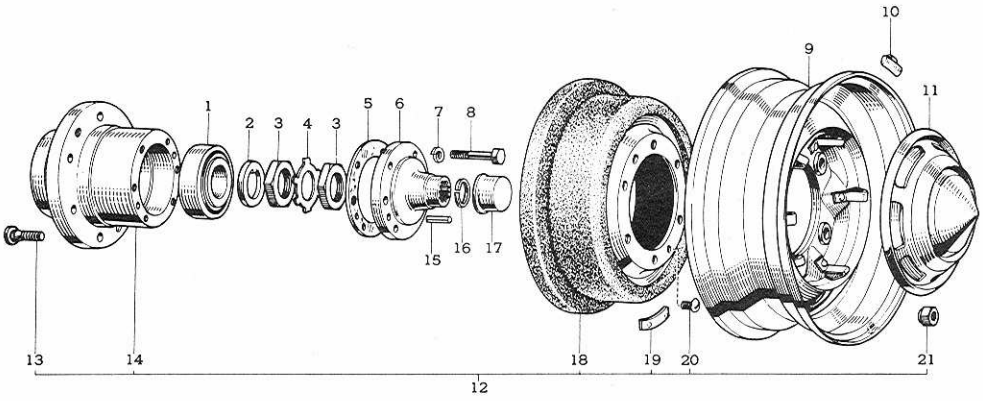
1. Front axle inner shaft
2. Oil seal
3. Shaft snap ring
4. Bearing ball
5. Joint cage
6. Joint inner race
7. Shaft snap ring
8. Front axle outer shaft
9. Steering knuckle spindle

Fig.5-22 Cross Section View of Steering Knuckle & Axle Shaft Y5732



1. Front drive shaft assembly
2. Axle inner shaft
3. Shaft snap ring
4. Shaft snap ring
5. Joint inner race
6. Ball
7. Joint cage
8. Axle outer shaft
9. Plug
10. Steering knuckle bearing
11. Adjusting shim No.1
12. Adjusting shim No.2
13. Steering knuckle
14. Gasket
15. Lock nut
16. Bolt
17. Dust seal
18. Oil retainer gasket
19. Oil retainer
20. Oil seal
21. Axle hub inner bearing
22. Bolt
23. Lock washer
24. Washer
25. Oil seal set
26. Oil seal cover
27. Outer oil seal
28. Inner oil seal
29. Oil seal inner ring
30. Stud bolt
31. Steering knuckle bearing cap
32. Dowel
33. Lock washer
34. Nut
35. Steering knuckle spindle
36. Bushing
37. Lock washer
38. Bolt
39. Front axle gasket kit
40. Flange gasket

Fig. 5-23 Steering Knuckle & Axle Shaft Components G2440



1. Axle hub outer bearing
2. Claw washer
3. Front wheel adjusting nut
4. Lock washer
5. Flange gasket
6. Axle outer shaft flange
7. Lock washer
8. Bolt
9. Disc wheel
10. Balance weight
11. Wheel cap
12. Front axle hub & brake drum assembly
13. Hub bolt
14. Front axle hub
15. Straight pin
16. Shaft snap ring
17. Axle outer shaft flange cap
18. Brake drum
19. Balance piece
20. Brake drum set screw
21. Hub nut

Fig.5-24 Front Disc Wheel & Drum Components G2441

Removal & Disassembly

1. Pry off the wheel cap, and loosen the hub nuts.

2. Jack up the front axle housing, and support the axle housing with stands.

3. Remove the hub nuts and remove the wheel.

4. Plug the brake master cylinder reservoir to prevent brake fluid from running out from the disconnect the brake flexible hose.

5. Remove the axle outer shaft flange cap, and then remove the shaft snap ring from the axle outer shaft.

6. Remove the axle outer shaft flange retaining bolts, then next, screw in the two service bolts into the shaft flange alternately, and remove the shaft flange with the gasket.

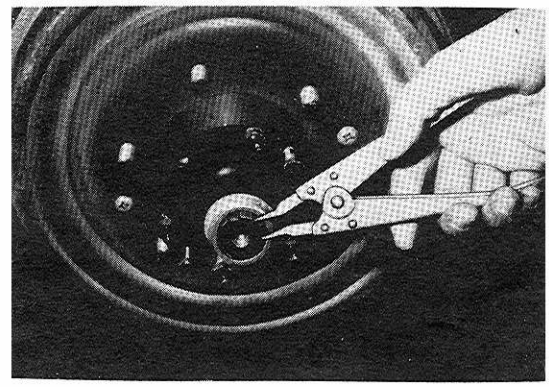


Fig.5-25 Removing Shaft Snap Ring V5107

7. Remove the brake drum set screws and remove the brake drum.

8. Straighten the lock washer tabs, and remove the front wheel adjusting nuts with the Front Wheel Adjusting Nut Wrench 09607-60010.

9. Remove the front axle hub with the claw washer, bearing and the oil seal.

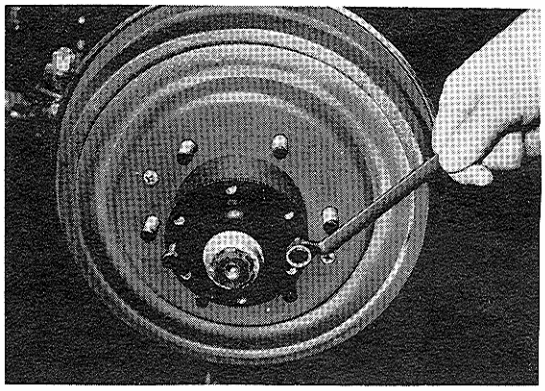


Fig.5-26 Removing Axle Outer Shaft Flange V5108

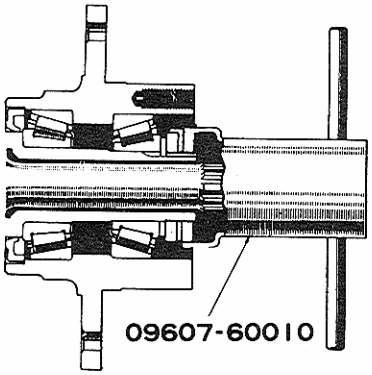


Fig.5-27 Front Wheel Adjusting Nut Removal G2414

10. Remove the clip, and disconnect the brake flexible hose from the brake tube.

11. Cut and remove the lock wire, and remove the bolts retaining the brake backing plate onto the steering knuckle.
Remove the brake backing plate assembly.

12. Tap the steering knuckle spindle lightly with a mallet, and remove it with the gasket.

13. Pull out the front drive shaft assembly from the axle housing.

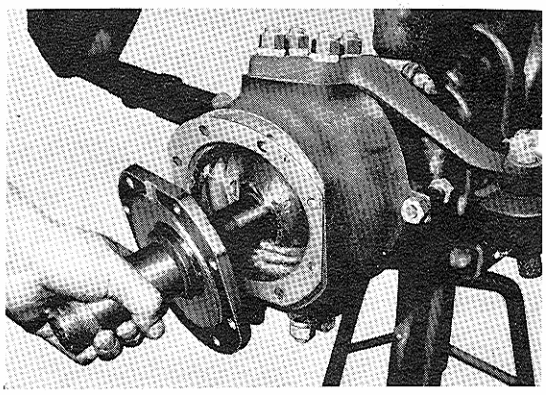


Fig.5-28 Removing Steering Knuckle Spindle V5109

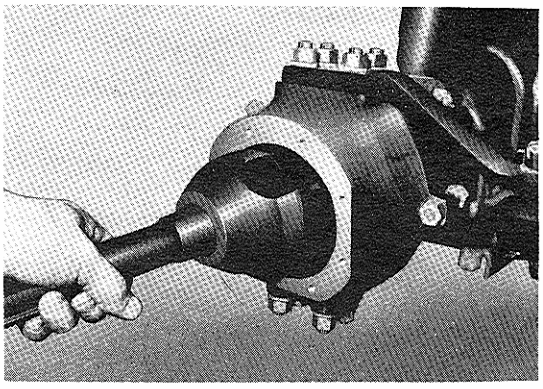


Fig.5-29 Removing Front Drive Shaft V5110

14. Remove the steering knuckle oil seal covers.

15. Disconnect the tie-rod end from the steering knuckle arm using the Tie-rod End Puller 09611-20011.

16. Remove the nuts retaining the steering knuckle arm on the steering knuckle.
Next, hold a short drift firmly onto the side of the dowel, and strike it sharply to loosen the dowel.
Remove the dowels from the steering knuckle arm.

17. Next, using the Steering Knuckle Bearing Remover 09606-60010 remove the steering knuckle arm from the steering knuckle.

Caution:
Do not lose the steering knuckle adjusting shims which are installed between the steering knuckle arm

and the steering knuckle. Record the position, and thickness of the shims so that they can be installed in their original location.

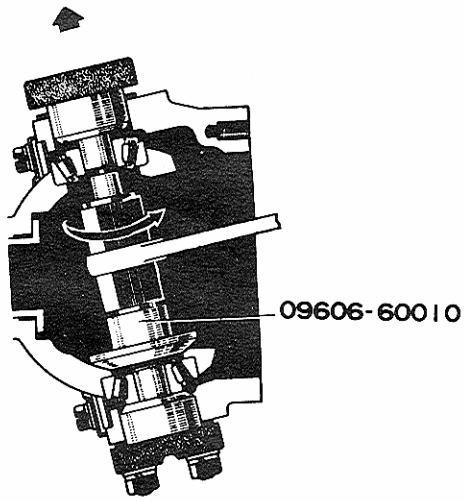


Fig. 5-30 Steering Knuckle G2415 Arm Removal

18. Remove the steering knuckle bearing cap retaining nuts, and the dowels in the same manner as in paragraph 16.

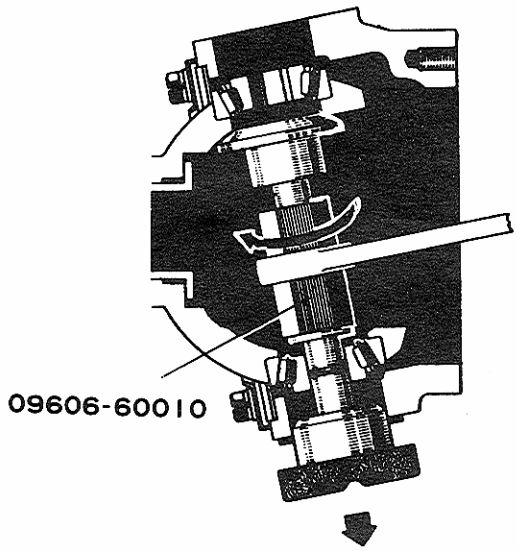


Fig. 5-31 Steering Knuckle G2416 Bearing Cap Removal

Next, remove the steering knuckle bearing cap with the Steering Knuckle Bearing Remover 09606-60010.
Remove the steering knuckle adjusting shims.

19. Be careful not to drop the steering knuckle bearings onto the ground, and remove the steering knuckle with the bearings from the axle housing.

20. Remove the steering knuckle outer and inner oil seals from the axle housing.

21. Pry off the oil seal in the front axle hub with a screwdriver, and remove the bearing from the front axle hub.

Inspection & Repair

Clean all disassembled parts thoroughly with cleaning solvent and dry with compressed air.
Inspect the following parts, and replace if defective.

1. Inspect the splines on the front drive shaft end for chips, nicks or excessive wear.

2. Check the oil seal and bushing contact surface on the front drive shaft for scores or excessive wear.

3. Check the joint of the front drive shaft for smooth operation, and if necessary, replace the defective parts.
Inspect each of the disassembled parts for wear, scores and cracks.

a. To disassemble the joint, secure the front axle inner shaft in a vise, and apply a brass rod against the joint inner race, and drive out the front axle outer shaft with the joint inner race off the front axle inner shaft.

The snap ring on the front axle inner shaft end will break by the impact.

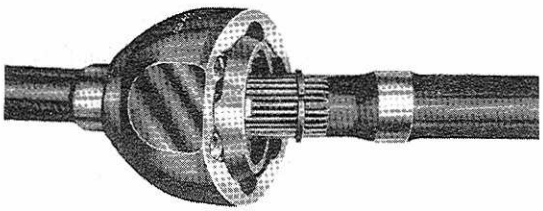


Fig.5-32 Joint Disassembly V3947

b. Push down on one side of the joint inner race, and remove the bearing ball onto the other side from the cage.
In the same manner, remove the rest of the bearing balls.

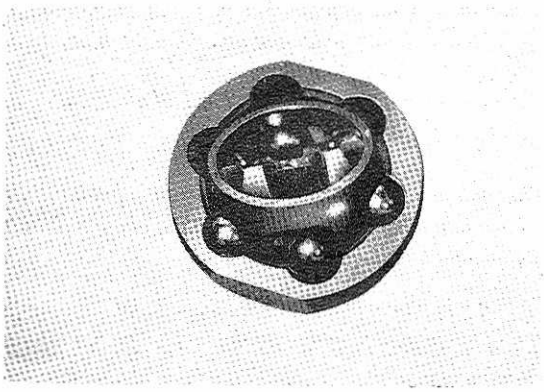


Fig.5-33 Bearing Ball Removal V5111

c. The cage has two large openings among the six which are symmetrically located.
Turn the cage together with the joint inner race in the housing of the front axle outer shaft 1/2 of a turn to bring them to upright position.
Through the openings, manage to remove both parts out of the housing.

d. Through the large openings, remove the joint inner race from the cage.

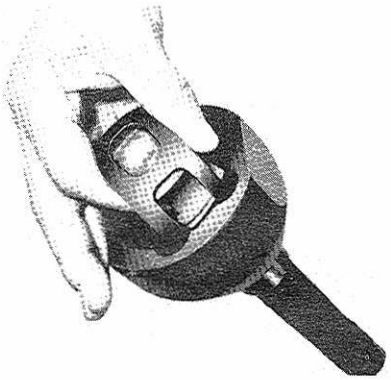


Fig.5-34 Removing Cage & Joint Inner Race V5112

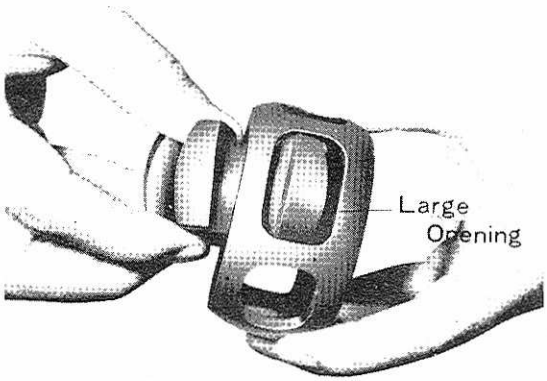


Fig.5-35 Removing Joint Inner Race V5113

e. Before assembly, lubricate the joint related parts with multipurpose grease.
To assemble, install the joint inner race into the joint cage with the flat end of the joint inner race facing towards the joint cage narrower side.

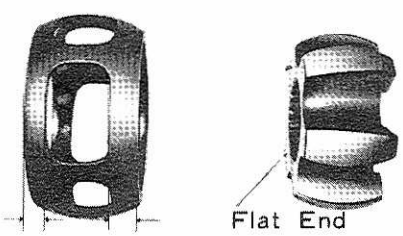


Fig.5-36 Joint Inner Race & Joint Cage V5114

f. Assemble the joint cage and the joint inner race into the housing of the front axle outer shaft with the protrusions of the joint inner race facing outward, then assemble the bearing balls into the cage.

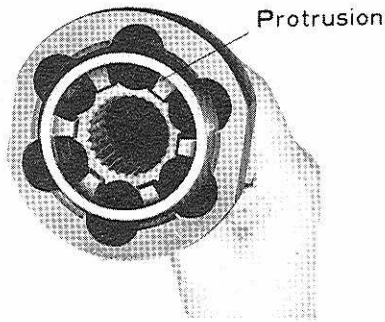


Fig.5-37 Joint Inner Race & Cage Assembly V5115

g. Install a new snap ring (inner) into the groove of the front axle inner shaft end. Squeeze the snap ring, and fit the axle inner shaft into the joint inner race until the outer shaft snap ring contacts with the inner race. With the front axle inner shaft in this position, the inner shaft snap ring will expand to lock the front axle inner shaft in place.

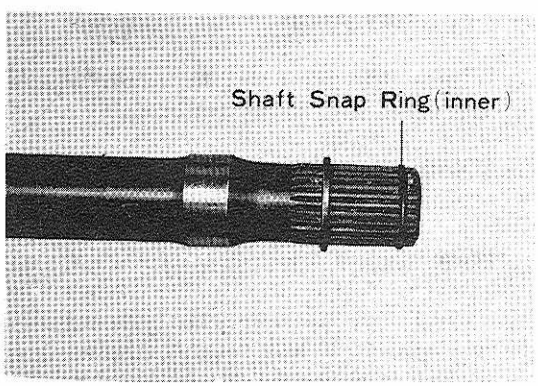


Fig.5-38 Shaft Snap Ring Installation V5116

h. Check the assembled joint for smooth movement.

4. Inspect the bushing in the steering knuckle spindle for scores, excessive wear or other defects. If necessary, replace the bushing.

a. To remove, use the Steering Worm Bearing Puller 09612-65010 and remove the bushing from the steering knuckle spindle.

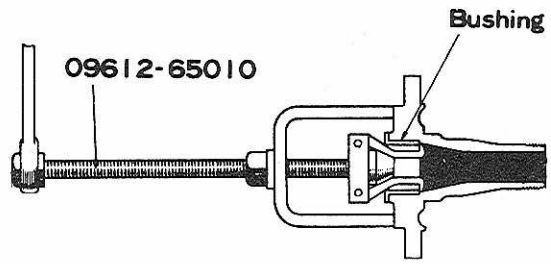


Fig.5-39 Bushing Removal G2419

b. Install the bushing into the steering knuckle spindle with the Front Axle & Drive Shaft Bearing Replacer 09618-60010 and a press.

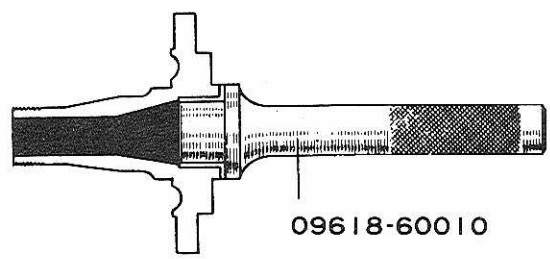


Fig.5-40 Bushing Installation G2420

5. Inspect the bearing fitting portions and the oil seal contacting surface on the steering knuckle spindle for scores, pits or wear.

6. Check the steering knuckle arm, steering knuckle and the front axle hub for cracks or other defects.

7. Check the bearings for roughness, wear and rusty condition.
Check the bearing for abnormal noise or damage by rotating the bearings after applying few drops

of oil.

a. If necessary, remove the bearing cups from the axle housing with the Steering Worm Bearing Puller 09612-65010.

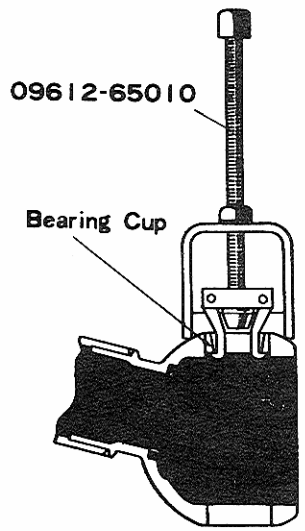


Fig.5-41 Knuckle Bearing Cup Removal G2421

b. To install, use the Steering Knuckle Bearing Cup Replacer 09605-60010, and drive the bearing cups into the axle housing.

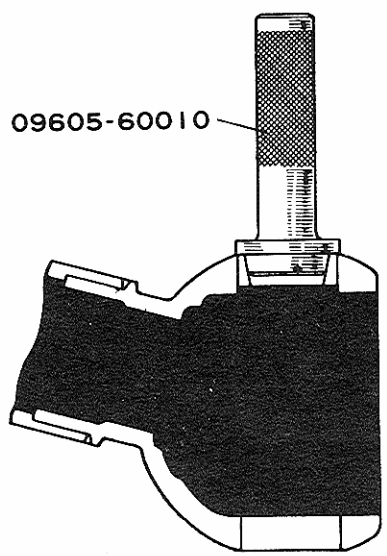


Fig.5-42 Knuckle Bearing Cup Installation G2422

c. Drive out the inside bearing cup from the front axle hub with a brass rod.
Next, drive out the outside bearing cup in the same manner.

d. Drive the bearing cups into the front axle hub with a brass rod.
Lubricate the inside bearing with multipurpose grease, and install it into the front axle hub.
Next, install a new oil seal into the front axle hub.

Adjustment

Before assembling the steering knuckle onto the axle housing, the following adjustment should be performed.
For adjustment, refer to Adjustment on page 5-10.

1. Steering knuckle bearing pre-load.

2. Adjustment of upper and lower adjusting shim thickness.

Assembly & Installation

When assembling, the oil seals, gaskets and the lock washer should be replaced.
Lubricate with multipurpose grease before installation.

1. Place the steering knuckle oil seal set onto the axle housing.

2. Place the steering knuckle upper and lower bearings onto the bearing cups into the axle housing, then install the steering knuckle.

3. Install the steering knuckle adjusting shims which were determined at the previous adjustment onto the steering knuckle arm, and then install the steering knuckle arm with the adjusting shims onto the steering knuckle.
Next, install the steering knuckle bearing cap and the bearing adjusting shims onto the steering knuckle into the bearing.

4. Insert the dowels into the knuckle arm, and install the steering knuckle bearing cap, then tighten the retaining nuts to 6.0 ~ 7.5 m-kg (43 ~ 54 ft-lb) torque.

5. Next, check the steering knuckle bearing pre-load by attaching a pull-scale to the end hole of the steering knuckle arm at right angle. The reading of the pull-scale should be 1.8 ~ 2.3 kg (3.9 ~ 5.0 lb). If necessary, re-adjust the bearing pre-load.

Caution:

1. Pre-load checking should be performed without the front drive shaft, steering knuckle spindle, and etc.
2. Install the same number of the steering knuckle bearing adjusting shims which were determined at the previous adjustment on both upper and lower of the steering knuckle.

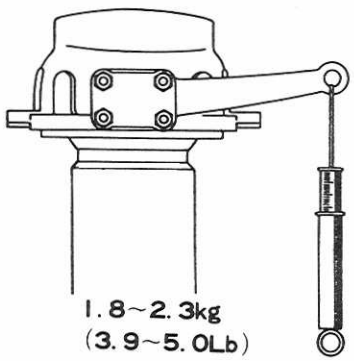


Fig.5-43 Checking Steering Knuckle Bearing Pre-load G2427

6. Install the steering knuckle oil seal covers onto the steering knuckle.

7. Install the front drive shaft into position until the splines on the shaft end is fully meshed with the differential side gear splines.

8. Pack the steering knuckle with multipurpose grease for about 3/4 of the interior area.

9. Assemble the steering knuckle spindle with the gasket.

10. Install the brake backing plate assembly onto the steering knuckle spindle.
Tighten the backing plate retaining bolts to 1.5 ~ 2.2 m-kg (11 ~ 16 ft-lb) torque, and secure with a new steel wire.

11. Pack the axle hub with multipurpose grease, and assemble the axle hub together with the brake drum onto the steering knuckle spindle, then install the axle hub outer bearing.

12. Install the claw washer and tighten the front wheel adjusting nut with the Front Wheel Adjusting Nut Wrench 09607-60010.
Rotate the brake drum to-and-fro to seat the bearings into place. Next, loosen the adjusting nut 1/8 to 1/6 of a turn, and check the brake drum rotation.
If the brake drum rotates properly, install the lock washer and tighten the lock nut securely with the Front Wheel Adjusting Nut Wrench 09607-60010.

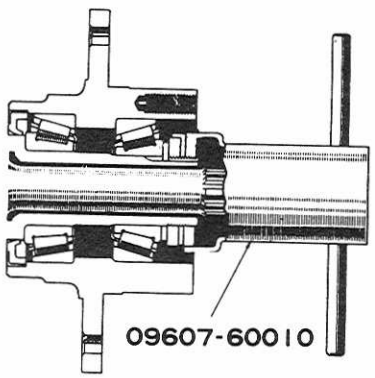


Fig.5-44 Tightening Lock Nut G2414

Bend the tabs of the lock washer, and lock the nuts.

13. Install the axle outer shaft flange with the gasket.
    Tighten the flange retaining bolts to 1.5 ~ 2.2 m-kg (11 ~ 16 ft-lb) torque.

14. Install a bolt into the outer shaft end, and while pulling the outer shaft, install the snap ring onto the shaft.
    Next, install the axle outer shaft flange cap onto the axle outer shaft flange.

15. Check if the front drive shaft is free from binding in the steering knuckle spindle by turning the steering knuckle from the extreme end to the other.

16. Connect the steering tie-rod end with the steering knuckle arm, and tighten the nut securely.

17. Connect the brake flexible hose to the brake tube.
    Bleed the air from the hydraulic line.
    Adjust the brakes. Refer to Brake Adjustment on page 7-5.

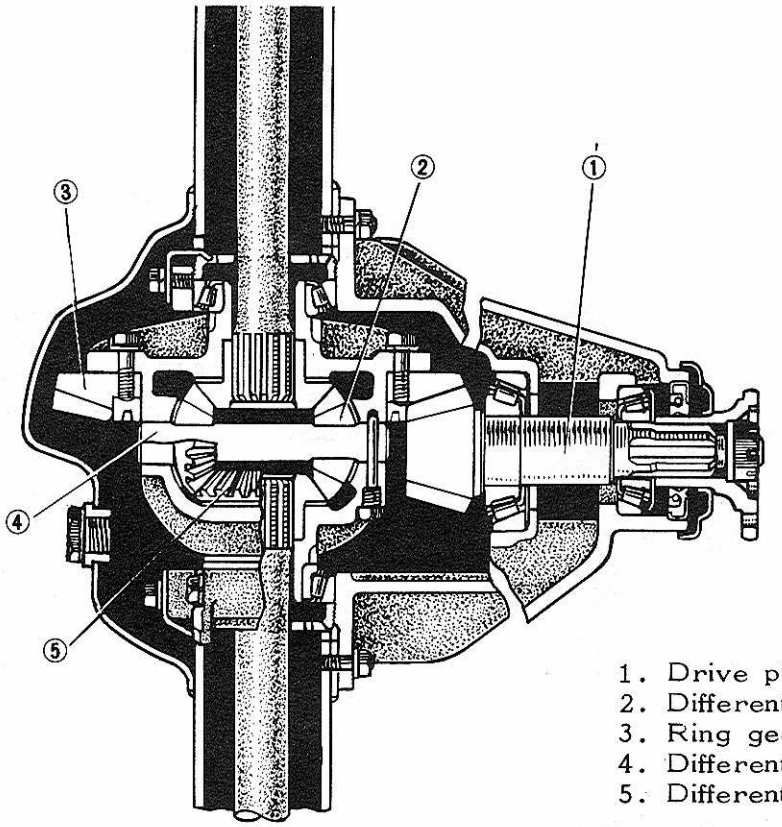
18. Install the wheel, remove the stands and lower the vehicle onto the ground.
    Tighten the hub nuts securely, and fit the wheel cap.

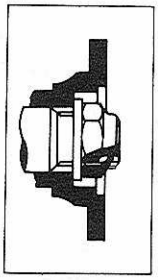
19. During road testing the vehicle, check the ease of the steering control, by turning the steering wheel to the right and to the left.

* *

DIFFERENTIAL

The differential on the front axle is of a hypoid gear type. As the construction of the front differential is almost identical with that utilized on the rear axle. For operation, and other procedures except Removal and Installation, refer to Differential in Rear Axle & Rear Suspension section.





NEW

1. Drive pinion
2. Differential pinion
3. Ring gear
4. Differential pinion shaft
5. Differential side gear

Fig.5-45 Cross Section of Front Differential G1327

Removal

1. Pry off the wheel caps, and loosen the hub nuts.
2. Jack up the front axle housing, and support the housing with stands.
3. Remove the hub nuts, and remove the wheels.
4. Remove the bolts and disconnect the front propeller shaft from the universal joint flange on the differential.
5. Drain the differential gear lubricant.
6. Remove the axle outer shaft flange cap, and then remove the shaft snap ring on the outer shaft.
7. Remove the axle outer shaft flange retaining bolts, and remove the axle outer shaft flange to screw in the two service bolts into the shaft flange alternately.
8. Straighten the lock washer, and remove the front wheel adjusting nuts with the Front Wheel Adjusting Nut Wrench 09607-60010.
9. Remove the brake drum together with the front axle hub.

10. Cut and remove the lock wire, and remove the bolts retaining the brake backing plate onto the steering knuckle without removing the brake flexible hose connection, then place the brake backing plate onto the front spring.

11. Remove the steering knuckle spindle with the gasket from the steering knuckle, and then remove the outer shaft, front drive ball joint and the front axle inner shaft.

12. Remove the nuts retaining the differential carrier onto the front axle housing, and remove the differential carrier assembly.

Installation

Follow the removal procedures in the reverse order.

1. When installing, all gaskets and lock washers should be replaced.

2. To prevent oil leak, apply liquid sealer onto the differential carrier gasket.

3. The tightening torque of the differential carrier retaining nuts should be 4.0 ~ 5.5 m-kg (29 ~ 40 ft-lb).

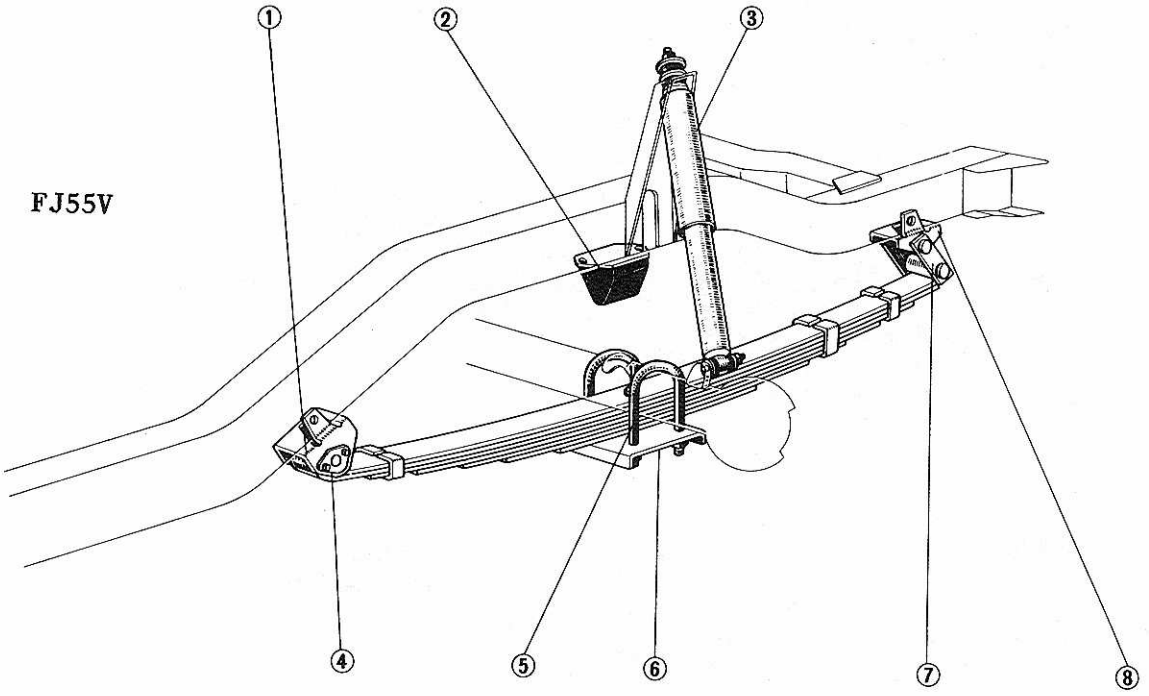
4. For adjustment of the front axle hub bearing, refer to Assembly & Installation (paragraph 11) on page 5-17.

5. Refill the axle housing with hypoid gear lubricant up-to the filler hole. Use grade SAE 90. The capacity is 2.5 liters (2.6 US qts., 2.2 Imp.qts).

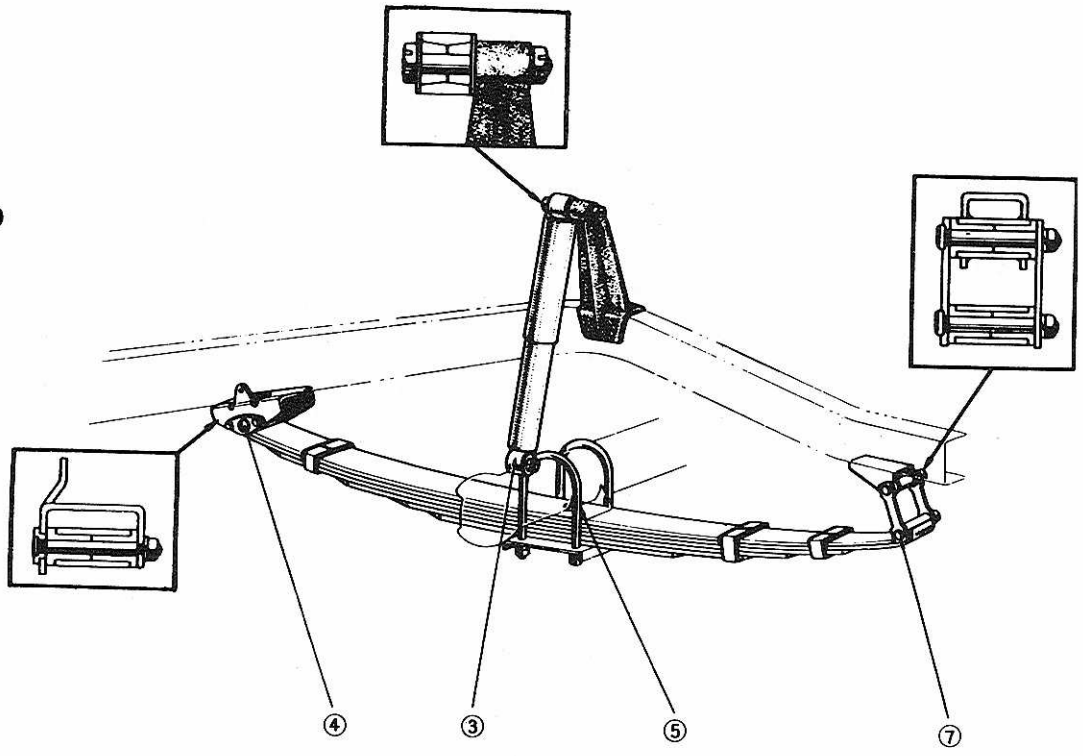
* *

FRONT SUSPENSION

FJ55V



FJ40



1. Spring bracket
2. Front spring bumper
3. Shock absorber
4. Spring bracket pin
5. U-bolt
6. Spring U-bolt seat
7. Spring shackle
8. Spring bracket

Fig.5-46 Front Suspension Components Y5733

Removal

1. Pry off the wheel cap, and loosen the hub nuts.
2. Jack up the front end of the vehicle and place stands under the frame and under the front axle housing.
3. Remove the hub nuts, and remove the wheel.
4. Remove the nuts, cushion, and the cushion retainer, then disconnect the shock absorber upper end from the bracket.
5. Remove the cotter pin and the nut at lower end of the shock absorber and then remove the shock absorber.
6. Loosen and remove the U-bolt nuts, and remove the U-bolt seat and the U-bolts.
7. Adjust the axle housing height with a jack until the weight is off the spring.
   Remove the nuts, and take out the spring shackle inner plate.
   Next, pry the spring shackle with a suitable bar, and remove the spring shackle and the rubber bushings.
8. Remove the two bolts retaining the spring bracket pin onto the spring bracket.
   Be careful and drive out the spring bracket pin, then remove the front spring.
   Remove the rubber bushings from the spring.

Inspection & Repair

Refer to Rear Suspension on page 4-21.

Installation

Follow the removal procedures in the reverse order.

Caution:

1. Make sure that the spring center bolt head is properly positioned in the hole provided in the spring seat on the axle housing.
2. The nuts on the spring shackle and the spring bracket pin must be tightened firmly after applying weight on the spring.
3. Tightening torque should be as follows:
   U-bolt nuts:
   6.9 ~ 9.7 m-kg (50 ~ 70 ft-lb)
   Spring shackle & spring bracket pin nut:
   5.0 ~ 8.0 m-kg (36 ~ 58 ft-lb)

* *

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DESCRIPTION

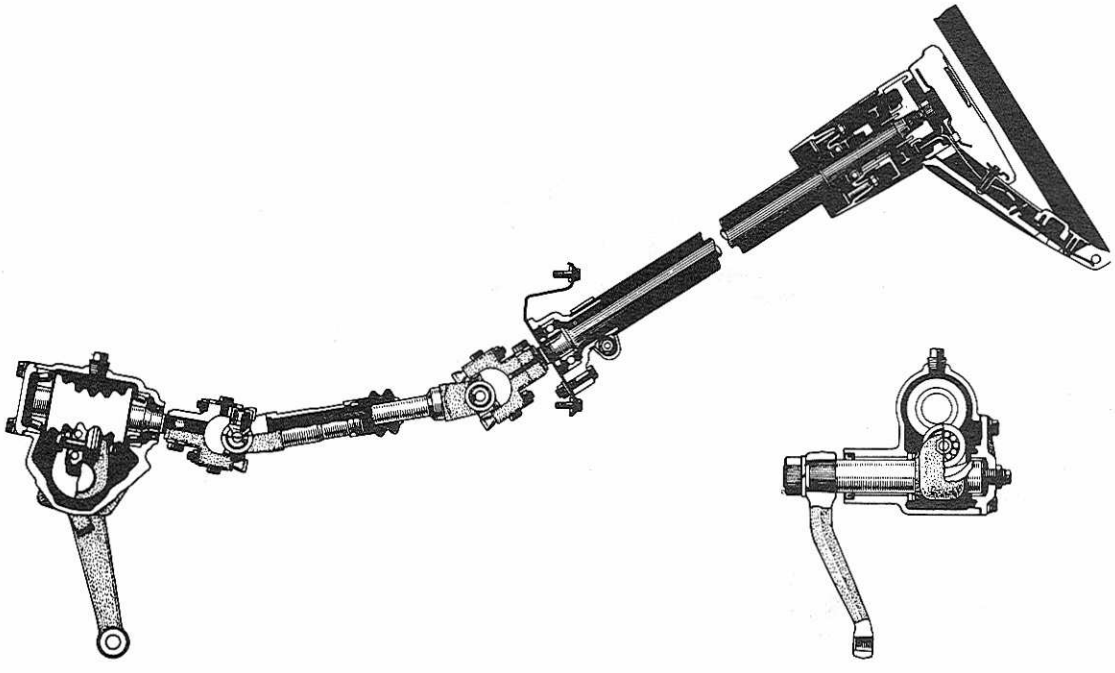


Fig.6-1 Steering Cross Section View G2442

The steering gear mechanism is of the worm and sector roller type with a gear ratio of 21 to 1, and the steering gear housing is of a unit constructed casting.

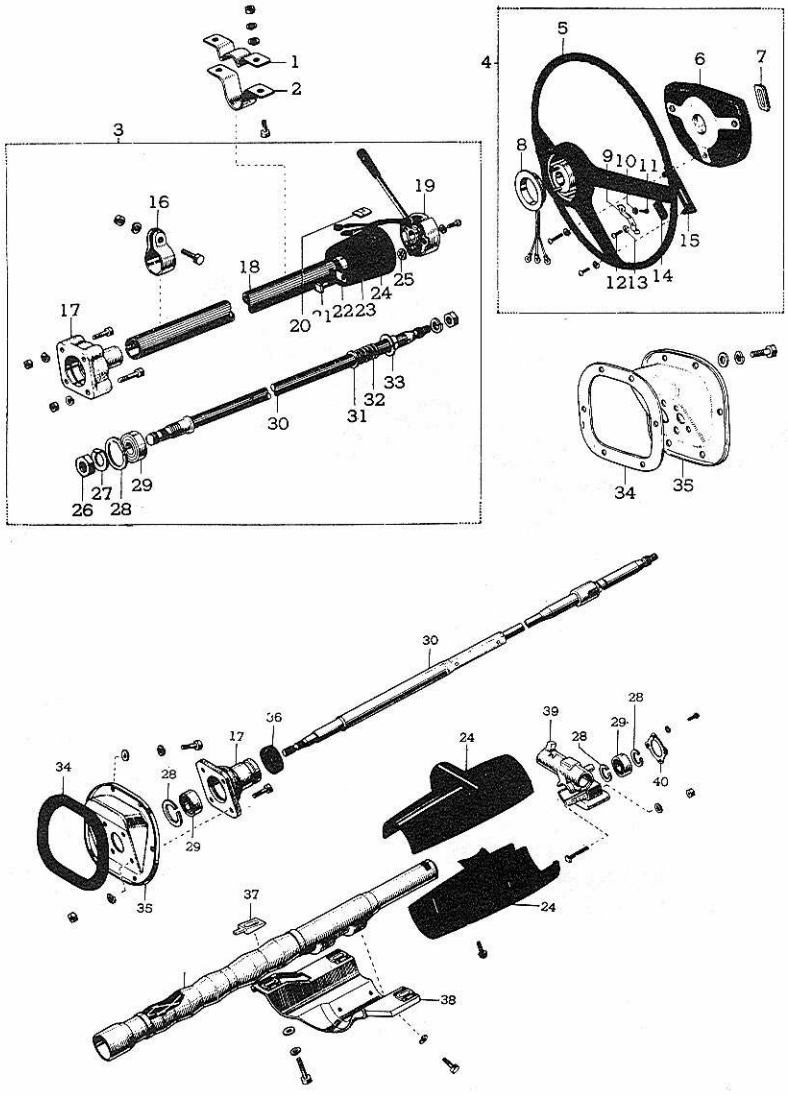
The steering gear housing is mounted onto the frame with the steering gear housing bracket, and the worm and sector roller tooth backlash is controlled by the adjusting shims and the set bolt on the sector shaft end cover.

The steering shafts are incorporated with two universal joints and a sliding joint, and are provided to allow a complete flexible mount between the frame and the body which improves the steering stability.

TROUBLE SHOOTING

Since the Trouble Shooting on the steering has a close relation with the front axle, therefore, it is recommended that the Trouble Shooting described in the Front Axle & Front Suspension be referred.

STEERING WHEEL & STEERING MAIN SHAFT (55V)



1. Steering column upper clamp
2. Steering column lower clamp
3. Steering post assembly
4. Steering wheel assembly
5. Steering wheel
6. Steering wheel pad
7. Pad mark
8. Contact ring
9. Horn contact spring
10. Lock washer
11. Screw
12. Screw
13. Lock washer
14. Horn button
15. Horn button setting cover
16. Steering column lower clamp
17. Steering column tube support
18. Steering column tube
19. Turn signal switch
20. Control lever caution plate
21. Housing retaining bolt
22. Steering column tube lock
23. Bearing
24. Contact ring housing
25. Washer
26. Nut
27. Claw washer
28. Hole snap ring
29. Bearing
30. Steering main shaft
31. Shaft snap ring
32. Spring
33. Bearing thrust collar
34. Steering column hole sealed
35. Steering column hole cover
36. Oil seal
37. Caster wedge
38. Brake away bracket
39. Steering column upper bracket
40. Main shaft bearing retainer

Fig.6-2 Steering Wheel & Steering Main Shaft Components G2443

Removal

1. Loosen and remove the three screws attaching the steering wheel pad onto the steering wheel, and remove the pad

2. Loosen and remove the steering wheel retaining nut, then remove the steering wheel from the main shaft with the Steering Wheel Puller 09609-20010.

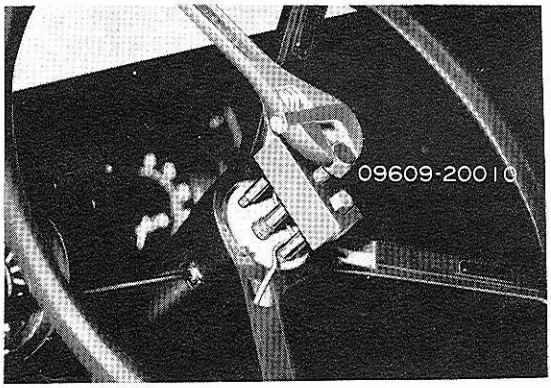


Fig.6-3 Removing Steering Wheel V5136

3. Loosen and remove the control select lever shaft, and also remove the bushings from the control select lever.

4. Cut the lock wire, and remove the shift fork lock bolt.
Next, slide the control shift lever out of the control shaft.

5. Remove the bolt securing the steering worm yoke onto the steering main shaft.

6. Disconnect the wirings, then remove the back-up light switch with the bracket.

7. Disconnect the wirings of the turn signal switch from the wiring connectors.

8. Remove the bolts attaching the steering column hole cover onto the floor.

9. Remove the steering column upper and lower clamps, and pull out the steering column tube together with the steering main shaft, steering column hole cover and the control shaft towards the interior.

Disassembly

1. Remove the turn signal switch retaining screws, and remove the turn signal switch assembly from the contact ring housing.

2. Remove the "E" ring and the washer from the end of the control shaft upper shaft.
Remove the two nuts retaining the contact ring housing onto the steering column tube, then pull out the housing.
Remove the control shaft.

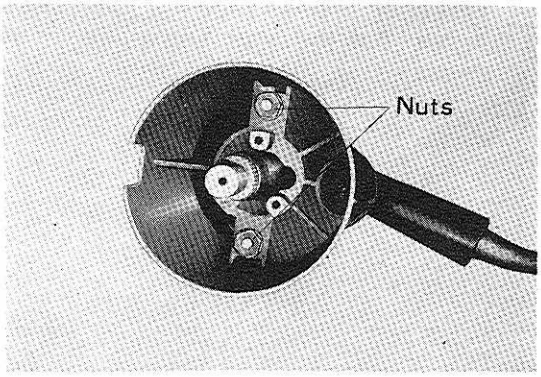


Fig.6-4 Contact Ring Housing Removal V5150

3. Remove the steering column hole cover and the control shaft lower bracket from the steering column tube support.

4. Remove the steering main shaft upper bearing, thrust collar and the spring.

5. Loosen the steering column lower clamp bolt, and pull out the steering column tube from the steering column tube support.

6. Secure the steering main shaft in

a vise, and straighten the claw washer.
Next, remove the steering main shaft bearing retaining nut and the claw washer.

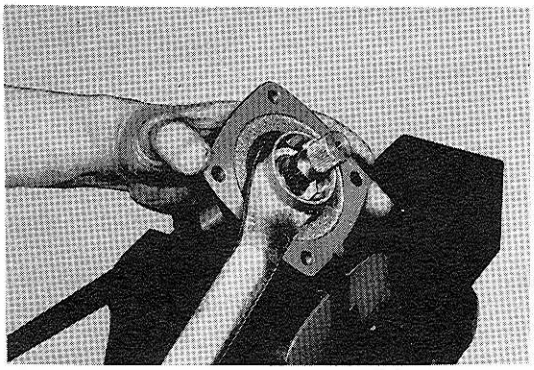


Fig.6-5 Removing Bearing Retaining Nut V5117

7. Remove the hole snap ring in the steering column tube support, then drive out the steering main shaft and the main shaft lower bearing from the steering column tube support.

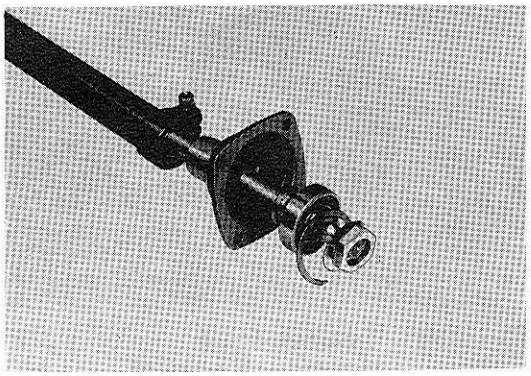


Fig.6-6 Steering Column Tube Support Related Part V5118

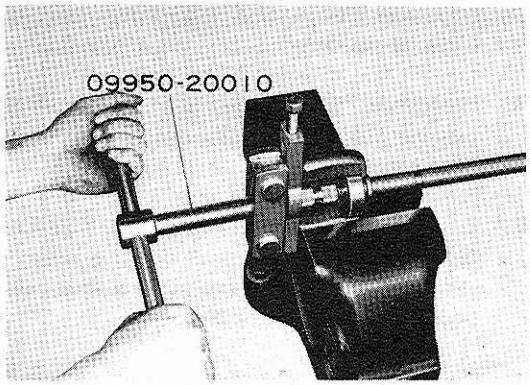


Fig.6-7 Removing Lower Bearing V5119

8. If necessary, remove the lower bearing from the steering main shaft using the Universal Puller 09950-20010.

Inspection

Clean the disassembled parts thoroughly, and check for damage.
Replace the defective part/s if necessary.

1. Inspect the steering main shaft for bend, and the serrations on the main shaft for damage.

2. Inspect the bearings for wear, and abnormal noise.

3. Inspect the steering wheel for cracks, and the installing portion onto the steering main shaft for wear or other defects.

Assembly

1. With the Transmission Oil Plug 09325-12010, press the lower bearing onto the steering main shaft.

2. Install the steering main shaft and the bearing into the steering column tube support using the Transmission & Transfer Bearing Replacer 09316-60010 and a press.

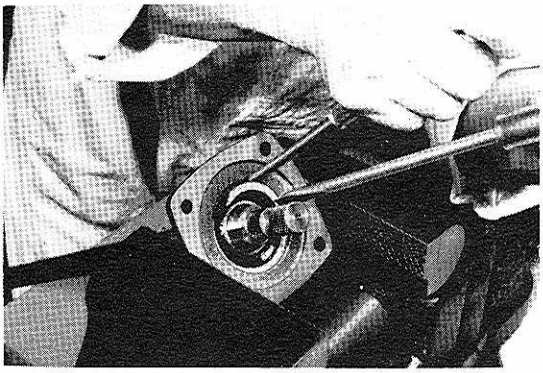


Fig.6-8 Installing Hole Snap Ring V5120

3. Install the new claw washer, and tighten the bearing retainer nut securely, then bend the claw washer to prevent the nut from loosening.

4. Install the steering column tube onto the steering column tube support, then tighten the lower clamp bolt securely.

5. Lubricate the upper bearing with grease, and install the spring, thrust collar and the upper bearing onto the steering main shaft.
   Check the steering main shaft for smooth rotation.

6. Assemble the steering column hole cover and the control shaft lower bracket.

7. Apply grease onto the control shaft lower bushing and the control shaft upper shaft, and install the control shaft.
   Next, install the contact ring housing onto the steering column tube.
   To assemble the contact ring housing, temporarily install the two retaining bolts and the steering column tube locks into the contact ring housing, and screw in the nut one thread.
   Align the steering column tube locks and the slots in the steering column tube, then install the housing onto the steering column tube further into the steering column tube securely.

8. Secure the control shaft upper shaft to the contact ring housing with the washer and the "E" ring.

9. Install the turn signal switch into the contact ring housing.

Installation

1. Install the steering post assembly onto the vehicle, and connect the steering main shaft to the steering worm yoke.
   Install the steering column upper and lower clamps, and tighten the clamp attaching bolts with the fingers.
   Align the holes in the steering column hole cover and the floor, and tighten the hole cover attaching bolts securely.
   Next, tighten the steering column clamp attaching bolts securely.

2. Secure the steering worm yoke clamp bolt.

3. Lubricate the cut portion on the control shift lever with grease, and install the control shift lever onto the control shaft.
   Align the hole of the control shift lever, and the set screw recess of the control shaft, then install the shift fork lock bolt.
   Secure the bolt with lock wire.

4. Apply grease onto the bushings in the control select lever and assemble the control select lever.
   Tighten the control select shaft securely.

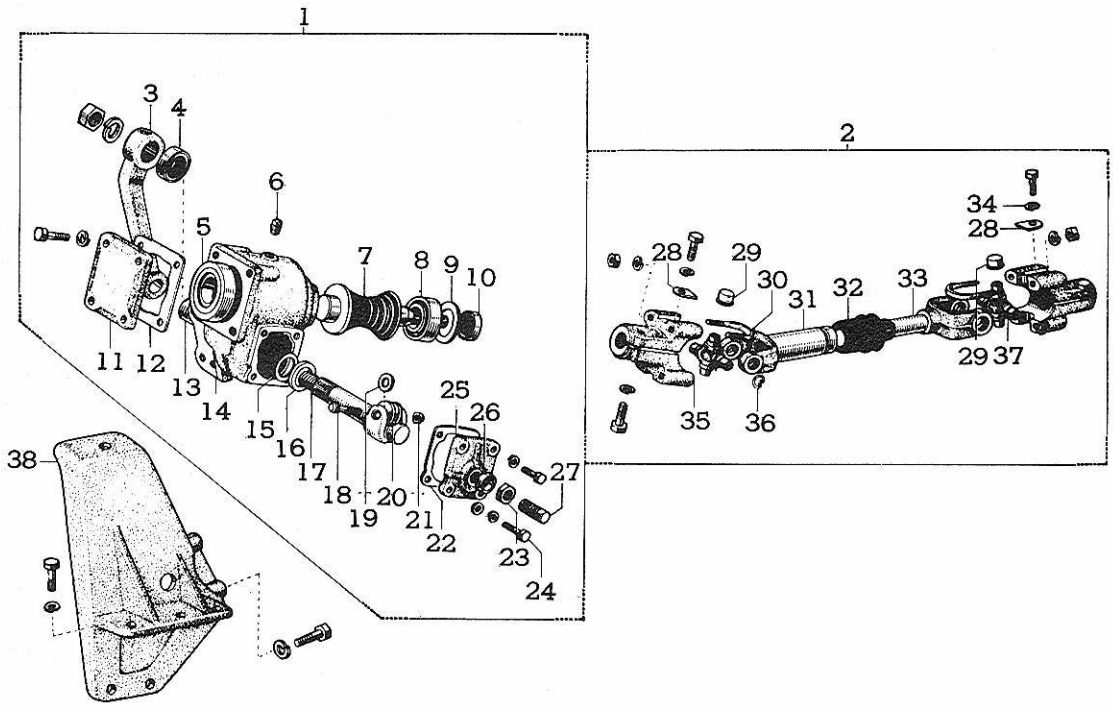
5. Install the back-up light switch with the bracket, and connect the wirings.

6. Connect the turn signal switch wirings.
   Check the turn signal switch for proper operation.

7. Install the steering wheel temporarily onto the steering main shaft.
   The final setting of the steering wheel should be determined after driving the vehicle.

8. Install the steering wheel pad.

STEERING INTER-MEDIATE SHAFT & GEAR HOUSING (55V)



1. Steering gear housing assembly
2. Steering intermediate shaft assembly
3. Pitman arm
4. Oil seal
5. Steering worm front bearing
6. Plug
7. Steering worm
8. Steering worm rear bearing
9. Adjusting shim
10. Oil seal
11. Gear housing end cover
12. Gasket
13. Sector shaft bushing
14. Steering gear housing
15. Adjusting shim
16. Adjusting plate
17. Steering sector shaft
18. Sector roller shaft
19. Shim
20. Sector roller
21. Nut
22. Gasket
23. Lock nut
24. Bolt
25. Sector shaft end cover
26. Bushing
27. Set bolt
28. Cup stopper plate No.1
29. Spider bearing
30. "U" bolt
31. Steering sliding yoke
32. Dust cover
33. Steering sliding shaft
34. Lock washer
35. Steering worm yoke
36. Hole snap ring
37. Universal joint spider
38. Steering gear housing bracket

Fig.6-9 Steering Inter-mediate Shaft & Gear Housing Components G2444

Removal

1. Raise the front of the vehicle, and support with suitable stands.
   Pry off the wheel cap, and remove the wheel.

2. Remove the bolts securing the steering worm yokes to the steering worm and the steering main shaft.
   Next, remove the steering inter-mediate shaft assembly.

3. Loosen and remove the pitman arm securing nut from the steering sector shaft.
   Punch mating marks onto the pitman arm and the sector shaft.
   Disconnect the pitman arm from the sector shaft using the Pitman Arm Puller 09610-55010.

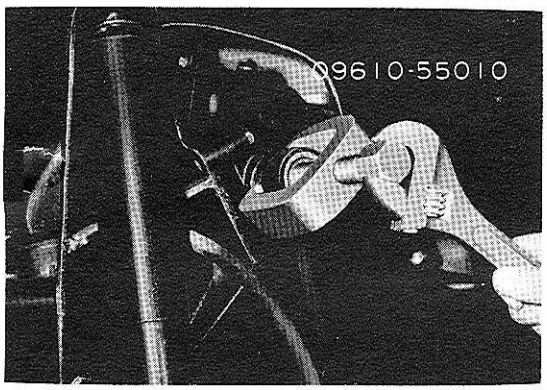


Fig.6-10 Removing Pitman Arm V5129

4. Remove the bolts retaining the steering gear housing onto the steering gear housing bracket, then dismount the gear housing assembly.

Disassembly

1. Inter-mediate shaft disassembly.

   a. Remove the cup stopper plates No.1 (1), then remove the U-bolts (2) securing the universal joint spider bearing to the steering worm yoke, and separate the worm yokes from the sliding yoke and the sliding shaft.

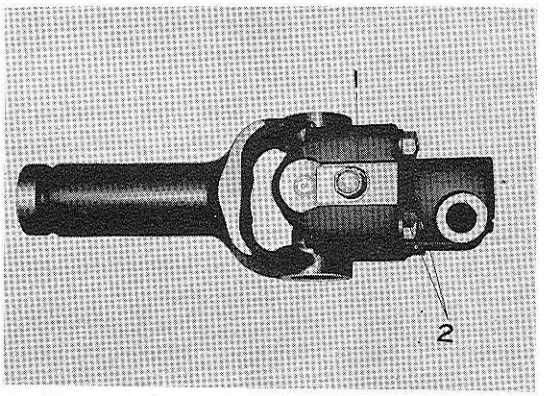


Fig.6-11 Inter-mediate Shaft V5130 Disassembly

   b. Remove the hole snap rings from the bearing holes, and tap the yoke lightly with a mallet, and remove the spider bearing.
   Next, push out the spider, and remove the opposite side bearing, and remove the spider from the yoke.

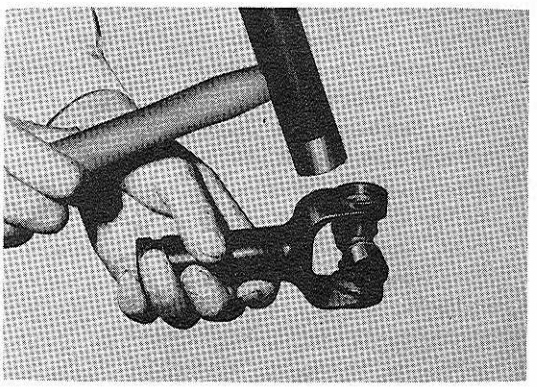


Fig.6-12 Removing Spider Bearing V5131

2. Steering gear housing disassembly

   a. Drain the gear lubricant from the steering gear housing.

   b. Secure the steering gear housing in a vise.

   c. Remove the sector shaft end cover retaining bolts, and remove the end cover with the gasket.

   d. Tap the end of the sector shaft lightly with a mallet, and drive the

sector shaft assembly out of the steering gear housing.

Caution:

Adjusting shims and the plate are installed on the sector shaft, thus care should be taken not to lose them when removing.

e. Remove the gear housing end cover and the gasket.
Tap the end of the steering worm with a mallet, and drive out the steering worm together with the bearings.

Inspection

Wash all disassembled parts thoroughly, and inspect the parts for wear, scores and other defects.
Repair or replace as necessary.

Steering Gear Housing

1. Inspect the sector roller and the sector roller bearing for wear, looseness, cracks or roughness when rotated.
To replace the sector roller, remove the weld at the sector roller shaft nut with a grinder, and remove the nut.
Pull the roller shaft out of the sector shaft, and remove the sector roller.

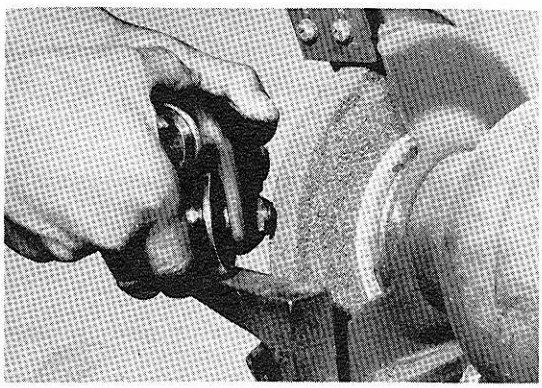


Fig.6-13 Sector Roller Removal V5121

Assemble the sector roller onto the sector shaft, and install the sector roller shaft and tighten the nut securely.
Weld it with an electric arc welder to secure it in place.

2. Inspect the serrations and the rotating portion of the sector shaft for wear and other defects.

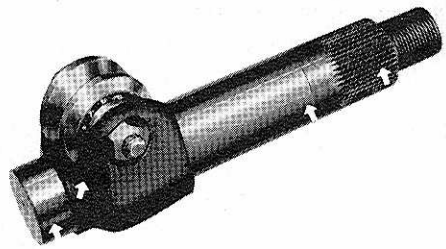


Fig.6-14 Sector Shaft Inspection V5122

3. Inspect the sector shaft bushings in the steering gear housing and the sector shaft end cover for scores and excessive wear.
Assemble the sector shaft into the steering gear housing and check the sector shaft to bushing oil clearance, and also check the sector shaft to sector shaft end cover bushing oil clearance.
The specified oil clearance should be 0.009 ~ 0.06 mm (0.00035 to 0.00236"), and if the clearance exceeds this specified clearance, replace the bushing/s or the sector shaft.

a. To replace the sector shaft bushing, pry off the oil seal, then using the Transmission Extension Housing Metal Tool 09307-12010, and press the sector shaft bushing out of the steering gear housing.

b. To install, follow the removal procedure in the same manner

c. After installation, hone the bushing with a pin hole grinder so that the sector shaft to bushing oil clearance will be within the specified clearance as described previously.

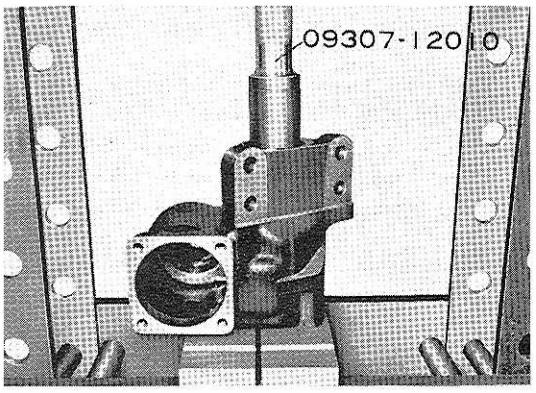


Fig.6-15 Removing Sector Shaft Bushing V5132

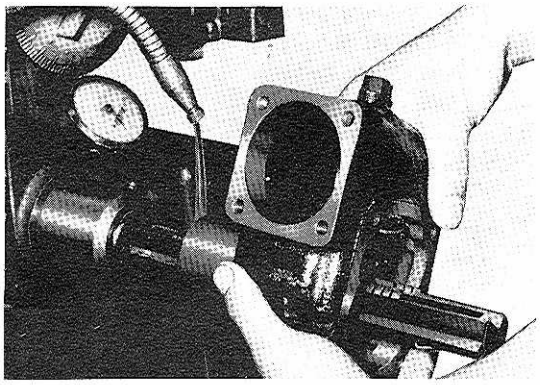


Fig.6-16 Honing Sector Shaft Bushing V5006

4. Inspect the steering worm for wear scores or chipped teeth.

5. Inspect the worm bearings for wear and improper movement.

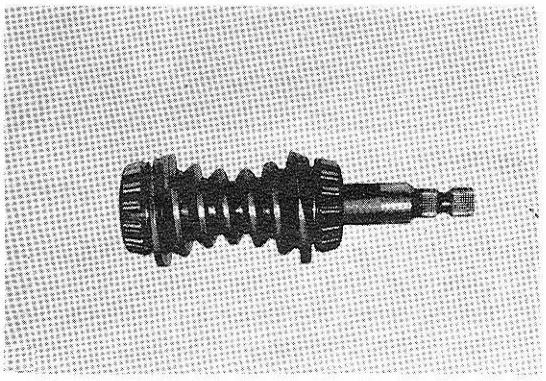


Fig.6-17 Steering Worm Inspection V5123

a. To remove the steering worm bearings, use the Steering Worm Bearing Cone Remover 09613-26010, and press out the bearings from the steering worm.

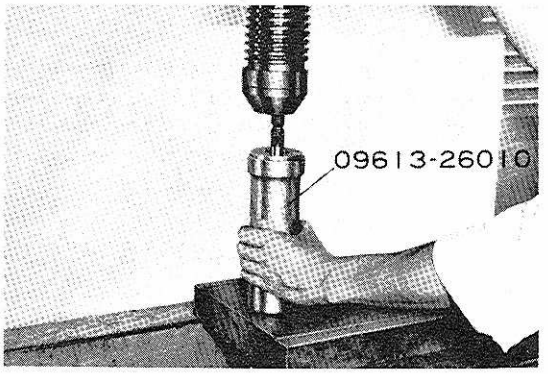


Fig.6-18 Removing Steering Worm Bearing V5124

b. To install the steering worm front bearing, use the Distributor Drive Gear Replacer 09212-10010 and press the bearing onto the steering worm.

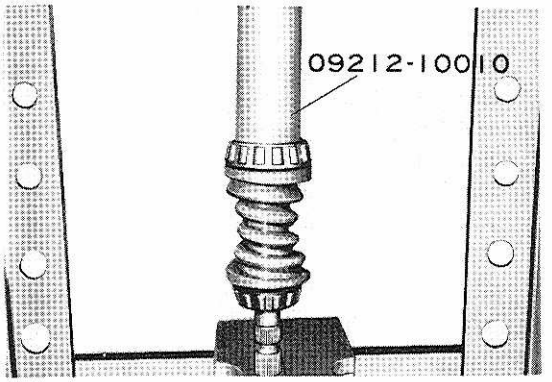


Fig.6-19 Installing Front Bearing V5151

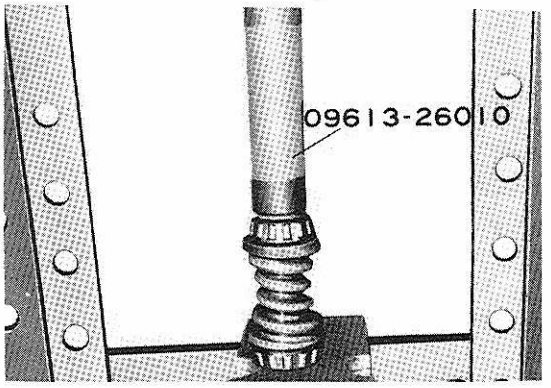


Fig.6-20 Installing Rear Bearing V5152

c. With the Steering Worm Bearing Cone Remover 09613-26010, install the steering worm rear bearing.

d. Using the Steering Worm bearing Puller 09612-30011, remove the steering worm rear bearing cup and the adjusting shim/s from the steering gear housing.

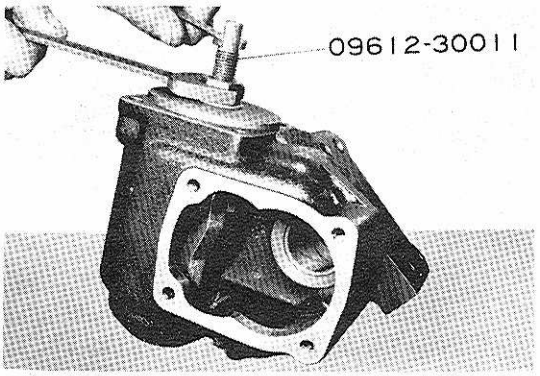


Fig.6-21 Removing Worm Bearing Cup V5133

e. To install the bearing cup, use the Transmission & Transfer Bearing Replacer 09316-60010, and press the bearing cup with the same shim/s which was removed from the steering gear housing.

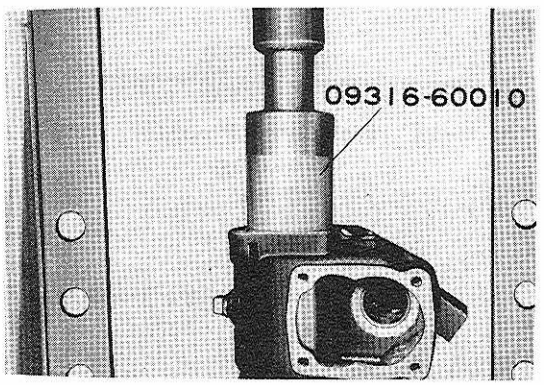


Fig.6-22 Installing Worm Bearing Cup V5153

Inter-mediate Shaft

1. Inspect the splines of the steering sliding yoke and the steering sliding shaft for cracks, excessive wear or other defects.

2. Inspect the universal joint spider journal for rust and wear.
   Also inspect the spider bearing cups and the bearing rollers for rusty condition, wear and damage.

3. Check the dust cover for hardness cracks and deterioration.

Assembly & Adjustment

It is recommended that the gaskets and the oil seals should be replaced when assembling.
Apply liquid sealer onto the gaskets to prevent oil leak.
Coat the lips of the oil seals with grease, and lubricate all interior parts with gear lubricant when assembling.

Inter-mediate Shaft

1. Pack the spider bearing cups with multipurpose grease, and assemble the bearing rollers into the bearing cups.

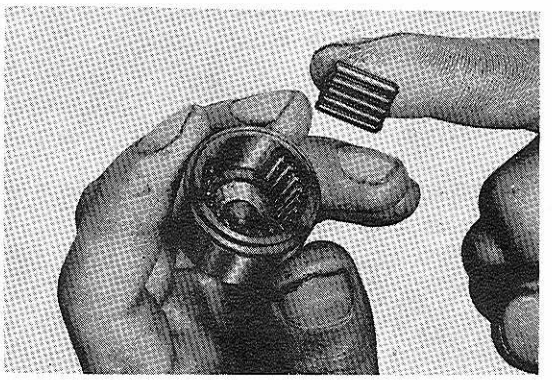


Fig.6-23 Assembling Bearing Rollers V5125

2. Press the spider bearing into one side of the sliding shaft bearing holes until the bearing is flush with the yoke flange surface.

3. Install the bearing seal onto the joint spider, then install the joint spider onto the yoke.

4. Press the opposite bearing with

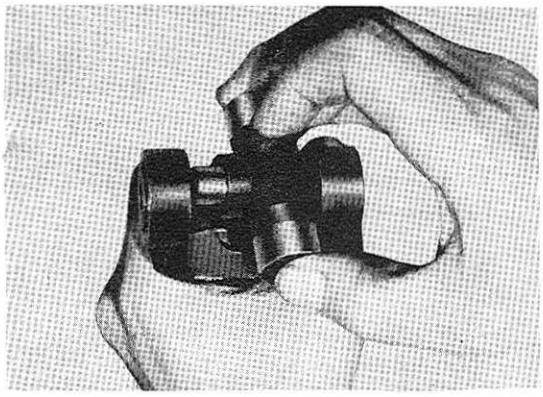


Fig.6-24 Installing Joint Spider V5126

the bearing seal onto the joint spider into the yoke.

5. Install the hole snap rings, and check the joint spider for smooth operation.
   Check the joint spider thrust clearance.
   If the clearance exceeds 0.5 mm (0.02"), adjust the clearance to become less than 0.5 mm (0.02") by selecting the hole snap ring.

   Hole snap ring thickness:
   Part No. 90521-22011
   Thickness: 1.20 mm (0.047")
   Part No. 90521-22012
   Thickness: 1.25 mm (0.049")
   Part No. 90521-22013
   Thickness: 1.30 mm (0.051")

6. Install the two bearings with the bearing seals onto the joint spider to the steering worm yoke.
   Next, install the cup stopper plates No.1 and the U-bolts.

7. Assemble the joint spider and the bearings onto the steering sliding yoke in the same manner.

8. Pack the inside hole of the sliding yoke with multipurpose grease to about one-half of the interior area.
   Align the cup stopper plates No.1 of the sliding yoke side and the sliding shaft side.
   Next, install the dust cover, and connect the sliding shaft with the sliding yoke.

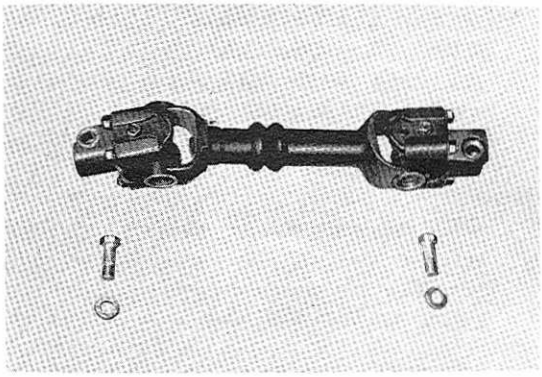
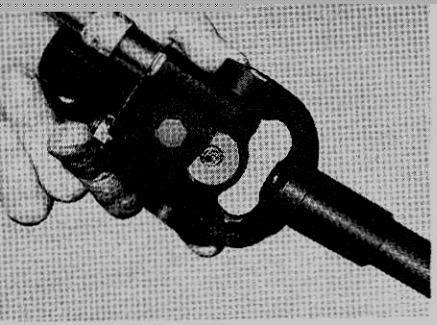


Fig.6-26 Inter-mediate Shaft Assembly V5154

Steering Gear Housing

Before assembling the gear housing, the following adjustment should be performed.



25 Tightening U-bolt Nut V5127

a. Assemble the steering worm into the gear housing.
Install the steering worm front bearing cup and the gear housing end cover with the gasket.
Tighten the end cover attaching bolts to 1.5 ~ 2.0 m-kg (11 ~ 14 ft-lb) torque.

b. Install the same sector shaft adjusting shims and the plate which were removed during disassembly onto the sector shaft, then assemble

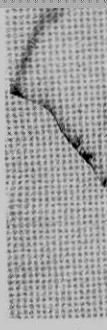


Fig.6-

into the gear housing.
Push the sector shaft end towards the steering worm with the hand, and maintaining this condition, check the backlash between the steering worm and the sector roller. Adjust so that the backlash will be zero or hardly noticeable in value by selecting the adjusting shim.

c. Install the sector shaft end cover with the gasket, then screw in the set bolt temporarily into the sector shaft end cover.

d. Install the pitman arm onto the sector shaft temporarily, and remove the backlash between the steering worm and the sector roller by turning the set bolt.
The backlash should be removed at the center position.

Note:
The sector roller center position is one half of the revolution when turning the steering worm from the right to the left side.

e. Turn the steering worm clockwise all the way, attach the plunger of the dial gauge onto the pitman arm, and check the pitman arm end play.
Next, turn the steering worm counterclockwise all the way, and check the pitman arm end play in the same manner.
The pitman arm end play should be within the same value.
If the pitman arm end plays are different, adjust the plays to be the same with the steering worm adjusting shim/s to be installed behind the steering worm rear bearing cup.

For RHD
Increase the adjusting shim if the pitman arm end play increases when the steering worm is rotated clockwise.
Decrease the adjusting shim if it decreases.

For LHD
Increase the adjusting shim if the pitman arm end play decreases when the steering worm is rotated clockwise.
Decrease the adjusting shim if it increases.

Steering worm adjusting shim thickness:
Part No. 90564-40037
Thickness: 0.5 mm (0.0197")
Part No. 90564-40038
Thickness: 0.2 mm (0.0079")
Part No. 90564-40039
Thickness: 0.1 mm (0.0039")

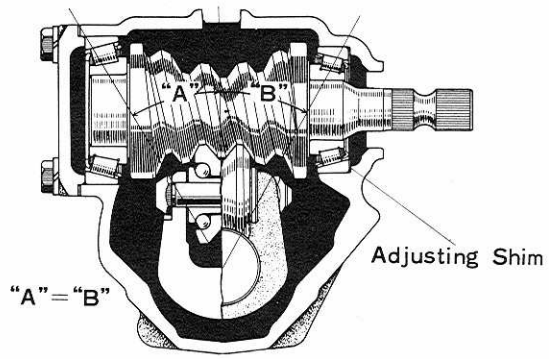


Fig.6-27 Steering Worm Centering Y5736

f. After the adjustment, remove the sector shaft end cover and the sector shaft from the steering gear housing.

2. Steering worm bearing pre-load adjustment.

Before assembling the steering worm, lubricate the steering worm bearings with gear lubricant.
The pre-load should be checked without the steering worm oil seal assembled.

a. Install the steering worm assembly into the gear housing, then install the gear housing end cover with the gasket.
Tighten the end cover attaching bolts to 1.5 ~ 2.0 m-kg (11 ~ 14 ft-lb) torque.

b. Wind a cord onto the steering worm shaft, then hook a pull-scale to the other end of the cord.
Pull the pull-scale slowly, then read the scale while applying a steady pull on the pull-scale.
The reading of the pull-scale should be 3.94 ~ 6.56 kg (8.67 ~ 14.43 lb).

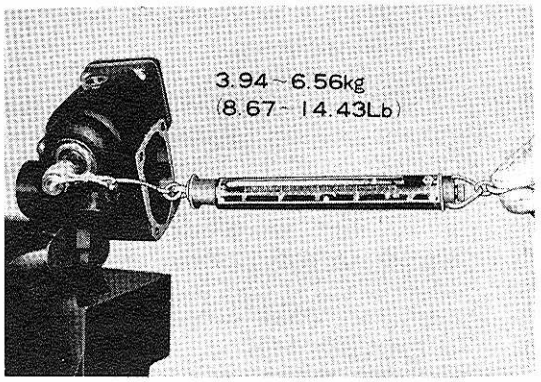


Fig.6-28 Checking Worm Bearing Pre-load V5155

c. Repeat the above procedure until the specified pre-load is obtained by selecting the following gasket.

Gear housing end cover gasket thickness:

Part No.	45322-55010
Thickness:	0.1 mm (0.004")
Part No.	45323-55010
Thickness:	0.2 mm (0.008")
Part No.	45324-55010
Thickness:	0.3 mm (0.012")
Part No.	45322-60010
Thickness:	0.5 mm (0.020")

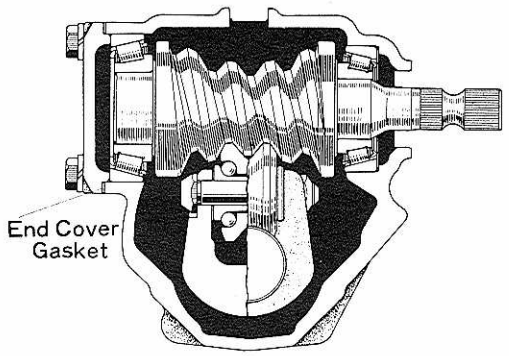


Fig.6-29 Gear Housing Cover Gasket Y5736

3. Adjustment of steering worm and sector roller backlash.

After adjusting the steering worm bearing pre-load, next, adjust the backlash between the steering worm and the sector roller in the following manner.

a. Install the sector shaft adjusting plate with the tapered face towards the sector shaft flange and the adjusting shims onto the sector shaft.

b. Assemble the sector shaft into the gear housing, then install the sector shaft end cover with the gasket.
Tighten the end cover attaching bolts to 1.5 ~ 2.0 m-kg (11 ~ 14 ft-lb) torque.
Next, screw in the set bolt until the sector shaft end play is removed.
Do not over screw in the set bolt to prevent the steering worm from turning hard.
The backlash between the steering worm and the sector roller is at the mid-way point of the steering worm and the sector roller travel.
To locate this mid-way point, turn the steering worm from one stop all the way to the other, counting the number of turns. Then turn the steering worm back exactly one half of the number of turns.

c. Next, check the backlash. If it exceeds, remove it by selecting

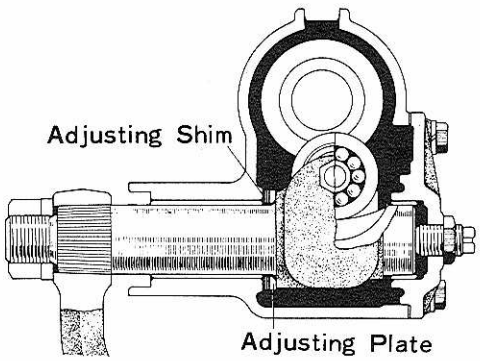


Fig.6-30 Backlash Adjustment Y5737

the following sector shaft adjusting shims.

Sector shaft adjusting shim thickness:

Part No. 90564-33110
Thickness: 0.31 mm (0.012")
Part No. 90564-33106
Thickness: 0.50 mm (0.020")

d. After the adjustment, rotate the steering worm from one stop all the way to the other, and check for smooth rotation.
Tighten the set bolt lock nut securely.

4. After the adjustment, install the new sector shaft oil seal and the steering worm oil seal into the steering gear housing.

5. Refill the gear housing with gear lubricant.
Grade: SAE 90
Capacity: 320 cc (0.34 US qt., 0.28 Imp qt)

Installation

1. Mount the steering gear housing assembly onto the gear housing bracket.

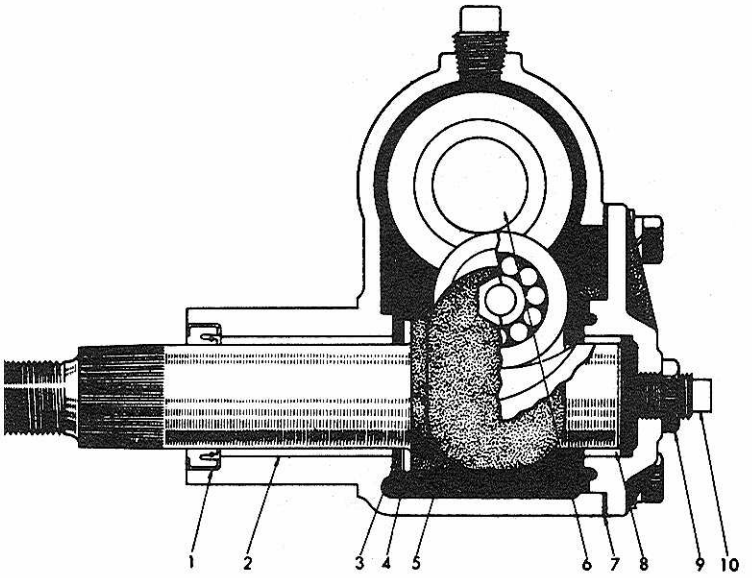
2. Align the mating marks on the sector shaft and the pitman arm, and tighten the pitman arm securing nut to 16.5 ~ 19.5 m-kg (119 to 141 ft-lb) torque.

3. Straighten the front wheels and the steering wheel. Maintaining these positions, install the inter-mediate shaft assembly.
Tighten the clamp bolts on the steering worm yokes securely.

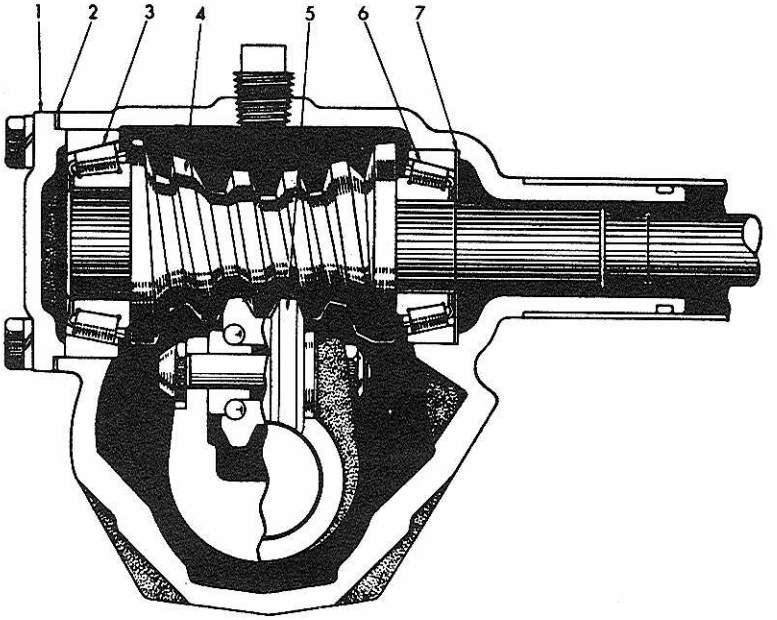
4. Install the wheel, and tighten the hub nuts securely.
Install the wheel cap, and remove the stand.

* *

STEERING WHEEL & GEAR HOUSING (FJ40, 43,45)

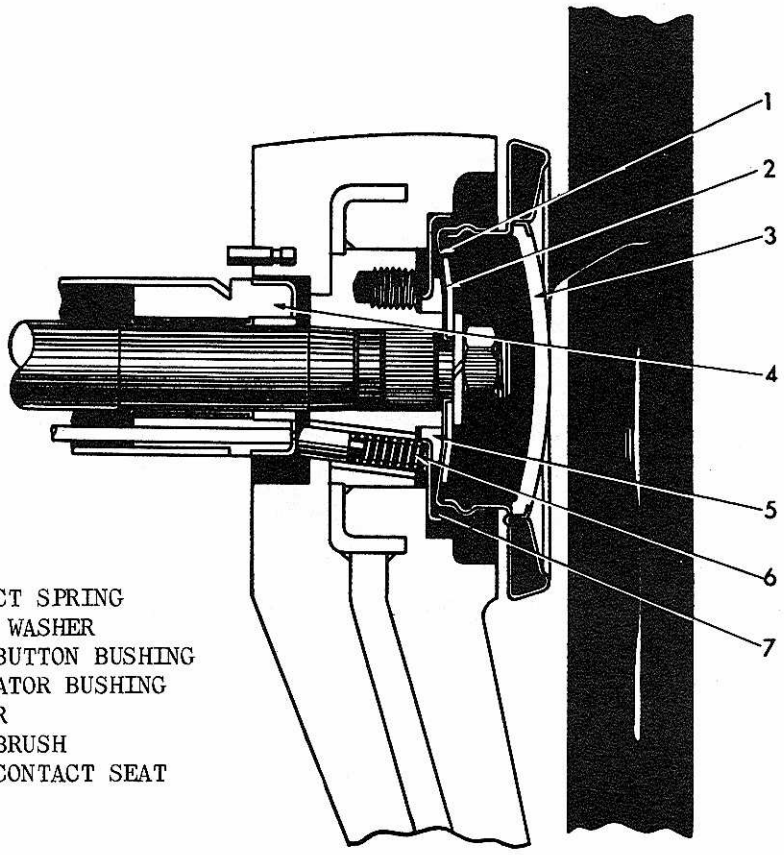


1. STEERING SECTOR OIL RETAINER
2. SECTOR SHAFT BUSHING
3. STEERING SECTOR ADJUSTING SHIM
4. STEERING SECTOR ADJUSTING PLATE
5. SECTOR SHAFT
6. WORM GEAR
7. PACKING
8. BUSHING
9. NUT
10. STEERING SECTOR THRUST SCREW



1. STEERING WORM BEARING CAP
2. PACKING
3. STEERING WORM REAR BEARING
4. WORM GEAR
5. SECTOR ROLLER
6. STEERING WORM FRONT BEARING
7. STEERING WORM FRONT BEARING ADJUSTING SHIM

Fig.6-31 Steering Gear



1. CONTACT SPRING
2. PLATE WASHER
3. HORN BUTTON BUSHING
4. INSULATOR BUSHING
5. SPACER
6. HORN BRUSH
7. HORN CONTACT SEAT

Fig.6-32 Steering Wheel

Removal & Installation

1. Remove the horn button, contact spring, and other related parts from the steering wheel.
2. Remove the steering wheel from the main shaft using Steering Wheel Puller 09609-20010.
3. Disconnect the horn button wire connection at the side of the mast jacket.
4. Remove the mast jacket lower clamp.
5. Remove the turn signal switch assembly.
6. Remove the mast jacket hole cover rubber see plate and hole cover rubber.

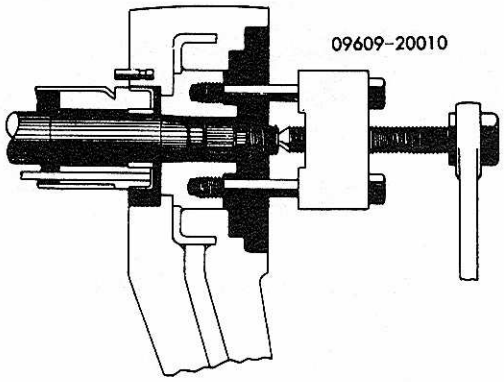


Fig.6-33 Steering Wheel Removal

7. On the right hand drive vehicle, remove the battery. On the left hand drive vehicle, remove the carburetor and oil cleaner.

8. Disconnect the gear shifting rod No.1 and gear selecting rod at the ends of the control shift lever and control select lever.

9. Remove the control shaft lower bracket clamp.

10. Remove the control shift lever, control select lever, and the control shaft lower bracket. Also remove the control shaft low speed lever and control shaft lower bracket.

11. Pull out the control shaft toward the driver's seat.

12. Using Pitman Arm Puller, 09610-55010 remove the pitman arm.

13. Remove the steering gear box bracket cap, and then lifting the steering gear box and mast jacket, take them out through the engine compartment.

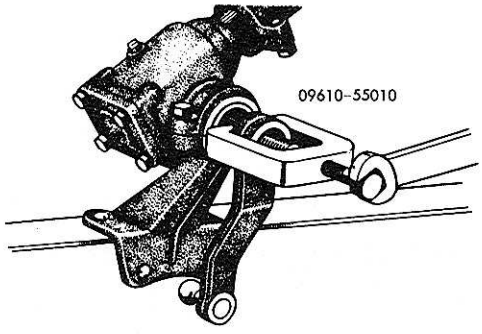


Fig.6-34 Pitman Arm Removal

For Installation, follow "Removal" in reverse order.

Note:

1. Tighten the steering gear box bracket cap bolts to 75~90 ft-lbs forue.

2. Tighten the pitman arm nut to 120~140 ft-lbs torque.

3. Tighten the steering wheel nut to 4.5~7 m-kg (30~50 ft-lbs) torque.

Disassembly

1. Remove the steering gear box oil plug and drain out the gear oil.

2. Hold the steering assembly in a vise and unloosen the bolt holding the lower clamp on the steering mast jacket and pull out the mast jacket from the steering main shaft.

3. Unscrew the steering sector thrust screw, then remove the sector shaft end cover and take out the sector shaft assembly.

Note: Take care not to lose the sector adjusting shims as they must be reinstalled to obtain proper lash when reassembling.

4. Remove the steering worm bearing cap along with the steering worm rear bearing cap packings. Check the number of the adjusting packings, so that preload adjusting can be done easily upon installation.

5. Tap the end of the steering main shaft with a wooden hammer and remove the steering main shaft worm gear assembly together with the steering worm rear taper roller bearing and front taper roller bearing cone.

Caution: Take care as the rear bearing cup drops out when removing.

6. Using Bearing Puller 09612-65010, remove the steering worm front bearing cup together with the front bearing adjusting shims.

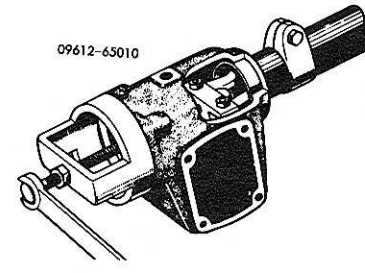


Fig.6-35 Front Bearing Cup Removal

7. To remove the steering worm front and rear bearing cones at both ends of the worm gear, use the Steering Worm Bearing Cone Remover 09613-30010.

8. To remove the worm gear from the main shaft, use a press and force out the gear.

9. The removal of the sector shaft bushing and oil retainer in the gear box may be deferred until a thorough inspection of the parts can be made.
If preliminary inspection shows damage, drive the bushing and the oil retainer out of the gear box using a suitable bushing remover and replacer.

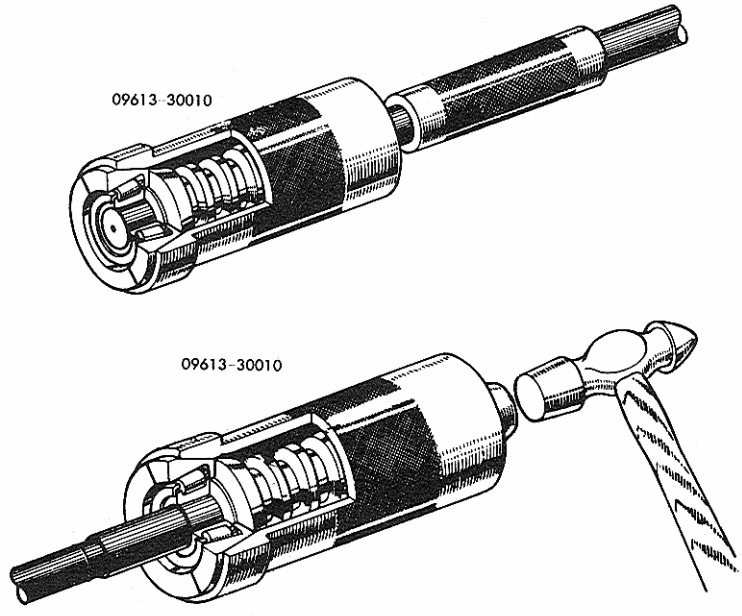


Fig.6-36 Bearing Cone Removal

Inspection

1. Wash all parts in cleaning solvent and dry completely.

2. Inspect the steering main shaft and worm for worn or rough grooves and bent conditions.

3. Inspect the sector shaft assembly for damaged serrations, worn or twisted shaft, worn sector roller and roller balls.
If any of these parts is found defective, they should be replaced as a sector shaft assembly.

4. Inspect the worm bearings for excessively worn, damaged, or noisy conditions.
Replace the defective bearings with the new ones.

5. Inspect the sector shaft bushing for wear. If the clearance between the bushing and the shaft exceeds 0.2 mm (0.08 in.), replace the bushing.

6. Replace the gear box if inspection reveals cracks or other damages.

7. Replace the oil retainer or "O" ring if found damaged.

8. Inspect the gear box for cracks.

Caution: No attempt should be made to weld, machine, or repair any component parts of the steering gear assembly. Parts which are worn or cracked should be replaced with new parts.

Assembly & Adjustment

Described below are the assembly and adjustment procedures of the steering gear mechanism. The instructions on adjustment are covered under each assembling order although the adjustment may not always be done at that time of assembling.

1. Install the steering worm front taper roller bearing cup in the steering gear box inserting the selective fit front bearing adjusting shim between them.

End Play in Steering Worm Adjustment

The centerlines of the steering worm and sector roller are in proper alignment if the steering wheel has the same amount of play when turned in eigher direction. If there is a difference of play in either direction, adjust by increasing or decreasing the number of front bearing adjusting shims.

Note: If there is any difference in play or stiffness between right and left when turning the steering wheel, it means that the center line of the worm gear is not aligned with the pivoting center of the sector shaft.

Front Bearing Adjusting Shim Thickness

Part No.	mm	inch
90564-40037	0.5	0.020
90564-40038	0.2	0.008
90564-40039	0.1	0.004

2. Install the main shaft assembly with bearing cones attached. Then install the rear bearing cup.

3. Install the selective fit rear bearing cap packings and attach the worm bearing cap.

Worm Bearing Preload Adjustment

Adjust preload of worm bearing using cap packings. Place one packing and tighten the cap to specified 1.5~2.2 m-kg (10~16 ft-lb) torque. Attach the steering wheel temporarily. Apply the pull scale to a spoke at a rim of wheel and exert a steady pull while keeping the scale at 90 degrees to the spoke as shown in the figure. The pull required to keep wheel turning slowly should be approximately 0.4 kg (0.88 lbs). If preload is excessive, increase thickness of packing. If preload is not enough, decrease thickness of parking.

Steering Worm Rear Bearing Cap Packing Thickness

Part No.	mm	inch
45322-60010	0.5	0.020
45322-55010	0.31	0.012

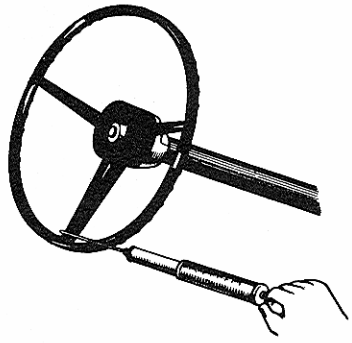


Fig.6-37 Worm Bearing Preload Adjustment

4. Attach the sector adjusting shims and adjusting plate to the sector shaft and install the sector shaft assembly to the gear box.

Steering Wheel play Adjustment

The steering wheel play can be adjusted by increasing or decreasing the number of sector adjusting shims. Decreasing the shims will move the roller closer o the worm to make the mesh tighter, while increasing the shims will make the mesh looser. To adjust, install the steering wheel on end of the main shaft and while holding the sector roller shaft with hand,

turn the steering wheel in both directions. The point on the steering wheel where the roller shaft is felt to begin turning is made as the starting point and made adjustments by increasing or decreasing the number of shims until there is about 1 inch play in the steering wheel.

Note: The standard number of steering sector adjusting shims are as follows.

Thickness 0.3 mm (0.012 in.) 6pcs.
0.5 mm (0.020 in.) 5pcs.
Total is 11 pieces.

5. Install the sector shaft end cover. Tighten the bolts to 1.5~2.2 m-kg (10~16 ft-lb) torque.

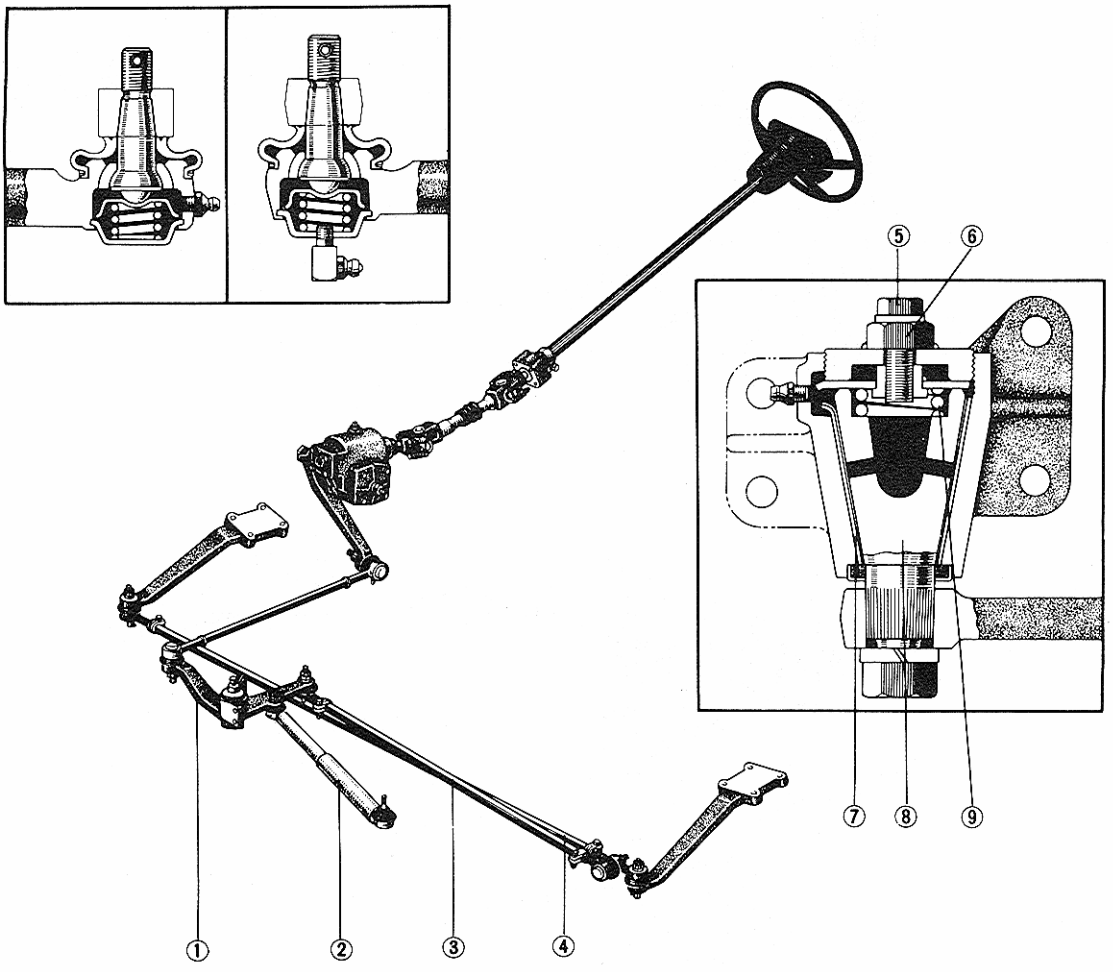
Sector Roller Shaft Axial Play Adjustment

Adjust the sector roller shaft axial play by turning the sector thrust adjusting screw. Loosen the lock nut and tighten the screw until the steering shaft feels heavy to turn. Then loosen the screw 1/4 to 1/2 turn and tighten the lock nut. the lock nut to 5~8 m-kg (37~60 ft-lb).

6. Install the mast jacket "O" ring and install the mast jacket onto the gear box and then tighten with the mast jacket lower clamp.

* *

STEERING LINKAGE



1. Steering center arm
2. Shimmy damper
3. Steering relay rod
4. Tie rod
5. Bolt
6. Center arm shaft nut
7. Bushing
8. Center arm shaft
9. Compression spring

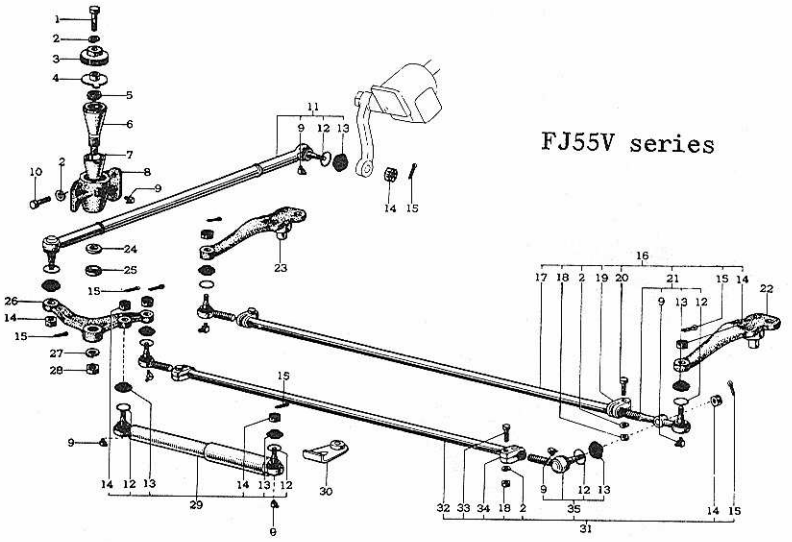
Fig.6-38 Steering Linkage Y5735

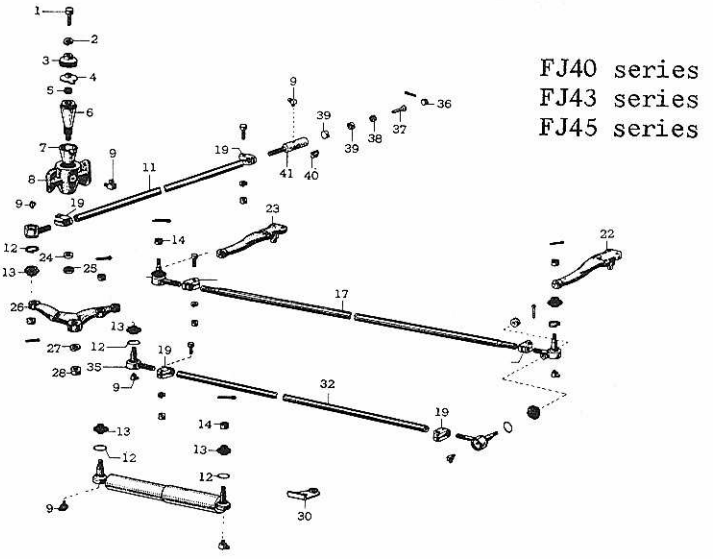
Removal

1. Jack the front end of the vehicle, and support with stands.
   Pry off the wheel caps, and remove the front wheels.

2. Loosen and remove the pitman arm securing nut.
   Punch the mating marks onto the pitman arm and the steering sector shaft.
   These mating marks are for guidance when installing the pitman arm.
   Disconnect the pitman arm from the sector shaft using the Pitman Arm Puller 09610-55010.

3. Disconnect the steering drag link





1. Bolt
2. Lock washer
3. Center arm shaft nut
4. Center arm nut lock plate
5. Compression spring
6. Center arm shaft
7. Shaft bushing
8. Center arm blacket
9. Grease fitting
10. Bolt
11. Steering drag link assembly
12. Set ring
13. Joint dust seal
14. Lock nut
15. Cotter pin
16. Tie-rod assembly
17. Steering tie-rod
18. Lock nut
19. Tie-rod end clamp
20. Bolt
21. Tie-rod end assembly
22. Steering knuckle arm No.2
23. Steering knuckel arm No.1
24. Dust seal
25. Center arm dust lower seal
26. Steering center arm
27. Lock washer
28. Nut
29. Steering shimmy damper
30. Shimmy damper bracket
31. Steering relay rod assembly
32. Steering relay rod
33. Bolt
34. Tie-rod end clamp
35. Relay rod end assembly
36. Straight screw plug
37. Steering link joint spring seat
38. Compression spring
39. Ball stud seat
40. Drag link dust seal
41. Drag link end

Fig.6-39 Steering Linkage Components G2445



Fig.6-40 Removing Pitman Arm V5129

from the steering center arm with the Tie-rod End Puller 09611-20011 or the Ball Joint Puller 09628-62010, and withdraw the drag link with the pitman arm.

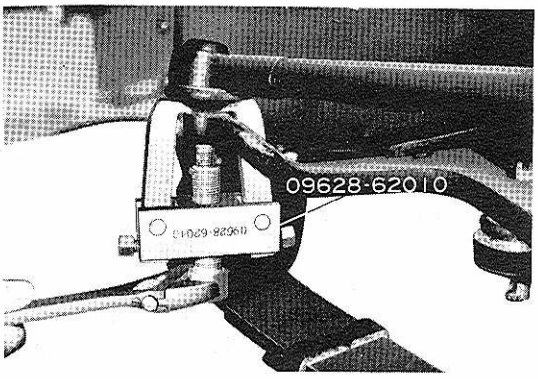


Fig.6-41 Disconnect Drag Link V5156

4. Disconnect the tie-rod ends on both sides of the tie-rod from the steering knuckle arm No.1 and No.2 using the Tie-rod End Puller 09611-20011.
   Also disconnect the steering relay rod end from the steering center arm, and then remove the tie-rod assembly together with the steering relay rod assembly.

5. Disconnect the end of the steering shimmy damper from the shimmy damper bracket on the front cross-member frame.

6. Loosen and remove the steering center arm securing nut, then using the Ball Joint Puller 09628-62010, remove the steering center arm with the simmy damper.

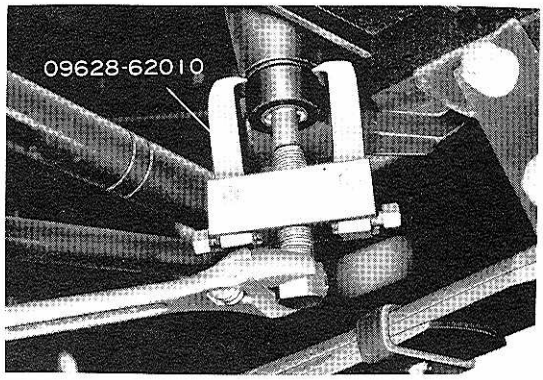


Fig.6-42 Removing Steering Center Arm V5157

7. Remove the engine under cover, then remove the center arm bracket from the frame.

Disassembly

1. Remove the steering shimmy damper from the steering center arm, and also remove the steering relay rod from the tie-rod using the Tie-rod End Puller 09611-20011.

2. Steering center arm shaft disassembly.

   a. Secure the center arm bracket in a vise, remove the bolt on the center arm shaft nut, then loosen and remove the center arm shaft nut.

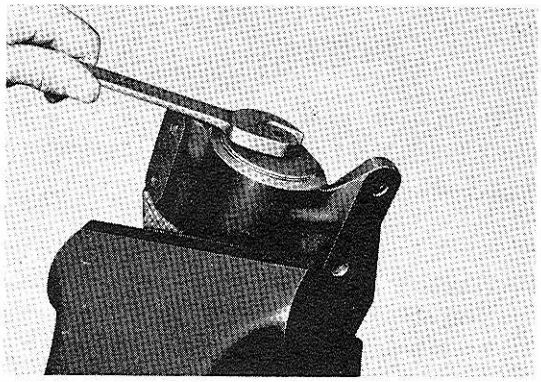


Fig.6-43 Removing Center Arm Shaft Nut V5134

b. Carefully press the end of the center arm shaft with the lock plate and the spring out of the center arm bracket.

c. Remove the bushing from the center arm bracket.

Inspection

Wash all disassembled parts in cleaning solvent, and inspect the followings. Repair or replace any defective part as necessary.

1. Inspect the rod ends for excessive looseness at the ball stud.
   Check the rod end dust seals for cracks and damages.

2. Inspect the relay rod, tie-rod and the drag link for bend or other defects.
   Do not attempt to straighten a bent rod. Also replace if bent.

3. Inspect the steering center arm, pitman arm, and the center arm shaft bracket for cracks or other defects.
   Use Magna-flux if available, and always demagnetize the part after using the tester.

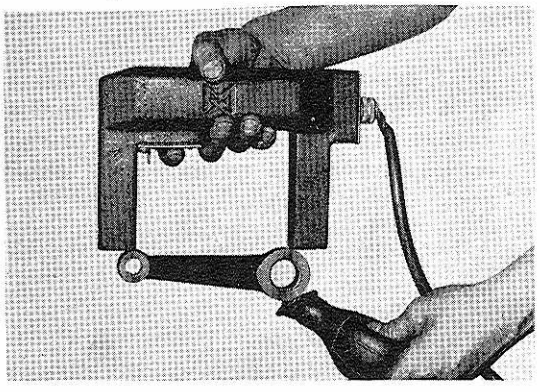


Fig.6-44 Checking for Cracks V5128

4. Inspect the condition of the serration on the pitman arm and the steering center arm for damage.

5. Inspect the center arm shaft for wear, and the serration of the shaft for damage.

6. Inspect the center arm shaft bushing for wear or other defects.

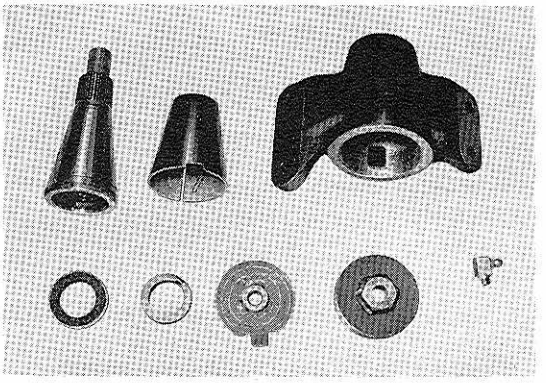


Fig.6-45 Steering Center Arm Shaft Components V5135

7. Inspect the steering shimmy damper for operating condition and abnormal noise.

Assembly

1. Install the center arm lower dust seal into the center arm bracket.

2. Install the bushing into the center arm bracket, and then bend the tab on the bushing.

3. Apply the bushing with multipurpose grease, and also pack the multipurpose grease into the center arm shaft.
   Next, install the center arm shaft into the center arm bracket.

4. Place the spring and the center arm nut lock plate onto the end of the center arm shaft.
   Tighten the center arm shaft nut firmly, then loosen the nut 1/4 of a turn.

5. Install the bolt located on the center arm shaft nut, and tighten the bolt securely.

Installation

Follow the removal procedures in the reverse order.

1. Align the mating marks on the pitman arm and the steering sector shaft, and tighten the pitman arm securing nut.

2. If the rod end/s is replaced, adjust the length of the steering relay rod and the tie-rod.

   Steering relay rod length:
   827 mm (32.56")
   Tie-rod length:
   1,205 mm (47.44")

3. After the installation, check and adjust the toe-in.
   To adjust, refer to Front End Alignment on page 6-24.

4. Lubricate all rod ends and the ends of the steering shimmy damper with multipurpose grease.

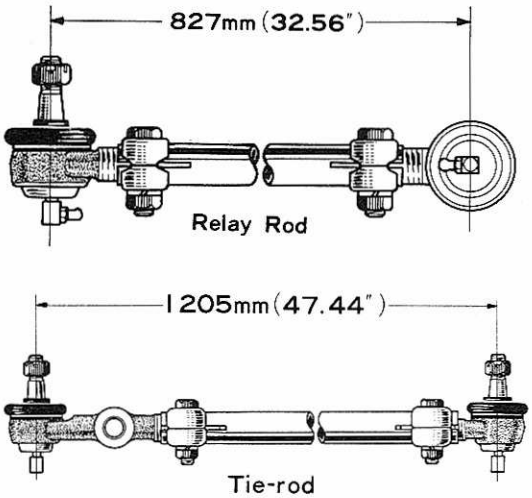
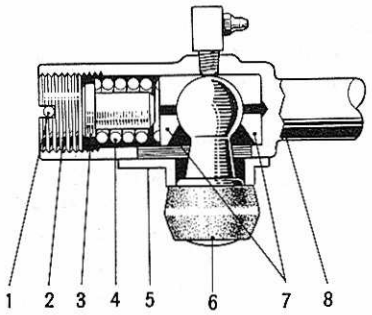


Fig.6-46 Tie-rod & Steering Relay Rod G2446 G2431

DRAG LINK



1. Cotter pin
2. End plug
3. Spring seat
4. Spring
5. Dust seal
6. Pitman arm
7. Ball seat
8. Drag link end

Fig.6-47 Drag Link End X4769

Disassembly

1. Pitman Arm End. Remove the cotter pin and drag link end plug. Then, disconnect the drag link assembly from the pitman arm knob, and remove the spring seat, spring, ball seats, and dust cover.

2. Center Arm End. To disconnect the drag link end from the center arm end, remove the cotter pin and nut retaining the tie-rod end knob. Then disconnect using Tie-rod End Puller 09611-20011. Refer Section 3, Tie-rod Ends.

Inspection

Wash all parts in cleaning solvent and check them for wear and the spring for lost tension. Discard all parts that are worn excessively.

Assembly

For Assembly, follow "Disassembly" in reverse order.

Note: Coat ample grease on the ball, ball seat and other sliding parts. Tighten the drag link end plug fully at first and then screw back 1/2 turn and install the cotter pin after making sure that the knob will move smoothly and with no looseness.

WHEEL & TIRES

The rotation of the wheel and tire as an assembly can be affected by several factors, some of which are created by the alignment of the front wheels, while others are created by the assembly itself.

A wheel assembly that is out of balance or alignment may affect the riding qualities of the vehicle, cause hard steering or be responsible for rapid tire wear. Several symptoms which appear to be caused by wheel and tire troubles are also common to suspension and steering troubles.

Tires

Normal tire tread wear varies in relation to the type and condition of road surface, amount of traffic, temperature, and the driving habits of the driver.
Abnormal tire wear will occur under certain circumstances, and in various degrees can be accounted for by such conditions as incorrect tire inflation, improperly adjusted suspension and steering parts, improper brake operation, and vehicle overloading.
Check the tires frequently to be sure that the air pressure agrees with the specification.
Inspect the tire treads, and remove all stones, nails, glass, or other objects that may be wedged into the tread grooves. Check for holes or cuts that may permit air leakage from the tire, and make the necessary repairs.
Inspect the tire side walls for cuts, bruises, and other damages. If internal damage is suspected, demount the tire from the disc wheel for further inspection and repair or replace.
Check the tire valve for air leakage, and replace the valve if necessary. Replace any missing valve cap.

TIRE PRESSURE SPECIFICATION

Model	Tire Size	Tire Pressure kg/cm² (lb/in²)						
		Front Tire			Rear Tire			
		Local Road	Highway	Sandy Road	Local Road	Highway	Sandy Road	
FJ40(V)(L)	7.15-15 4P	1.8 (25.5)	2.0 (28.4)	1.2 (17.1)	1.8 (25.5)	2.0 (28.4)	1.2 (17.1)	Laden: G.V.W. (Gross vehicle weight) 2,000 kg (4,500 lb)
	7.60-15 4P	1.8 (25.5)	2.0 (28.4)	1.2 (17.1)	1.8 (25.5)	2.0 (28.4)	1.2 (17.1)	
	7.60-15 6P	1.8 (25.5)	2.0 (28.4)	1.2 (17.1)	1.8 (25.5)	2.0 (28.4)	1.2 (17.1)	
	7.00-15 6P LT	1.8 (25.5)	2.0 (28.4)	1.8 (25.5)	1.8 (25.5)	2.0 (28.4)	1.8 (25.5)	
	7.00-15 8P LT	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	
	7.00-16 6P LT	1.8 (25.5)	2.0 (28.4)	1.8 (25.5)	1.8 (25.5)	2.0 (28.4)	1.8 (25.5)	
	7.00-16 8P LT	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	
	7.50-16 6P LT	1.8 (25.5)	2.0 (28.4)	1.8 (25.5)	1.8 (25.5)	2.0 (28.4)	1.8 (25.5)	
	9.00-15 6P	1.2 (17.1)	———	0.7 (10.0)	1.2 (17.1)	———	0.7 (10.0)	
	Do not exceed 50 km/h (30 mph), when using 9.00-15 6P tires at paved road.							
FJ40LV-A	7.60-15 4P	1.8 (25.5)	2.0 (28.4)	1.5 (21.3)	1.8 (25.5)	2.0 (28.4)	1.5 (21.3)	
FJ43(L)	7.60-15 4P	1.8 (25.5)	2.0 (28.4)	1.2 (17.1)				Laden: G.V.W. (Gross vehicle weight) 2,300 kg (5,000 lb)
	7.60-15 6P	2.4 (34.1)	2.4 (34.1)	1.8 (25.5)	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	
	7.00-15 6P LT	1.8 (25.5)	2.2 (31.3)	1.8 (25.5)	2.4 (34.1)	2.8 (39.8)	2.4 (34.1)	
	7.00-15 8P LT	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.8 (39.8)	2.4 (34.1)	
	7.00-16 6P LT	1.8 (25.5)	2.2 (31.3)	1.8 (25.5)	2.4 (34.1)	2.8 (39.8)	2.4 (34.1)	
	7.00-16 8P LT	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.8 (34.1)	2.4 (34.1)	
	7.50-16 6P LT	1.8 (25.5)	2.2 (31.3)	1.8 (25.5)	2.4 (34.1)	2.8 (39.8)	2.4 (34.1)	
	7.50-16 8P LT	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.8 (39.8)	2.4 (34.1)	
	9.00-15 6P	1.2 (17.1)	———	0.7 (10.0)	2.0 (28.4)	———	2.0 (28.4)	
	Do not exceed 50 km/h (30 mph), when using 9.00-15 6P tires at paved road.							
FJ45P-B(L)	7.00-16 6P LT	1.8 (25.5)	2.2 (31.3)	1.8 (25.5)	3.3 (46.9)	3.3 (46.9)	3.3 (46.9)	Laden: G.V.W. (Gross vehicle weight) 2,900 kg (6,380 lb)
	7.00-16 8P LT	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	3.8 (54.0)	4.3 (61.1)	3.8 (54.0)	
	7.50-16 6P LT	1.8 (25.5)	2.2 (31.3)	1.8 (25.5)	3.0 (42.7)	3.5 (49.8)	3.0 (42.7)	
	7.50-16 8P LT	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	3.0 (42.7)	3.5 (49.8)	3.0 (42.7)	
	9.00-15 6P	1.3 (18.5)	———	0.9 (12.8)	2.3 (32.7)	———	2.3 (32.7)	
	Do not exceed 50 km/h (30 mph), when using 9.00-15 6P tires at paved road.							
FJ55V(L) FJ55V-B(L)	7.00-15 6P LT	1.8 (25.5)	2.2 (31.3)	1.8 (25.5)	2.8 (39.8)	3.3 (46.9)	2.8 (39.8)	Laden: G.V.W. (Gross vehicle weight) 2,600 kg (5,700 lb)
	7.00-15 8P LT	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	2.8 (39.8)	3.3 (46.9)	2.8 (39.8)	
	7.00-16 6P LT	1.8 (25.5)	2.2 (31.3)	1.8 (25.5)	2.6 (37.0)	3.0 (42.7)	2.6 (37.0)	
	7.50-16 6P LT	1.8 (25.5)	2.2 (31.3)	1.8 (25.5)	2.6 (37.0)	3.0 (42.7)	2.6 (37.0)	
	7.60-15 6P	2.0 (28.4)	2.4 (34.1)	1.8 (25.5)	2.4 (34.1)	2.4 (34.1)	2.4 (34.1)	
	9.00-15 6P	1.4 (16.2)	———	1.2 (17.1)	2.3 (32.7)	———	2.1 (29.9)	
	Do not exceed 50 km/h (30 mph), when using 9.00-15 6P tires at paved road.							
FJ55L-G	7.60-15 4P	1.8 (25.5)	2.0 (28.4)	1.8 (25.5)	2.0 (28.4)	2.0 (28.4)	1.8 (25.5)	

Disc Wheels

Check and tighten the wheel hub nuts regularly to avoid accidental loosening of the wheels. Loose wheel hub nuts may cause shimmy and vibration.
Elongated hub bolts also result from loose hub nuts. Check for damage that may affect the run-out of the disc wheels.
Wobble or shimmy caused by a damaged disc wheel will damage the hub bearings as a result.

Wheel Balancing

Wheel balancing is the correct distribution of weight around a disc wheel and tire assembly to counteract centrifugal forces acting on the heavy area.
The purpose of wheel balancing is to maintain a true running wheel perpendicular to its rotating axis.

A properly balanced wheel will eliminate vibration and abnormal wear of suspension parts and tire wear.
There are two types of wheel balancing; as static balance and dynamic balance to check and correct an unbalanced condition.

Static balance should be established first.

1. A wheel that is statically unbalanced will rotate by itself until the heavy side will be at the bottom.
   Balancing a wheel statically is accomplished by adding a compensating weight to the top of the wheel opposite to the heavy section.

2. If a wheel is dynamically unbalanced, it will wiggle or oscillate horizontally in motion.
   To eliminate this dynamic unbalance, install the compensating weight 180° opposite each other, one on the outside of the wheel, and another one on the inside.
   The static balance will not be affected.

Tire Rotation

To obtain maximum protection of the tire wear, the rotation of the tires is essential.
It is recommended that the tires should be rotated every 6,000 kilos (4,000 miles).
Rotate the tires as per the illustration.

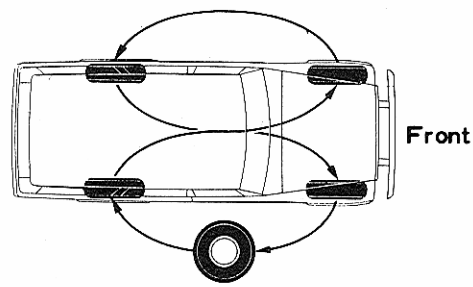
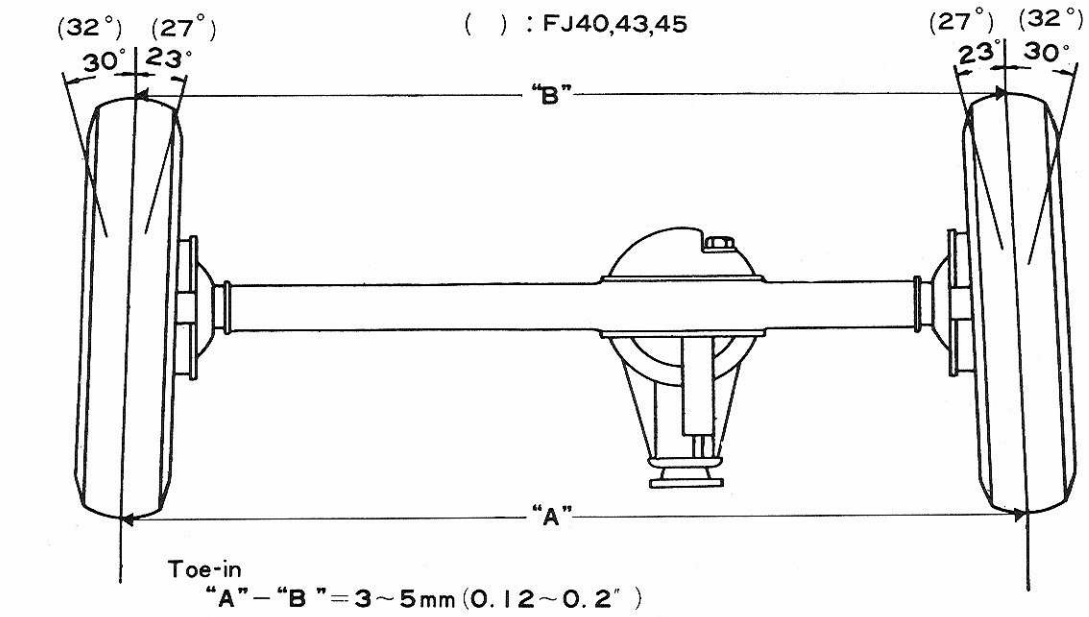


Fig.6-48 Tire Rotation G1329

FRONT END ALIGNMENT



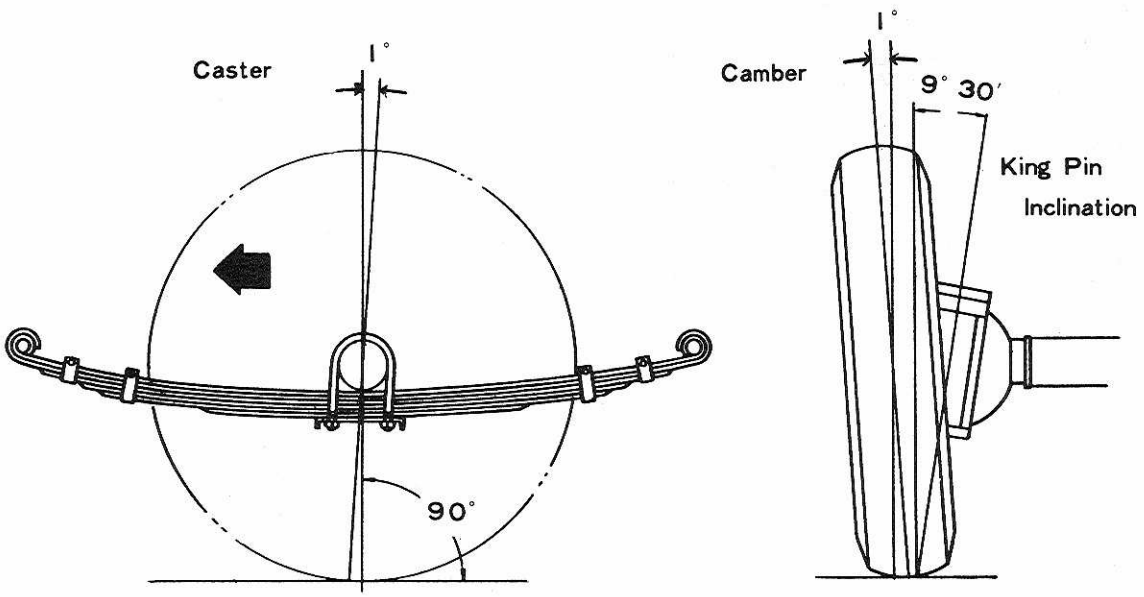


Fig.6-49 Front End Alignment G2428

The front end alignment should be correctly maintained in order to insure and reduce tire wear to a minimum.
The satisfactory operation of the vehicle with almost effortless control of the steering requires the following factors.

1. Steering wheel must operate easily.
2. Steering wheel must return to its original position.
3. Steering must be steady.

The most important factors of the front end alignment are; Toe-in, Caster, Camber and King pin inclination.
Before checking and adjusting the front end alignment, the following preliminary check should be made.

1. Check all tires for inflation and wear.
   The tires should have about the same wear and be inflated to specified pressure.
2. Check the hub bearing for loosenness, wear or damage.
3. Check the steering gear housing mountings, and all rod ends and clamps for looseness.
   Worn or bent linkage should be replaced.
4. Check all rod ends for wear and damage.
5. Check the shock absorber action, and replace if necessary.
6. Bounce the vehicle at the front and rear ends several times to allow the frame to level up.

There are several kinds of front end alignment gauges, and to perform the front end alignment, the operation instruction furnished by each manufacturer must be followed.
Regardless of any type of equipment used, it is essential that the vehicle is placed on a level surface at all times with tires properly inflated.

Specifications:

Toe-in:	3 ~ 5 mm (0.12 ~ 0.20")
Camber:	1°
Caster:	1°
King pin inclination:	9° 30'
Front wheel turning angle:	
Inner wheel:	30° (32°)
Outer wheel:	23° (27°)

( ) : FJ40,43,45 series

Camber

Using the front end alignment gauge, measure the caster.
The specified camber is 1°.
There is no adjustment for camber, however loose hub bearings, bent steering knuckle spindle, or bent axle housing may cause defective camber

Caster

Using the front end alignment gauge, check the caster.
The value should be 1°.
Caster is established by the design, and will be changed only by the shifting of the front axle housing on the springs or by the distorsion of the springs or chassis frame. There is no adjustment for caster.

King Pin Inclination

Inspect the king pin inclination with the front end alignment gauge.
The king pin inclination should be 9 degrees and 30 minutes.
There is no adjustment for king pin inclination.
If it is incorrect, inspect the steering knuckle bearings for wear or other damage, and the steering knuckle spindle for bend or other defects.

Toe-in

Using the toe-in gauge, measure the toe-in.
The toe-in should be 3 ~ 5 mm or 0.12 ~ 0.20".
To adjust, loosen the clamp bolts at each end of the tie-rod.
Rotate the tie-rod with a pipe wrench or another tool to obtain the correct toe-in.
Tighten the clamp bolts, and position the bolts at right angle to the slot in the tie-rod.

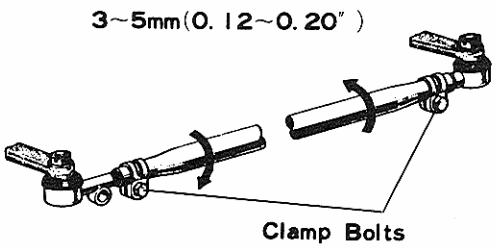


Fig.6-50 Toe-in Adjustment G2429

Side Slip

After adjusting the toe-in, and checking the camber, caster and the king pin inclination, check the side slip with a side slip tester.
If the side slip exceeds the specified movement of 3/1,000 meter 10/3,000 feet, the toe-in must be re-adjusted.

Front Wheel Turning Angles

Check the turning angle by placing the front wheels on a turning gauge.
Adjust the turning angle with the knuckle stopper bolts located on the steering knuckles.
The specified turning angles are 30° for the inner wheel, and 23° for the outer wheel.

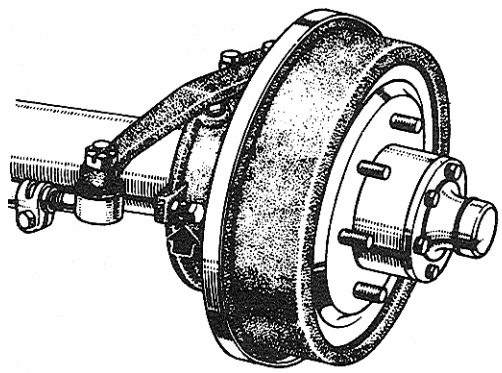


Fig.6-51 Turning Angle Adjustment G2430

* *

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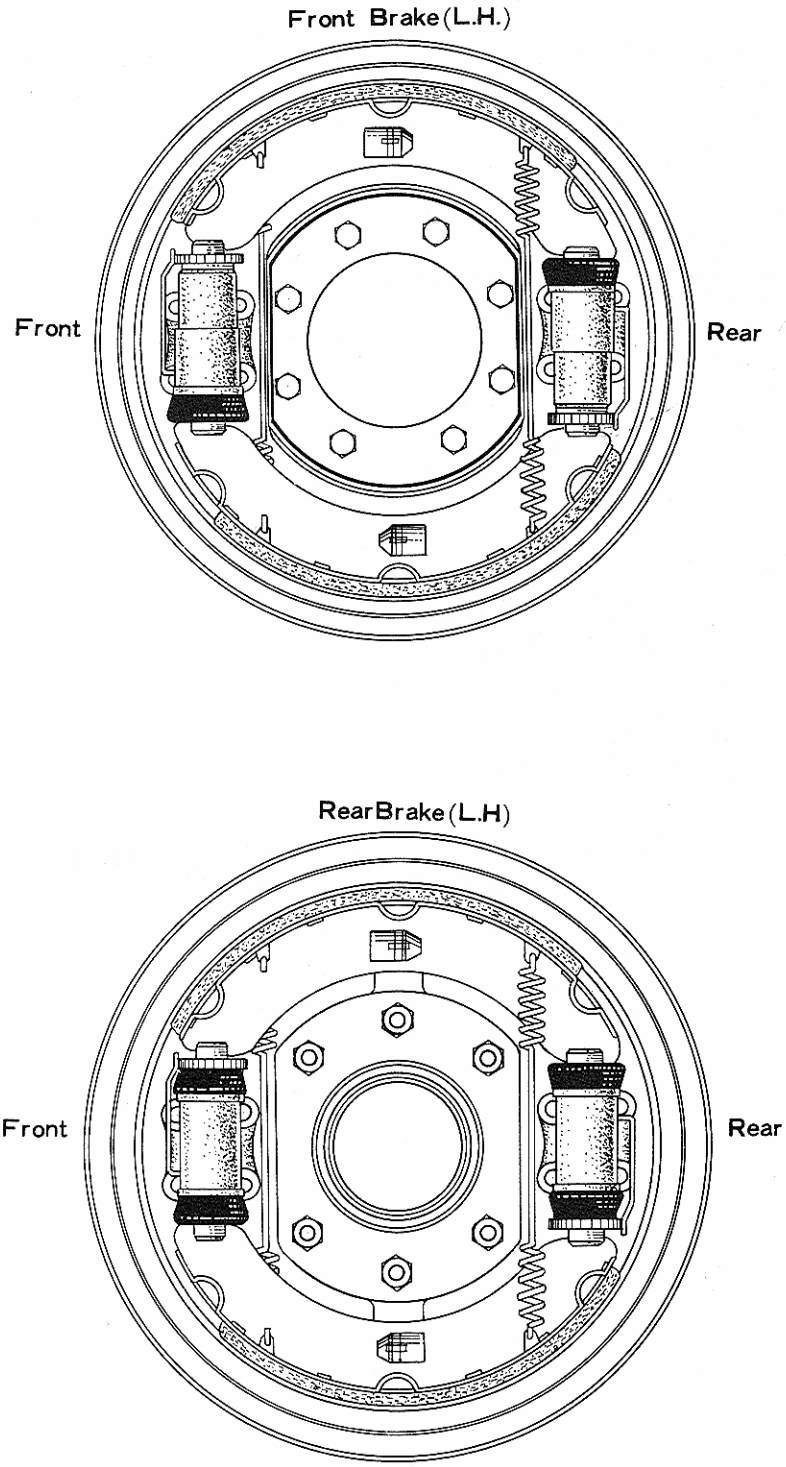


Fig.7-1 Brake Assembly

The service brakes are of the internal expanding, hydraulically operated type acting on four wheels actuated by means of a brake pedal, connected to the brake master cylinder via the push rod.

The front brakes are of the two leading type with two brake wheel cylinders and the rear brakes are of the dual two-leading type with two brake wheel cylinders on each wheel. The front brake wheel cylinders have one piston and the rear have two pistons.

The vacuum assisted Brake Booster is able to be installed on the FJ55V to increase the braking force.

The parking brake is a mechanical internal expanding shoe type mounted at the rear of the transmission exerting a brake effect on the rear wheels through the drive line. The parking brake application is accomplished by the parking brake plunger through the flexible cable and onto the brake shoes then to the brake drum.

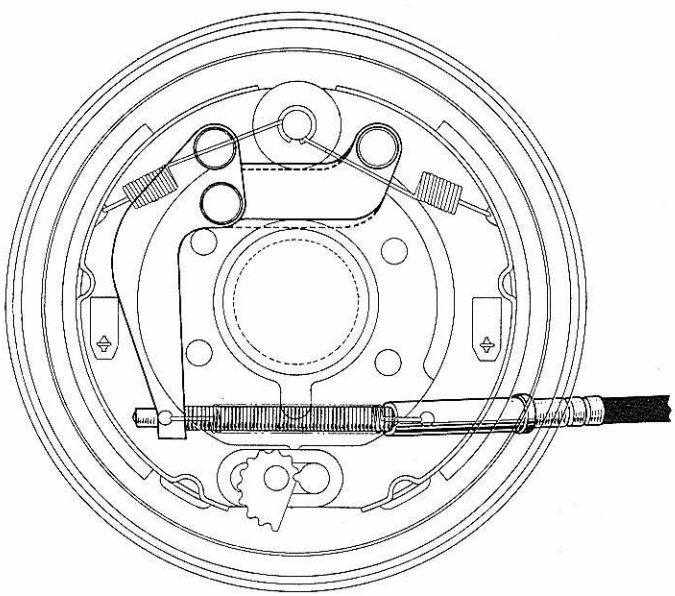


Fig.7-2 Parking Brake G2462

TROUBLE SHOOTING

Symptoms & Probable Causes	Remedies
1. Pedal spongy.	
a. Air in hydraulic lines	Bleed the brake system
2. Excessive pedal travel	
a. Worn lining or improperly adjusted brake shoe clearance	Replace lining or adjust clearance
b. Leak in hydraulic system	Repair or replace necessary part/s
c. Excessive pedal free travel	Adjust free travel
3. Brake does not release or drags	
a. Faulty master cylinder	Overhaul master cylinder
b. No pedal free travel	Adjust brake pedal
c. Brake shoe distorted or improperly adjusted	Replace shoe or correctly adjust brakes
d. Faulty brake booster	Overhaul booster
4. One brake drags (pulls to one side)	
a. Loose or worn wheel bearings	Replace or adjust bearing/s
b. Weak or unhooked brake shoe spring/s	Replace or repair
c. Improperly adjusted brake shoe clearance	Adjust shoe clearance
d. Faulty brake wheel cylinder	Repair or replace
5. Brake pulls to one side	
a. Abnormal wear of brake drum or lining	Replace drum or lining
b. Loose brake backing plate attaching bolts	Retighten
c. Distorted brake shoe	Replace brake shoe
d. Oil on lining or drum	Clean and replace lining
e. Loosen or damaged wheel bearing	Adjust or replace bearing
f. Improperly adjusted brake shoe clearance	Adjust shoe clearance
g. Front end misalignment	Adjust front end alignment
h. Tires improperly inflated	Inflate tires to correct pressure
i. Axle off-set from spring seat	Correct axle seating on spring
6. Noisy brakes	
a. Worn or glazed lining	Dress or replace lining
b. Loose brake backing plate attaching bolts	Retighten
c. Loose wheel bearing	Tighten and adjust

Symptoms & Probable Causes	Remedies
d. Grease, mud or water on lining	Clean or replace lining
e. Scored brake drum	Repair or replace drum
f. Excessive friction between shoe and brake backing plate	Fill and lubricate with grease
7. Pedal counter-acts when depressed	
a. Damaged hydraulic piston cup	Replace piston cup
b. Distortion of brake drum	Replace drum
c. Improperly installed brake drum	Correct drum installation
d. Faulty brake booster	Overhaul booster
8. Poor brake effectiveness	
a. Poor contact of brake lining	Correct brake contact
b. Air in brake lines	Bleed brake system
c. Faulty brake booster	Overhaul booster

* *

ADJUSTMENT

Brake Pedal

1. Adjust the brake pedal height with height of 170 mm (6.69") for only FJ55V series or 245 mm (9.65") for others from the dash board to the top center of the pedal pad.

2. After adjusting the brake pedal height, adjust the clearance between the master cylinder push rod and the master cylinder piston. To obtain the clearance of 0.5 mm (0.02"), turn the master cylinder push rod after loosening the lock nut.

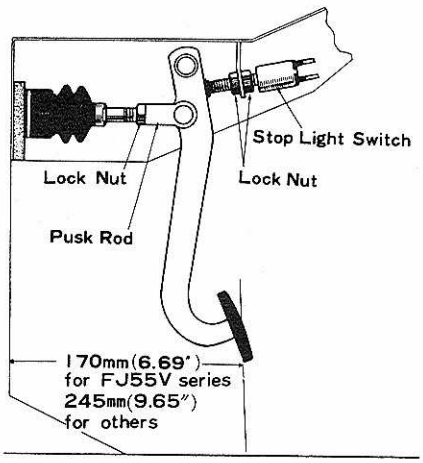


Fig.7-3 Brake Pedal Adjustment G2463

3. If the distance from toe-board to the brake pedal is less than 25 mm (1 in.) when depressed, the brake lining should be checked for wear.

Brake Shoe Clearance

Brake shoe adjustment re-establishes the brake lining to drum clearance, and compensates for lining wear. The hydraulic brakes are adjusted by The brake wheel cylinder adjusting nut through the service holes of the brake backing plate.
The brake drums should be at normal room temperature when the brake shoes are adjusted.

If the shoes are adjusted when the drums are hot and expanded, the shoes may drag as the drum cool and contract.

1. Raise the vehicle until the wheels clear the floor.

2. Release the parking brake plunger completely and check the rear wheels to turn freely.

3. Remove the shoe adjusting hole plugs from the brake backing plate.

4. Expand the brake shoe by turning the wheel cylinder adjusting nut with the adjusting tool until the shoe is tight against the drum.
At this time, pump the brake pedal a few times to make sure that the shoes contact the drum onto the entire surface.
If the wheel still turns after removing the foot from the brake pedal, turn the adjusting nut further until the wheel is locked completely.

5. Back off the adjusting nut 5 notches if the shoe still drags lightly on the drum, then back off the adjusting nut 1 ~ 2 additional notches.
Check if the wheel rotates freely.
Re-install the shoe adjusting hole plugs.

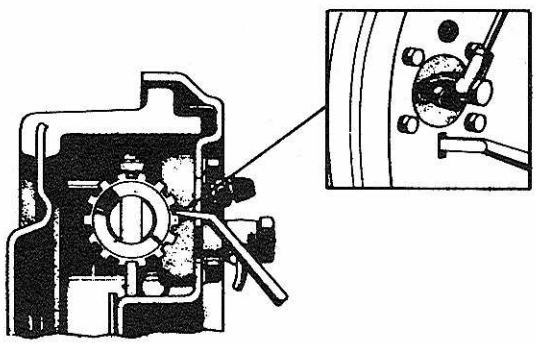


Fig.7-4 Brake Shoe Clearance Adjustment G2464

For the wheel with two wheel cylinders, never adjust the shoes with the two adjusting nuts at the same time.

6. Perform the same operations on each brake shoe.
   After all brake shoes have been properly adjusted, lower the vehicle.
   Road test the vehicle on a level road and check the following items. Perform the road test only to determined whether the brake will apply properly, and the vehicle can be stopped safely.

   a. All wheels should lock.

   b. The brake effectiveness is well balanced on both the right and left.

   c. Check if the brakes are noisy.

Parking Brake

1. Place the parking brake plunger in fully retarded position, then jack up the rear of the vehicle, and position the stands.

2. Turn the parking brake adjuster located on the lower position of the parking brake plate counterclockwise until the shoes seat against the drum.
   Next, loosen the adjuster one notch.

3. After the adjustment of the parking brake shoe clearance, pull the parking brake plunger, and check if the drum is locked.
   Next, releasing the plunger, check if the drum rotates freely.
   If the rotation is still tight, the adjuster should be loosened one additional notch.

4. Adjust the parking brake cable by adjusting the effective stroke of the plunger with the turn-buckle on the inter-mediate lever pull rod No.1 and No.2 and the adjusting nuts on the parking brake cable end. The effective stroke of the parking brake plunger should be 6 ~ 9 notches.

5. Test the parking brake effectiveness on a brake tester if available or on a slope.

Air Bleeding

When any part of the hydraulic system has been disconnected or presence of air in the system is detected, the system must be bled.

1. Remove the dirt from the area around the top of the master cylinder, and fill the master cylinder with clean brake fluid, and keep the reservoir at least half full of fluid at all times during the operation.

Caution:
Never re-use the brake fluid that has been bled from the hydraulic system.
Do not spill any brake fluid on the painted surface during the operation.

2. Remove the bleeder plug cap from the bleeder plug of the wheel cylinder, and connect a vinyl tube to the plug.
   Submerge the other end of the tube into a container half filled with clean brake fluid.

Note:
Air bleeding operation should be performed first from the bleeder plugs on the hydraulic cylinder plug and the top of the end plate if the brake booster is installed. Bleed the wheel cylinder with the longest hydraulic lines first.

3. Depress the brake pedal slowly several times to bleed the air, and with the brake pedal depressed, loosen the bleeder plug 1/3 to 1/2 of a turn, then close the plug immediately.

4. Repeat this operation until the brak fluid flows into the container without any trace of air.

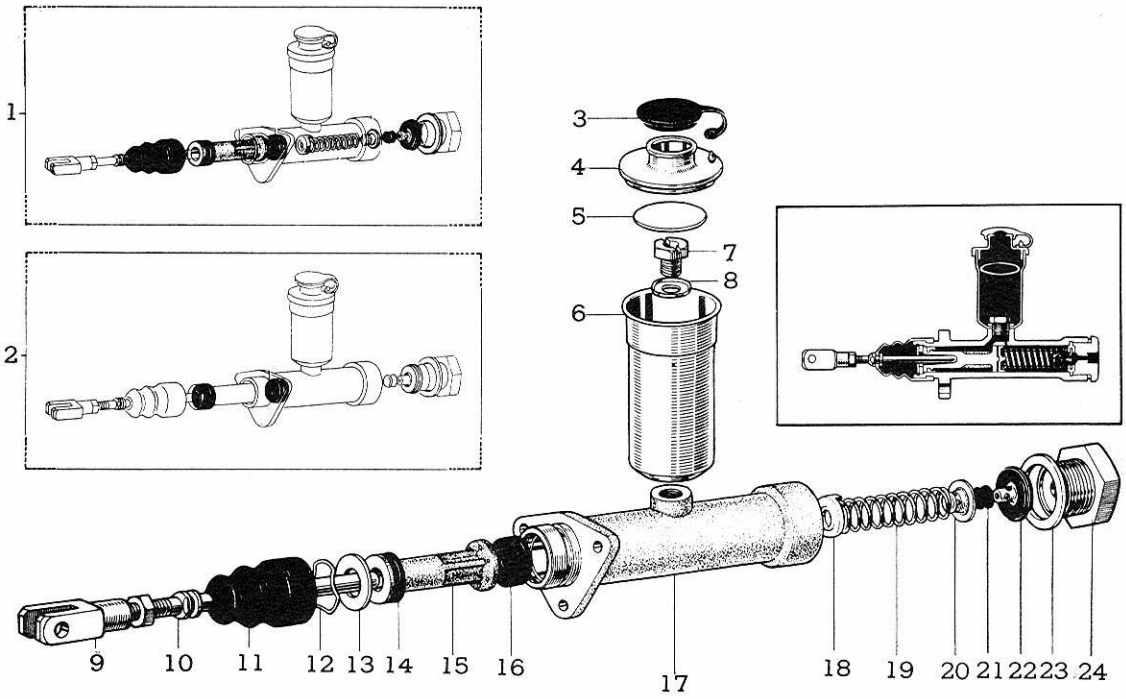
5. Install the bleeder plug cap onto the plug, and replenish the brake fluid

into the reservoir up-to the specified level.

BRAKE PEDAL

As the brake pedal is almost identical with that used for the clutch pedal, refer to the Clutch Pedal section for details on page 1-5.

BRAKE MASTER CYLINDER



1. Brake master cylinder kit
2. Brake master cylinder piston cup kit
3. Reservoir filler cap
4. Reservoir cap
5. Float
6. Master cylinder reservoir
7. Reservoir set bolt
8. Washer
9. Push rod clevis
10. Master cylinder push rod
11. Boot
12. Hole snap ring
13. Washer
14. Cylinder cup
15. Master cylinder piston
16. Cylinder cup
17. Master cylinder body
18. Return spring retainer
19. Piston return spring
20. Outlet check valve seat
21. Outlet check valve
22. Seat gasket
23. Gasket
24. Master cylinder plug

Fig.7-5 Brake Master Cylinder Components G2465

Removal & Disassembly

Do not spill any brake fluid on painted surface during the operation.

1. Plug the reservoir inlet, then disconnect the brake tube from the master cylinder.

2. Loosen and remove the master cylinder mounting bolts, and remove the master cylinder assembly.

3. Remove the reservoir cap and the reservoir float, and drain the brake fluid.

4. Loosen and remove the master cylinder reservoir set bolt, and remove the reservoir from the master cylinder body.

5. Pull out the master cylinder boot. Remove the hole snap ring, then remove the piston stopper plate, piston with the cylinder cup, cylinder cup spring retainer and the piston return spring from the master cylinder body in above sequence.

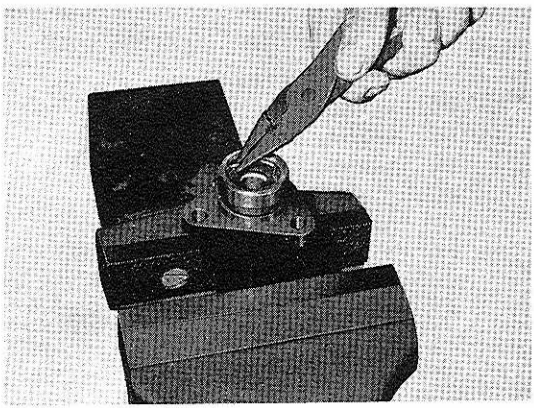


Fig.7-6 Removing Hole Snap Ring V5159

6. Clamp the master cylinder plug in a vise, then loosen and remove the master cylinder plug from the cylinder body with a pipe wrench. Next, remove the outlet check valve seat gasket, check valve and the check valve seat.

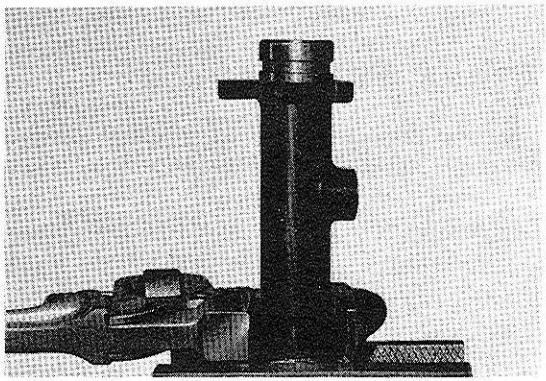


Fig.7-7 Removing Master Cylinder Plug V5160

7. Remove the cylinder cup from the master cylinder piston.

Inspection

Clean all disassembled parts in clean brake fluid or alcohol, and dry with compressed air.
Inspect the parts for wear or damage, and replace the parts if necessary.

1. Inspect the master cylinder bore for wear, scores or rust.

2. Inspect the piston exterior for abnormal wear or scores.

3. Inspect the cylinder bore to piston clearance, and if the clearance exceeds the limit of 0.15 mm or 0.006", replace the piston and/or the cylinder body.

   Master cylinder bore diameter:
   25.400 ~ 25.452 mm
   (1.000 ~ 1.002")
   Piston diameter:
   25.327 ~ 25.360 mm
   (0.997 ~ 0.998")
   Cylinder to piston clearance:
   0.040 ~ 0.125 mm
   (0.002 ~ 0.005")

5. Check the piston return spring for rust and excessive weakness.

6. Inspect the reservoir for scores and deformation at the base.

Assembly

It is recommended that the cylinder cups and the gasket should be replaced pon assembly.
Dip all internal parts of the brake master cylinder in clean brake fluid before assembly.

1. Install the cylinder cup onto the piston with the lip facing towards the front of the piston.

2. Insert the piston into the piston body, then install the piston stopper plate and the hole snap ring.

3. Insert the cylinder cup, spring retainer, piston return spring and the outlet check valve with the check valve seat and the valve seat gasket into the master cylinder.

4. Install the master cylinder plug with the gasket.

5. Position the master cylinder reservoir, and tighten the reservoir set bolt to 1.4 ~ 1.8 m-kg (10 ~ 13 ft-lb) torque.

6. Place the float into the reservoir and install the cap onto the reservoir.

7. Install the master cylinder boot onto the master cylinder body.

Installation

Follow the removal procedures in the reverse order.

1. Fill the reservoir with clean brake fluid up-to the specified level, first, bleed the air from the master cylinder, then bleed the other hydraulic system.
   Refer to Air Bleeding on page 7-6.

2. Adjust the master cylinder push rod to master cylinder piston clearance.
   Refer to Brake Pedal Adjustment on page 7-5.

* *

BRAKE LINE

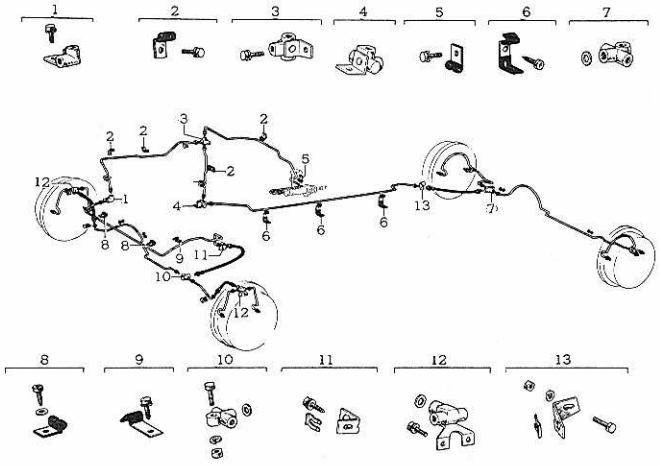


Fig.7-8 Brake Line Components, FJ40(L)(V)

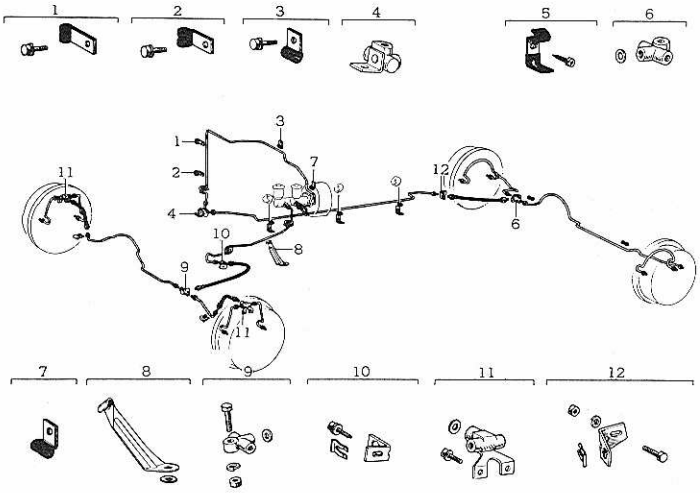


Fig.7-9 Brake Line Components, FJ40(L)(V)-OPT

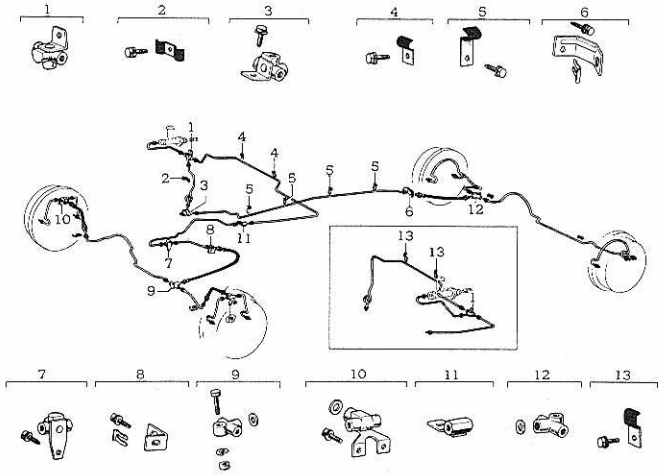


Fig.7-10 Brake Line Components, FJ55(L)V

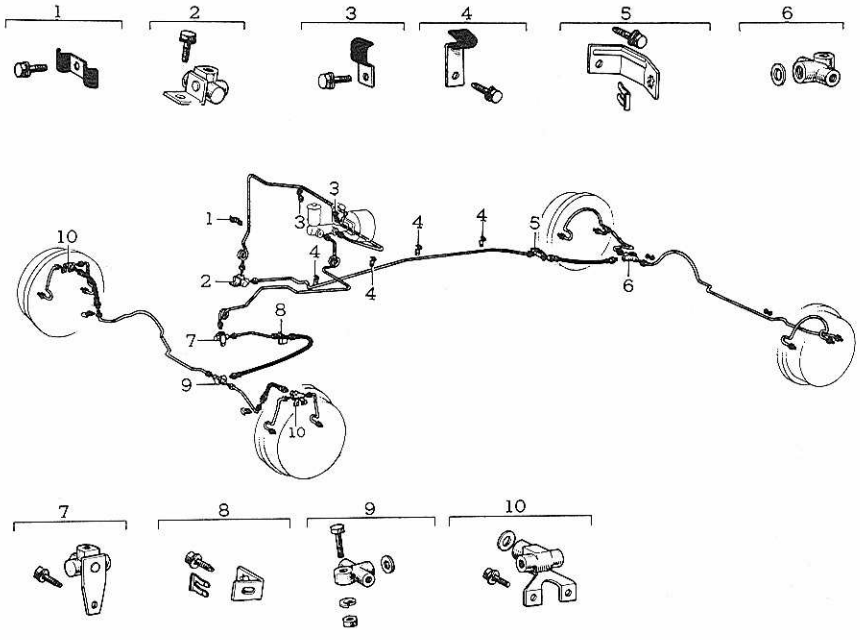


Fig.7-11 Brake Line Components, FJ55(L)(V)-OPT

Flexible Hoses

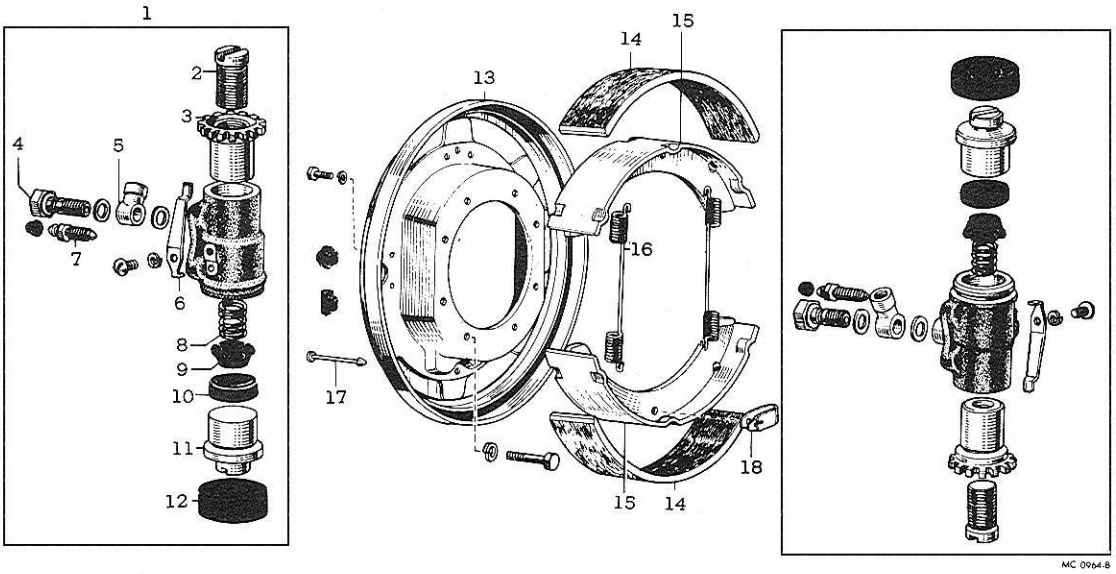
The flexible hoses require no service other than periodic inspection for damage from road hazards or other like sources.
The hoses showing signs of softening, cracking, swelling or other damage should be replaced.
When installing a new hose, position the hose to avoid contact with other vehicle parts.
Never twist the hose unduly during the operation as its natural curvature is absolutely necessary to maintain proper hose-to-suspension clearance through full movement of the suspension and the steering parts.

Brake Tubes

Steel tube is used for all brake tubes which resist corrosion and have the physical strength to withstand under high pressure when the brake is applied.
If a section of the brake tube becomes damaged due to unexpected external force, the entire section should be replaced with the new one.
Copper tube should not be used in the hydraulic system.
When replacing the brake tube, hose/s or connection/s, tighten all connections securely.
After the replacement, bleed the brake system at the wheel cylinders and at the brake booster if so equipped.

* *

FRONT BRAKE



1. Brake wheel cylinder assembly
2. Wheel cylinder adjusting bolt
3. Wheel cylinder adjusting nut
4. Union bolt
5. Union
6. Adjuster lock spring
7. Bleeder plug
8. Compression spring
9. Spring seat
10. Cylinder cup
11. Cylinder piston
12. Wheel cylinder boot
13. Brake backing plate
14. Brake lining
15. Brake shoe
16. Brake shoe return spring
17. Shoe hold down spring pin
18. Shoe hold down spring

Fig.7-12 Front Brake Components G2468

Removal

1. Pry off the wheel cap and loosen the hub nuts.
   Raise the front end of the vehicle and support the front axle housing with stands, then remove the front wheel.

2. Plug the brake master cylinder reservoir inlet.

3. Loosen and remove the brake drum set screws, tap the drum lightly with a mallet and remove the drum. Do not depress the brake pedal after the drum has been removed. Back off the adjusting nuts if the drum cannot be removed.
   Remove the shoe hold down springs.

4. Remove the upper and lower brake shoes by pulling out the shoe end while pushing it up or down.

Do not allow the oil or grease to touch the brake linings.
Place the brake shoes in order, and do not change the upper shoe with the lower shoe.

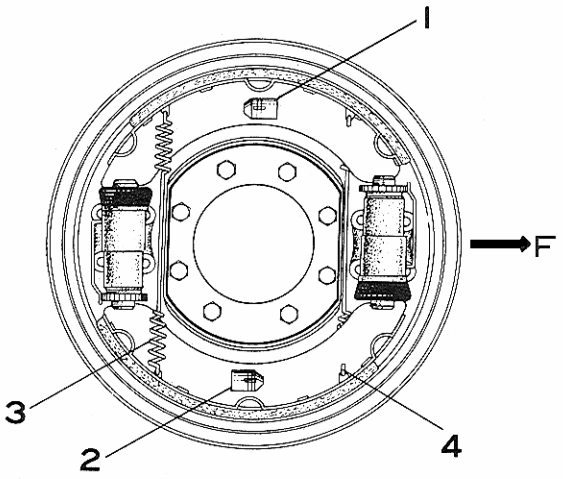


Fig.7-13 Brake Shoe Removal G2469

5. Loosen and remove the union bolt connecting the union of the wheel cylinder brake tube to the brake wheel cylinder.

6. Remove the wheel cylinder mounting bolts and remove the wheel cylinder assembly.
Remove the other wheel cylinder in the same manner.

7. If necessary, remove the brake backing plate after removing the front axle hub.
To remove, refer to Steering Knuckle & Axle Shaft.

Inspection & Repair

Brake Drum

1. Clean all dirt out of the drum, and check for cracks, scores, roughness, deep grooves and out-of-round.
If any of these conditions exists, replace or correct as these can impair the efficiency of brake operation and also cause premature failure of the brake linings.

2. Smoothen any slight scores by polishing with fine emery cloth. Heavy or extensive scoring will probably be necessary to rebore in order to true up the braking surface.
If the drum is to be rebored, use a drum lathe with the front axle hub attached onto the drum.
The refinished braking surface must be smooth and free from chatter or tool marks.

Brake drum inside diameter:
290 mm (11.42")
Serviceable limit of inside diameter:
293 mm (11.54")

Wheel Cylinder

After the disassembly, wash the parts thoroughly in clean brake fluid.

1. Inspect the piston and cylinder bore for scores, wear, deep scratches or corrosion.
Replace if defective.

2. Inspect the wheel cylinder to piston clearance, and if the clearance exceeds the limit, replace the wheel cylinder and/or the piston.

	FJ40,43,45,55V	F40L-A,55L-G,OPT
Wheel cylinder dia.	28.550~28.552 mm (1.122~1.124")	31.750~31.802 mm (1.250~1.252")
Piston dia.	28.427~28.460 mm (1.118~1.120")	31.686~31.725 mm (1.247~1.249")
Specified clearance	0.04~0.125 mm (0.002~0.005")	
Clearance limit	0.15 mm (0.006")	

3. Inspect the wheel cylinder adjusting nut and the adjusting bolt for wheel or abnormal rotation.

If necessary, replace as a set.

4. Inspect the cylinder cup for scores, cracks, wear or swelling due to improper brake fluid.
Replace if necessary.

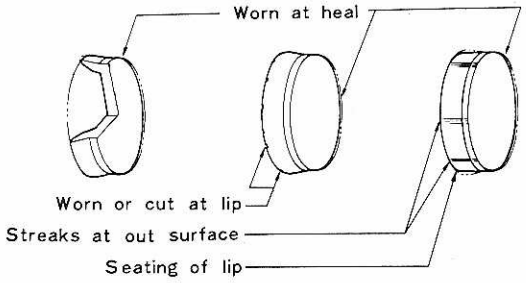


Fig.7-14 Cylinder Cup Inspection G2470

Brake Shoe Return Springs

Inspect the spring for weakness and deformation.

Free length:	189.5 mm (7.46")
Installed length:	205.0 mm (8.07")
Installed load:	15 kg (33 lb)

Brake Backing Plate

Inspect the backing plate for distortion. Check the plate contacting surfaces with the shoes for any nicks or burrs.

Brake Shoe

1. Inspect the brake shoes for wear, deformation, rust and damage. Inspect the brake linings for scores and excessive wear, and if the thickness of the lining is less than 4 mm (0.16"), replace the brake shoe assembly or reline the lining.

2. Inspect the lining and drum for proper contact.
If the contact between them is improper, repair the lining with the brake shoe grinder or replace the brake shoe assembly.
When any lining requires replacement, it should be replaced in sets of two-both front wheels to maintain effective brakes.

Brake Lining Replacement

1. Lining removal.

Heat the brake shoe to about 250 °C (480 °F) for bout 20 minutes, then peel off the lining from the brake shoe without deforming the brake shoe.

2. Lining installation

a. Dress the brake shoe surface with a suitable sander, and remove the bonding material, rust or any rough spot.

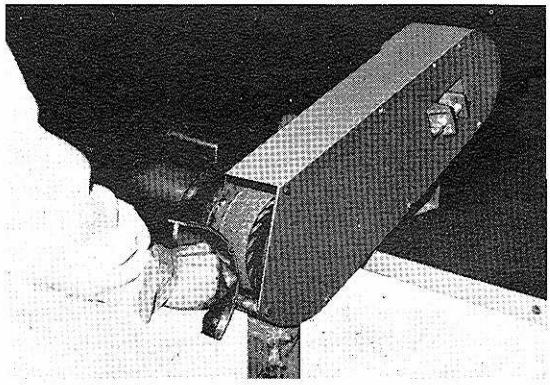


Fig.7-15 Dressing Brake Shoe Surface V1023

b. Coat the brake shoe surface, and the inner surface of the brake lining with a reliable bonding material.
For application of the bonding material, refer to the inspection furnished with the material.

Note:
The bonding material of Toyota (Part No.08814-00010) is available which is heat hardening type adhesive.
Dry the adhesive sufficiently before bonding the brake lining onto the brake shoe.

c. The lining should be positioned as illustrated.

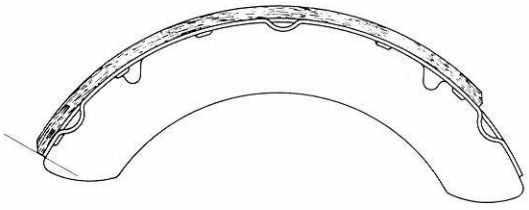


Fig.7-16 Brake Lining Installation Position G2471

d. Bond the brake lining onto the brake shoe with a shitable bonding machine.
There are several bonding machine available, and the instructions furnished by each manufacturer for the operation of the machine must be followed.

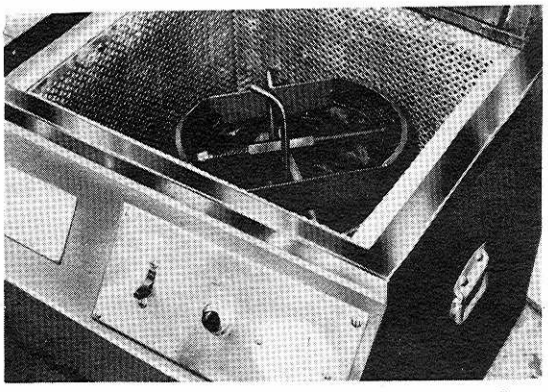


Fig.7-17 Bonding Brake Lining V2629

e. Inspect the new brake lining, and confirm that there are no nicks or burrs on the shoe edge where it contacts with the brake backing plate or other contacting surface.

f. Test the brake lining bonding condition with a bonding tester. Hold the brake shoe and apply the pressure of 7 kg/cm^2 (99 psi) on the side of the brake lining, and if the brake lining does not peel, the bonding it satisfactory.

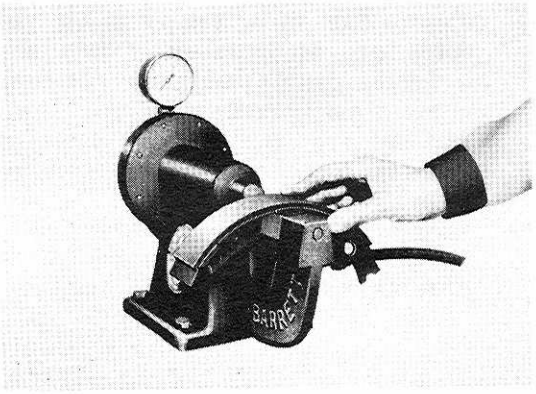


Fig.7-18 Testing Bonding Condition V2632

Installation

Coat all points of contact between the brake shoe and the other brake assembly parts with grease.
Lubricate the adjusting bolt threads.

1. Apply clean brake fluid into the wheel cylinder bore, cylinder cup and the piston, and install the spring, piston spring seat, cylinder cup and the piston into the wheel cylinder in order.
   Next, install the wheel cylinder boot.

2. Assemble the wheel cylinder adjusting nut with the bolt into the wheel cylinder.

Caution:
The adjusting nuts and the bolts are of two kinds; the adjusting bolt of left-hand threads is on the right side of the front brake, and the right-hand threads one is on the left side of the front brake.

3. Install the wheel cylinder assemblies onto the brake backing plate as illustrated in the figure 7-17 and 7-18.

4. Hook the brake shoe return springs onto the brake shoes.

Note:
Hook the front spring from the shoe back side, and hook the rear spring from the shoe face side.

First, fit the lower brake shoe ends into the grooves of the wheel cylinder piston, and the adjusting bolt, then push up the upper brake sho and fit the brake shoe ends into the grooves of the piston and the adjusting bolt.
Each brake shoe ends must be properly fitted into the grooves of the pistons and the adjusting bolts.

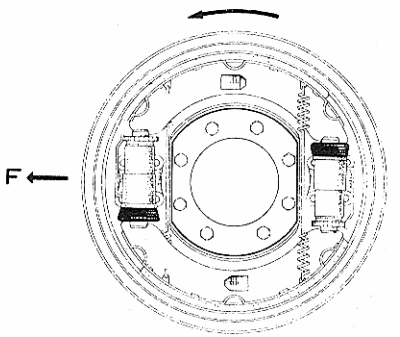


Fig.7-19 Front Brake Assembly (Left) G2469

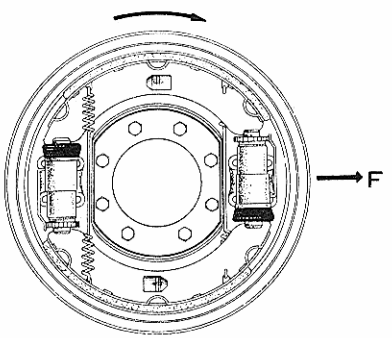
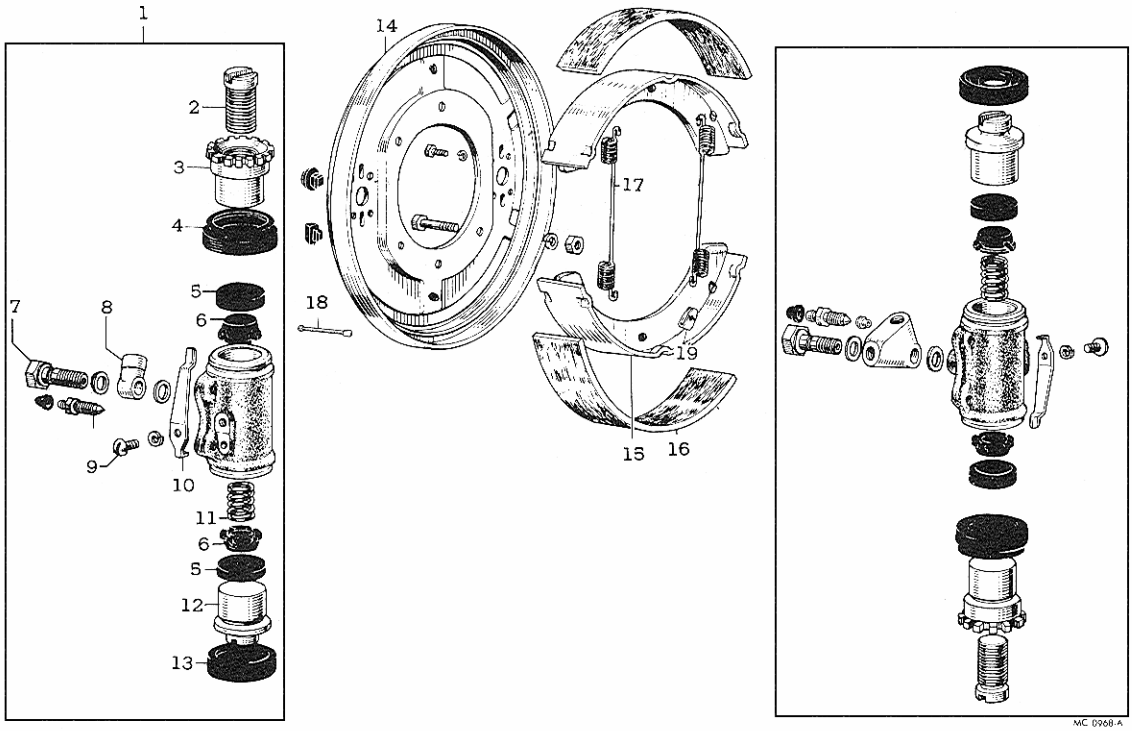


Fig.7-20 Front Brake Assembly (Right) G2472

5. Install the shoe hold down spring pinsand shoe hold down springs.
6. Install the brake drum and secure with the drum set screws.
7. Connect the unions of the brake tubes with new gaskets onto the wheel cylinders.
8. Bleed the hydraulic system. Refer to Air Bleeding on page 7-6.
9. Adjust the brake shoe clearance. Refer to Brake Shoe Clearance on page 7-5.
10. Install the front wheel, and tighten the hub nuts securely.
Install the wheel cap.
11. Remove the stands.
Road test the vehicle on a level road to determined whether the vehicle can stop safely.

REAR BRAKE



1. Brake wheel cylinder assembly
2. Wheel cylinder adjusting bolt
3. Wheel cylinder adjusting nut
4. Wheel cylinder boot
5. Cylinder cup
6. Spring seat
7. Union bolt
8. Union
9. Bleeder plug
10. Adjuster lock spring
11. Compression spring
12. Cylinder piston
13. Wheel cylinder boot
14. Brake backing plate
15. Brake shoe
16. Brake lining
17. Brake shoe return spring
18. Shoe hold down spring pin
19. Shoe hold down spring

Fig.7-21 Rear Brake Components G2473

Removal

1. Pry off the wheel cap and loosen the hub nuts.
   Raise the rear end of the vehicle and support the rear axle housing with stand, then remove the rear wheel.

2. Plug the brake master cylinder reservoir inlet.

3. Loosen and remove the brake drum set screws, tap the brake drum lightly with a mallet, and remove the drum.
   Do not depress the brake pedal after the drum has been removed.
   Back off the adjusting nuts if the drum cannot be removed.
   Remove the shoe hold down spring pins.

4. Remove the upper and lower brake shoes by pulling out the shoe end while pushing it up or down.
   Do not let oil or grease touch the brake linings.
   Place the brake shoes in order so as not to change the upper shoe with the lower shoe.

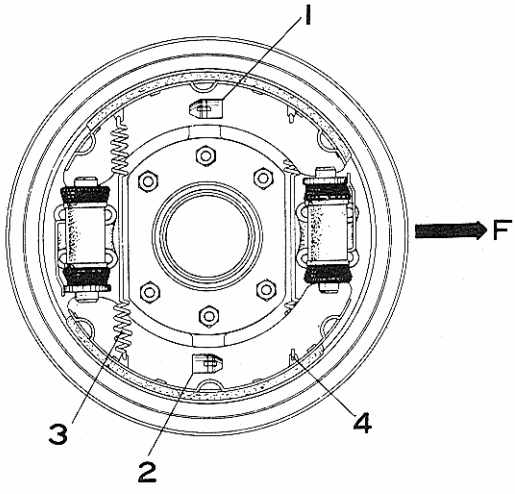


Fig.7-22 Brake Shoe Removal G2474

5. Loosen and remove the union bolt connecting the union of the wheel cylinder brake tube to the brake wheel cylinder.

6. Remove the wheel cylinder mounting bolts, and remove the wheel cylinder assembly.

7. If necessary, remove the brake backing plate after the rear axle shaft removal.
   To remove, refer to Rear Axle Shaft section.

Inspection & Repair

Refer to Inspection & Repair in the Front Brake section.

Installation

Coat all points of contact between the brake shoes and the other brake assembly parts with grease.
Lubricate the adjusting bolt threads.

1. Apply clean brake fluid into the wheel cylinder bore, cylinder cups and the piston, and install the spring, piston spring seats, cylinder cups, pistoncup seat, piston and the adjusting nut with the bolt into the wheel cylinder in order. Next, install the wheel cylinder bolts.

Caution:
There are two kinds of adjusting nuts and the bolts. The adjusting bolt of the left-hand threads is on the right side of the rear brake, and the right-hand threads bolt is on the left side of the rear brake.

2. Install the wheel cylinder assemblies onto the brake backing plate as illustrated in the figure 7-21 and 7-22.

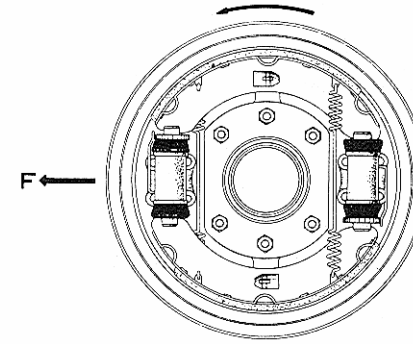


Fig.7-23 Rear Brake Assembly (Left) G2474

3. Hook the brake shoe return spring onto the brake shoes.

Rear Brake Wheel Cylinder Specifications

	FJ40(L)	FJ40L-A,40(L)-OPT	FJ43,45P-B,55V	FJ55LG,55(L)V-OPT
Wheel cylinder dia	25.400~25.452 mm (1.000~1.002")	22.220~22.272 mm (0.875~0.877")	28.500~28.552 mm (1.122~1.124")	23.800~23.862 mm (0.937~0.939")
Piston dia	25.327~25.360 mm (0.997~0.998")	22.167~22.200 mm (0.873~0.874")	28.427~28.460 mm (1.119~1.120")	23.757~23.790 mm (0.935~0.937")
Specified clearance	0.04~0.125 mm (0.002~0.005")			
Clearance limit	0.15 mm (0.006")			

First, fit the lower brake shoe ends into the grooves of the piston and the adjusting bolt, then push up the upper brake shoe and fit the brake shoe ends into the grooves of the piston and the adjusting bolt.
Each brake shoe ends must be properly fitted into the grooves of the pistons and the adjusting bolts.

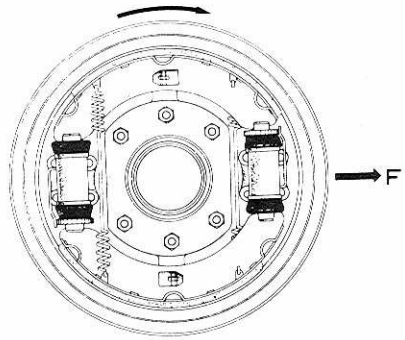


Fig.7-24 Rear Brake Assembly (Right) G2475

4. Back off the adjusting nuts, and install the brake drum, and secure with the drum set screws.

5. Connect the unions of the brake tubes with new gaskets to the wheel cylinders.

6. Bleed the hydraulic system. Refer to Air Bleeding on page 7-6.

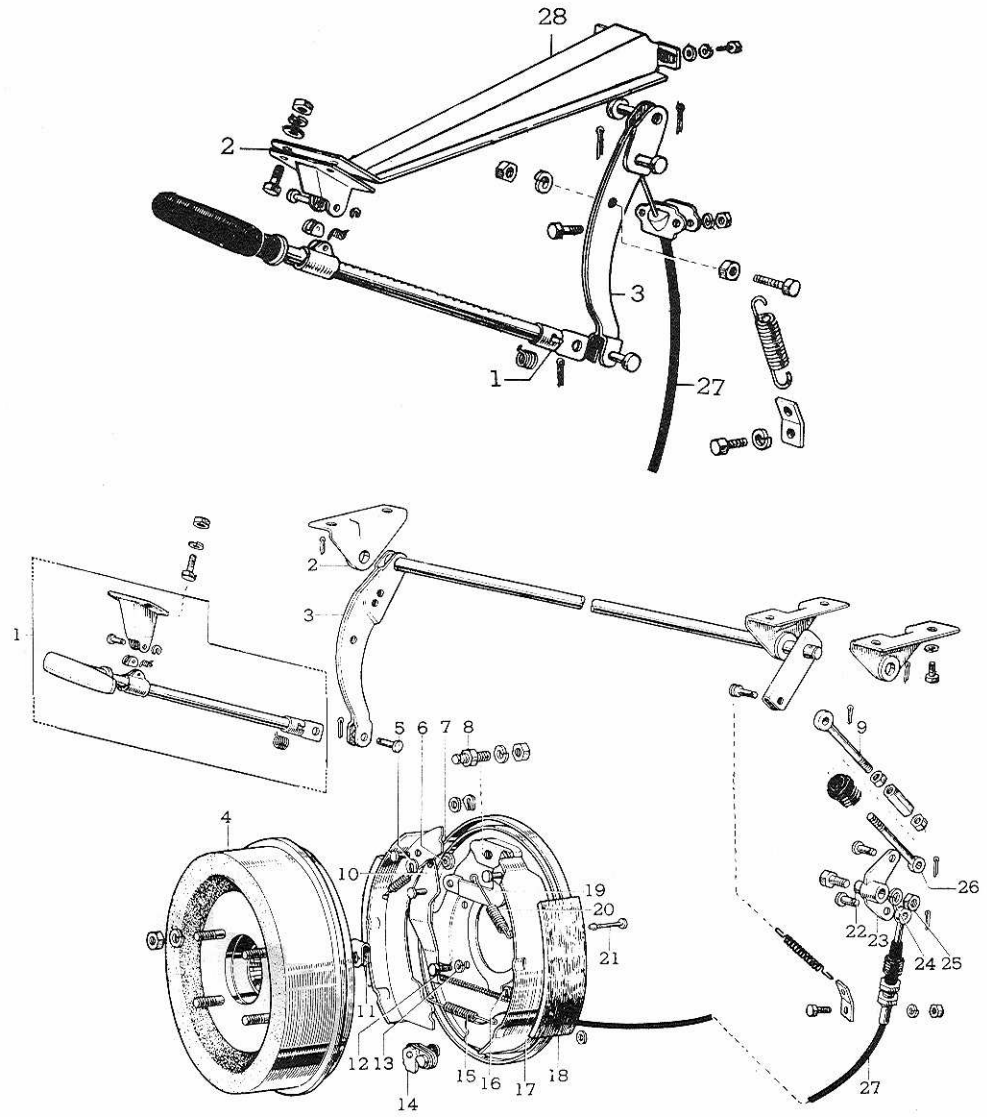
7. Adjust the brake shoe clearance. Refer to Brake Shoe Clearance on page 7-5.

8. Install the rear wheel, and tighten the hub nuts securely.
Install the wheel cap.

9. Remove the stand.
Road test the vehicle on a level road to determined that the vehicle will stop safely.

* *

PARKING BRAKE



1. Parking brake plunger assembly
2. Parking brake plunger bracket
3. Parking brake link lever
4. Parking brake drum
5. "C" washer
6. Washer
7. Brake backing plate
8. Anchor
9. Intermediate lever pull rod No.1
10. Brake shoe lever
11. Brake shoe hold down spring
12. Bolt
13. Lock washer
14. Parking brake shoe adjuster
15. Tension spring
16. "C" washer
17. Parking brake shoe
18. Lining
19. Parking brake shoe lever strut
20. Tension spring
21. Hold down spring pin
22. Spacer
23. Parking brake link lever
24. Lock washer
25. Nut
26. Intermediate lever pull rod No.2
27. Parking brake cable
28. Parking brake bracket

Fig.7-25 Parking Brake Components G2476

Removal & Disassembly

1. Disconnect the throttle and choke rods from the carburetor, and remove them from the instrument panel.

2. Remove the heater air duct No.1.

3. Disconnect the tension spring from the parking brake link lever. Pull out the cotter pins from both ends of the link lever shaft.

4. Remove the link lever brackets bolts and the parking brake plunger bracket bolts, then withdraw the parking brake plunger together with the parking brake link lever.

5. Remove the cotter pin on the parking brake link lever located in the engine compartment, and remove the inter-mediate lever pull rod towards the interior.

6. Disconnect the parking brake cable from the parking brake link lever, and also loosen the lock nut at the end of the cable.

7. Loosen and remove the link lever shaft, and remove the parking brake link lever.

8. Raise the rear end of the vehicle, and support with stands.

9. Remove the transmission under cover, and disconnect the rear propeller shaft from the parking brake drum.
   Drain the transmission gear lubricant from the transfer case.

10. Pull the cotter pin out of the transfer output shaft, and remove the drum retaining nut.
    Remove the parking brake drum.

11. Remove the backing plate retaining bolts, and withdraw the backing plate assembly.

12. Turn and remove the brake shoe hold-down springs, and also remove the hold-down spring pins.

13. Unhook the three tension springs from the brake shoes, and also unhook the parking brake cable from the parking brake shoe lever. Next, remove the brake shoes together with the brake shoe lever and the brake shoe lever strut from the backing plate.

14. Remove the brake shoe adjuster.

Inspection

Wash the disassembled parts except the brake shoes in cleaning solvent.

1. Inspect the brake lining to drum contact condition.
   If the inspection indicates poor contact or scores, recondition the linings.
   Replace the lining if the thickness is less than 1.5 mm (0.06").
   Replace the brake lining if necessary in the same manner as the service brake on page 7-14.

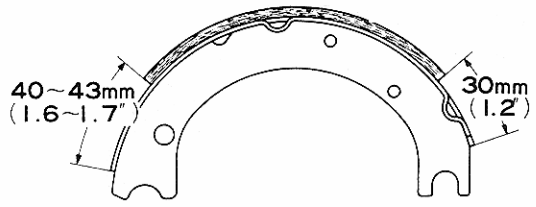


Fig.7-26 Brake Shoe & Lining G2477

2. Check the drum inner surface for wear, scores or roughness. If necessary, dress or replace the drum.

3. Check the tension springs for damage or weakness.

4. Inspect the backing plate for distortion.
   Check the plate contacting surface with the shoes for any nicks or burrs.

5. Check the pins and pin holes of the linkages for excessive wear.

6. Check the parking brake cable for smooth movement.

Assembly & Installation

Follow the disassembly and removal procedures in the reverse order.

1. Retard the brake shoe adjuster fully when installing the drum.

2. Lightly coat with grease onto the contact and sliding portions.

3. Tighten the brake drum retaining nuts to 14 ~ 17 m-kg (101 ~ 123 ft-lb) torque.

4. Refill the gear lubricant into the transfer case up-to the filler hole.
   Grade: SAE 90
   Capacity: 1.7 liters
   (1.8 US qts.,
   1.5 Imp qts)

5. Adjust the parking brake by referring to Parking Brake Adjustment on page 7-6.

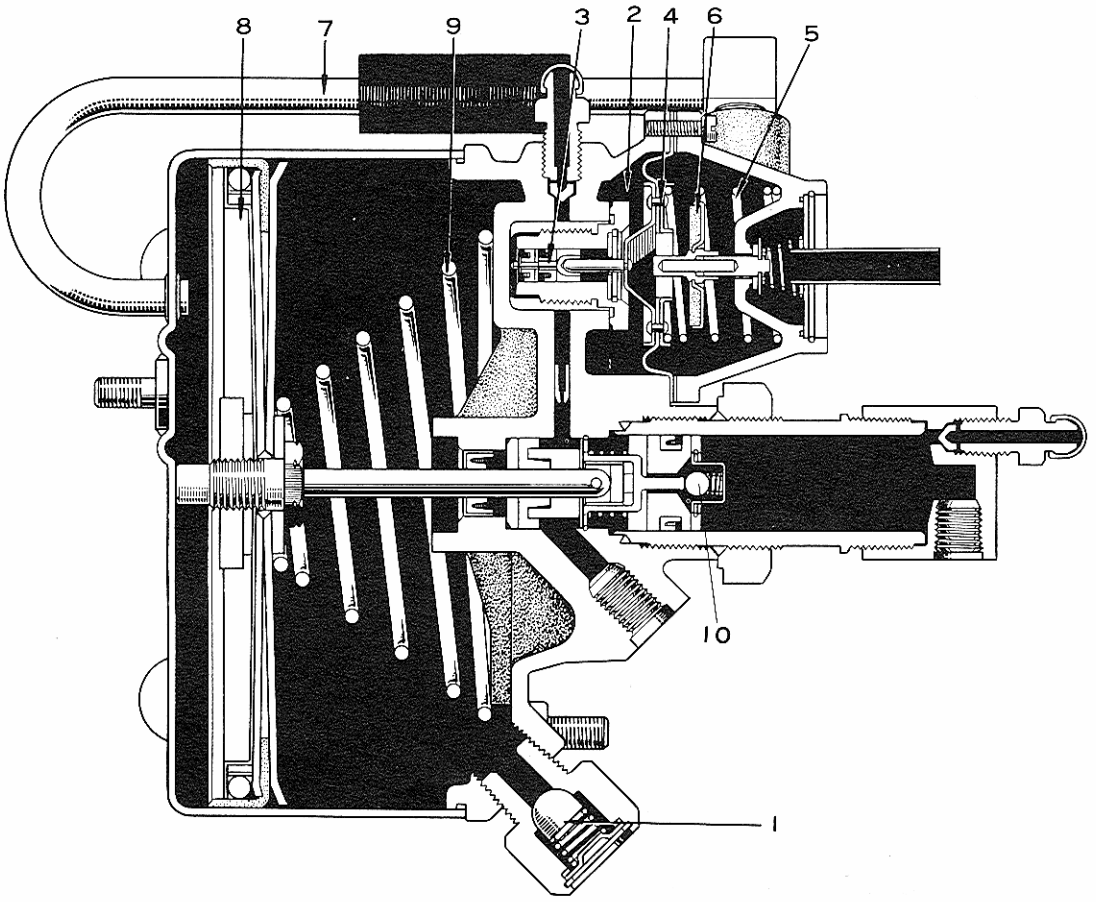
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BRAKE BOOSTER (OLD)

Description

The brake booster is installed as optional equipment, and is mounted on the left front fender apron in the engine compartment.
The booster is a combined hydraulic and vacuum power braking system which utilizes the vacuum created in the engine intake manifold as an operating force. It is a self-contained unit placed between the regular master cylinder and the main line connected to the wheel cylinders.

Operation



1. Check valve
2. Vacuum chamber
3. Relay valve piston
4. Diaphragm
5. Diaphragm spring
6. Poppet valve
7. Connecting pipe
8. Booster piston
9. Booster piston return spring
10. Check ball

Fig.7-27 Brake Booster Cross Section View Y7028

The brake booster consists of three operating units built into the assembly; a booster cylinder, vacuum control valve and a hydraulic cylinder.
A check valve is located in the booster end plate for maintaining maximum vacuum in the system.
When the engine is operating, the vacuum from the intake manifold is transmitte through the vacuum hose to the check valve (1), and from the check valve to the vacuum chamber (2) through the forward end of the power cylinder. At this time, the diaphragm (4) and the relay valve piston are held in the off position by the diaphragm spring (5), and the poppet valve (6) is in open position. This allows the vacuum to be impressed on the rear end of the booster piston (8) through the connecting pipe (7). With the vacuum impressed on each side of the booster piston (8), the pressure on each side is equalized, and the piston is suspended in vacuum.
The booster piston return spring (9) holds the booster piston in the brake released position.

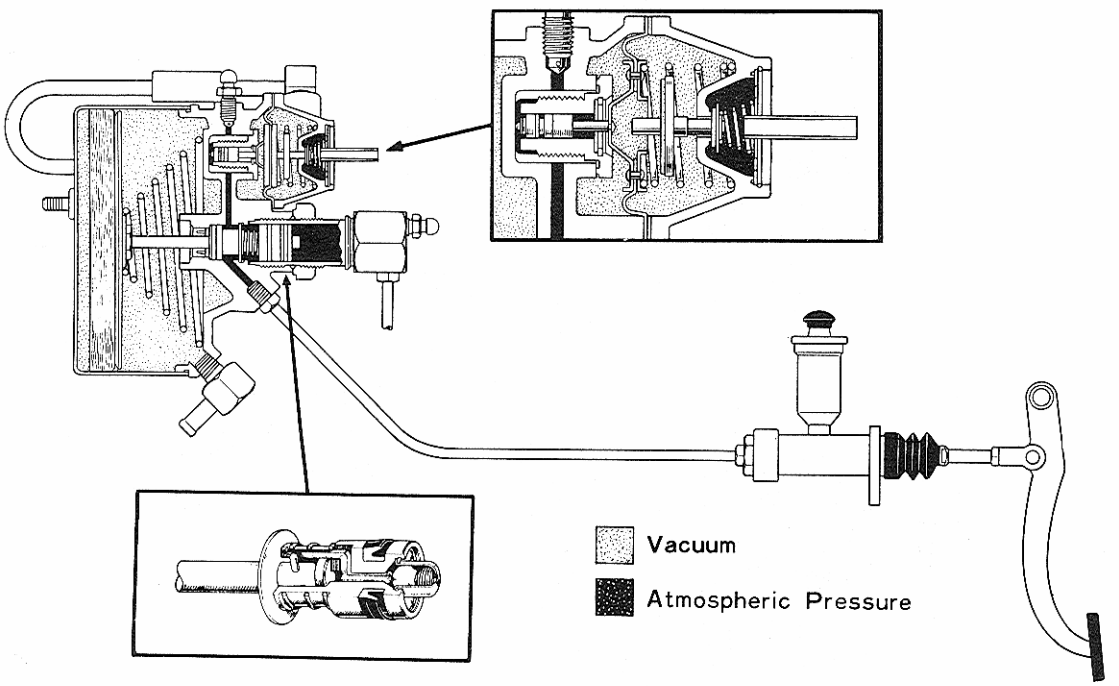


Fig.7-28 Booster in Holding Position Y7029

When the brake pedal is depressed, the hydraulic pressure is built up within the system. The initial pressure that is transmitted to the check ball (10) in the hydraulic piston, which unseats the check ball and permits the pressure onto the wheel cylinders where braking application begins.
At the same time, the pressure is also conducted through the passage to the rear end of the relay valve piston (3). As soon as the hydraulic pressure builds up high enough to move the relay valve piston against the pressure of the diaphragm spring, the movement of the valve piston seats the vacuum poppet valve at the center of the diaphragm.
Further movement of the diaphragm unseats the atmospheric poppet valve, allow-

ing air to pass around the atmospheric poppet valve through the connecting pipe (7) and into the booster cylinder to the rear side of the booster piston.
The force of air on the rear side of the booster piston, working with the vacuum on the front side of the booster piston, drives the hydraulic piston forward. Then the check ball (10) in the hydraulic piston is closed by the check ball spring and the pressure in the hydraulic line prevents the return of the brake fluid to the master cylinder during the brake application, and forces the brake fluid through the lines to the wheel cylinders for additional braking pressure.

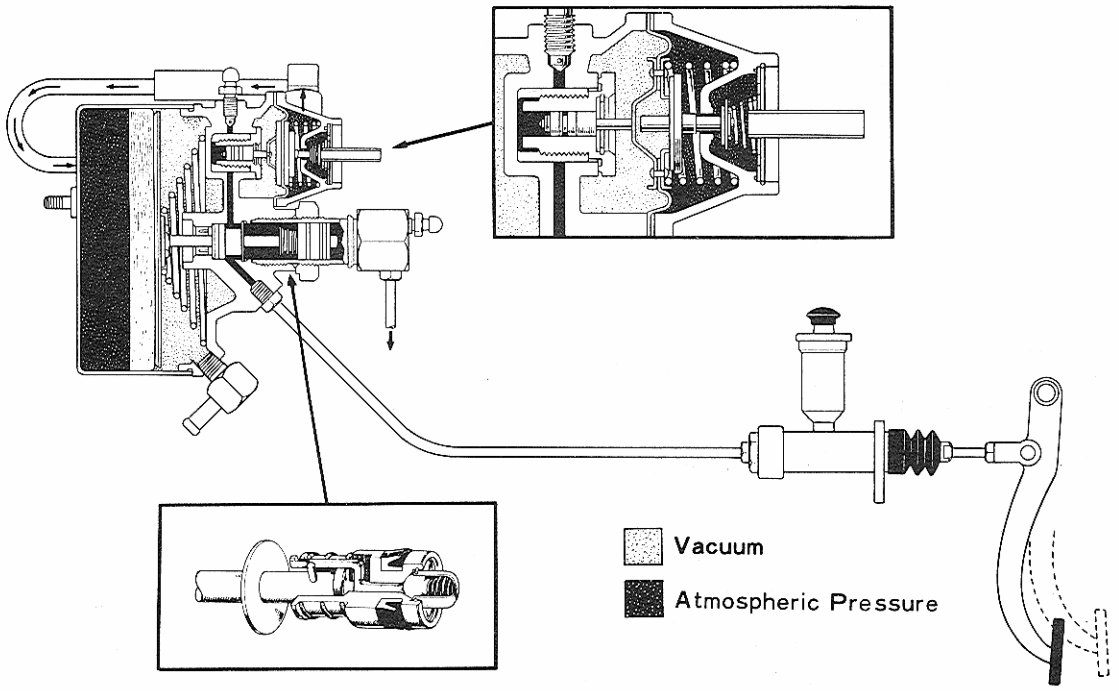


Fig.7-29 Booster in Applied Position Y7030

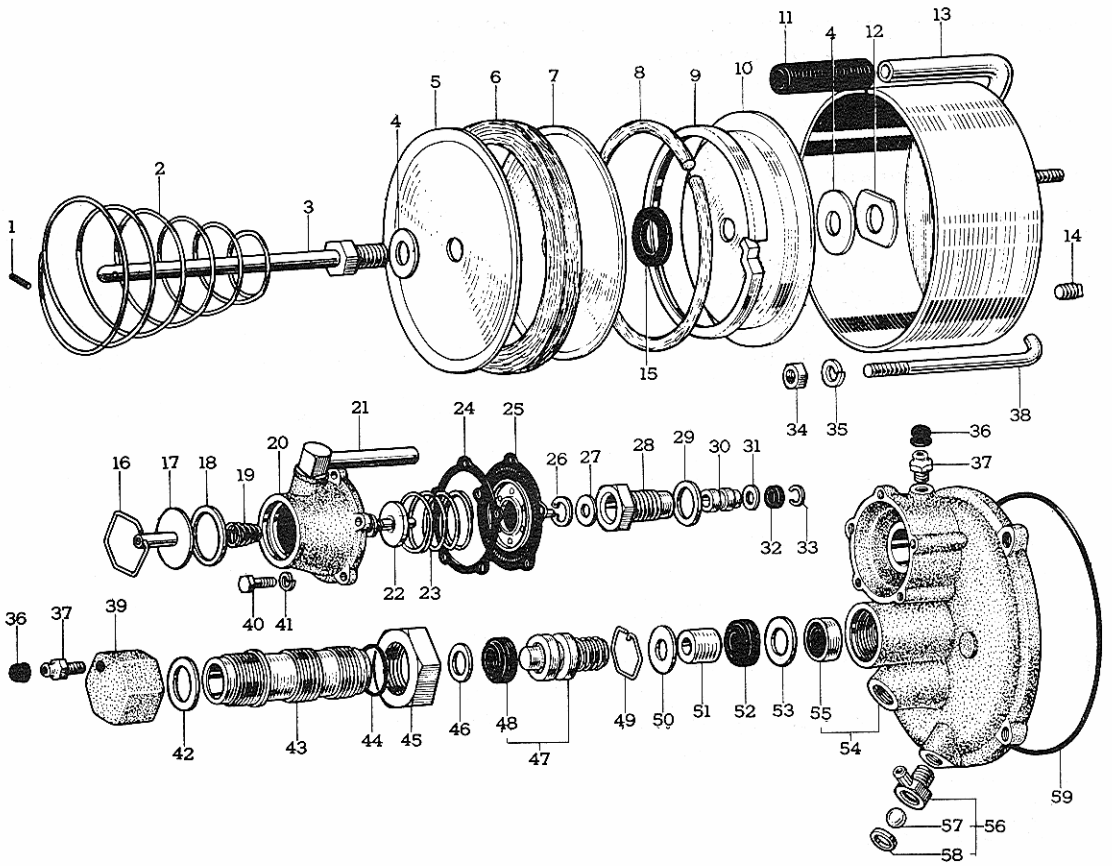
When the brake pedal is released, as the hydraulic pressure in the master cylinder and the applied pressure on the relay valve piston decrease, the diaphragm spring moves the diaphragm and the relay valve piston rearward, permitting the spring pressure to seat the atmospheric poppet valve, and unsets the vacuum poppet valve from the diaphragm.
As the vacuum poppet valve opens, the vacuum from the engine intake manifold which draws the air from the rear of the booster cylinder through the diaphragm into the front of the booster cylinder, allowing the booster piston return spring to return the booster piston and the hydraulic piston to their released position.
As the hydraulic piston returns, the check ball opens, permitting the brake fluid to flow through the hydraulic piston, allowing it to return to its fully released position.

Trouble Shooting

When the brake booster is not operating properly, check the system for vacuum leaks before proceeding with the trouble shooting operations.

Symptoms & Probable Causes	Remedies
1. Booster inoperative or hard pedal	
a. Leaking vacuum hose	Replace or tighten hose connection
b. Booster check valve faulty or in frozen condition	Replace check valve
c. Dirt on check valve seat	Clean or replace check valve
d. Poppet valve seat leaking	Replace poppet valve
e. Diaphragm damaged	Replace diaphragm When a ruptured diaphragm is found, check for gasoline odor on the diaphragm. Gasoline can get on it if the check valve is defective.
f. Leaking vacuum chamber	Check for loose valve body securing screws or defective gasket.
g. Relay valve piston sticking	Clean or replace piston and/or valve fitting
h. Hydraulic piston sticking	Clean or replace piston and/or slave cylinder tube
i. Booster piston gasket defective	Replace gasket
2. Lose of brake fluid from brake booster	
a. Defective booster push rod seal	Replace seal
b. Defective relay valve piston cup	Replace cup
c. Loose booster valve fitting, booster slave cylinder tube, hydraulic cylinder plug or slave cylinder lock nut. Damaged respective gaskets or seals	Tighten or replace gaskets or seals
3. Brake pedal kicks back when applied	
a. Defective hydraulic piston cup	Replace cup
b. Improperly seated check ball in the hydraulic piston	Replace hydraulic piston assembly
4. Brake drag or won't release	
a. Sticky relay valve piston	Clean or replace piston or valve fitting
b. Booster piston inoperative	Check piston gasket for proper lubrication Fill brake booster oil
5. Brakes applies when engine starts	
a. Sticky or unseated poppet valve	Clean or replace valve
b. Broken poppet valve spring	Replace spring
c. Sticky relay valve piston	Clean or replace piston or valve fitting

Removal & Disassembly



1. Booster push rod pin
2. Booster piston return spring
3. Booster push rod
4. Washer
5. Booster piston front plate
6. Booster piston gasket
7. Booster piston rear plate
8. Booster gasket wick
9. Booster piston gasket ring
10. Booster piston wick retainer
11. Vacuum hose
12. Booster nut
13. Booster shell
14. Plug
15. Booster piston rod seal
16. Snap ring
17. Booster tube & cover
18. Gasket
19. Poppet valve spring
20. Valve body
21. Hose elbow
22. Poppet valve
23. Diaphragm spring
24. Valve body gasket
25. Diaphragm assembly
26. Retainer ring
27. Piston stop washer
28. Valve fitting
29. Valve fitting seal
30. Relay valve piston
31. Retainer washer
32. Piston cup No.1
33. Washer
34. Nut
35. Lock washer
36. Bleeder plug cap
37. Air bleeder plug
38. Hook bolt
39. Hydraulic cylinder plug
40. Bolt
41. Lock washer
42. Gasket
43. Slave cylinder tube
44. Slave cylinder seal
45. Slave cylinder lock nut
46. Booster seal
47. Hydraulic piston assembly
48. Hydraulic piston cup No.2
49. Snap ring
50. Piston stop washer
51. Booster seal retainer
52. Booster piston cup No.2
53. Push rod washer
54. Booster end plate
55. Push rod seal
56. Booster check valve assembly
57. Check valve ball
58. Check valve seal
59. Booster cylinder seal

Fig.7-30 Brake Booster Components G2478

1. Depress the brake pedal several times to remove all vacuum from the system.

2. Plug the brake master cylinder reservoir inlet.

3. Disconnect the vacuum hose and the two brake tubes from the brake booster.

4. Remove the two bolts retaining the brake booster front bracket onto the brake booster bracket on the front fender apron.

5. Remove the nut at the end of the brake booster shell, then dismount the brake booster assembly with the front bracket.
   In removing, do not spill any brake fluid on painted surface.

6. Clamp the hydraulic cylinder plug in a vise, and loosen the slave cylinder tube lock nut.
   Next, unscrew the slave cylinder tube from the booster end plate.

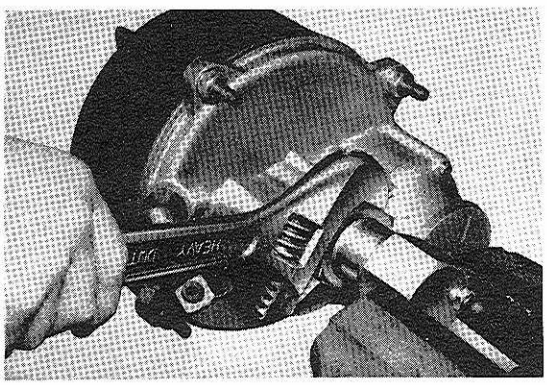


Fig.7-31 Loosening Lock Nut V5161

7. Scribe mating marks on the booster end plate and the booster shell so that these parts can be assembled in their original position.

8. Remove the nuts on the booster shell end plate hook bolts, and remove the hook bolts.
   Next, separate the end plate from the booster shell with the booster piston assembly attached.

9. Remove the five screws securing the valve body onto the end plate then remove the valve body, diaphragm spring, diaphragm and the gasket.

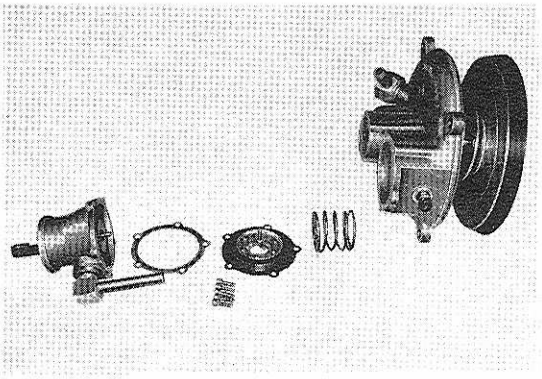


Fig.7-32 Valve Body Removal V5162

10. By removing the snap ring, remove the booster tube and cover, cover gasket and the poppet valve spring from the valve body.

11. Push down the end plate until the push rod protrudes from the end plate, and then remove the hydraulic piston (1) by removing the push rod pin (2).
    Remove the booster piston with the push rod from the end plate.

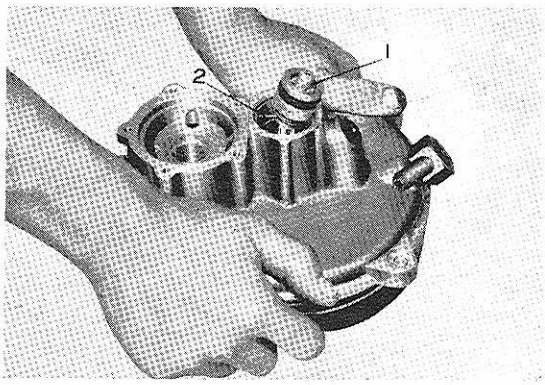


Fig.7-33 Removing Hydraulic Piston V5163

12. Remove the retainer ring (2) and the piston stop washer (3), then pull the relay valve piston (4) out

of the valve fitting (1).

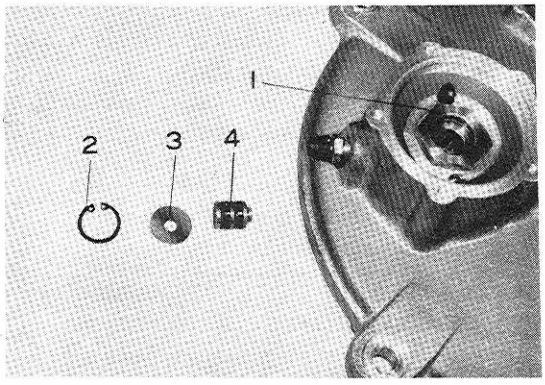


Fig.7-34 Removing Relay Valve Piston V5164

13. Loosen and remove the valve fitting with a socket wrench.

14. If the booster piston is to be disassembled, clamp the nut on the push rod end in a vise.
Loosen and remove the push rod, and disassemble the booster piston.

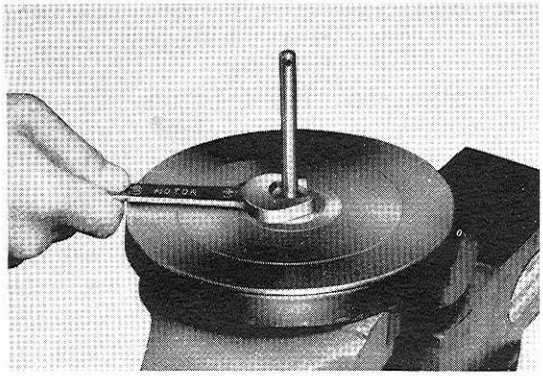


Fig.7-35 Disassembling Booster Piston V5165

Inspection

Clean all metal parts in cleaning solvent or all hydraulic system parts in brake fluid.
Dry all parts thoroughly, and also dry all passages with compressed air.
If necessary, replace the defective parts.

1. Inspect the inner surface of the booster shell for dents and pits or scores.
If the bore is corroded or rusted, polish with fine emery cloth or steel wool.

2. Inspect the booster piston gasket for wear and scores.

3. Inspect the end plate for cracks and deformation, and the push rod seal and piston cup No.2 for wear or damage.
If these require replacement, remove the snap ring, piston stop washer and the seal retainer, and then drive the push rod seal, push rod washer and the piston cup No.2 out of the end plate.
Place the push rod seal, then using a pipe with the outer diameter equal to the seal, press the seal into the end plate.
Install the push rod washer, piston cup No.2, seal retainer, piston stop washer and the snap ring in order.

4. Inspect the hydraulic piston, and the piston cup for wear, scores and other defects, and also inspect the check ball for proper operation.

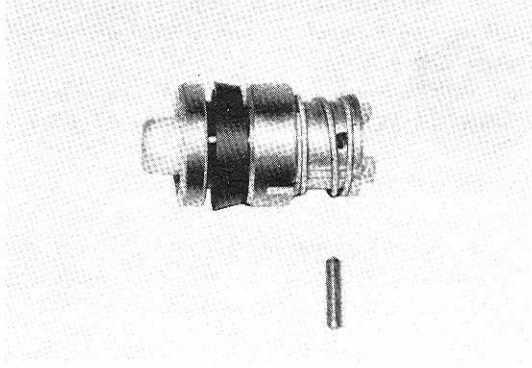


Fig.7-36 Hydraulic Piston Inspection V5166

5. Inspect the relay valve piston, piston cup and the valve fitting inner surface for wear, scores and damage.
Check the diaphragm for tear and other defects, and also check the poppet valve seat for corrosion.

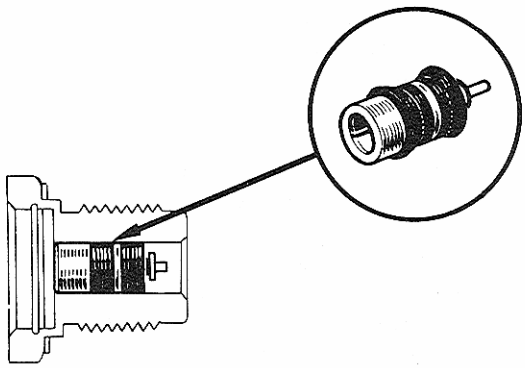


Fig.7-37 Relay Valve Piston Inspection G0414

6. Inspect the poppet valve (vacuum and atmospheric valves) for damage.
   As the replacement poppet valve Kit is available, and the poppet valve can be removed by using a punch to separate the two valve.

7. Inspect the vacuum check valve for proper operation.

Assembly

When overhauling the brake booster, it is recommended that all gaskets, piston cups and seals to be replaced upon assembly.
All rubber parts should be dipped in clean brake fluid before assembly.

1. Booster piston assembly.

   a. Clamp the hexagon nut on the push rod (1) in a vise with the threaded end upward.

   b. Install the washer (2) onto the push rod, then place the piston front plate (3) onto the push rod with the curved edge to the lower side, then install the piston gasket (5) onto the front plate with the lip upward.

   c. Place the piston rod seal (4), and place the piston rear plate (6) with the lip towards the piston gasket (5).

   d. Install the gasket ring (8) and the gasket wick (7) onto the wick retainer (9), then install the assembled wick retainer.
   Install the washer (10), and tighter the nut (11) securely.

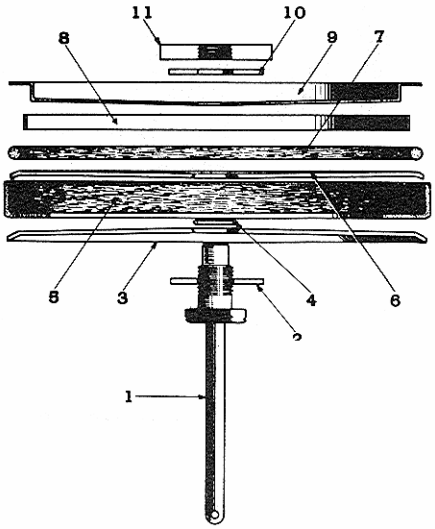


Fig.7-38 Booster Piston Assembly G2479

2. Install the valve fitting with the gasket into the end plate, and tighten it to 4 ~ 5 m-kg (29 ~ 36 ft-lb) torque with a socket wrench.
   Next, install the relay valve piston assembly, piston stop washer and the retaining ring into the valve fitting.

3. Place the piston return spring onto the booster piston front plate with the small end of the spring towards the front plate.
   Next, install the booster piston into the end plate until the push rod protrudes from the end plate, and install the hydraulic piston assembly onto the end of the push rod. Compress the spring on the hydraulic piston, and install the push rod pin, and release the spring.

4. Align the mating marks on the booster shell and the end plate, and assemble the booster piston

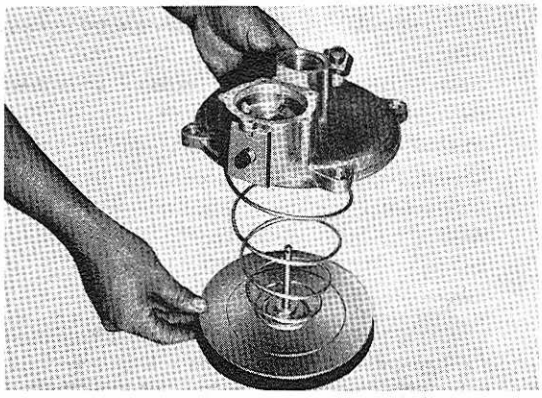


Fig.7-39 Installing Booster Piston V5167

and the end plate with the booster cylinder seal into the booster shell. Install the hook bolts and tighten the nut evenly.

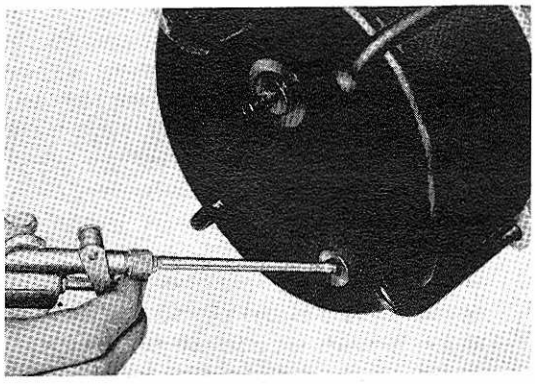


Fig.7-40 Filling Booster Oil V5168

5. Install the slave cylinder tube and the cylinder plug with the slave cylinder seal over the hydraulic piston into the end plate.
   When installing the slave cylinder, the bleeder plug on the cylinder plug should be aligned with the bleeder plug on the end plate.
   Tighten the slave cylinder lock nut securely.

6. Place the diaphragm, diaphragm spring onto the end plate, then, install the valve body with the gasket onto the end plate.
   Tighten the screws evenly, and at this time, connect the vacuum hose to the elbow on the valve body.

7. Install the poppet valve spring with the small end towards the poppet valve, and cover gasket, booster tube and the cover into the valve body.
   Secure the tube and cover by installing the snap ring.

8. Fill the brake booster with 30 cc (0.06 US qt., 0.05 Imp qt) of oil from the oil plug on the end of the booster shell.

Note:
Periodical oil filling should be performed every 30,000 kilometers (19,000 miles) or every once a year.

Installation

Follow the removal procedures in the reverse order.

1. To bleed the entire hydraulic system, the brake booster must be bled at both bleeder plugs before attempting to bleed at the wheel cylinders.
   To air bleed, refer to Air Bleeding on page 7-6.

Caution:
The bleeding operation must be performed without running the engine, and no vacuum in the power system.

Performance Test

The following method of diagnosing the brake booster trouble may lack in accuracy, but it enables servicemen to roughly understand the condition of the brake booster by inspecting it in the following orders.

1. With the engine stopped, depress the brake pedal in the normal manner, then start the engine with the pedal depressed. If the brake pedal stroke after a period of time, sinks a little, it indicates that the brake booster is in the satisfactory working condition.

2. With the engine running, depress the brake pedal fully.
   If the pumping of the brake pedal is noted, it indicates the brake booster defect in the hydraulic lines.

3. With engine at idle speed, disconnect the hose from the booster tube and cover located in the valve body, and bring a piece of string near the inlet of the tube. If the string tends to be drawn into the tube of the valve body, it indicates that there is a leak in the poppet valve.
   If the string is rapidly drawn towards the tube only when the brake pedal is depressed, the poppet valve is satisfactory.

4. Diagnosis with the tester.

   a. Vacuum leak test when the brake pedal is not depressed.
   Remove the oil plug on the rear end of the booster shell, and connect a vacuum gauge at the plug.
   With the engine idling, adjust the idle speed so that the vacuum gauge reading will be 480 ~ 500 mmHg (18.9 ~ 19.7 inHg).
   Now stop the engine, and note the vacuum drop on the gauge, which should not exceed the limit of 25 mmHg (1 inHg) within 15 seconds.
   If it exceeds this limit, recheck the poppet valve, connection of the vacuum hose and the valve body fitting condition.

   b. Vacuum control valve operation test.
   (1) Connect the vacuum gauge to the oil plug hole at the rear end of the booster shell.
   Start the engine, and adjust the vacuum gauge reading to about 480 ~ 500 mmHg (18.9 ~ 19.7 inHg) by controlling the engine speed.
   Next, depress the brake pedal fully. At this time, the vacuum should be zero at a moment. If it does not, check the poppet valve, diaphragm and the poppet valve spring.
   (2) Connect one pressure gauge to the plug on the top of the end plate, and connect the other pressure gauge to the bleeder plug on the hydraulic cylinder plug.
   Connect the vacuum gauge to the rear end of the booster sheel.
   Start the engine, and set the vacuum gauge reading at 480 ~ 500 mmHg (18.9 ~ 19.7 inHg).
   Both pressure gauges begin to register as the brake pedal is slowly depressed.
   But when the poppet valve (atmospheric valve) opens, the pressure gauge on the hydraulic cylinder plug momentary jumps up to indicate higher pressure reading.
   At this time, check the pressure gauge on the top of the end plate.
   The pressure should be 5 ~ 7 kg/cm^2 (71 ~ 99 psi), and this is the control valve piston operating pressure.

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BRAKE BOOSTER (NEW)

Operation

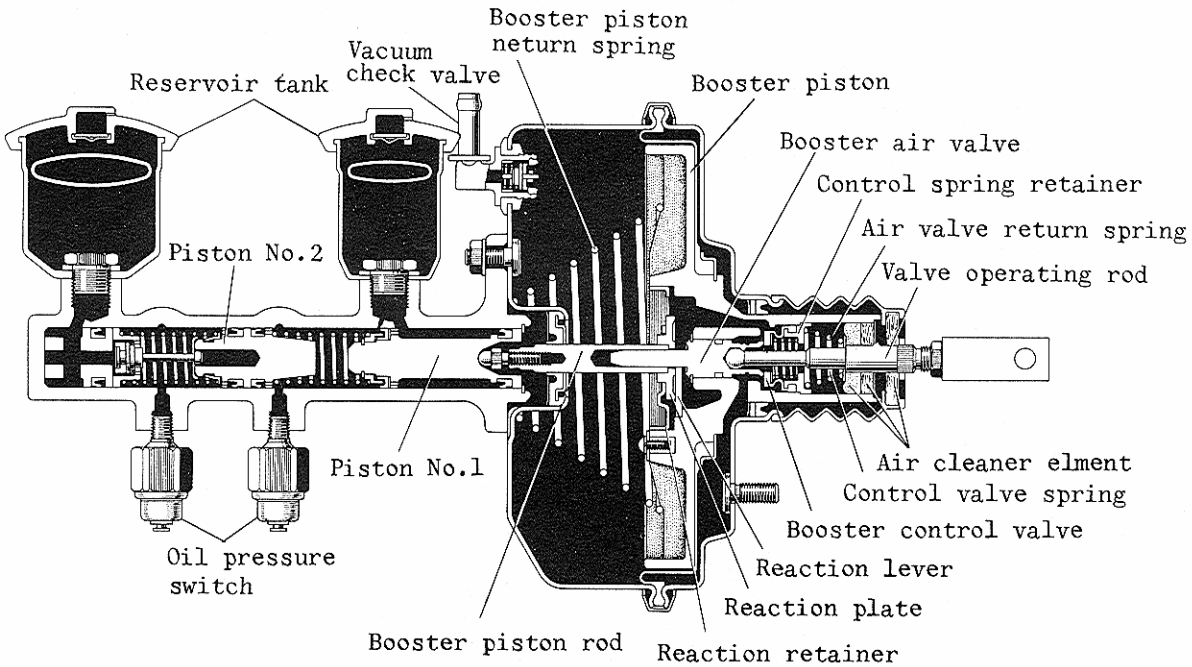


Fig.7-41 Tandem Master Cylinder & Brake Booster Section View S0569

1. Non-Operating State

In this case, the operating rod is pulled toward the right by the tension of brake pedal return spring. The air valve, being attached to the operating rod ball end, is pulled to the right together with the rod, shutting off the atmospheric air passing through the air cleaner element. The control valve is also separated from the booster piston valve seat (C), forming continuity between passages A and B. Since this provides continuity between the constant pressure chamber and the variable pressure chamber, there will be no pressure difference in the chambers at both sides of the booster piston, and the piston will be pushed to the right by the tension of piston return spring.

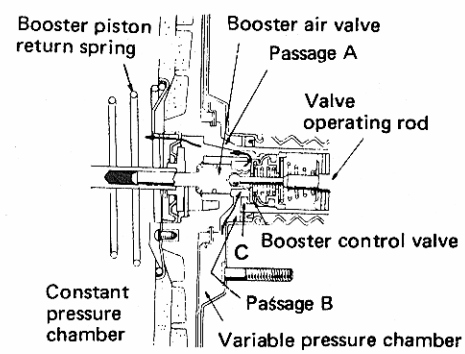


Fig.7-42 Non-Operating State S0570

2. Operating State
Stepping down on the brake pedal causes the operating rod to push the air valve. The control valve is also pushed to the left by spring tension, and contacts against the booster piston valve seat (C) to shut off passage A from passage B and closing the continuity between the constant and vatiable pressure chambers. As the air valve moves further to the left, the air valve separates from the control valve. Since the air will pass through passage B and flow into the variable pressure chamber, a pressure difference will be created with constant pressure chamber and cause the piston to start moving to the left. This force is transmitted to one end of each reaction lever through the fulcrum provided in the piston, while the force subjected on the operating rod is transmitted to the other end of each reaction lever through the fulcrum provided on the air valve. The sum of the forces acting on the ends of the reaction levers is transmitted to the reaction plate outer circumference, and then from the booster piston rod to the mastery cylinder piston

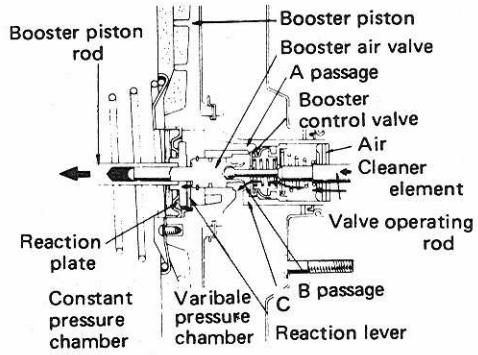


Fig.7-43 Operating State S0571

3. Holding State
If the pressure on the brake pedal is such that the force acting on the air valve from the operating rod and the force acting on the booster piston due to pressure difference are in balance, with reaction plate outer circumference serving as the fulcrum, the control valve will be contacting against the air valve and also the booster piston valve seat (C). This state will be held as long as the pressure on the brake pedal remains unchanged.

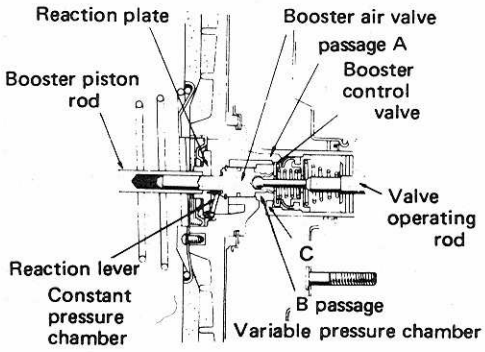


Fig.7-44 Holding State S0572

4. Released State
When the pedal pressure is increased until the variable pressure chamber is completely under atmospheric pressure, maximum pressure difference will be acting on the booster piston, and the air valve will be fully separated from the control valve. If the pedal pressure is increased further, there will no longer be any more balancing effect on the reaction levers so that only the increased amount of pedal pressure will act on the booster piston rod.

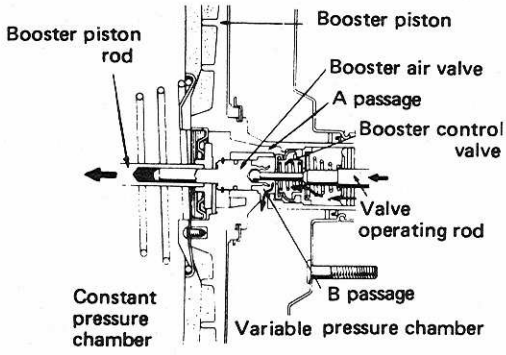


Fig.7-45 Maximum Boosting State S0573

5. Released State
When the pressure on the brake pedal is released, the reaction lever balance will be destroyed and the air valve will be returned to the right. The air valve will then contact against the control valve and shut off the variable pressure chamber from the atmosphere. As the air valve moves further to the right, the control valve is separated from the booster piston valve seat (C)/ This creates continuity between the passages A and B so that the variable pressure chamber comes under vacuum until there is no longer any pressure difference with the constant pressure chamber. The piston assembly will then be pushed back by the return spring to the non-operating position.

6. Lost Vacuum State
In this case, the constant and variable pressure chambers will both be under atmospheric pressure. Stepping down on the brake pedal will cause the operating rod push the air valve and advance to the left. The reaction levers will push the reaction plate, and the reaction plate will push the booster piston rod, which in turn will push the master cylinder piston.
At this time, the reaction plate will push the reaction retainer No.1, and in turn, the retainer No.2 attached to the booster piston, and advance the piston assembly to the left against the tension of return spring.
Although there will be no boosting action supplied in this case, it will still be possible to push the master cylinder piston and develop hydraulic power. Thus the hydraulic brake function will still be retained even if the brake booster should fail to operate due to trouble.

Table 7-1 Brake Booster Specifications

Type	Vacuum servo
Diaphragm effectibe dia.	191.5 mm (9.05")
Power piston stroke	40 mm (1.57")
Servo ratio	3.37

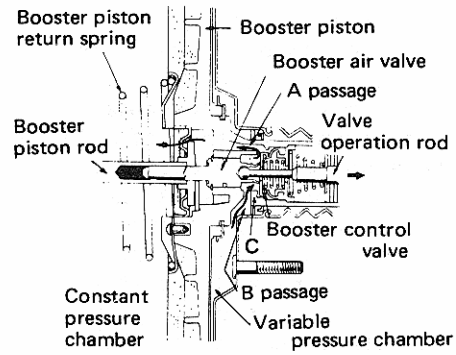


Fig.7-46 Released State S0574

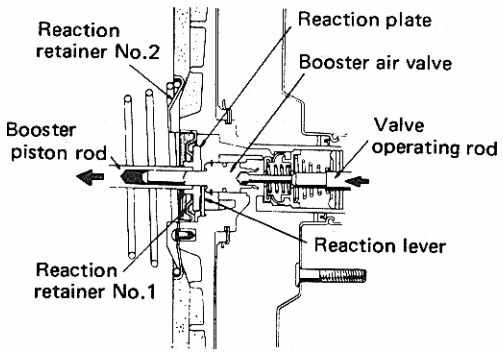


Fig.7-47 Lost Vacuum State S0575

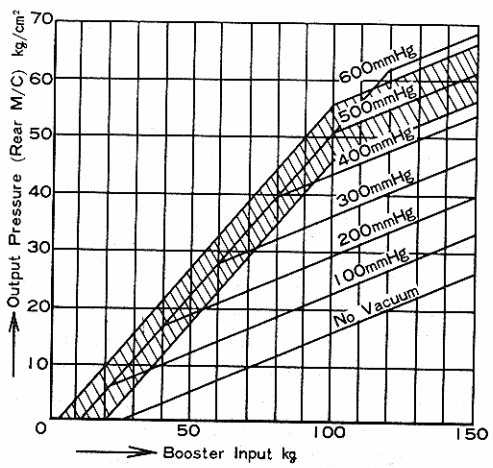


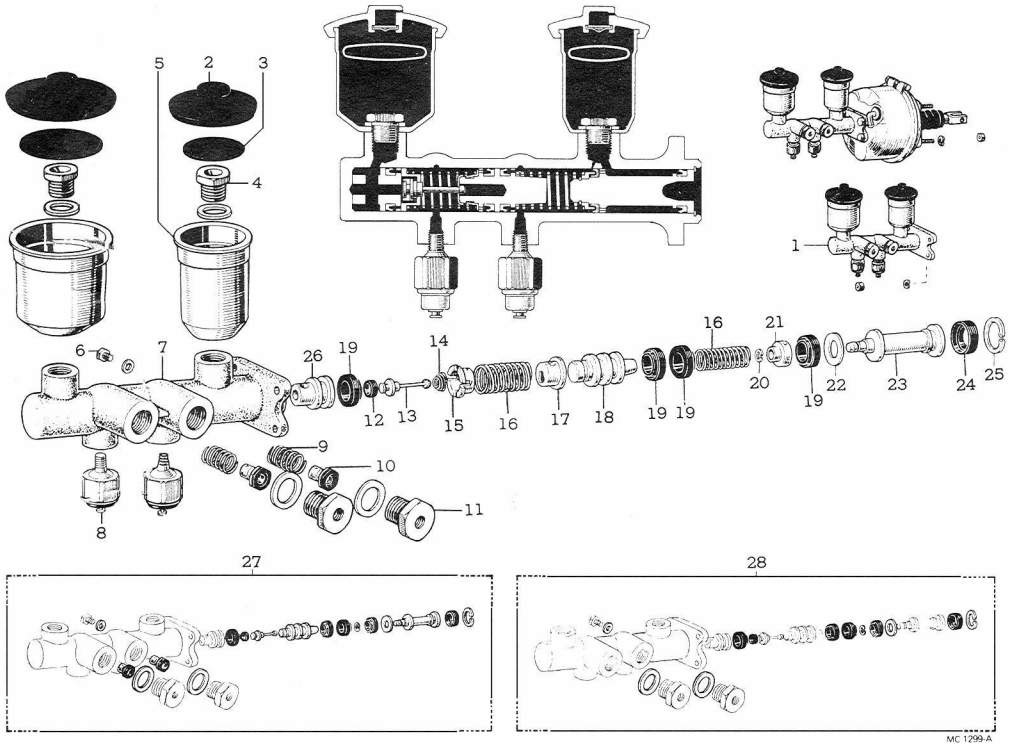
Fig.7-48 Booster Performance Curves G7658

TROUBLE SHOOTING
Brake Booster

Symptoms & Possible Causes	Remedies
No Braking Effect or Pedal is Heavy	
1. Loose coupling	Repair
2. Vacuum hose clogged, disconnected, or broken	Replace
3. Vacuum check valve not functioning properly	Replace
4. Seals defective	Replace
5. Seals defective	Replace
6. Control valve not functioning properly	Replace
7. Air valve binding on booster piston rod	Repair or replace
8. Air cleaner clogged	Replace
Brakes Drag or Retract Poorly	
1. Air valve binding on booster piston rod	Replace
2. Booster piston rod out of adjustment	Adjust
3. Valve operating rod out of adjustment	Adjust
Braking Effect Insufficient or Slow	
1. Vacuum cneck valve not functioning properly	Replace
2. Vacuum hose clogged, disconnected, or broken	Replace
3. Valve operating rod out of adjustment	Adjust
Pedal Sticks and Noisy	
1. Air valve binding on booster piston rod	Replace
2. Valve operating rod out of adjustment	Adjust
3. Excessive clearance between booster piston rod and master cylinder piston	Adjust

TANDEM MASTER CYLINDER

Component Parts



1. Cylinder sub-assy., tandem master
2. Cap assembly, reservoir filler
3. Float, master cylinder reservoir
4. Bolt, master cyl. reservoir set
5. Reservoir, master cylinder
6. Bolt
7. Body, tandem master cylinder
8. Switch assy., oil pressure
9. Spring, compression
10. Valve assy., master cyl. outlet check
11. Plug, master cyl. fluid outlet
12. Valve, inlet
13. Rod, inlet valve connecting
14. Spring, conical
15. Case, inlet valve
16. Spring, compression
17. Retainer, piston return spring, No.2
18. Piston, master cylinder, No.2
19. Cup, cylinder
20. Link, shaft snap
21. Retainer, piston return spring
22. Spacer, master cylinder piston cup
23. Piston, master cylinder, No.1
24. Ring, hole snap
25. Boot, master cylinder
26. Seat, inlet valve
27. Kit, master cylinder
28. Kit, master cylinder cup

Fig.7-49 Tandem Master Cylinder Component Parts S0560

Removal

Note: Do not allow the brake fluid to get on any of the vehicle painted surfaces.

1. Disconnect the brake tubes from the cylinder.
2. Disconnect the oil pressure switch wiring.
3. Remove the master cylinder from the booster unit.

Disassembly

Note:
Disassemble the master cylinder by holding it in a vise, and taking care not to damage the reservoir installation surface. Do not damage any of the disassembled parts.

1. Remove the master cylinder.
2. Remove the oil pressure switches.
3. Remove the snap ring and take out piston No.1 and spring.
4. Loosen the bolt and take out piston No.2, and inlet valve seat.
5. Remove the outlet plugs, and take out the outlet check valves.
6. Disassemble the piston assembly.
   (1) Pry up the spring retainer lips, and remove the piston.
   (2) Remove the connecting rod from the retainer, and remove the inlet valve.
   (3) Remove the piston cap from the piston.

Inspection

Replace any disassembled part if found defective.

1. Inspect master cylinder bore and piston outside surfaces to see if worn, out of round, or damaged.
2. Inspect cylinder cups, inlet valve, spacer, gaskets, and outlet check valve to see if damaged, deformed, or worn.
3. Inspect reservoir for damage and if deformed at mounting part.
   Note: Defects in the above parts are difficult to detect, and since rubber parts tend to deteriorate, it is recommended that these parts be replaced when the master cylinder is disassembled.

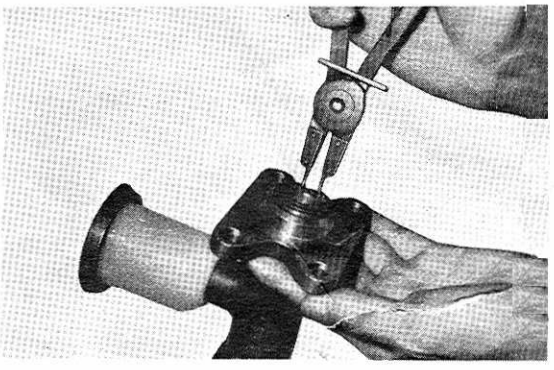


Fig.7-50 Snap Ring Removal

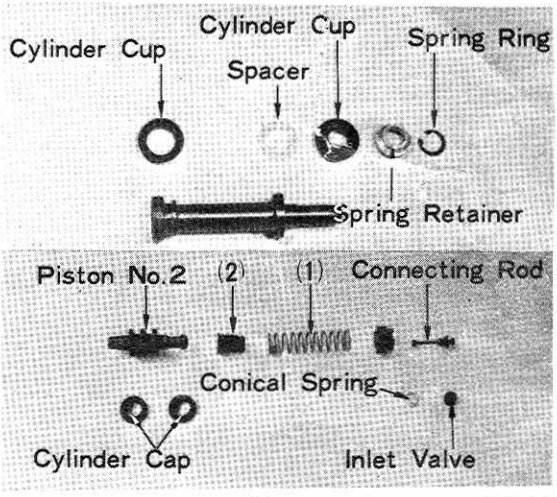


Fig.7-51 Piston Disassembly B6844

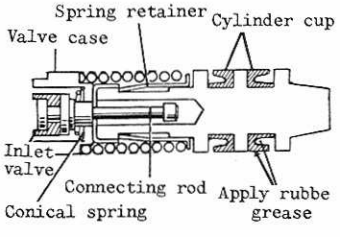


Fig.7-52 Assembling Piston G6973

Assembly

Note: Wash all parts to be assembled in clean brake fluid.

1. Assemble the inlet valve seat.
   Note: Make sure it is assembled in correct direction.
2. Bend down the spring retainer lips.
3. Bend down the spring retainer lips.

4. Insert the inlet valve seat (1) into the master cylinder.

5. Insert the piston No.2 (2) into the cylinder and install the stop bolt, (3).
   Tightening torque 80~120 kg-cm (69.2~103.9 in-lb)

6. Insert the return spring (4) into the cylinder.

7. Install the piston No.1 assembly (5) into the piston, and install the snap ring (6).

8. Install the spring (7), outlet check valve (8), gasket and union bolt (9).
   Tightening torque 1100~1800 kg-cm (79.5~130.0 ft-lb)

9. Install the oil pressure switches (10).
   Tightening torque 300~450 kg-cm (22~29 ft-lb)

10. Install the master cylinder reservoirs (11).
    Tightening torque 200~300 kg-cm (14~22 ft-lb)

Installation

1. Adjust the clearance between the booster piston rod and piston. (Refer to P.7-44)

2. Install the master cylinder on the booster unit.
   Note: Before tightening the nuts, have the brake tubes screwed a few turns into the master cylinder.
   Tightening torque 100~160 kg-cm (7.2~11.6 ft-lb)

3. Tighten the brake tubes.

4. Connect the oil pressure switch wiring.

5. Adjust pedal height and play, and bleed the system to remove air. (Refer to P.7-5)

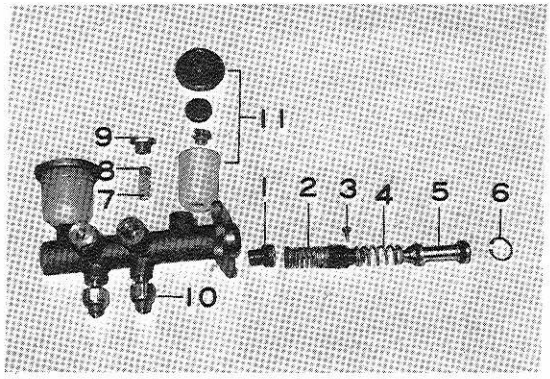
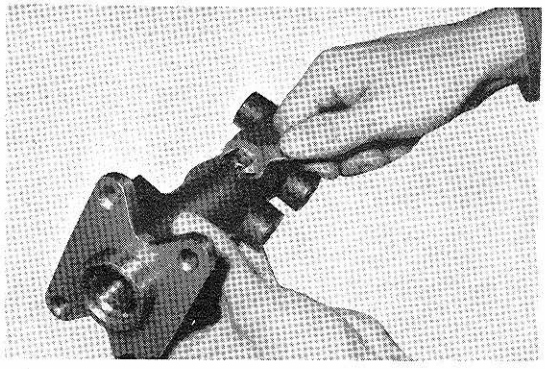
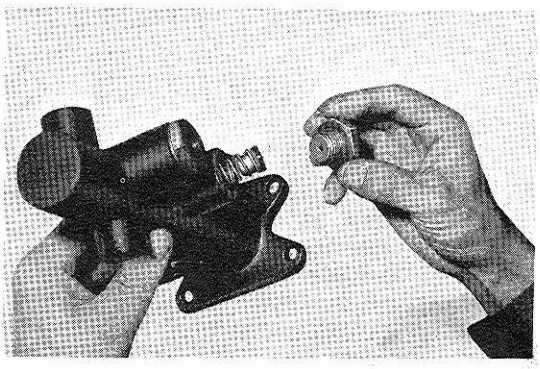


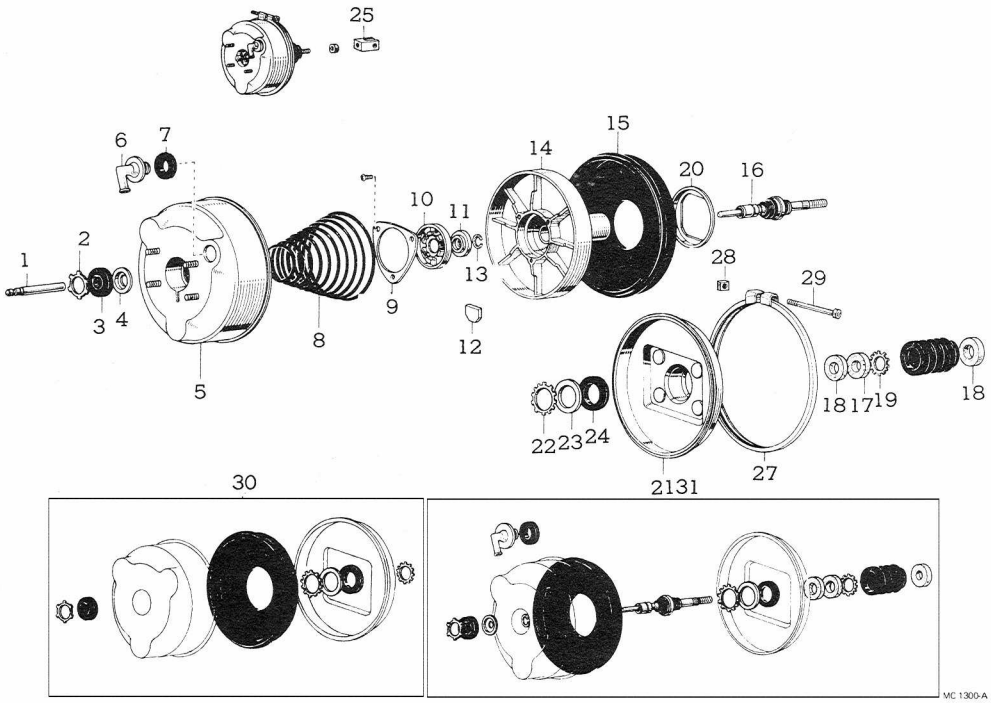
Fig.7-53 Component Parts


Fig.7-54 Stop Bolt Assembly


Fig.7-55 Outlet Check Valve Assembly

BRAKE BOOSTER

Component Parts



1. Screw, rod adjust
2. Ring, circular internal
3. Seal, booster body, No.1
4. Retainer, booster body seal
5. Body, booster, No.1
6. Valve assy., vacuum check
7. Grommet
8. Spring, booster piston return
9. Retainer, reaction, No.2
10. Retainer, reaction, No.1
11. Plate, reaction
12. Lever, reaction
13. Ring, snap
14. Piston, booster
15. Diaphragm, booster
16. Valve subassy , booster air
17. Separator, air cheaner
18. Element, air cleaner
19. Ring, circular internal
20. Retainer, diaphragm
21. Body, booster, No.2
22. Ring, circular internal
23. Bearing, booster piston
24. Seal, booster body, No.2
25. Clevis
26. Boot
27. Band, booster
28. Nut, screw
29. Screw, booster body band
30. Booster kit, brake (Minor)
31. Booster kit, brake (Major)

Fig.7-56 Brake Booster Component Parts S0562

Removal

1. Disconnect the push rod clevis from the brake pedal.
2. Disconnect the brake tubes, wiring, and vacuum hoses.
3. Remove the booster with the master cylinder attached.
4. Remove the master cylinder from the booster.

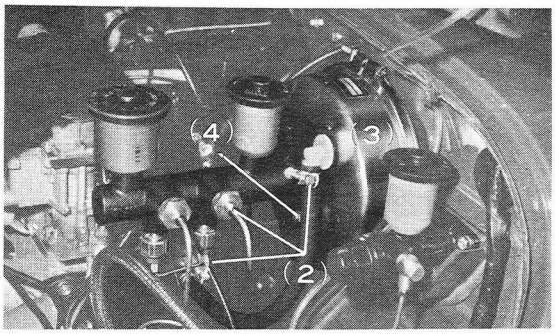
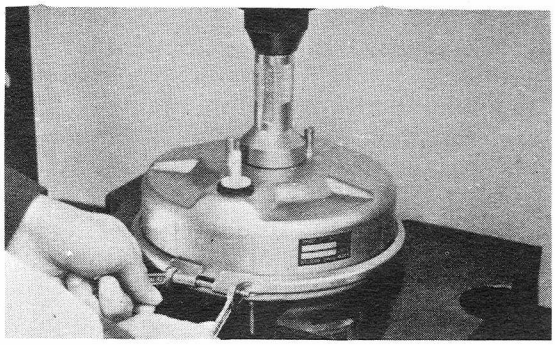


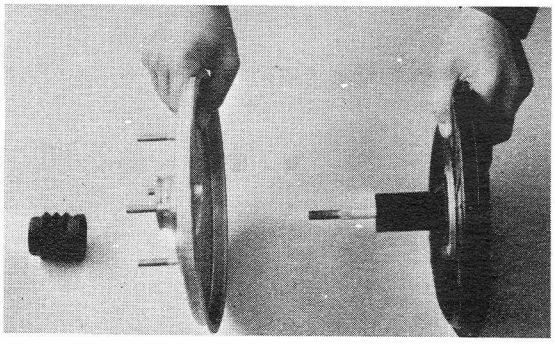
Fig.7-57 Booster Removal

Disassembly

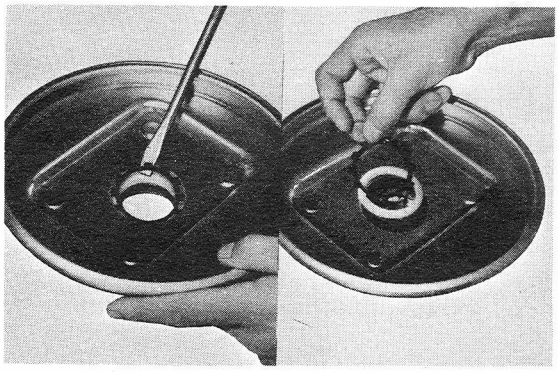
1. Remove the booster push rod.
2. Using a press, separate the booster No.1 body from the No.2 body.
   (1) Scribe aligning marks on bodies No.1 and No.2.
   (2) Remove the band.


Fig.7-58 Removing Band B8545

3. Remove the boot and booster piston assembly from body No.2.


Fig.7-59 Disassembling Boyd No.2 B8546

4. Remove the circular ring from body No.2, and remove the bearing and body seal.


Fig.7-60 Removing Circular Ring B8547

5. Remove the circular ring from body No.1, and remove the body seal and seal retainer.

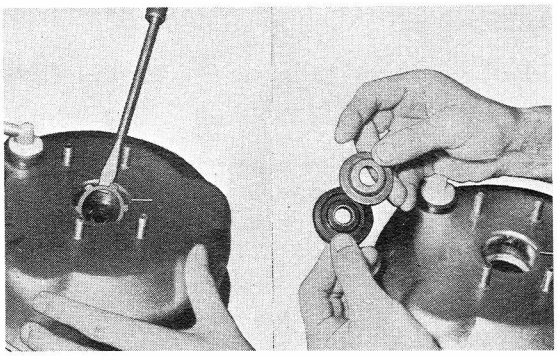


Fig.7-61 Booster Body No.1 Disassembly

6. Disassemble the booster piston.

(1) Remove the reaction retainer No.2, reaction retainer No.1, reaction palte, and reaction levers.

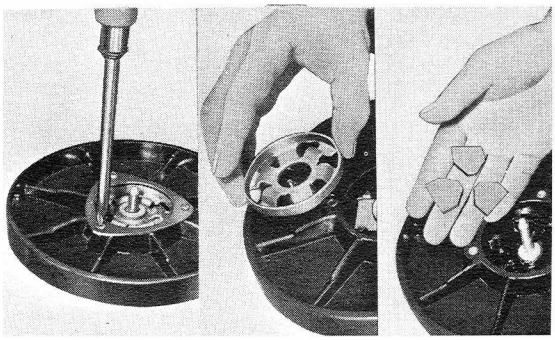


Fig.7-62 Booster Body No.1 Disassembly B8548

(2) Remove the snap ring lockeng the booster air valve.

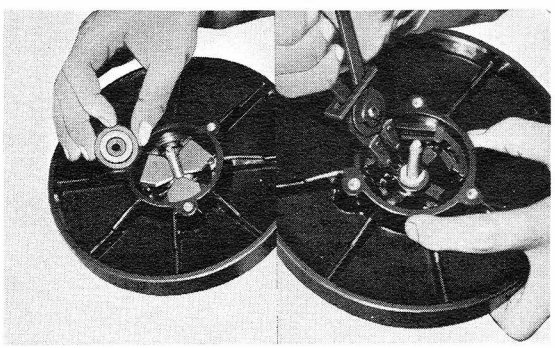


Fig.7-63 Removing Circular Ring B8549

(3) Remove the circular ring, and take out booster air valve, air cleaner element, and separator.

(4) Using SST(09736-30020),remove the diaphragm by turning it 45°, and remove diaphragm from piston.

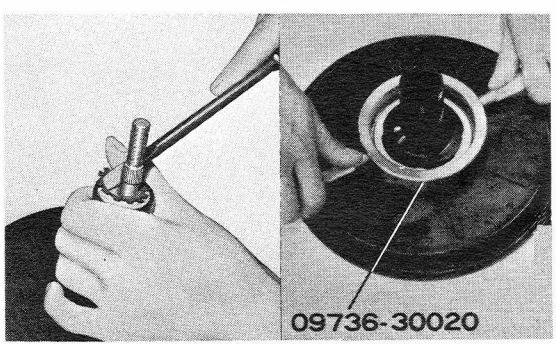


Fig.7-64 Removing Diaphragm B8550

7. Remove the vacuum check valve from the booster body No.1.

Inspection

Wash all disassembled parts and dry (merely wipe the cups and plastic parts). Inspect the parts on the following points, and repair or replace any found to be defective.

1. Booster piston for damage or crack.
2. Air valve for damage, wear, or corrosion.
3. Reaction levers for wear.
4. Reaction retainer for deformation or crack.
5. Diaphragm for damage.
6. Control valve and spring for damage and weakening.
7. Bearing for wear or damage.
8. Booster push rod for bend or damaged.
9. Body for deformation, crack, or damage.

Assembly

1. Assemble tne booster piston.
   (1) Using SST(09736-30020), install the diaphragm on the booster piston.

   Note: Coat rubber grease on the contacting surfaces between the diaphragm and booster piston.

   (2) Assemble the air valve.
   (3) Assemble the separator, air cleaner, and circular ring.
   (4) Fit on the reaction levers and place the reaction plate over them.
   (5) Place the reaction retainer No.1, and install the reaction retainer No.2 with screws.
2. Assemble the booster body seal retainer, push it into the body No.1, and install the circular ring.

   Notes:
   1. Assemble the seal retainer side in the body inner side.
   2. Coat rubber grease on the seal outer surface and lip.
3. Assemble the bearing into body No.2.
4. Assemble the booster piston into body No.2.

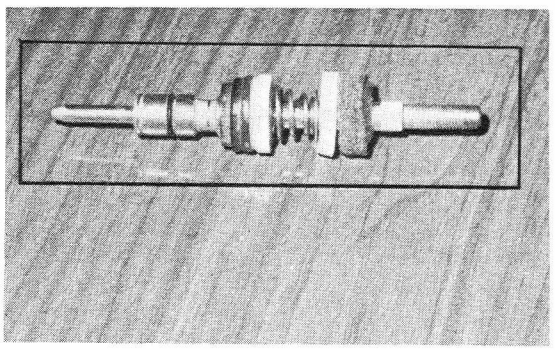


Fig.7-65 Assembling Piston B8551

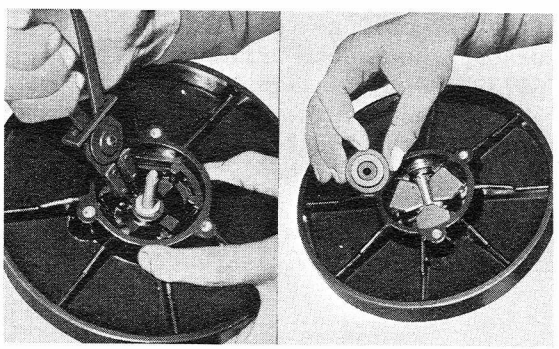


Fig.7-66 Assembling Reaction Lever & Plate B8552

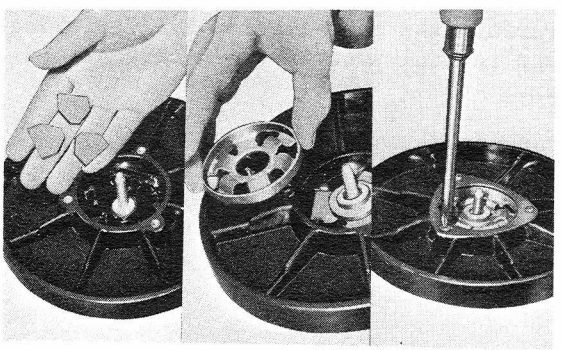


Fig.7-67 Assembling Reaction Retainers B8553

5. Place the piston return spring into body No.2, and using a press, push down body No.1 and install the band.
   Tightening torque 25~40 kg-cm (21.7~34.6 in-lb)

   Note: Align the matching marks of bodies No.1 and No.2.

6. Assemble the booster silencer and install the boot.

7. Install the booster push rod.

   Note: Coat rubber grease on the surfaces sliding along the booster push rod.

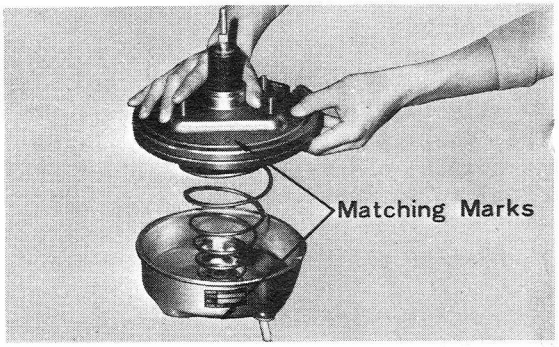


Fig.7-68 Booster Assembly

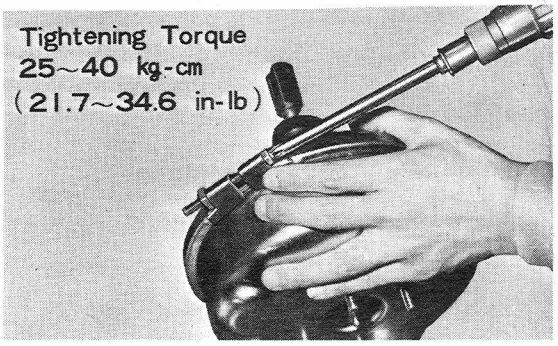


Fig.6-69 Tightening Brake Band

Adjustment

After assembling the brake booster, measure the master cylinder with SST (09737-22011) as illustrated, and then reverse the gauge. If the reversed gauge and the booster push rod length agree, there will be a clearance of 0.1~0.5 mm (0.004"~0.002") between the push rod and piston.
Piston to push rod clearance
0.1~0.5 mm (0.004"~0.020")

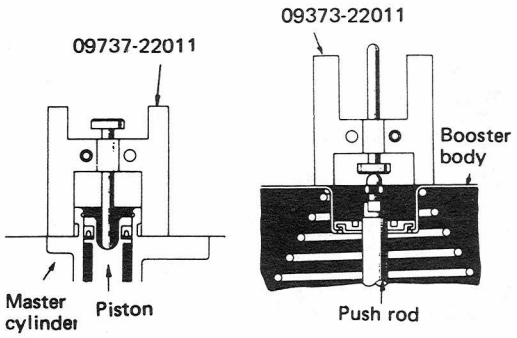


Fig.7-70 Push Rod Adjustment G7756 G7757

Installation

Perform the installation by following the removal procedures in reverse order.

Notes:
1. Remove air by bleeding.

2. Adjust pedal height and play.

Booster Performance Check

Test method without using tester

These methods are not adequate to pin point the location of trouble, but the general condition can be determined by performing the check in the following order.

Air tightness check

Start the engine and then stop it after 1~2 minutes. Using pedal pressure for notmal braking, step down on the brake pedal several times. If the pedal goes down deep the first time but gradually rises after the second and third time, and condition is good. Therefore, if there is no change in pedal height, the condition is defective.
Note: If defective, make a precision check with tester.

With the engine stopped, step on the brake pedal several times with the same pedal pressure as above. After making sure that there is no change in pedal height, start the engine while keeping the brake pedal depressed. If the pedal goes down slightly, the condition is good, and if there is no change, the condition is defective.
Note: If defective, make a precision check with tester.

Air tightness check under load

Step on the brake pedal while the engine is running, and then stop the engine while still keeping the brake pedal depressed. Hold this state for 30 seconds and if the pedal height does not change, the condition is good. If the pedal rises, the condition is defective.
Note: If defective, make a precision check with tester.

Test methods using tester

As test equipment, have available a foot pressure meter, two compression gauges with brake piping, a vacuum gauge with hoses, and a 3-way connection.

Air tightness check

1. Start the engine and then stop it when the vacuum gauge shows 250mmHg (9.3"Hg). There should be no loss in vacuum for 15 seconds after stopping the engine.
   The same condition should prevail at 500mmHg (19.7"Hg).

2. If defective, the following are the possible causes so that the booster should be disassembled.

   (1) Check valve not functioning properly.
   (2) Leakage in piping.
   (3) Leakage from booster body bolt welded part.
   (4) Air valve not tight.
   (5) Leakage from body seal or bearing.
   (6) Torn diaphragm.

Air tightness test under load

1. Start the engine, step on the brake pedal with 10 kg (22 lb) pedal pressure, and stop the engine when the vacuum gauge shows 250mmHg (1.0"Hg) 15 seconds after the engine is stopped, the condition is satisfactory.

2. If defective, refer to par, 2 above on air tightness check.

Check with booster action

Stop the engine, and when the vacuum gauge indicates zero. If the relationships between fluid pressure and pedal pressure are as prescribed below, the condition is good.

5 kg/cm (71 psi) minimum at 10 kg (22 lb) pedal pressure.
23 kg/cm (327 psi) minimum at 30kg (66 lb) pedal pressure.

Check without booster action

Run the engine and have the vacuum gauge indicating 500mmHg (19.7"Hg). If the relationships specified below exist between fluid pressure and pedal pressure, the condition is good.

16~25 kg/cm (228~356 psi) at 7 kg (15 lb) pedal pressure
36~48 kg/cm (512~683 psi) at 13 kg (29 lb) pedal pressure
60~70 kg/cm (853~996 psi) at 20 kg (44 lb) pedal pressure

F R A M E

DESCRIPTION ..... 8 - 1

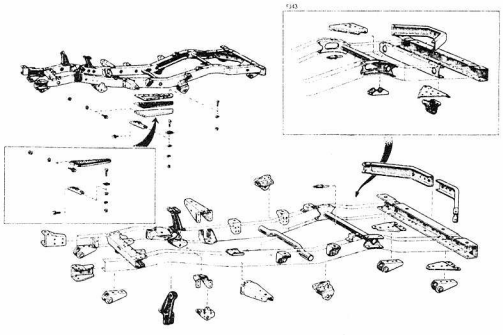
Inspection ..... 8 - 4

Repair & Replacement ..... 8 - 4

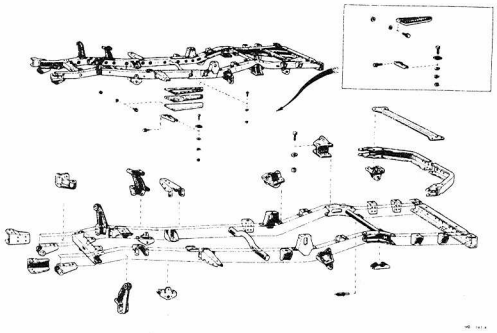
DESCRIPTION

The frames utilized on the FJ series are of the ladder type with box cross sectional side members and cross members to increase the rigidity and durability. Strong brackets are incorporated to maintain proper longitudinal position of the side members relative to each other and at the same time providing additional resistance to twisting.

FJ40, 43 series



FJ45 series



FJ55 series

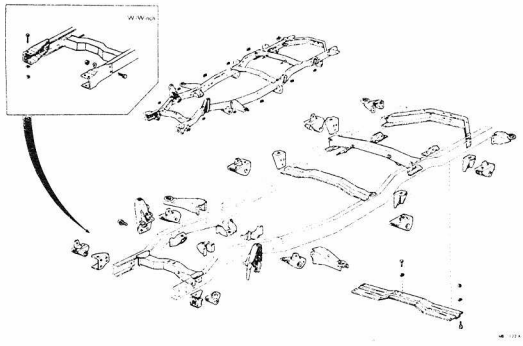


Fig.8-1 Frame Components

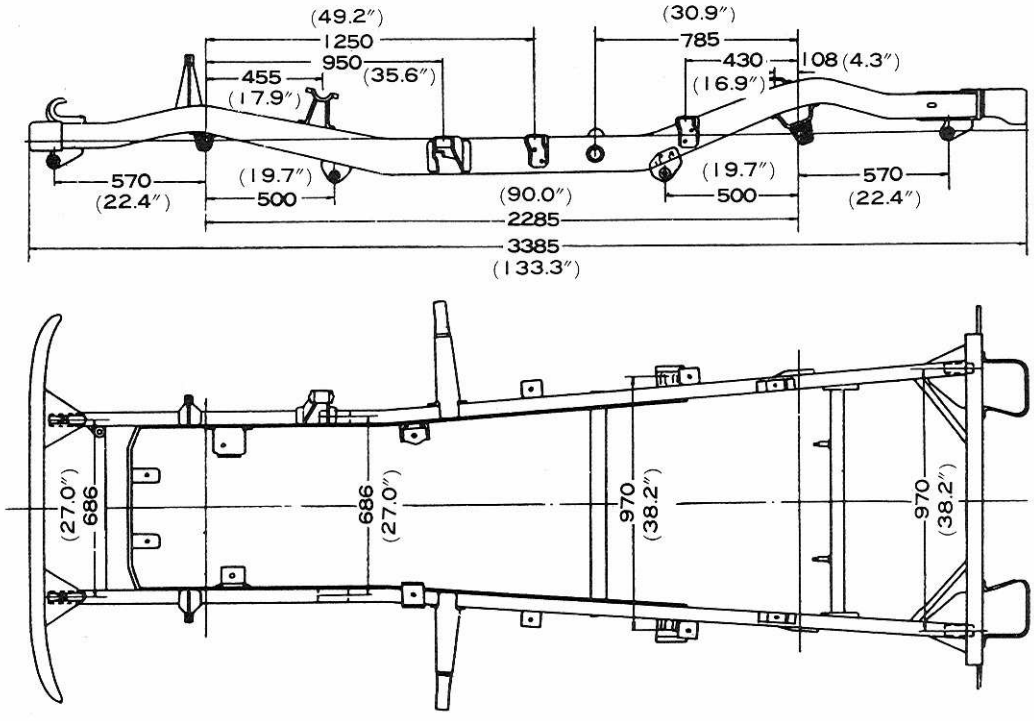


Fig.8-2 Frame Dimension Diagram (FJ40 series)

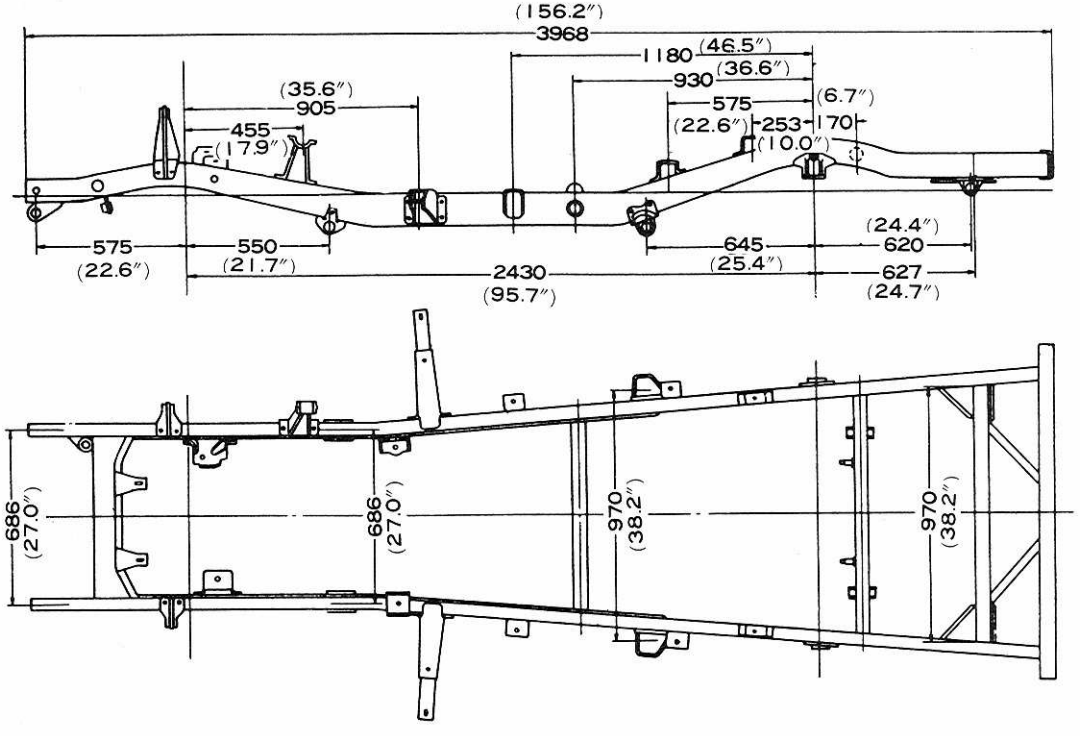


Fig.8-3 Frame Dimension Diagram (FJ43 series)

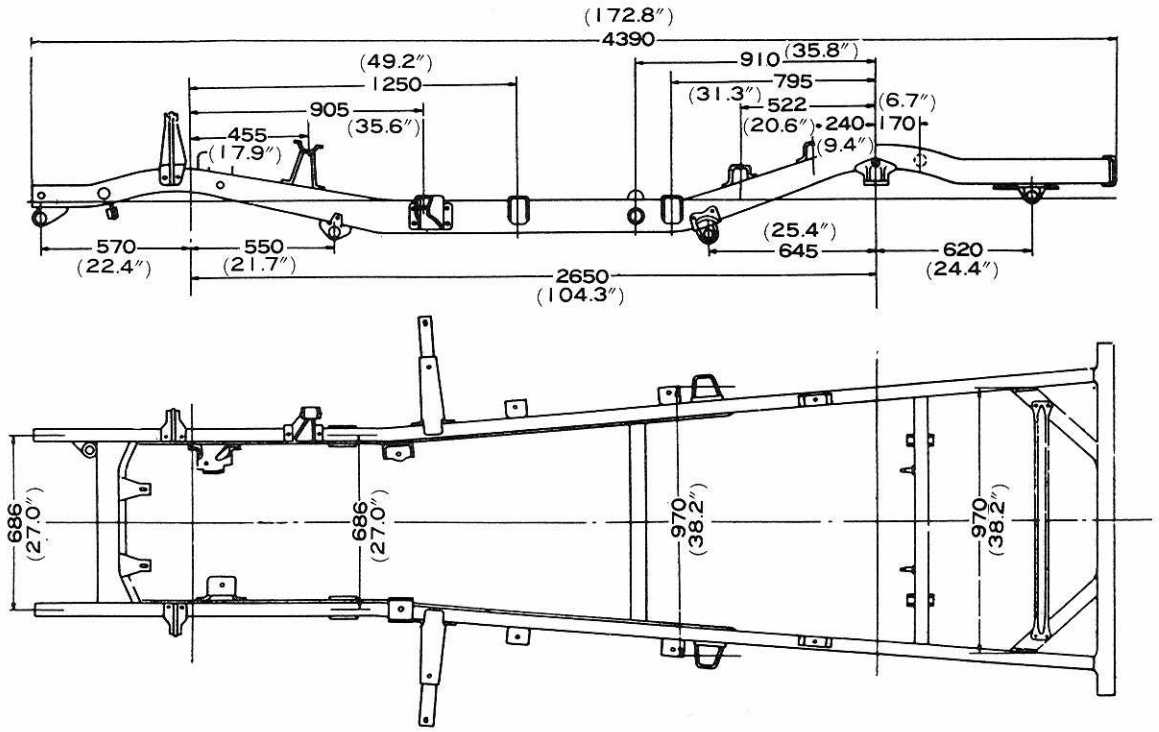


Fig.8-4 Frame Dimension Diagram (FJ45 series)

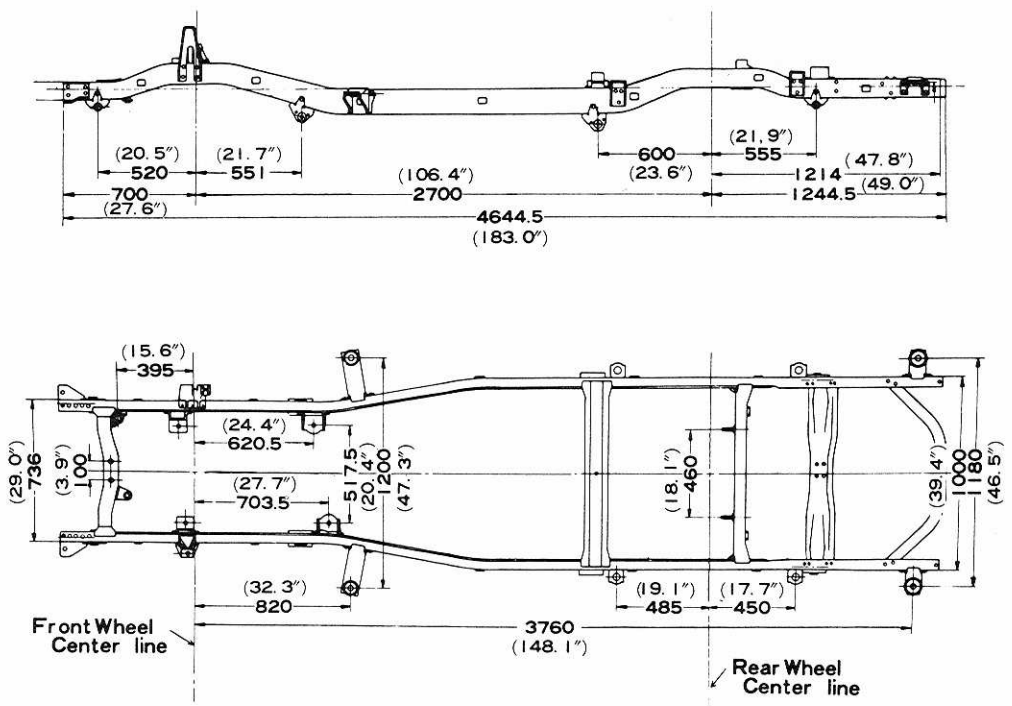


Fig.8-5 Frame Dimension Diagram (FJ55 series)

Inspection

Vehicles which have been in a collision, upset or accident of any nature which might result in a twisted or sprung frame, should always be carefully checked for proper frame alignment in addition to steering geometry and wheel alignment.

1. Frame damage inspection.

   Before checking frame alignment, inspect the frame for damage and loose parts. Inspect all frame members, for cracks, twist, or bends. Check all welded connections for cracks. Inspect all rivets, bolts, and body support brackets for looseness. Make all necessary repairs or replacement.

2. Frame alignment checking method.

   Frame alignment can be checked without removing the vehicle body from the frame by using "X" checking method which is most efficient.

   a. Place the vehicle on a clean level floor and set the parking brake.

   b. Prepare a piece of cord attached to an ordinary surveyor's plumb bob.

   c. Select several points along one frame side member and very carefully place the free end of the cord on these points allowing the plumb bob to hang on the floor.

   d. Mark the points on the floor just under the tip of the plumb bob as accurately as possible. If desired, paper can be taped on the floor along both sides of the vehicle below the frame.

   e. Locate the corresponding points along the opposite frame side member, and carefully transfer these points to the floor in the same manner.

   f. Move the vehicle aways from the marks on the floor, then measure between diagonal points. Both corresponding measurements should agree within 5 mm (0.197"). Measure diagonally between all points on the floor.

   g. Measure between corresponding points parallel to the frame side members. These measurements should also be within 5 mm (0.197") of each other.

   If the measurements do not agree within the above limit, it means that corrections will have to be made between those measurement points that are not equal.

Repair & Replacement

Frame misalignment can be corrected by straightening the out-of-line parts by replacing the cross members or brackets.

1. Frame straightening.
   Frame straightening should be limited to parts which are not severly bent to prevent internal stresses in the metal. Use of heat is not recommended when straightening frame as heat weakens the structural characteristics of frame members. Therefore, any straightening of frame members should be done cold. Frame members which are bent or buckled sufficiently to show strains or cracks after straightening should be reinforced or replaced.

2. Frame reinforcing.
If any defects or cracks are found after inspecting the frame member, it should be reinforced or replaced. Reinforcements can be made from channel, angle, or flat stock. The reinforcement stock should be of the same material and the same thickness as the frame member being reinforced. Before the reinforcement is welded to a cracked frame member, the crack should be prepared to insure a good sound repair. To prevent the crack from spreading, drill a 3 ~ 4 mm (0.12 ~ 0.16") hole at the root of the crack. Grind out the crack to form a slot which will allow the weld to pentrate to the surface of the reinforcement. The proper location of the reinforcement depends upon the location of the cracks. If the crack is at the bottom of the channel, the reinforcement should be welded to the channel bottom. If the crack extends along the side of the channel, an additional reinforcement should be welded to the side. All frame welding should be done with electric welding equipment, and the heat should be kept in a small area to prevent affecting the hardness of the metal.

3. Cross member and brackets.
All cross members, brackets or gussets that are damaged or broken may be replaced. Cut off the rivets holding part to be replaced by first drilling the heads and then cuttin them off usin a sharp cold chisel. Care should be exercised to prevent distorting rivet holes. In permanently attaching a new piece, it is recommended that hot rivets be used to secure in place.

FRONT WINCH

DESCRIPTION ..... 9 - 1

POWER TAKE-OFF ..... 9 - 2

- Removal & disassembly ..... 9 - 3
- Inspection ..... 9 - 3
- Assembly ..... 9 - 4
- Installation ..... 9 - 4

DRIVE SHAFT ..... 9 - 5

- Removal ..... 9 - 6
- Disassembly ..... 9 - 6
- Inspection ..... 9 - 6
- Assembly ..... 9 - 6
- Installation ..... 9 - 7

WINCH ..... 9 - 7

- Removal ..... 9 - 7
- Disassembly ..... 9 - 7
- Inspection ..... 9 - 9
- Assembly ..... 9 - 9
- Installation ..... 9 -11

DESCRIPTION

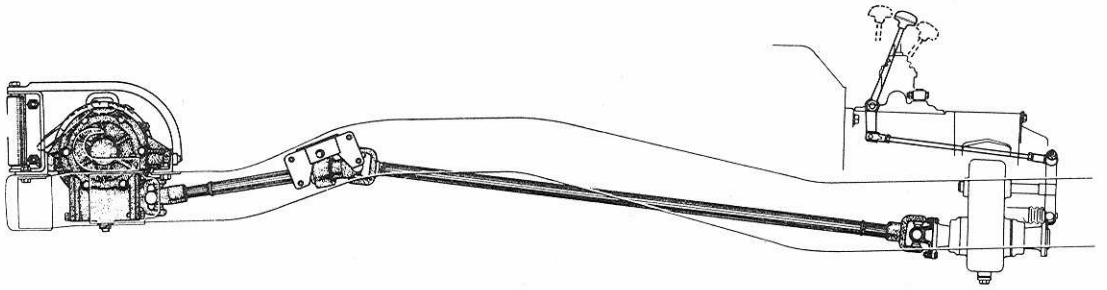


Fig.9-1 Front Winch Power Train Y5760

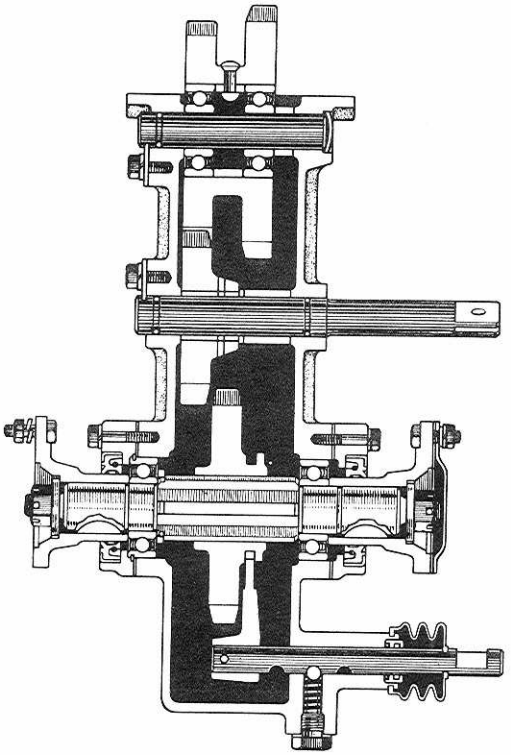


Fig.9-2 Cross Section of Power Take-off G2481

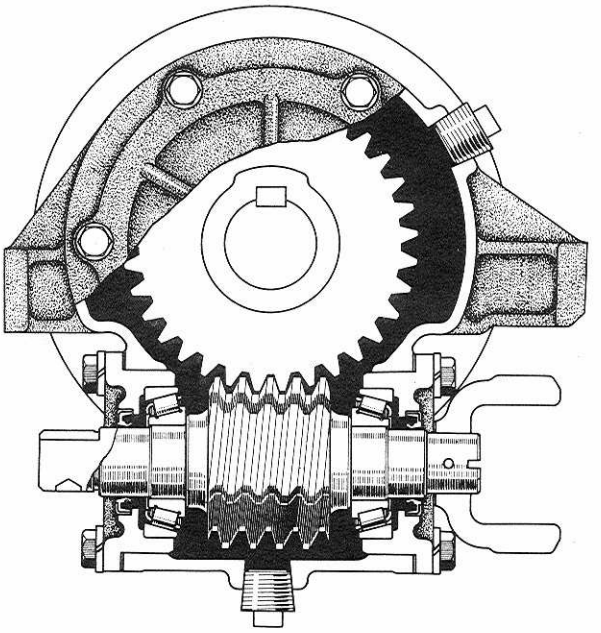


Fig.9-3 Cross Section of Winch Gear Case G2661

The front winch system consists of the power take-off, drive shafts and the shift linkage with the winch assembly.
The power take-off is a single drive type and is mounted on the left side of the transfer case, and is utilized for the operation of the winch.
Power is transmitted to the winch through the drive shafts which are connected to the power take-off output shaft.
The power take-off input gear is constantly in mesh with the power take-off drive gear on the transmission output shaft.
As the power take-off output gear is of a spur gear, the clutch pedal should be depressed when shifting this gear, and also the transfer shift lever or transfer high and low shift lever should be shifted at "N" (neutral) position.

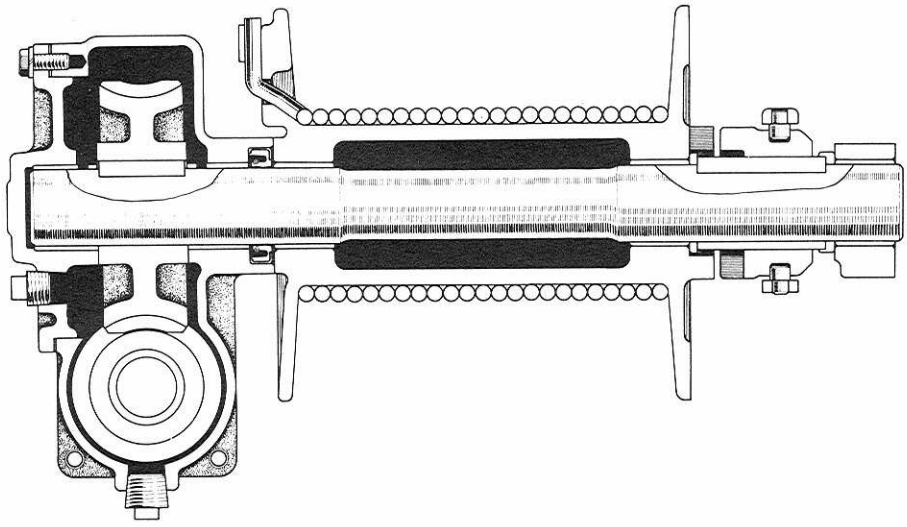
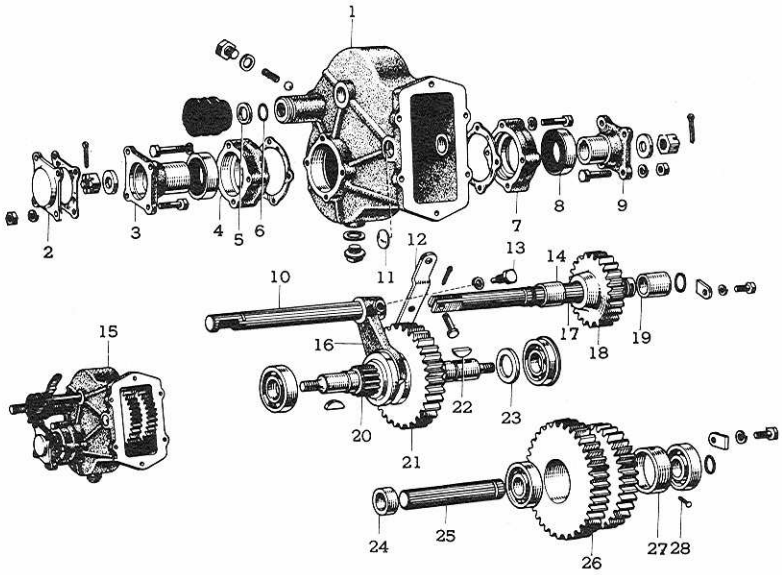


Fig.9-4 Cross Section of Front Winch G2662

POWER TAKE-OFF



1. Power take-off cover
2. Retainer cap
3. Universal joint flange
4. Bearing retainer
5. Dust seal
6. "O" ring
7. Bearing retainer
8. Oil retainer
9. Universal joint flange
10. Fork shaft No.1
11. Expansion plug
12. Shift link lever
13. Fork shaft lock bolt
14. Reverse idler gear spacer
15. Power take-off assembly
16. Shift fork No.1
17. Reverse idler shaft
18. Reverse idler gear
19. Bushing
20. Power take-off output shaft
21. Power take-off output gear
22. Woodruff key
23. Spacer
24. Spacer
25. Input gear shaft
26. Power take-off input gear
27. Bearing spacer
28. Rivet

Fig.9-5 Power Take-off Components G2482

Removal & Disassembly

1. Remove the transmission under cover.
   Drain the gear lubricant from the transfer case and the power take-off case.

2. Disconnect the drive shaft from the universal joint flange on the power take-off output shaft.
   Disconnect the power take-off shift link lever.

3. Dismount the power take-off assembly from the transfer case.

4. Remove the input gear shaft lock plate, and pull the input gear shaft out of the power take-off case.
   If difficult to remove the shaft, first tap the shaft lightly towards the rear, and remove the expansion plug.
   Next, drive out the shaft with a brass rod to the front.

5. Take out the spacer, and the input gear together with the bearings.

6. Remove the reverse idler shaft lock plate, and drive out the reverse idler shaft from the case to the rear.
   Remove the reverse idler gear and the spacer.

7. Loosen and remove the lock bolt on the case, and remove the spring and the gear shift fork lock ball.

8. Remove the drive fork shaft lock bolt, and then pull the fork shaft with the boot out of the case.
   Remove the shift fork.

9. Remove the universal joint flange retaining nuts, and remove both universal joint flanges.

10. Remove the bearing retainers together with the oil seals and the gaskets.
    Remove the two woodruff keys from the output shaft.

11. Retain the output gear with hand, and drive the output shaft with the rear bearing out of the case to the rear.

12. Remove the output gear and the spacer.
    Drive out the output shaft rear bearing with a brass rod.

Inspection

Clean all disassembled parts thoroughly, and inspect for the following. If necessary, replace the defective parts.

1. Check the power take-off case for cracks and the gasket surfaces for burrs and nicks.
   Replace the case if the cracks or burrs are excessive.

2. Check the gears for teeth wear or damage.

3. Inspect the gear bushing to shaft fitting condition for excessive wear.

4. Check the shaft splines, bearing fitting portions, oil seal lip contact surfaces, case fitting portions for excessive wear, scores or damage.

5. Install the output gear on the output shaft, and check for smooth movement.

6. Inspect the shaft at gear fitting portion for wear, scores or roughness.

7. Check the fork shaft for smooth movement, and also check the shift fork thrust surfaces for distortion and excessive wear.

8. Check the bearings for roughness and wear.
   After applying few drops of oil, check for noise or damage.

9. Check the lip of the oil seal for wear or damage.

Assembly

Lubricate the internal parts with gear lubricant before assembling.
Apply liquid sealer onto the gasket surfaces to prevent oil leak.
Lubricate the oil seal lips with grease.
The gaskets and "O" rings should be replaced upon assembly.

1. Position the output gear into the case with the shift fork groove towards the rear, then install the output shaft.

2. Place the spacer onto the front side of the output shaft.
Retain the output shaft, and install the front bearing until the snap ring on the front bearing contacts on the case properly.

3. Install the woodruff key onto the output shaft.
Install the front bearing retainer with the gasket.
Tighten the bearing retainer attaching bolts to 1.0 ~ 1.6 m-kg (7 ~ 11 ft-lb) torque.

4. Install the universal joint flange, and tighten the retaining nut temporarily.

5. Press the output shaft rear bearing onto the output shaft, then install the woodruff key and the rear bearing retainer with the gasket.
Tighten the bolts to 1.0 ~ 1.6 m-kg (7 ~ 11 ft-lb) torque.

6. Install the universal joint flange. and tighten the retaining nut firmly, and also tighten the front universal joint flange retaining nut firmly.
At this stage, check the output shaft rotating condition for smoothness and shaft end play.
The shaft end play should be zero.
If necessary, replace the bearing/s.
Install the cotter pins.

7. Place the shift fork on the shift fork groove of the output gear with the flange side to the front.

8. Slide the fork shaft into the case, and connect with the shift fork.
Align the lock bolt hole of the shift fork and the fork shaft, and install the lock bolt with the washer.

9. Place the lock ball and the spring into the locking hole of the case, and tighten the lock bolt with the gasket.
Install the dust boot onto the fork shaft.

10. Place the reverse idler gear and the idler gear spacer into the case with the gear hub to the rear side.
The spacer should be installed between the gear hub and the case.
Install the "O" rings on the groove of the reverse idler shaft, and then install the shaft from the rear of the case.
Align the groove with the front end of the shaft and install the lock plate.

11. Place the input gear into the case with the smaller gear towards the front, and mesh with the reverse idler gear. Install the spacer.
Install the "O" ring on the groove of the input gear shaft, then drive the shaft into the case through the gear and the spacer from the front of the case. Install the lock plate.

12. If the expansion plug was removed, apply the liquid sealer onto the plug, and install it into the hole of the case.
Peen the center of the plug, and secure it. Install the shift link lever.

13. After assembling, check the power take-off operation in all gears.

Installation

1. Install the power take-off assembly with the gasket onto the trans-

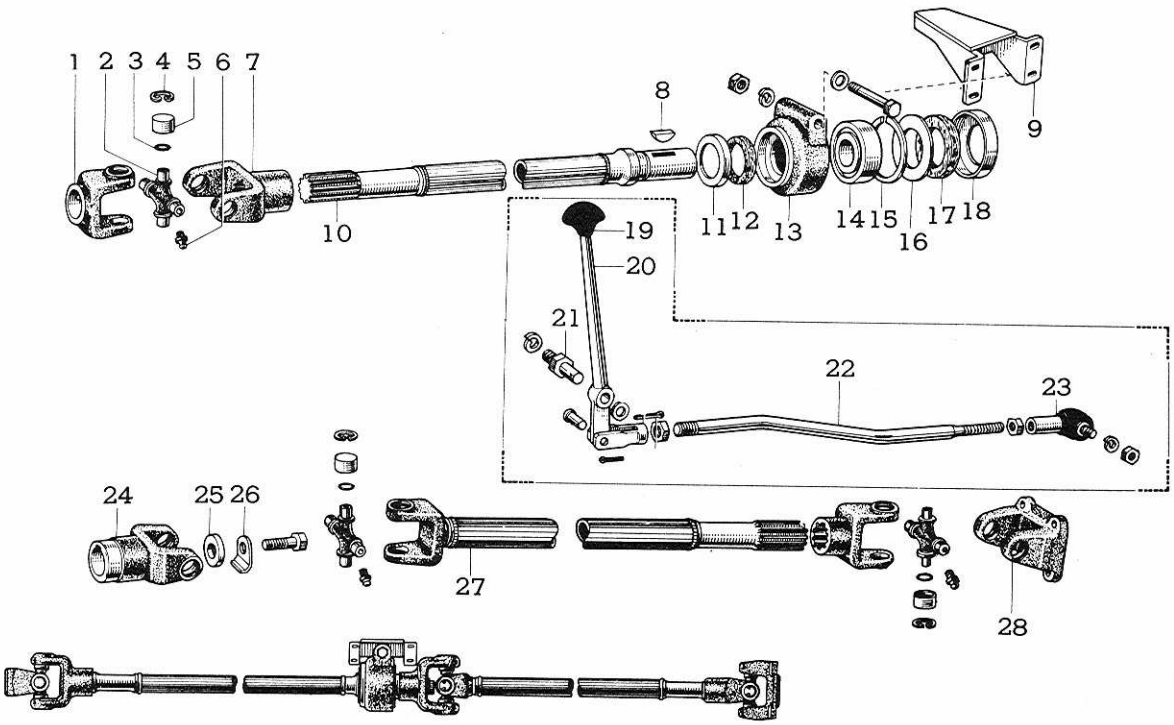
fer case. Tighten the bolts securely.

2. Connect the shift rod to the shift link lever. Connect the drive shaft to the output shaft.

3. Refill the transmission gear lubricant into the transfer case up-to the filler hole.

3. Install the transmission under cover.

DRIVE SHAFT



1. Universal joint yoke
2. Universal joint spider
3. "O" ring
4. Hole snap ring
5. Spider bearing
6. Grease fitting
7. Sleeve yoke
8. Woodruff key
9. Pillow block bracket
10. Front drive shaft No.1
11. Dust seal retainer No.2
12. Dust seal
13. Pillow block body No.2
14. Bearing
15. Hole snap ring
16. Seal washer
17. Dust seal
18. Dust seal retainer No.1
19. Shift lever knob
20. Shift lever
21. Lever support shaft
22. Power take-off shift rod
23. Connecting rod end
24. Sleeve yoke
25. Washer
26. Drive shaft lock plate
27. Front drive shaft No.2
28. Universal joint flange yoke

Fig.9-6 Drive Shaft Components G2483

Removal

1. Remove the transmission under cover.

2. Remove the front engine under cover attaching bolts.
   Remove the bolts connecting the universal joint flange yoke of the drive shaft to the universal joint flange of the power take-off output shaft.
   Next, pull out the drive shaft No.2 from the drive shaft No.1.

3. Remove the cotter pin and the straight pin at the end of the winch worm.
   Remove the winch assembly. To remove, refer to Winch Assembly Removal on page 9-7.
   Remove the universal joint yoke assembly at the front of the drive shaft No.1.

4. Remove the woodruff key at the rear end of the drive shaft No.1.

5. Remove the bolt mounting the pillow block body onto the pillow block bracket, then withdraw the drive shaft No.1 together with the pillow block body.
   Press the drive shaft No.1 out of the pillow block body.

Disassembly

1. Pillow block body disassembly.

   a. Pry the dust seal retainer No.1 out of the pillow block body, and remove the dust seal and the seal washer.

   b. Remove the hole snap ring, then drive the bearing out of the pillow block body with a brass rod.

   c. Remove the dust seal retainer No.2 and the dust seal.

2. Universal joint yoke disassembly.

   a. Remove the hole snap rings from the bearing holes of the yoke.

   b. Holding the yoke in one hand, tap lightly with a mallet on the radius of the lug on the yoke. The bearing will gradually sink and can finally be removed.

   c. Remove the opposite side bearing, and remove the yoke.
   Remove the other bearings in the same manner, and remove the joint spider from the yoke.

   d. Disassemble the other universal joint in the same manner.

Inspection

Wash all disassembled parts thoroughly, and inspect for damage, wear and rusty condition.
Replace the part/s if defective.

1. Inspect the splines in the joint yoke and the drive shaft for wear or evidence of twist.

2. Inspect the journals of the joint spider for rust and wear.

3. Inspect the spider bearing for rusty condition, wear and damage.

4. Inspect the bearing in the pillow block body for roughness and wear. Check for noise or damage by rotating the bearing.

5. Inspect the drive shaft for excessive bend.

Assembly

1. Repack the bearing with multipurpose grease, and press the bearing into the pillow block body, then install the hole snap ring to secure the bearing.

2. Place the seal washer into the pillow block body.
   Install the new dust seal into the

dust seal retainer No.1, and press them into the pillow block body.

3. Install the new dust seal into the dust seal retainer No.2, then install them into the pillow block body. Coat the dust seals with multipurpose grease.

4. Repack the spider bearings with multipurpose grease, and install the "O" ring onto the spider bearing.
   Position the joint spider into the joint yoke, and press the bearing into the bearing hole of the yoke and onto the journal of the joint spider, then install the hole snap ring to secure the installed bearing.

5. Install the opposite side bearing, then install the hole snap ring.

6. Install the other journal bearings in the same manner.

7. Check the universal joints for smooth movement.

WINCH

Removal

1. Remove the cotter pin and the straight pin at the front end of the drive shaft No.1, and disconnect the drive shaft No.1 from the winch worm.

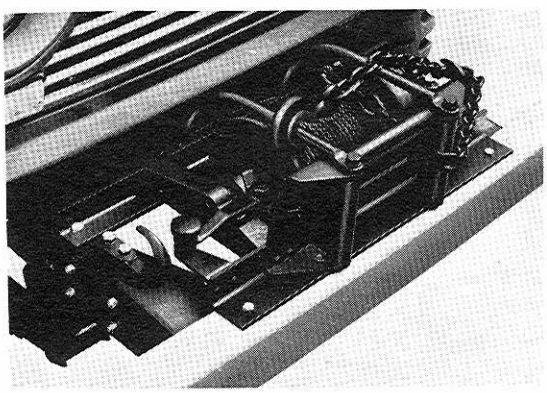


Fig.9-8 Front Winch V3981

Installation

Follow the removal procedures in the reverse order.

1. When assembling the drive shaft No.1, all universal joints should align in line as illustrated in figure 9-7.

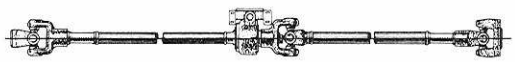


Fig.9-7 Drive Shaft Alignment G2484

2. Lubricate the universal joints with multipurpose grease.

2. Remove the bolts mounting the rear and front base members onto the frame and the front bumper bar.

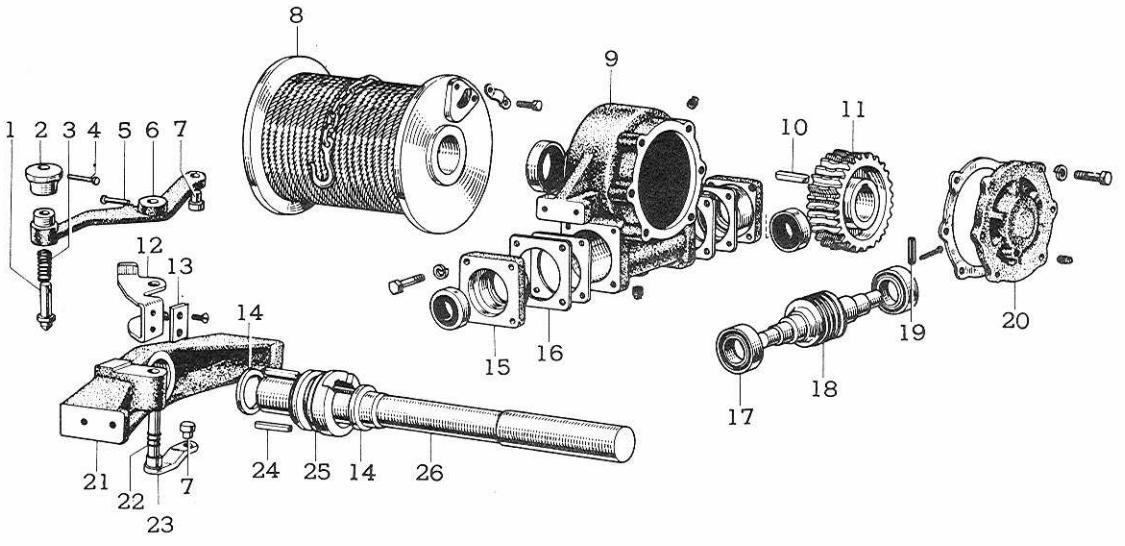
3. Drain the gear lubricant, and remove the winch assembly from the vehicle.

Disassembly

1. Remove the front and rear base members, and the roller bracket supports.

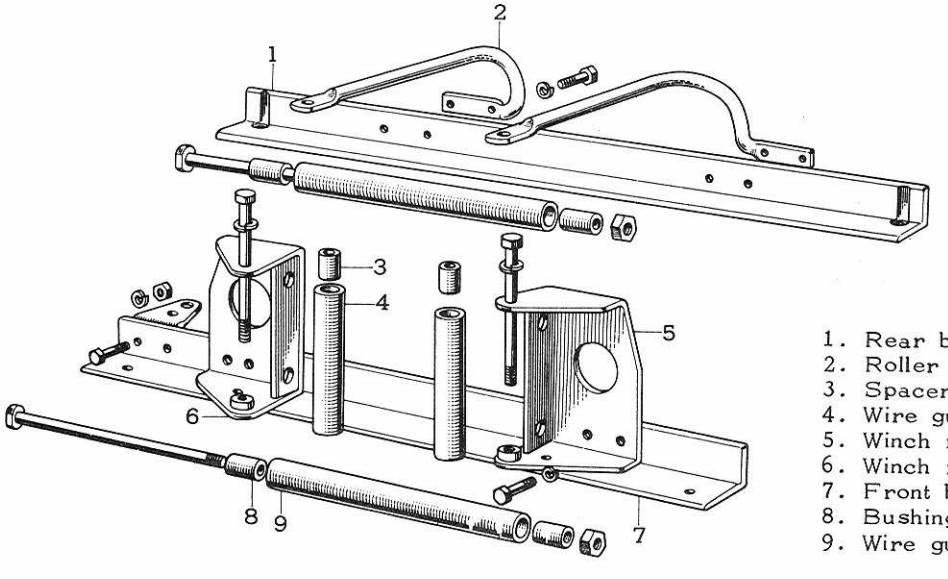
2. Drive out the pin connecting the winch clutch lever and the winch clutch lower lever shaft, and remove the winch clutch lever, winch clutch lower lever and the brake shoe.

3. Remove the winch end bracket



1. Lever shift lock pin
2. Winch clutch lever knob
3. Spring
4. Pin
5. Pin
6. Winch clutch lever
7. Head pin
8. Winch drum
9. Winch gear case
10. Sliding key
11. Worm gear
12. Brake shoe
13. Brake plate
14. Clutch feather key spacer
15. Worm bearing retainer
16. Adjusting shim
17. Worm bearing
18. Winch worm
19. Straight pin
20. Winch gear case cover
21. Winch end bracket
22. Spring
23. Winch clutch lower lever
24. Clutch key
25. Winch clutch
26. Worm gear shaft

Fig. 9-9 Front Winch Components G2485



1. Rear base member
2. Roller bracket support
3. Spacer
4. Wire guide roller
5. Winch roller bracket No.2
6. Winch roller bracket No.1
7. Front base member
8. Bushing
9. Wire guide roller

Fig. 9-10 Winch Member & Bracket Components G2486

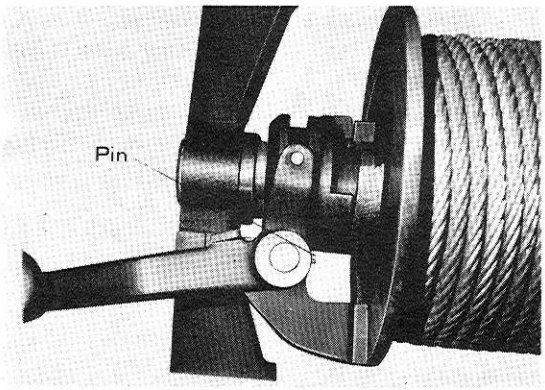


Fig.9-11 Pin Removal V5169

and the clutch feather key spacer from the worm gear shaft.

4. Slide the winch clutch out of the worm gear shaft, then remove the two clutch keys and the clutch feather key spacer.

5. Slide the winch drum assembly out of the worm gear shaft.

6. Remove the winch gear case cover with the gasket.

7. Remove the worm bearing retainers and the adjusting shims from both sides of the winch gear case, and remove the winch worm together with the bearings from the gear case.

8. Drive the worm gear shaft together with the worm gear out of the gear case.

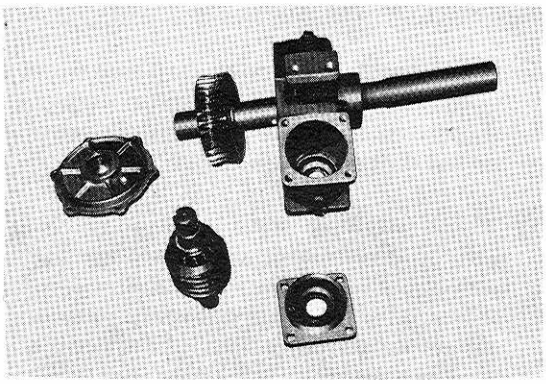


Fig.9-12 Winch Gear & Case Components V5170

9. Press the worm gear shaft out of the worm gear.

Inspection

Wash all disassembled parts thoroughly, and inspect for damage, wear and rusty condition.
Replace the parts if defective.

1. Inspect the worm gear shaft for wear, scores, bend or other defects.

2. Inspect the worm gear shaft to bushings clearance, and if it excessively worn, replace the shaft or the related part/s.

3. Check the winch drum, gear case and the bearing retainers for cracks, and the gasket surface for burrs or nicks.

4. Inspect the worm gear and the worm for tooth wear, chips or damage.

5. Check the winch clutch and winch clutch lever for smooth operation, and also check the claws of the winch drum and the winch clutch for chips or damage.

6. Check the head pins of the winch clutch lever and the winch clutch lower lever for excessive wear.

7. Check the brake shoe plate for wear.

8. Check the lip of the oil seal for wear or damage.

9. Inspect the worm bearings for roughness and wear.

Assembly

The clutch keys and the sliding key are to be replaced if it is damaged when removed.
Apply grease on all bushings, shaft and the clutch mechanism when as-

sembling, and also pack the inside of the drum with grease.
Apply liquid sealer onto the gasket surfaces to prevent oil leak.

1. Adjustment of the worm bearing pre-load.

   a. Install the winch worm with the bearings into the gear case, then install the worm bearing retainers with the adjusting shims and tighten the bearing retainer attaching bolts to 1.9 ~ 3.1 m-kg (14 ~ 22 ft-lb) torque.

   b. Rotate the worm, and check the condition for looseness or tightness, and also rock the worm to-and-fro, and check the worm end play.
   The worm end play should be zero and it should rotate smoothly.
   If necessary, adjust the worm bearing pre-load by selecting the adjusting shims to obtain the proper condition.
   The adjusting shims are available in the following thickness.
   Part No. 38123-60010
   Thickness: 0.228 mm (0.009")
   Part No. 38124-60010
   Thickness: 0.5 mm (0.020")
   The adjusting shims selected for both sides should have the same thickness.

   c. Remove the bearing retainers, adjusting shims and the worm from the gear case after adjustment.

2. Place the sliding key into the key groove of the worm gear shaft end, then press the worm gear onto the shaft.

3. Install the worm gear shaft with the worm gear into the gear case.

4. Re-install the worm with the bearings into the gear case, and install the bearing retainers and the adjusting shims which were determined at worm bearing pre-load adjustment.
   Tighten the bearing retainer attaching bolts to 1.9 ~ 3.1 m-kg (14 ~ 22 ft-lb) torque.

5. Install the gear case cover and the gasket.
   Tighten the bolts to 1 ~ 1.6 m-kg (7 ~ 11 ft-lb) torque.

6. Slide the winch drum assembly onto the worm gear shaft.

7. Install the clutch feather key spacer with the indented face towards the outside, and align the two indents of the spacer with the key grooves on the shaft.
   Next, install the two clutch keys onto the shaft. These keys should be replaced with new one if distortion is present when removed.

8. Install the winch clutch onto the shaft, and then install the clutch feather key spacer with the indented face towards the winch clutch.

9. Install the winch end bracket onto the shaft, then install the torsion spring onto the shaft of the winch clutch lower lever, and assemble the winch clutch lower lever, brake shoe and the winch clutch lever onto the winch end bracket. Align the holes of the lower lever shaft and the clutch lever, and drive in the pin.

10. Assemble the front and rear base members and the roller bracket supports onto the winch end bracket and the winch gear case.

11. When shifting the winch clutch lever on the clutch at disengaged position, the brake plate on the brake shoe should be contacted onto the drum side firmly and lock the drum. If necessary, replace the brake plate.

Installation

Follow the removal procedures in the reverse order.

Refill the gear lubricant into the case up-to the filler hole.

* *

- MEMO-

BODY (WAGON)

Description 10- 1

Hood & Hood Lock 10- 2

Front Fender 10- 4

Radiator Grille 10- 5

Lower Shroud Panel 10- 5

Front Bumper 10- 5

Front Door 10- 5

Front Door Window Regulator 10- 6

Door Window Glass & Ventilating Window Glass 10- 7

Front Door Lock 10- 9

Door Lock Cylinder 10- 9

Door Outside Handle 10-10

Door Lock Remote Control 10-10

Door Lock Striker Plate 10-10

Rear Door 10-10

Rear Door Glass 10-10

Rear Door Window Requlator 10-11

Rear Door Lock 10-11

Rear Door Lock Remote Control 10-12

Front Windshield Glass 10-12

Weatherstrip 10-14

Side Window Glass 10-14

Tail Gate 10-15

Tail Gate Glass & Regulator 10-19

Tail Gate Regulator Motor 10-20

Tail Gate Lock 10-21

Tail Gate Switch 10-22

Back Door (Swing Gate) 10-22

Back Door Lock (RH) 10-23

Back Door Lock (LH) 10-23

Back Door Glass 10-24

Roof Headlining 10-24

Front Seat & Rear Seat 10-25

Rear Bumper 10-27

Body Mounting 10-27

Front Fender Apron & Dash Panel 10-28

Floor Pan & Transmision Cover 10-29

Side Member 10-30

Roof Panel & Cowl Panel 10-31

BODY (HARD TOP)

Hood 10-32
Front fender 10-33
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Front windshield glass 10-36
Side windshield glass 10-37
Rear Drop gate 10-38
Rear swing gate 10-38
Rear gate 10-39
Hard top roof 10-40
Seat & seat track 10-40
Uentilator 10-43
Body mounting 10-43
Body side panel 10-44
Floor panel 10-44

BODY (CANVAS TOP)

Door 10-45
Rear swing gate 10-46
Top bow 10-47
Canvas top 10-47

BODY (PICK UP)

Roof panel & back panel 10-48
Seat & seat truck 10-49
Rear body 10-50
Cab mounting 10-51

DESCRIPTION

The body shell is incorporated with a box section construction which improves rigidity and durability.

The door frame of a high rigidity section shape has been adopted.

Soft rubber body mounts are utilized to absorb the vibrations from the road surfaces.

Wide front windshield is provided for easy visibility. The door handle and the window regulator handle are of indent type for safety consideration.

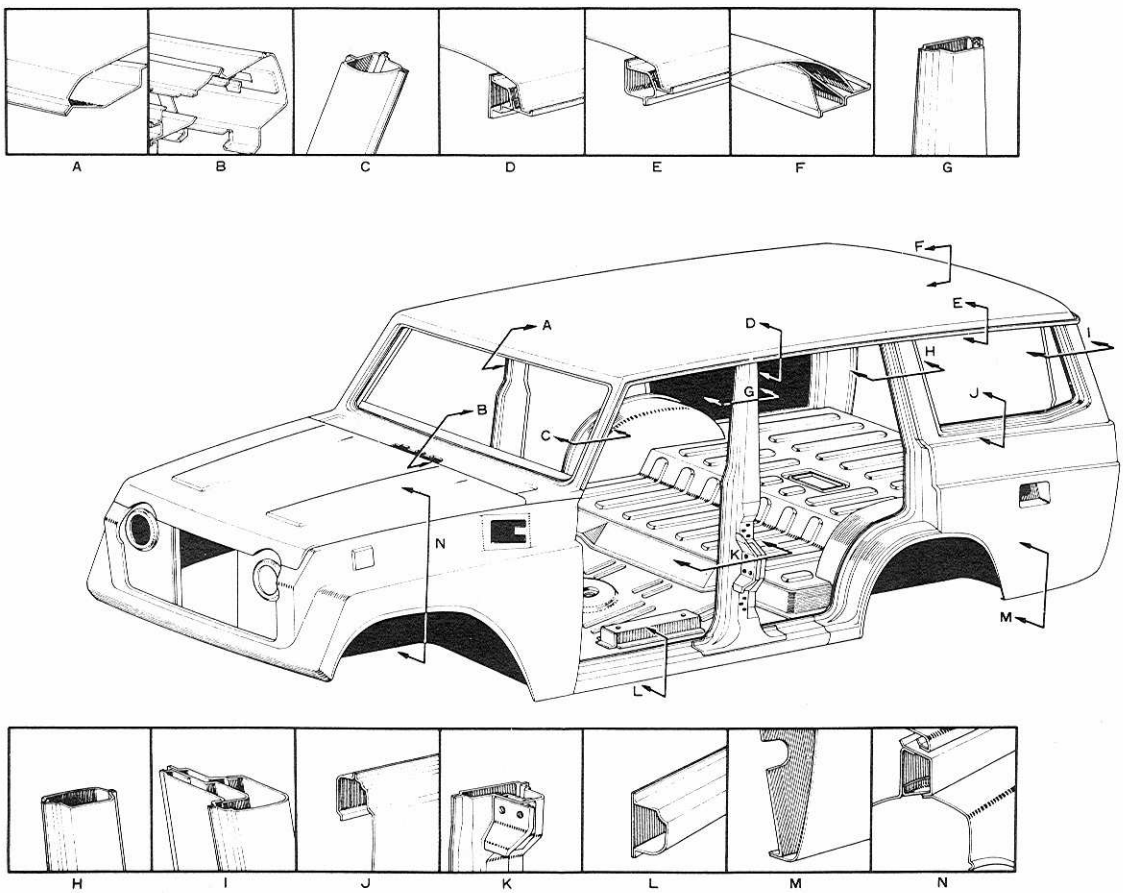
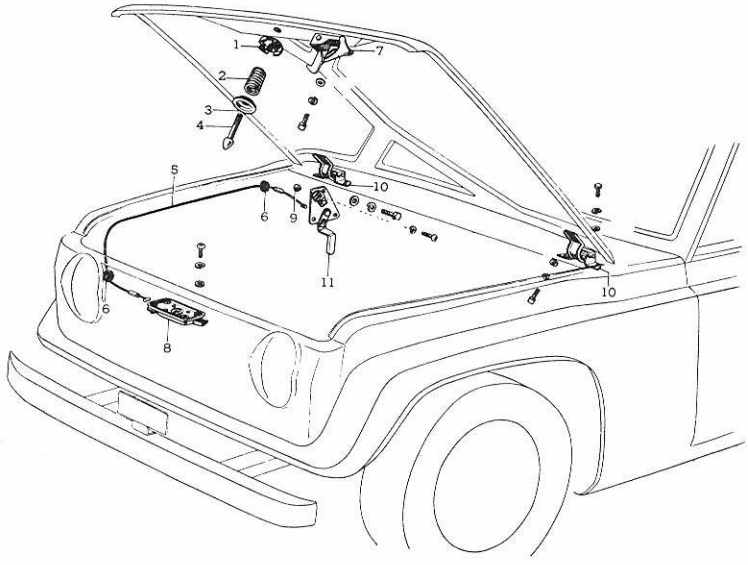


Fig.10-1 Body Construction Y5740

HOOD & HOOD LOCK



1. Nut retainer
2. Compression spring
3. Hood lock spring guide
4. Hood lock dowel
5. Hood lock control cable
6. Grommet
7. Hood auxiliary catch hook
8. Hood lock
9. Square nut
10. Hood hinge
11. Hood lock control

Fig.10-2 Hood Lock & Release Lever B3181

Removal

1. Open the hood, and remove the hood attaching bolts, then remove the hood.
2. Remove the hinge attaching bolts, and remove the hinge.
3. Remove the hood lock, release lever, hood lock control cable and the hood lock.

Installation

Follow the removal procedures in the reverse order.

Inspection

1. Apply a few drops of motor oil onto the frictional portions of the hood lock and release lever.
2. If the hood lock dowel is excessively worn, and/or the hood lock is defective, replace them.

Adjustment

Hood

1. To adjust the to-and-fro position, loosen the hood attaching bolts, and move the hood to fit properly.

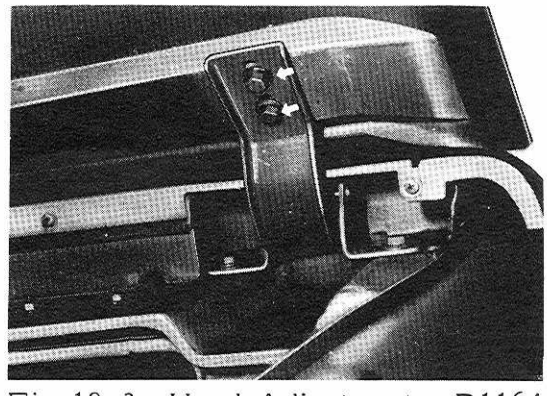


Fig.10-3 Hood Adjustment B1164

2. To adjust the side-to-side position, loosen the hinge attaching bolts, and move the hood to fit properly.

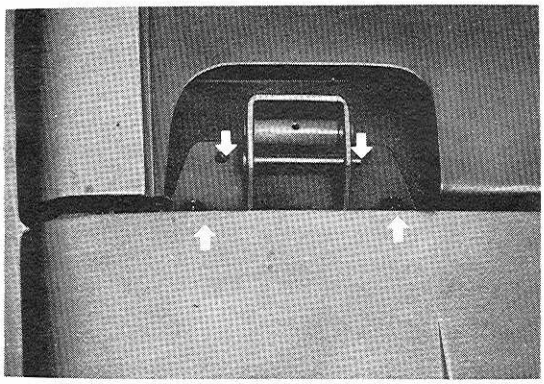


Fig.10-4 Hood Adjustment B1165

Hood Lock

Before adjusting the hood lock mechanism, ensure that the hood is properly aligned and fitted.

1. If the hood lock does not engage properly when the hood is closed, loosen the hood lock dowel lock nut, and turn the hood lock dowel counterclockwise or clockwise to lengthen or shorten the dowel. The length of the dowel should be adjusted as there is a little play when the hood is closed, and the hand pressure is applied onto the hood.

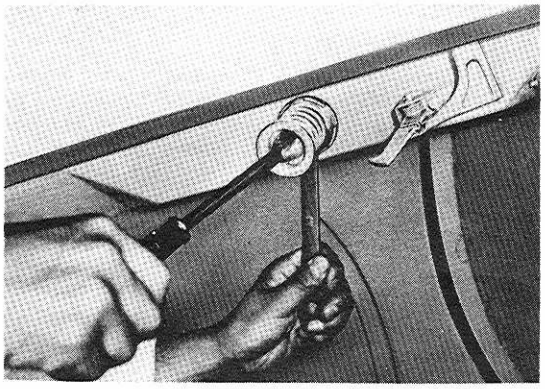


Fig.10-5 Hood Lock Dowel Adjustment B1166

2. If the hood lock dowel does not fit with the hood lock, loosen the hood lock attaching bolts, and adjust it.

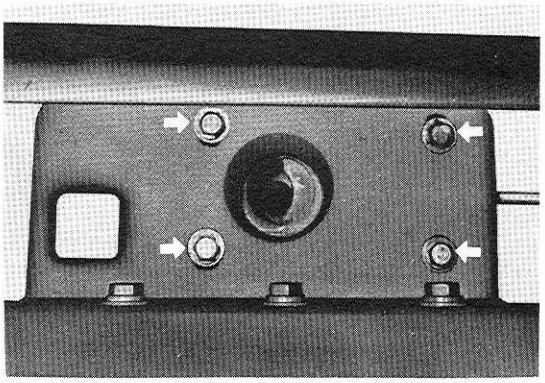


Fig.10-6 Hood Lock Adjustment B1167

3. Adjust the hood auxiliary catch hook by loosening the attaching bolts so that it may function properly when pulling the hood lock release lever.

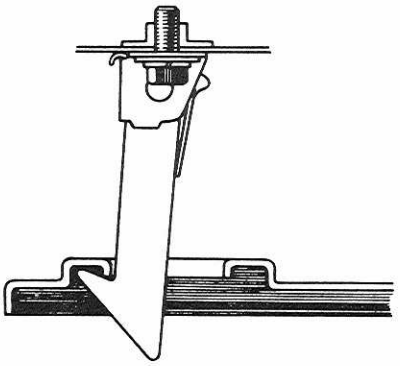
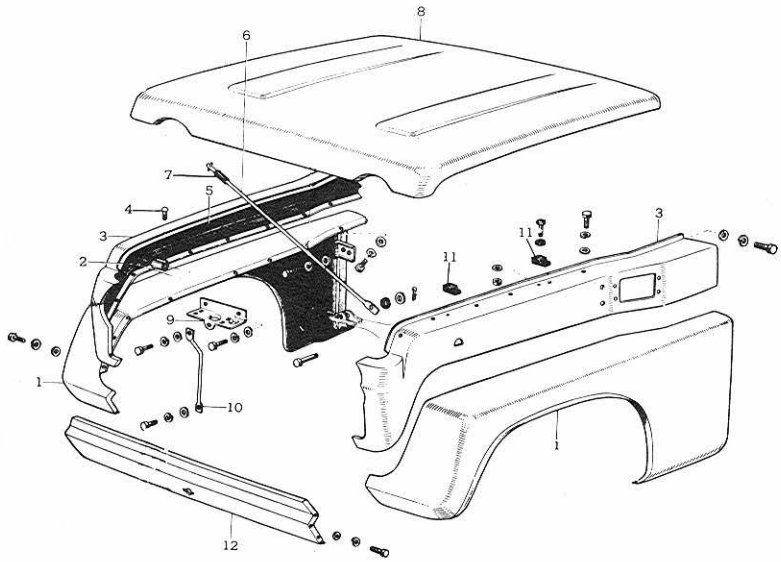


Fig.10-7 Catch Hook Adjustment X4793

FRONT FENDER



1. Front fender lower panel
2. Hood stay catch spring
3. Front fender upper panel
4. Rivet
5. Front fender trim packing
6. Hood support rod
7. Cushion
8. Hood
9. Hood lock upper support
10. Hood lock base support
11. Fender to hood bumper
12. Lower shroud panel

Fig.10-8 Hood & Front Fender B3117

Removal

1. Remove the fender to hood bumper attaching screws.
2. Remove the fender upper panel attaching bolts.
3. Remove the turn-signal light.

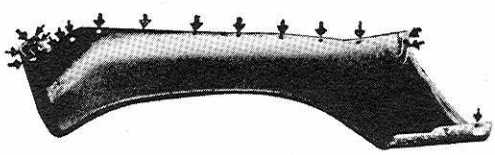


Fig.10-9 Bolts & Screws Removal B1168

4. Remove the fender lower panel bolts, and then, remove the fender lower panel and the fender upper panel.

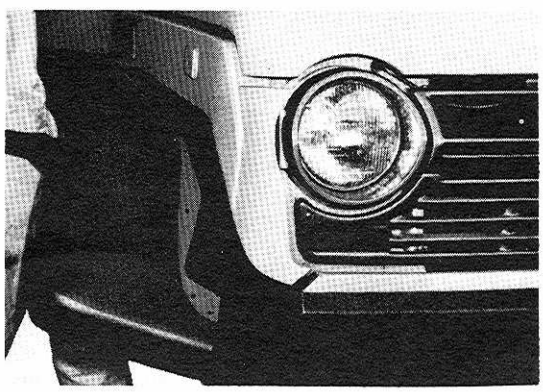


Fig.10-10 Fender Lower Panel Removal B1169

Installation

Follow the removal procedures in the reverse order.
Upon installation, first, install the bolts

loosely which secure the fender lower panel and fender upper panel onto the body, then install the other attaching bolts loosely.
Adjust the position of the fender upper and lower panels with the hood, lower shroud panel and the door, then tighten the attaching bolts.

RADIATOR GRILLE

Removal

1. Remove the radiator grille attaching bolts and screws.
2. Disconnect the front turn signal wiring.
3. Remove the front turn signal from the radiator grille.

Installation

Follow the removal procedures in the reverse order.

LOWER SHROUD PANEL

To remove the lower shroud panel, remove the attaching bolts.

FRONT BUMPER

To remove the front bumper, remove the attaching nuts, and remove the license plate from the bumper.

FRONT DOOR

Inspection & Adjustment

1. If some play is experienced in the axial or vertical direction of the door hinge, tighten the hinge attaching bolts.
   If a little play is still present after tightening the bolts, replace both the bushing and the pin.
2. To adjust the door for side-to-side position, loosen the hinge attaching bolts on the door side.

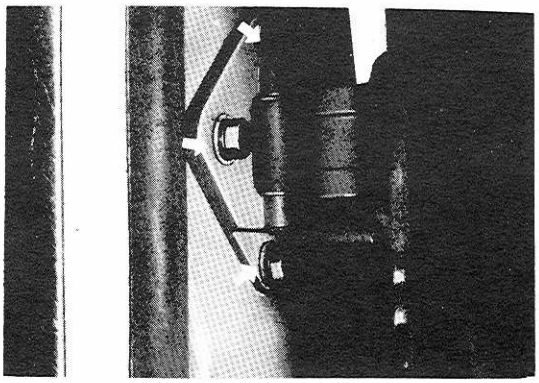


Fig.10-11 Hinge Adjustment B1170

3. To adjust the door for up-and-down, and to-and-fro positions, loosen the hinge attaching bolts on the pillar side.

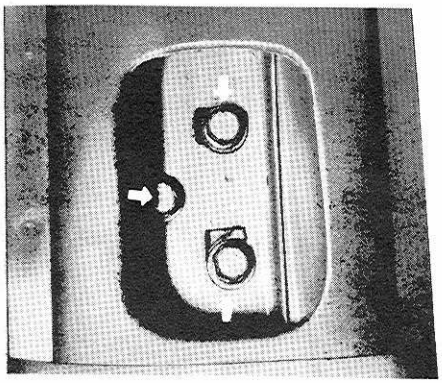


Fig.10-12 Hinge Adjustment B1177

4. Adjust the door for closing by moving the striker plate as required.

Removal

1. Remove the door hinge attaching bolts on the door side, and remove the door.
   To facilitate the procedure, support the door with a jack.
2. Remove the cowl side trim board.
3. Remove the door hinge attaching bolts on the pillar side, and remove the door hinge.

Door Hinge Bushing & Pin Replacement

1. To disassemble the hinge, drive out the pin towards the serration using a blunt punch.

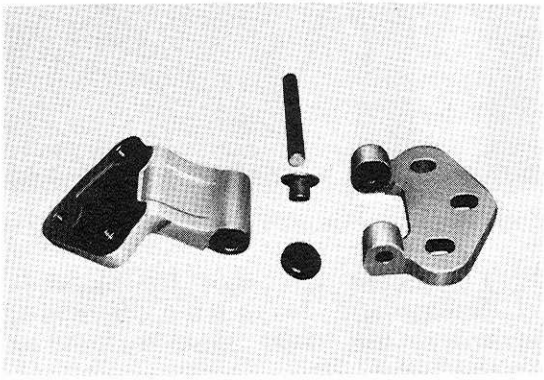


Fig.10-13 Hinge Disassembly B1194

2. Replace the bushing and/or the pin if necessary.

3. To assemble the hinge, coat some grease onto the bushing and open stopper spring.

Installation

Follow the removal procedures in the reverse order.
Before tightening the door hinge attaching bolts, ensure that the door is properly aligned.

FRONT DOOR WINDOW REGULATOR

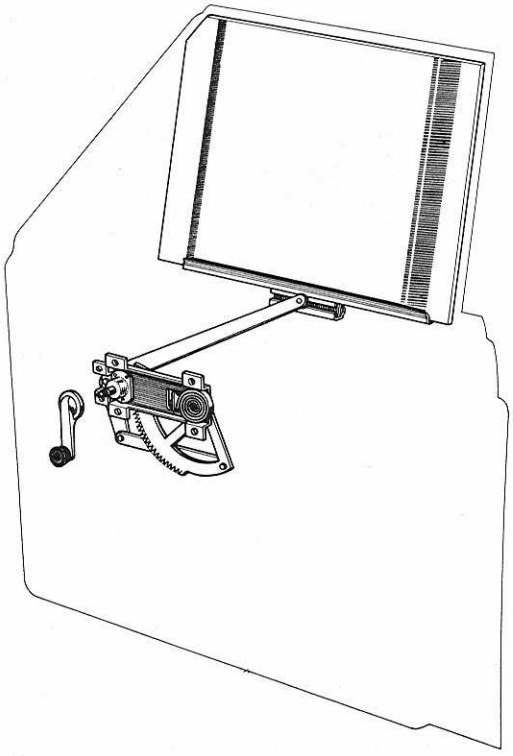


Fig.10-14 Door Window Regulator Y5744

Removal

1. Remove the arm rest if installed.

2. Remove the door inside handle case.

3. Remove the window regulator handle.

4. Remove the trim retainer with a screwdriver and remove the front door trim panel and the service hole cover.
When removing the trim retainer, protect the door panel with a cloth to prevent it from scoring and scratching with a screwdriver.

5. Remove the two attaching bolts, and disconnect the roller from the glass channel.

6. Remove the four attaching bolts, and remove the regulator assembly from the service hole.

Inspection

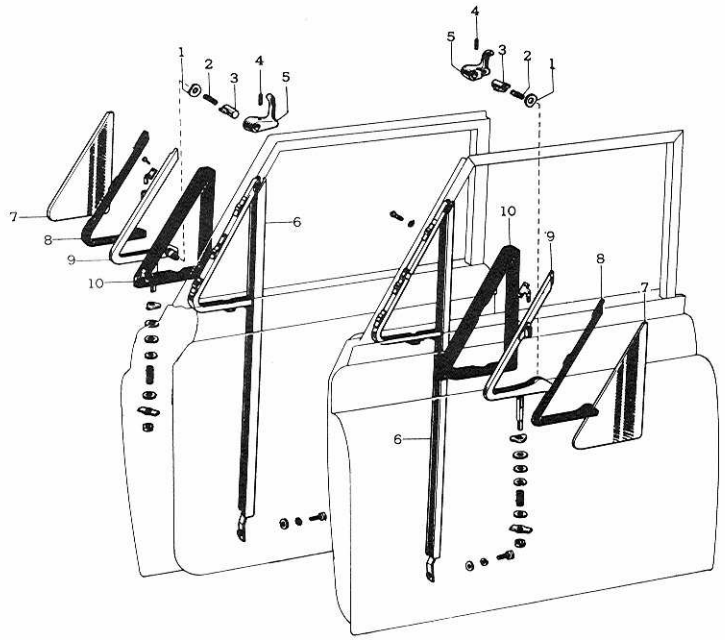
1. Inspect the regulator gear and the spring for wear and damage.

2. If necessary, coat grease onto each operating portion.

Installation

Follow the removal procedures in the reverse order.

DOOR WINDOW GLASS & VENTILATING WINDOW GLASS



1. Wave washer
2. Compression spring
3. Ventilating window lock handle push button
4. Pin with serration
5. Door ventilating window lock handle
6. Division bar
7. Ventilating window glass
8. Ventilating window frame strip
9. Ventilating window glass frame
10. Ventilating window weatherstrip

Fig.10-15 Front Door Division Bar & Ventilating Window B3129

Removal

1. Remove the window regulator.
2. Remove the door window glass outer weatherstrip and the inner weatherstrip with a flat formed tool or a screwdriver.
   In this case, place a cloth or a suitable material to prevent the door from scratching.
3. Remove the division bar adjusting bolts, and remove the door window glass run from the division bar.
4. Remove the three screws, and remove the division bar towards the rear.
5. Remove the door window glass from the door.

Door Window Glass Replacement

1. Remove the window glass channel from the glass with a wooden or fiber mallet.
2. To install, place the glass channel with the weatherstrip on the glass, and tap the glass channel with a

rubber mallet. Apply water and soap to facilitate the installation.

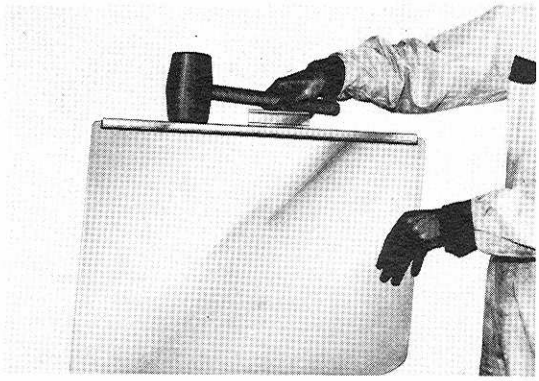


Fig.10-16 Window Glass Installation V0402

Ventilating Window Glass Replacement

1. Remove the ventilating window upper pivot bracket attaching screws and compression spring attaching nut.

2. Remove the glass from the glass frame.

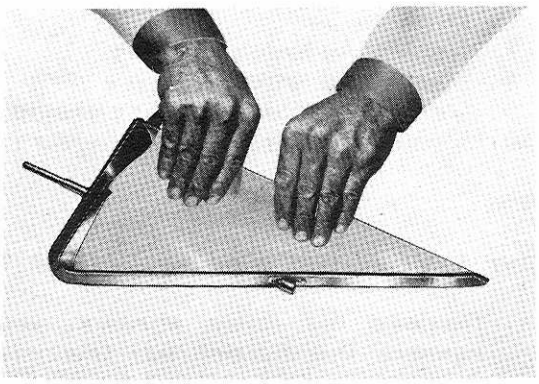


Fig.10-17 Glass Replacement W6819

3. Apply adhesive cement onto the glass frame, and install the frame.

4. Apply adhesive cement onto the frame strip, then install the glass onto the glass frame.

5. Install the glass frame to the ventilating window division frame.

6. Adjust the ventilating window for opening and closing by tightening the compression spring attaching nut, and then lock the nut with a lock plate.

Ventilating Window Weatherstrip Replacement

1. Remove the glass frame from the ventilating window division frame.

2. Remove the weatherstrips.

3. Install the replacement weatherstrips.

4. Ensure that the glass frame contacts with the weatherstrip equally.

5. If the clearance is present, apply suitable body sealer or adhesive cement on the corner of the frame.

Door Window Glass Run Replacement

1. Remove the glass run, then remove and clean the adhesive cement.

2. Apply adhesive cement onto the frame, and dry it for a while.

3. Install the glass run.

Installation

Follow the removal procedures in the reverse order.
Caution:

1. When installing the division bar adjusting bolt, adjust the location of the division bar to provide smooth movement of the glass, and also to contact it with the glass run equally.

2. Cement the service hole cover thoroughly to prevent water entry.

3. To install the regulator handle, insert the snap ring from the handle side, then install the handle by tapping on it.

FRONT DOOR LOCK

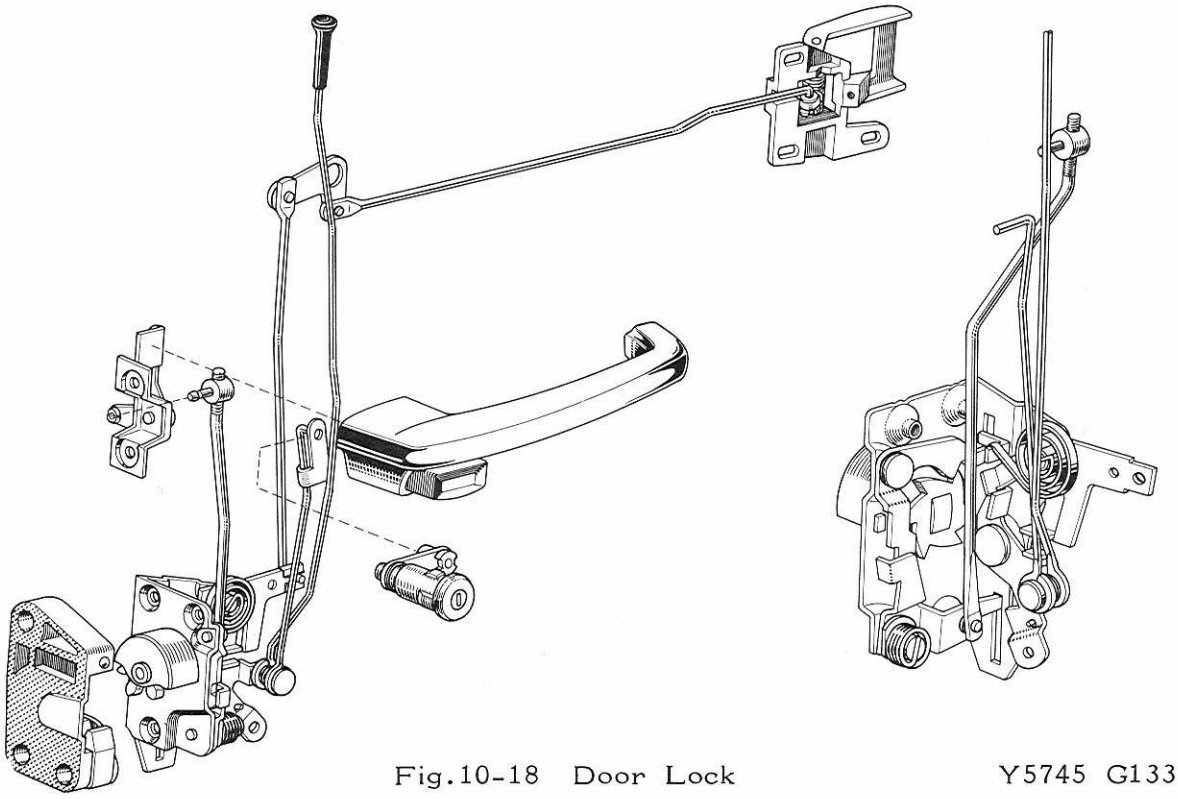


Fig.10-18 Door Lock Y5745 G1333

Removal

1. Remove the trim panel and the service hole cover.
2. Raise the glass completely, and disconnect the door lock remote control link, outside handle remote control lever and door lock cylinder from the door lock.
3. Remove the door lock button.
4. Remove the attaching screws, and remove the door lock assembly.

Inspection

1. Inspect the door lock for operation. If defective, repair or replace it.
2. Lubricate the frictional surfaces of the door lock with grease.

Installation

Follow the removal procedures in the reverse order.

DOOR LOCK CYLINDER

Removal

1. Remove the door trim panel and the service hole cover.
2. Raise the door window glass completely, and disconnect the door lock from the door lock cylinder.
3. Remove the door lock cylinder and the sleeve clamp, and remove the door lock cylinder.

Installation

Apply grease on the operating surfaces of the lock cylinder, and follow the removal procedures in the reverse order.

DOOR OUTSIDE HANDLE

Removal

1. Remove the door trim panel and the service hole cover.
2. Raise the door window glass completely, and remove the outside handle attaching nut and screw, then remove the door outside handle.

Installation

Follow the removal procedures in the reverse order.

DOOR LOCK REMOTE CONTROL

Removal

1. Remove the door trim panel and the service hole cover.
2. Raise the door window glass completely, and disconnect the door lock remote control from the door lock.
3. Remove the attaching bolts and screw, and remove the door lock remote control.

Installation

Follow the removal procedures in the reverse order.

DOOR LOCK STRIKER PLATE

Removal

Remove the three attaching screws.

Adjustment & Installation

Before installing the striker plate, inspect the striker plate for wear, and ensure that the door is correctly aligned.
To install, install the attaching screws loosely, and move the striker plate as required, then tighten the screws securely.

REAR DOOR

Inspection & Adjustment

Refer to "Inspection" & Adjustment of the Front Door section.

Removal

1. Remove the door hinge attaching bolts on the door side.
   In this case, support the door with a jack or other suitable tool to facilitate the procedures.
2. Remove the front door and rear door opening trims and weatherstrips on the center pillar.
3. Remove the retainers, and detach the center pillar garnish.
4. Remove the door hinge attaching bolts through the center pillar hole, and remove the door hinges.

Door Hinge Bushing & Pin Replacement

Follow the door hinge bushing & pin replacement of the front door.

Installation

Follow the removal procedures in the reverse order.
When installing the door, tighten the door hinge attaching bolts both on the door side and on the pillar side, making sure that the door is correctly aligned with the body.

REAR DOOR GLASS

Removal

1. Remove the door trim panel and the service hole cover.
2. Lower the glass. Remove the two regulator attaching bolts, and disconnect the roller from the glass channel, and position the glass into the door.

3. Remove the window glass inner and outer weatherstrips.

4. Remove the three division bar attaching screws, and remove the division bar.

5. Remove the rear door quarter window glass and also the rear door window glass.

Replacement

Follow the replacement procedures of the front door window glass.

Installation

Follow the removal procedures in the reverse order.
Before installing the quarter window glass, fit the glass into the weatherstrip fully.
To facilitate the installation, apply water and soap onto the weatherstrip and the door.

REAR DOOR WINDOW REGULATOR

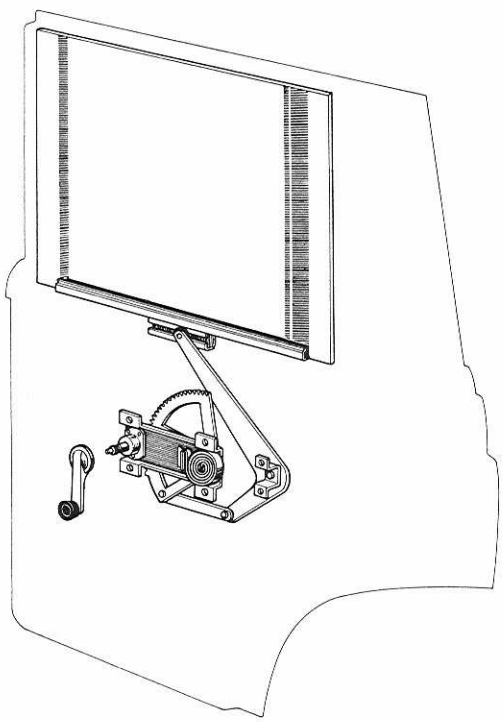


Fig.10-19 Door Window Regulator Y5743

Removal

1. Remove the door trim panel and the service hole cover.

2. Lower the window glass completely. Remove the two regulator attaching bolts, and disconnect the roller from the glass channel.

3. Remove the four regulator attaching bolts, and remove the regulator assembly from the service hole.

Inspection

1. Inspect the regulator gear and the spring for wear and damage.
If defective, replace the regulator assembly.

2. Apply grease onto each operating portion, if necessary.

Installation

Follow the removal procedures in the reverse order.

REAR DOOR LOCK

Removal

1. Remove the door trim panel and the service hole cover.

2. Disconnect the door opening control link and locking control link from the door lock.

3. Remove the three attaching screws, and remove the door lock assembly.

Installation

Follow the removal procedures in the reverse order.

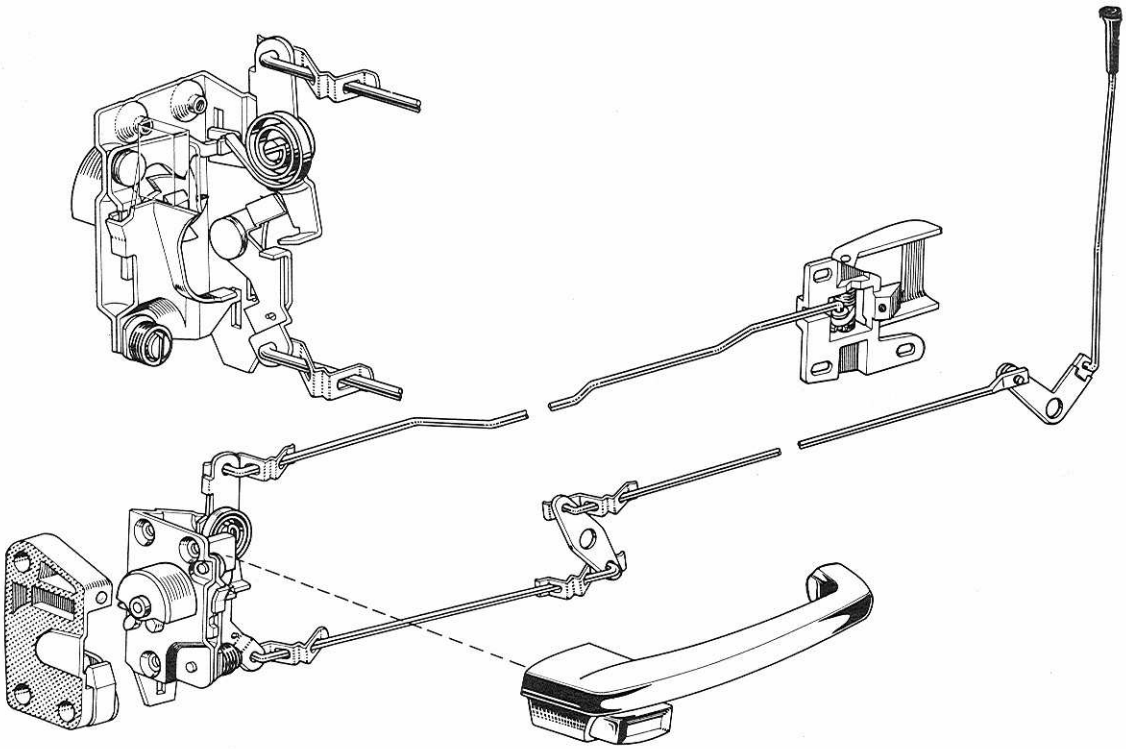


Fig.10-20 Door Lock Y5746 G1334

REAR DOOR LOCK REMOTE CONTROL

Removal

1. Remove the door trim panel and the service hole cover.
2. Remove the door locking remote control push button, and disconnect the door locking control link from the locking control link sub-assembly.
3. Remove each one of the attaching screws, disconnect the locking control link from the door lock, and remove the locking control link.
4. Remove the inside handle attaching screw, disconnect the opening control link from the door lock, and remove the opening control link with the inside handle.

Installation

Follow the removal procedures in the reverse order.

Note:

Pertaining to the rear door lock striker plate and rear door weatherstrip, refer to the "Front Door".

FRONT WINDSHIELD GLASS

Removal

1. Place a protective covering over the hood, hood side panels, fender, instrument panel and the front seat assembly.
2. Remove the inner rear view mirror.
3. Remove the windshield wiper arm assemblies.

4. Remove the windshield mouldings, if installed.

5. On the inside of the body, bend in the lip of the weatherstrip along the top and sides of the windshield with a blunt putty knife or other suitable tool, applying pressure onto the glass near the edge with the palm of the hand.

6. After the weatherstrip is free from the body, with an aid of a helper, carefully remove the windshield from the body opening, and place it on a protected bench or table.

Inspection

1. Check the weatherstrip for any irregularities.
   If defective, replace it.

2. Clean off the old adhesive cement around the windshield opening, and check the body opening flange for any irregularities.

Installation

1. Clean off the old adhesive cement in the glass cavity of the weatherstrip, and install the weatherstrip onto the glass.

2. Insert a strong cord into the body cavity of the weatherstrip completely around the windshield.

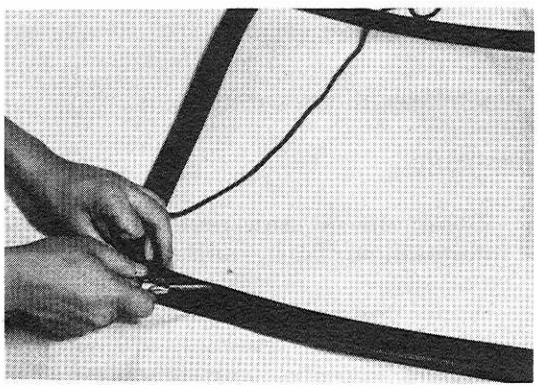


Fig.10-21 Cord Installation W6837

3. The cord should overlap at the center portion of the glass.

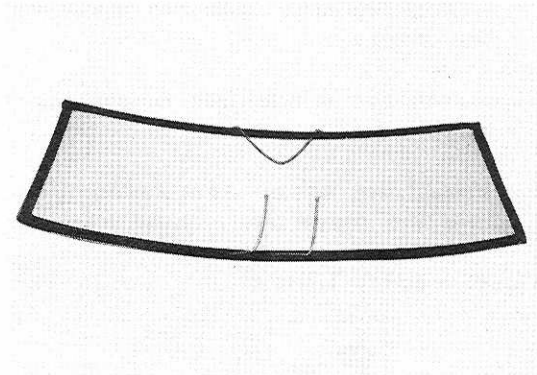


Fig.10-22 Cord Installation B1203

4. With the aid of the helper, position the glass onto the body carefully, and place the cord ends inside the body.
   To facilitate the procedure, apply water and soap lightly onto the body and the weatherstrip.

5. When the glass is properly positioned within the body opening, slowly pull the ends of the cord at right angle, starting at the bottom center portion of the glass to seat the lip of the weatherstrip over the body. At this time, the helper should tap the outside of the glass lightly with a hand in accordance with the movement of the cord when pulled.

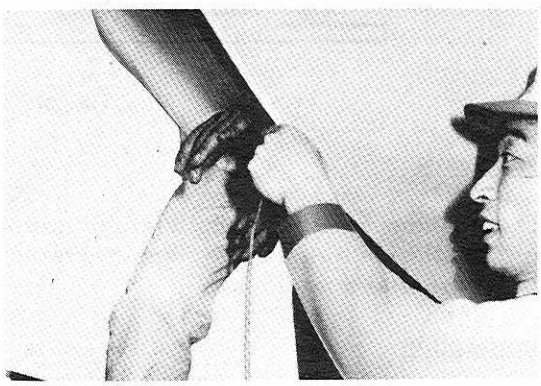


Fig.10-23 Glass Installation B1204

6. Apply the adhesive cement between the weatherstrip and the body, and also between the weatherstrip and

the glass. To facilitate cleaning, after applying the cement, attach a suitable tape onto the glass and the body.

7. Install the windshield moulding, if supplied.

8. Install the wiper arm assemblies, and the inner rear view mirror.

WEATHERSTRIP

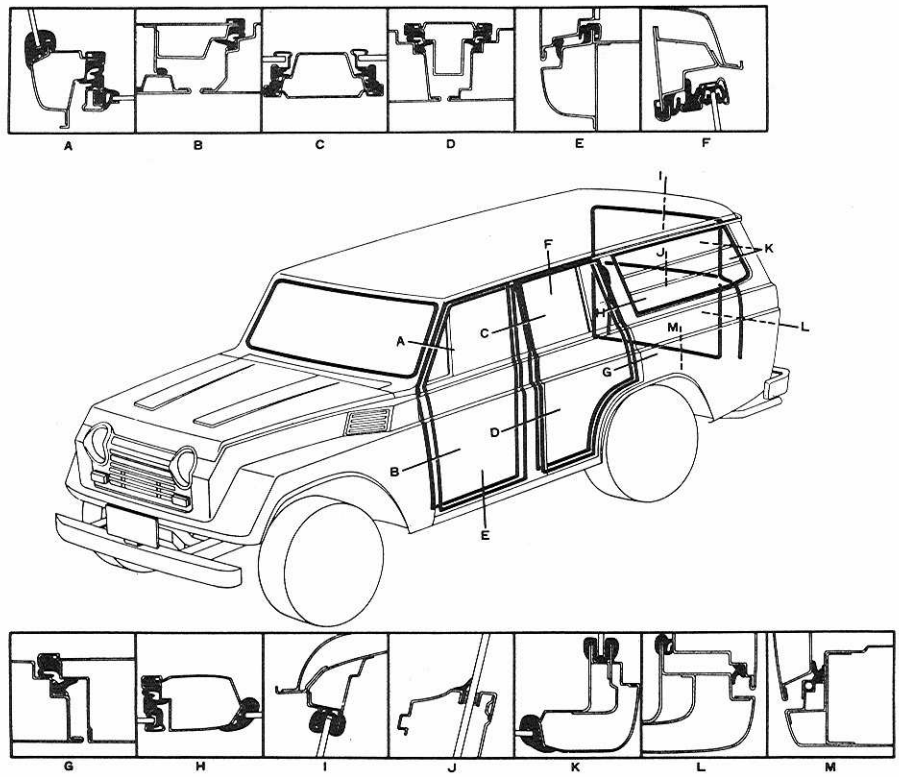


Fig.10-24 Weatherstrip Y5 742

Removal

Detach the weatherstrip without damaging the rubber if the weatherstrip is to be used again.

Inspection

1. Inspect the weatherstrip for leak by shower test. If leaky, repair it.

2. Inspect the weatherstrip for wrinkle, detaching, deformation and damage. If necessary, repair or replace the weatherstrip.

Installation

1. Clean off oil and dirt from the cemented surface, and dry it.

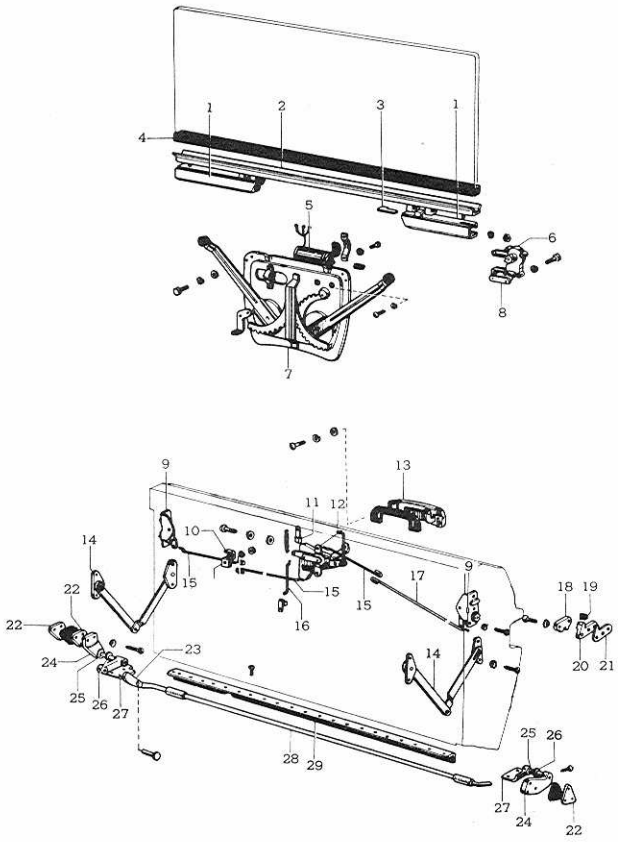
2. Apply the adhesive cement onto the surface to be cemented and weatherstrip evenly, and dry them.

3. Install the weatherstrip with a finger pressure applied onto it.

SIDE WINDOW GLASS

To remove and install the glass and the weatherstrip, refer to the "Front Windshield Glass".

TAIL GATE



1. Roller guide
2. Tail gate glass holder
3. Stopper plate
4. Tail gate glass packing
5. Regulator motor
6. Regulator gear box
7. Power regulator body
8. Gear box retainer
9. Gate lock
10. Connecting plate
11. Lock snap
12. Tail gate remote control
13. Tail gate handle
14. Tail gate support stay
15. Connecting wire No.1
16. Connecting wire No.3
17. Connecting wire No.2
18. Striker gear
19. Striker cushion
20. Striker
21. Striker plate
22. Hinge seat
23. Connecting plate
24. Pillar side hinge
25. Hinge shaft
26. Hinge bushing
27. Pillar side hinge
28. Torsion bar
29. Torsion bar cover

Fig.10-25 Tail Gate Lock & Regulator B3127

Description

The tail gate window glass is opened or closed by means of a power window regulator. In addition to this, a torsion bar is used at the tail gate hinge to provide a free opening or closing of the tail gate. The tail gate weatherstrips are installed on both the body side and the gate side.

Tail Gate Regulator

The tail gate regulator consists of a regulator assembly which includes a regulator motor, remote control switch, tail gate control switch, safety switch and the wiring circuit breaker. The tail gate window glass can be raised or lowered by pushing the tail gate remote control switch up or down respectively.
Letting a finger off the switch will open the switch contact points and the window glass will come to a stop. Inserting a key into the tail gate control switch, and turning it counterclockwise or clockwise will raise or lower the glass. The tail gate safety switch is to open or close the electrical circuit by opening or closing the tail gate. Should the remote control switch or tail gate control switch be ever actuated with the tail gate open, the safety switch will open the circuit not to operate the window glass. If any abnormal condition occurs while raising or lowering the glass, the circuit is opened by means of a bimetal in the wiring circuit breaker to prevent the flow of excessive current to the regulator motor.

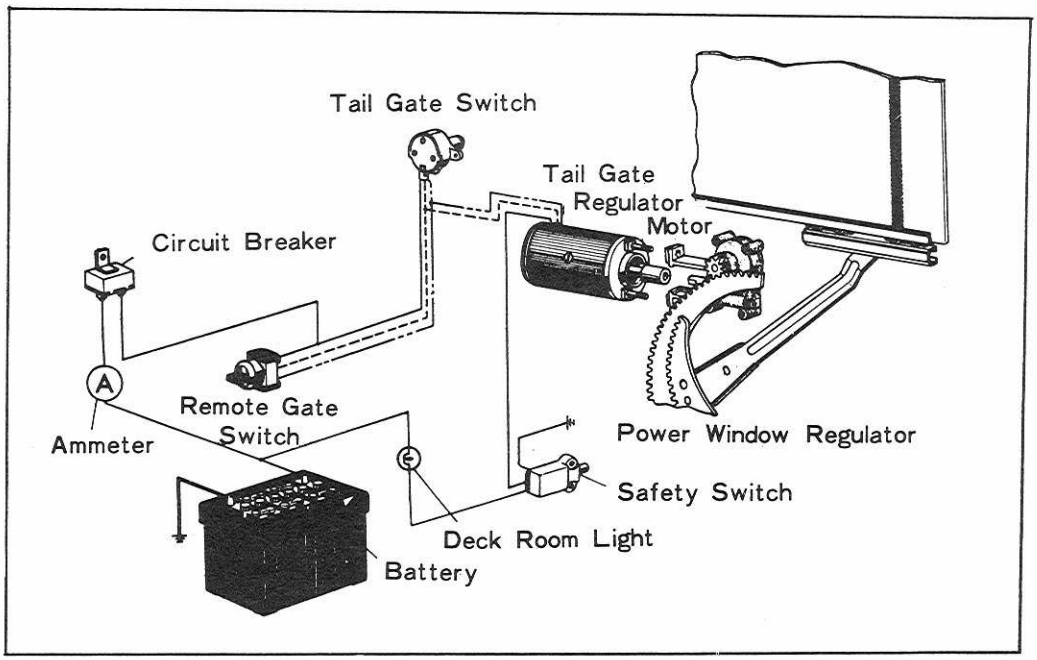


Fig.10-26 Tail Gate Regulator Wiring Diagram X1295

Tail Gate Power Regulator Body Assembly

The regulator body assembly consists of the base plate, regulator motor, gear box, driven gear I, driven gear II, arm and a balance spring. Power path is made from the motor to gear box through the coupling and further down to the driven gear I and II, then two arms are thereby operated up or down to raise or lower the glass.

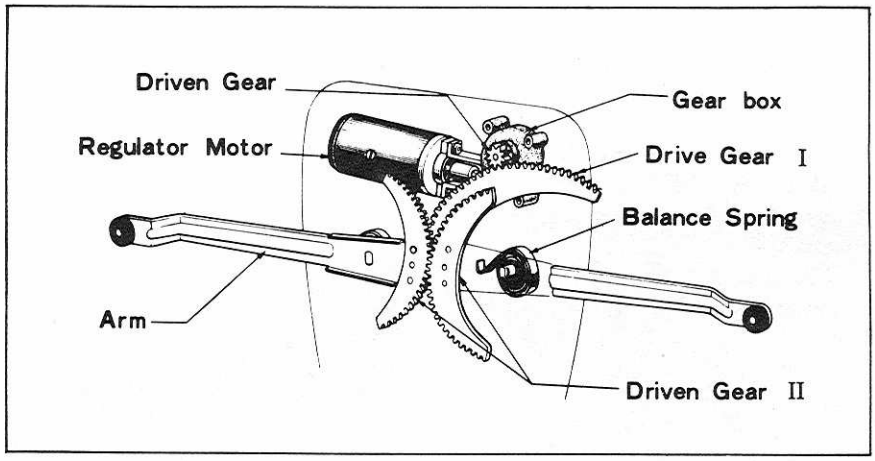


Fig.10-27 Tail Gate Regulator Body Assembly X1296

Trouble Shooting

Symptoms & Probable Causes	Remedies
Regulator Motor Does Not Turn	
1. Poor contact between motor brush and commutator	Repair commutator and holder
2. Worn brushes	Replace brushes
3. Shorted or grounded armature coil	Repair or replace motor
4. Grounded or open circuit in field coil	Repair or replace motor
5. Poor safety switch contact	Replace or adjust gate
6. Poor tail gate control switch contact	Replace
7. Poor contact of circuit breaker points	Replace
8. Broken wiring in wire harness or open circuit between motor grounded terminal and safety switch	Repair or replace wire harness
9. Broken wiring or grounded wire harness or open circuit grounded between motor field terminal and gate control switch or remote control switch	Repair or replace wire harness
10. Open circuit or grounded between circuit breaker and gate control switch or remote control switch	Repair or replace wire harness
11. Open circuit or grounded between battery and circuit breaker	Repair or replace wire harness

Glass Will Not Lower and
and Tail Gate Cannot Be Opened

1. Remove the tail gate inside panel and the service hole cover.

2. Push down the lock off the lever to position it to the OFF position.

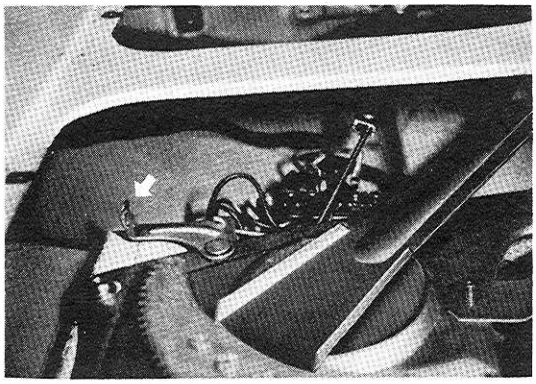


Fig.10-28 Lock OFF Lever B1209

3. Remove the stopper plate, and remove the roller guide. Refer to Fig.10-33.

4. Push and bend the regulator arm rearward, and lower the glass gradually.

5. Open the tail gate.

6. Check and repair each of the components.

Glass Lowers, but
Tail Gate Cannot Be Opened

1. Remove the tail gate inside panel and the service hole cover.

2. Remove the stopper plate, and remove the roller guide.

3. Raise the glass, and check the lock mechanism.

4. Lower the glass, and open the tail gate.

5. Disconnect the battery cable, and disconnect the remote control wire and junction block wiring.

6. Remove the regulator, and check each of the components.

Removal

1. Remove the hinge attaching screws on the tail gate side.

2. Remove the support stay attaching screws from the tail gate.

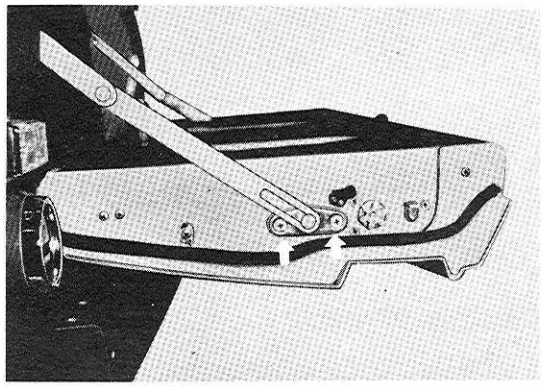


Fig.10-29 Removing Support Stay B1205

3. Remove the torsion bar attaching screws.

4. Disconnect the wiring, and remove the tail gate assembly.

5. Remove the torsion bar cover, and remove the torsion bar.

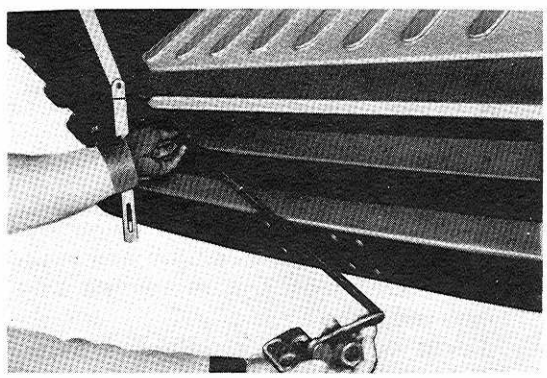


Fig.10-30 Removing Torsion Bar B1206

6. Remove the hinge attaching screws on the pillar side, and remove the hinge.

Installation

Follow the removal procedures in the reverse order.
To adjust the tail gate for up-and-down, side-to-side positions, loosen the hinge attaching screws on the pillar side.
To adjust the tail gate for to-and-fro and side-to-side positions, loosen the hinge attaching screws at the tail gate side.

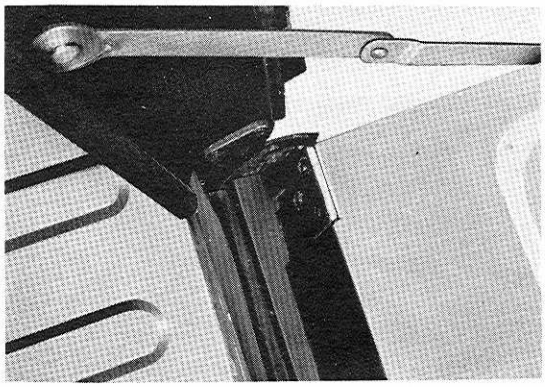


Fig.10-31 Tail Gate Adjustment B1207

TAIL GATE GLASS & REGULATOR

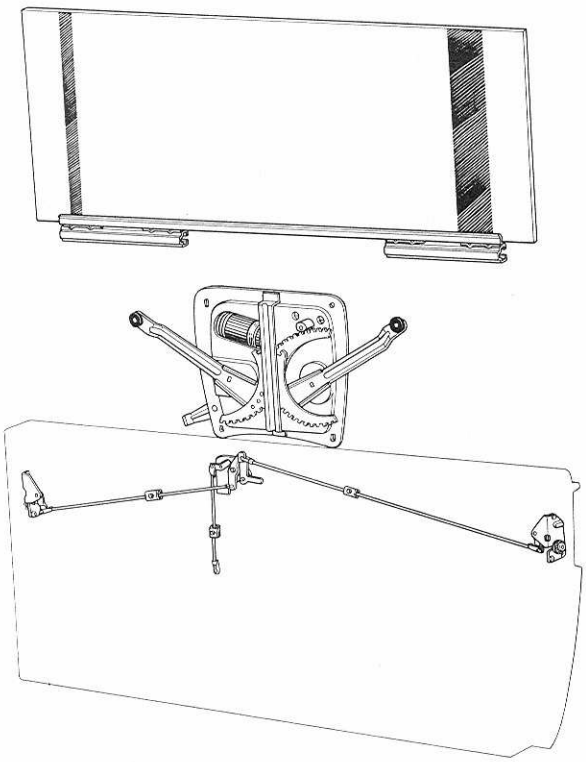


Fig.10-32 Tail Gate Y5747

Removal

1. Remove the inside panel and the service hole cover.
2. Raise the tail gate window glass half-way, and remove the stopper plate connecting the roller guide with the glass holder.
3. Remove the roller guide from the glass holder, and lower the glass completely.
4. Remove the inner and outer weatherstrips.
5. Remove the glass.
6. Disconnect the battery terminal or remove the fuse to insure safety on removal.

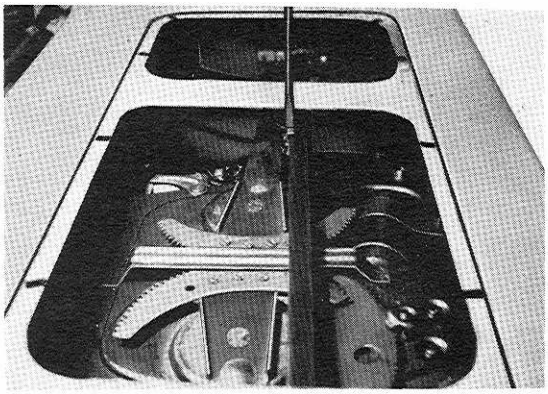


Fig.10-33 Removing Stopper Plate B1208

7. Disconnect the junction block wiring.

8. Disconnect the lock off lever connecting wire.

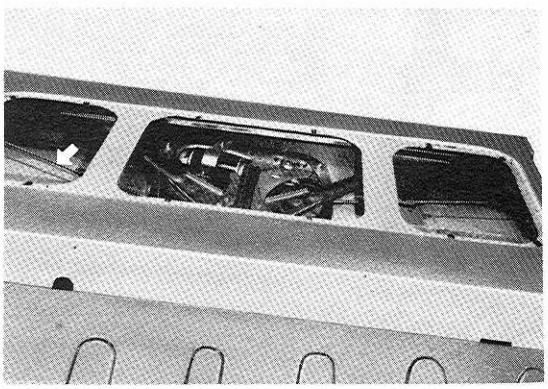


Fig.10-34 Disconnecting Connecting Wire B1279

9. Remove the regulator assembly.

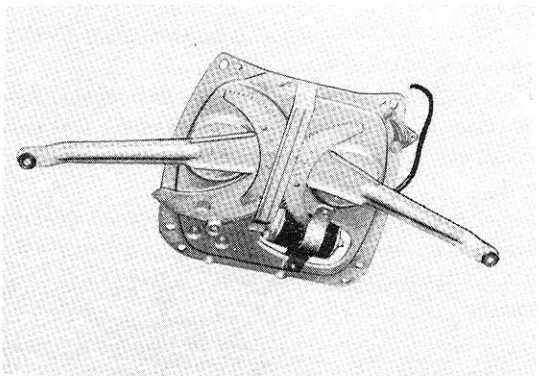


Fig.10-35 Removing Regulator Assembly B1210

Installation

Follow the removal procedures in the reverse order.
The regulator must be installed parallel to the gate.

TAIL GATE REGULATOR MOTOR

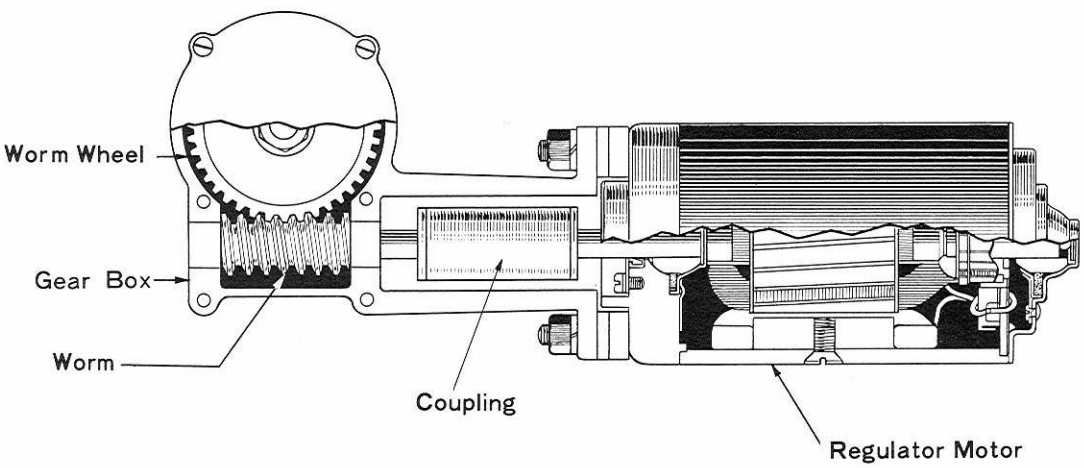


Fig.10-36 Regulator Motor Y0006

Removal

1. Remove the regulator.
2. Remove the motor attaching screws and nuts, and remove the motor.

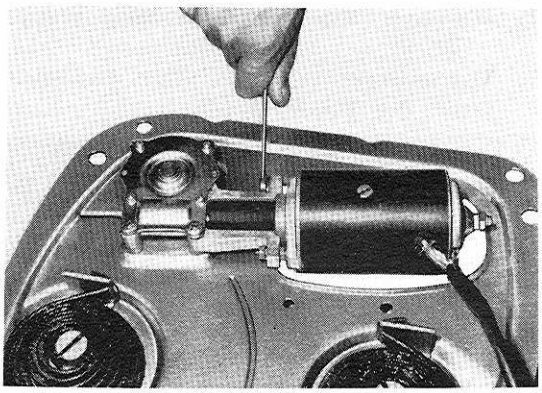


Fig.10-37 Removing Motor B1211

Disassembly

1. Loosen the nuts, and remove the through bolts.
2. Remove the bearing holder, thrust washer, armature, end frame and the ball.
3. If necessary, remove the brush by melting the solder.

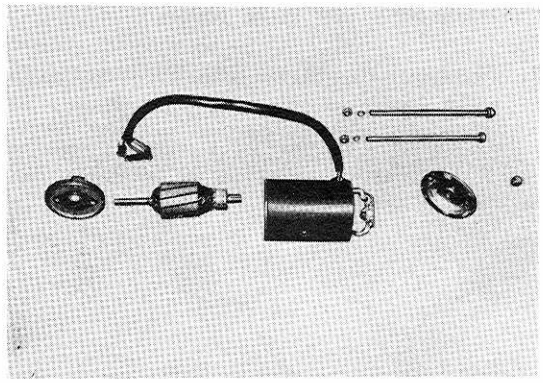


Fig.10-38 Motor Disassembly B1212

Assembly & Installation

Reverse the above-mentioned procedures. Adjust the armature thrust gap to 0.05 ~ 0.20" (0.002 ~ 0.008") by inserting two to four thrust washers.

TAIL GATE LOCK

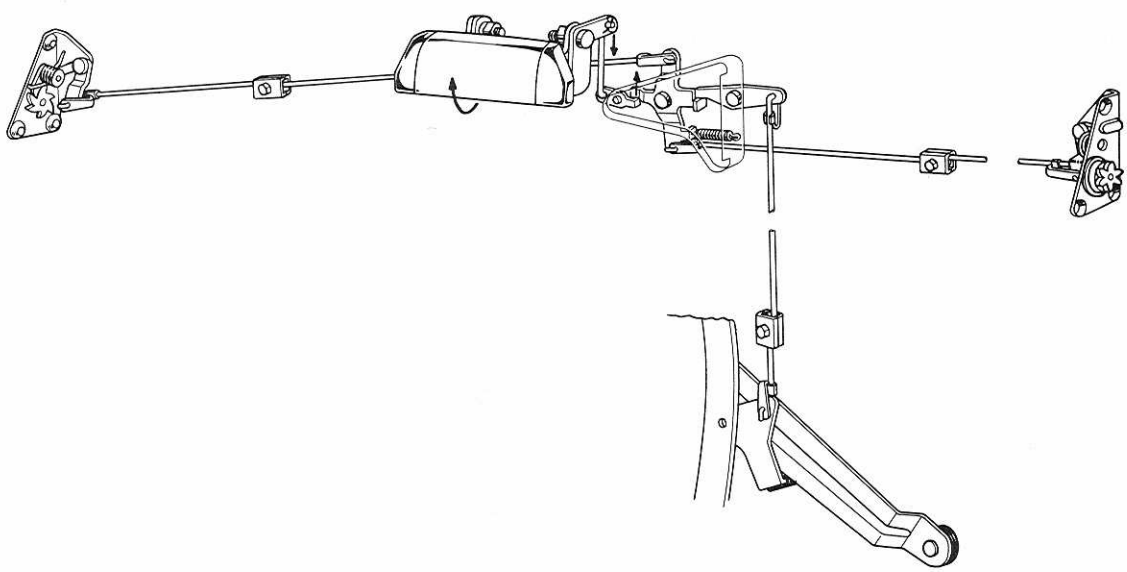


Fig.10-39 Tail Gate Lock Y5748

Removal

1. Remove the tail gate regulator.
2. Disconnect the remote control link from the tail gate lock.
3. Remove the three attaching screws, and remove the tail gate lock.

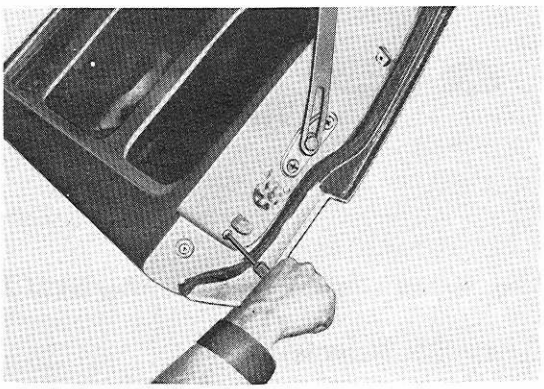


Fig.10-40 Removing Tail Gate Lock B1214

4. To remove the tail gate handle, remove the two attaching screws and the two bolts supporting the tail gate handle onto the handle seat, and disconnect the remote control wire from the handle.

Installation

Follow the removal procedures in the reverse order.
Apply grease onto the operating portion of the tail gate lock.

Adjustment

1. Inspect the lock off lever for operation. If improper, adjust it by changing the length of the connecting wire.
2. Adjust the tail gate for proper locking by loosening the striker plate attaching screws.

TAIL GATE SWITCH

Removal

1. Remove the tail gate regulator.
2. Remove the two attaching bolts.
3. Disconnect the wiring harness from the junction block.

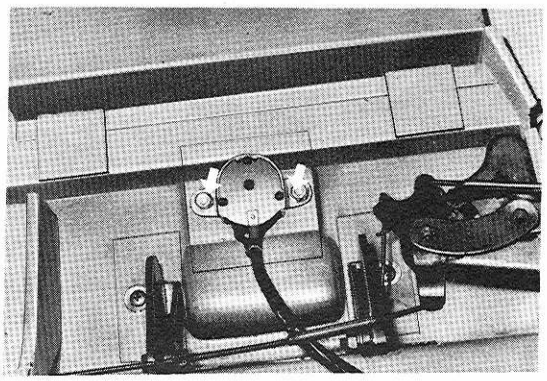


Fig.10-41 Removing Switch B1213

Installation

Follow the removal procedures in the reverse order.

BACK DOOR (SWING GATE)

Inspection & Adjustment

1. If some play is present in the axial direction of the door hinge, tighten the hinge attaching bolts.
   If a little play is still present after tightening the bolts, replace both the bushing and the pin.

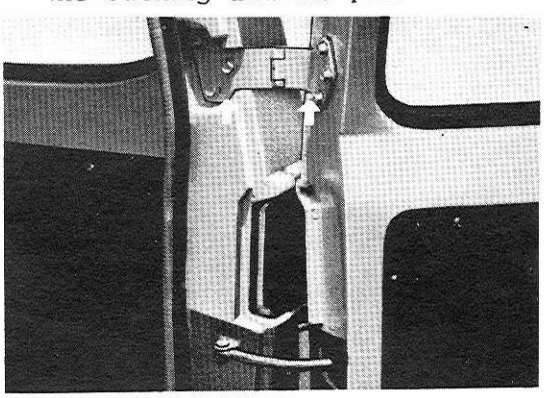


Fig.10-42 Door Adjustment B1215

2. To adjust the door for up-and-down, to-and-fro, and side-to-side positions, loosen the hinge attaching bolts.

3. Adjust the door for closing by moving the striker as required.

4. To disassemble the hinge, drive out the pin towards the serration using a blunt punch.

Removal

1. Remove the door open stopper on the pillar side.

2. Remove the hinge attaching bolts on the door side, and remove the door.

3. Remove the hinge attaching bolts on the body side, and remove the the hinge.

Installation

Follow the removal procedures in the reverse order.
Before tightening the hinge attaching bolts, ensure that the door is correctly aligned.

BACK DOOR LOCK (RH)

Removal

1. Remove the back door inner hole cover.

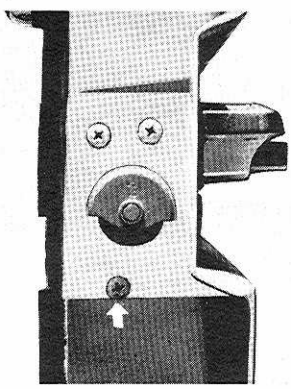


Fig.10-43 Removing Attaching Screws B1216

2. Disconnect the lock cylinder and the inside handle remote control link from the door lock.

3. Remove the three attaching screws, and remove the door lock.

4. To remove the lock cylinder, remove the clamp.

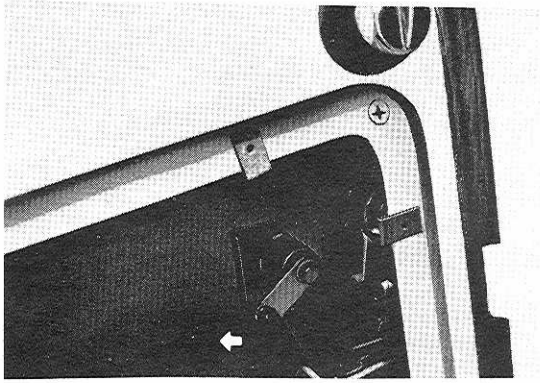


Fig.10-44 Removing Clamp B1217

5. To remove the outside handle, remove the two attaching nuts.

Installation

Follow the removal procedures in the reverse order.

BACK DOOR LOCK (LH)

Removal

1. Remove the inside handle and the back door inner hole cover.

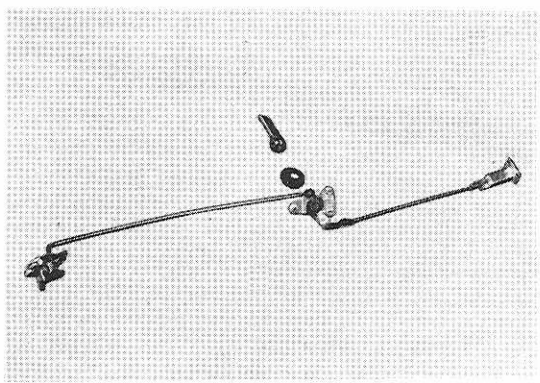


Fig.10-45 Removing Lock B1218

2. Remove each of the attaching screws at the upper side, bottom side, and the inside handle portion of the door, and remove the door lock assembly.

Installation

Follow the removal procedures in the reverse order.

BACK DOOR GLASS

To replace, refer to the Side Glass.

ROOF HEADLINING

Removal

1. Place protective coverings over the seat cushions and the backs.

2. Prior to removing the headlining, remove the following parts if installed.

   a. Sun visor and assist grip.
   b. Inner rear view mirror. To remove, remove one sun visor hanger attaching screw, and pull the hanger upwards. Remove the three attaching screws, and remove the inner rear view mirror. Never remove the screw shown in figure 10-45 as it will damage easily.

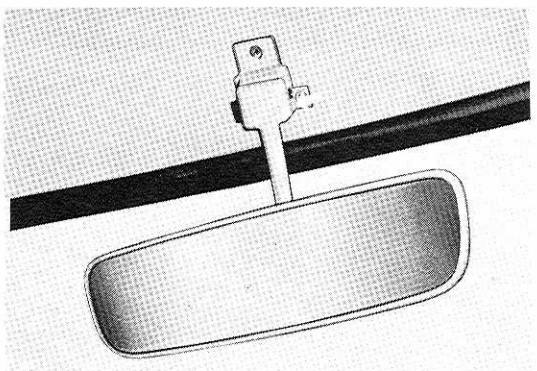


Fig.10-46 Inner Rear View Mirror B1219

   c. Front windshield glass and the side window glass.
   d. Room light.
   e. Seat belt anchor.
   f. Door opening trim and weatherstrips, where necessary.
   g. Center pillar garnish panel, where necessary.
   h. Headlining retaining clips.
   i. Headlining front garnishes and rear garnishes.
   j. Plates securing the headlining on the instrument panel side.

3. Carefully detach the cemented edge of the headlining.

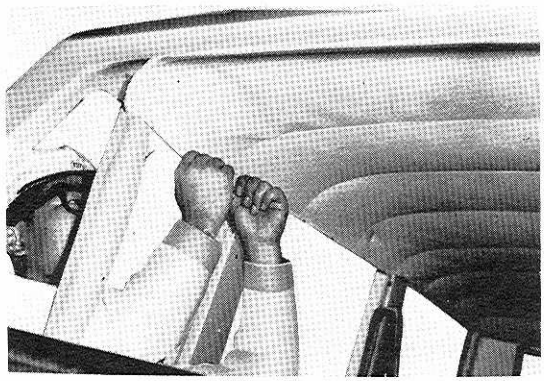


Fig.10-47 Detaching Cemented Edge B1220

4. Starting at the front of the body, carefully disengage the headlining supports from the side roof inner rails.

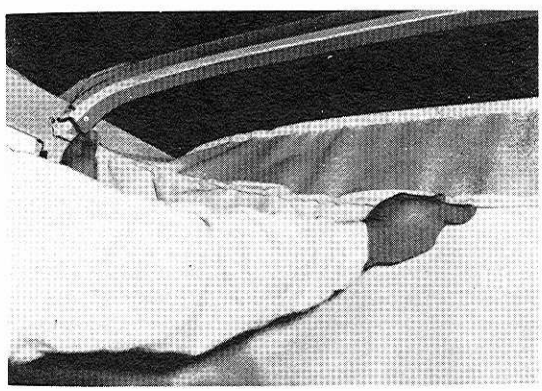


Fig.10-48 Disengaging Support B1221

5. Remove the headlining supports from the headlining.

Installation

1. If previously removed, install the headlining supports onto the new headlining.

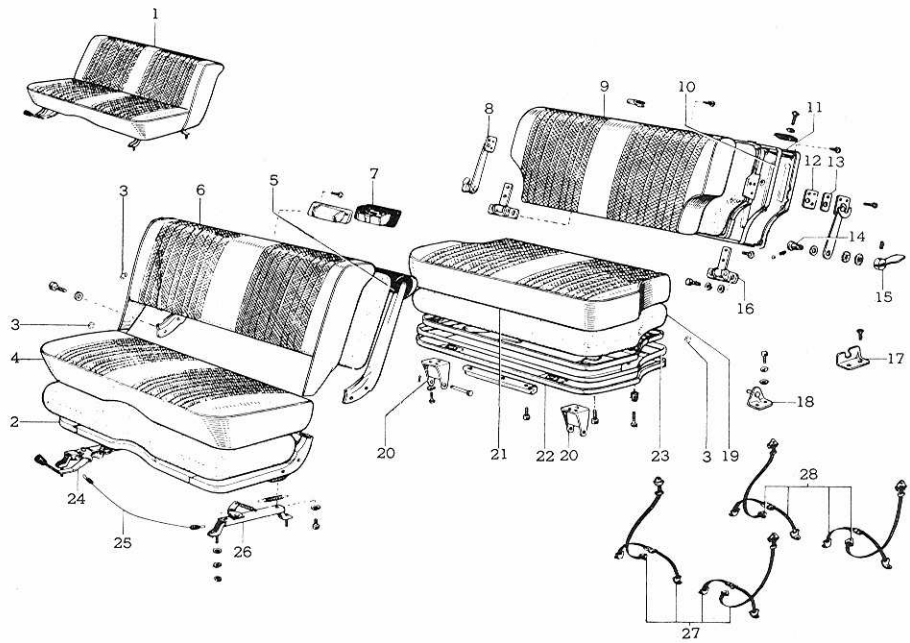
2. Apply approved adhesive cement onto the headlining attaching surface onto the windshield, side roof rail and back door opening.

3. Lift the headlining assembly in the body, and stretch the headlining evenly to both left and right side.

4. Follow the removal procedures in the reverse order, and install the other parts.

5. Check the headlining for wrinkles. If any wrinkle is present, warm the wrinkle/s with an infra-red light or a similar equipment for 0.5 to 1.0 minute.

FRONT SEAT & REAR SEAT



1. Front seat
2. Front seat cushion
3. Fog large ring
4. Front seat cushion cover
5. Front seat back
6. Front seat back cover
7. Ash receptacle
8. Rear seat back holder
9. Rear seat back cover
10. Ornament
11. Rear seat back panel
12. Rear seat back stopper plate
13. Rear seat back stopper plate
14. Rear seat back stopper lock pin
15. Rear seat back stopper handle
16. Rear seat back hinge
17. Rear seat back stopper bracket
18. Rear seat back front stop
19. Rear seat cushion
20. Rear seat cushion female hinge
21. Rear seat cushion cover
22. Rear seat cushion panel
23. Rear seat cushion panel ornament
24. Seat track
25. Seat track equalizing wire
26. Seat track
27. Seat belt

Fig.10-49 Front Seat & Rear Seat B3139

Front Seat

Removal & Installation

Remove the attaching bolts, and with the aid of a helper, remove the seat assembly from the body.

To install the seat assembly, reverse the removal procedures.

Seat Track Removal & Installation

To remove the seat track, remove the seat assembly, disconnect the adjusting lever control wire, and remove the two attaching bolts.

To install, reverse the removal procedures.

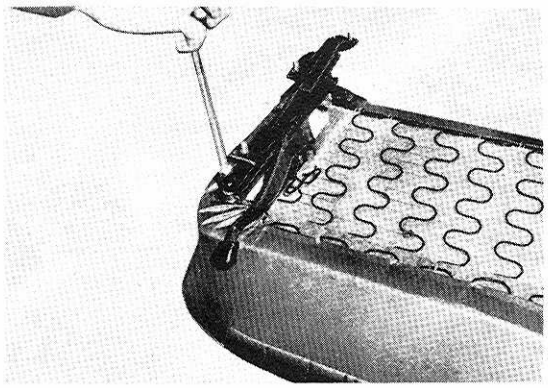


Fig.10-50 Removing Seat Track B1222

Seat Cushion Cover & Back Cover Replacement

To remove:

1. To remove the bolts securing the seat cushion onto the seat back, remove the retaining clips, and detach the cover, where necessary.

2. Remove the attaching bolts, and separate the seat cushion from the seat back.

3. Remove the ash tray. Remove the retaining clips, and detach the covers for both the seat cushion and the seat back.

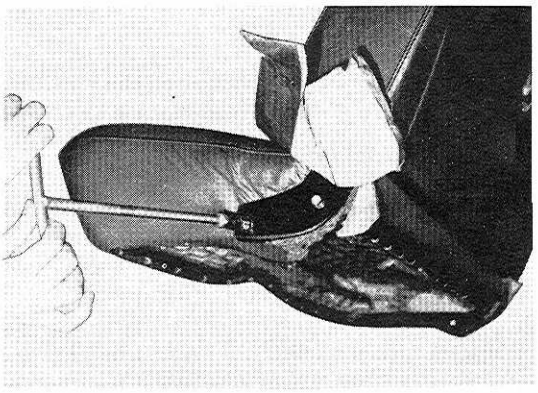


Fig.10-51 Removing Attaching Bolt B1223

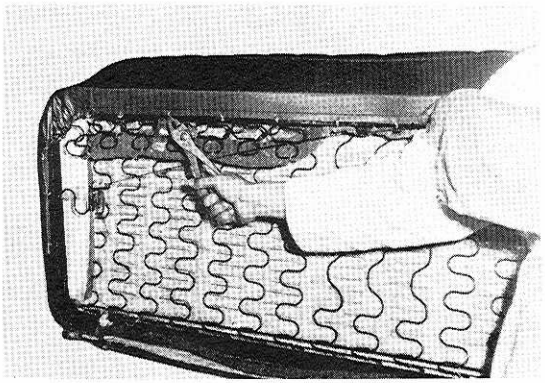


Fig.10-52 Removing Clip B1224

To install, reverse the removal procedures.

Rear Seat

Cushion Cover Removal & Installation

1. Remove the cotter pin, and remove the hinge pin.

2. With the aid of the helper, remove the seat cushion.

3. Remove the rear seat female hinge.

4. Remove the frame, and bend the cover clamp, and remove the cover

5. To install, reverse the removal procedures.

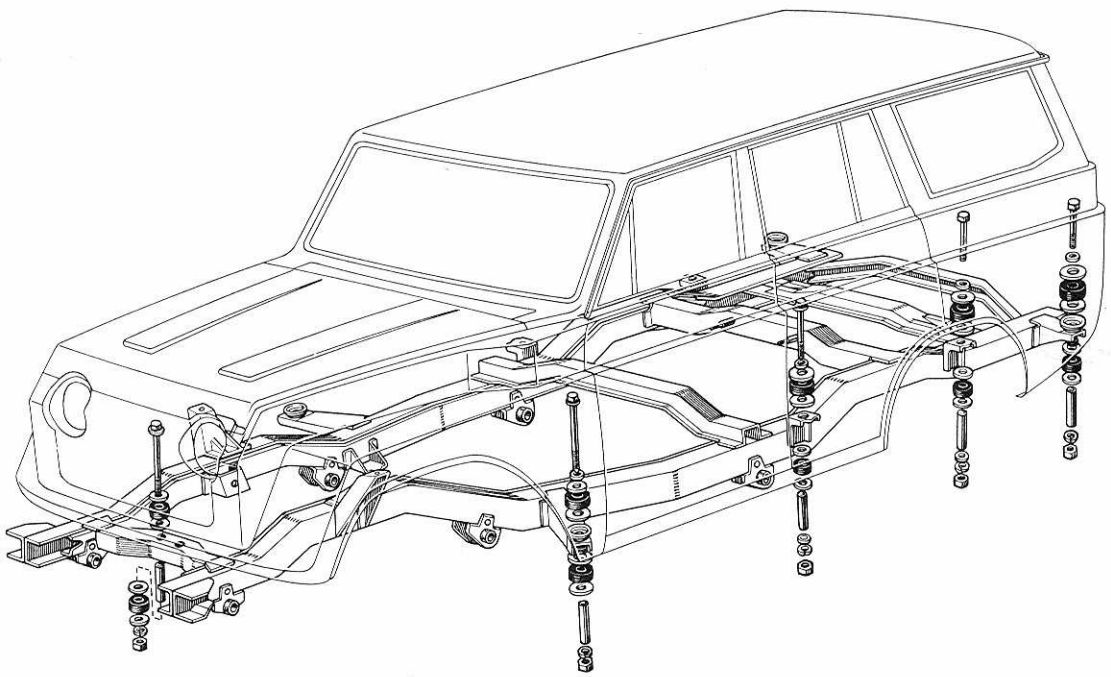
Back Cover Removal & Installation

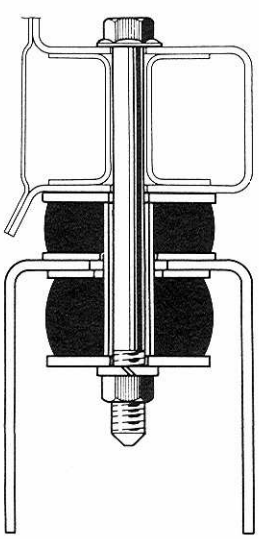
Refer to Cushion Cover Removal and Installation.

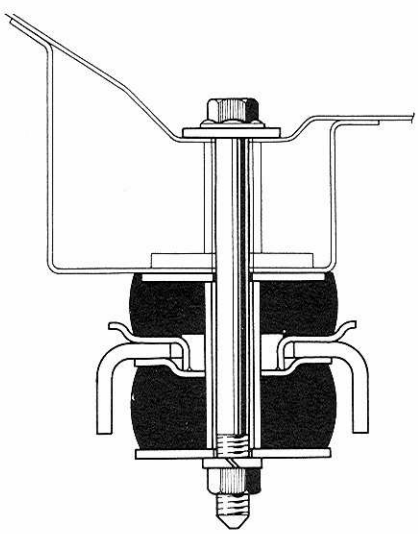
REAR BUMPER

To remove the rear bumper, remove the attaching nuts.

BODY MOUNTING







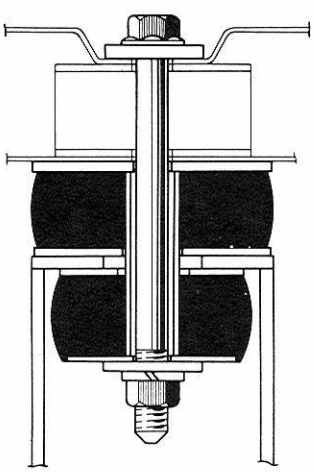
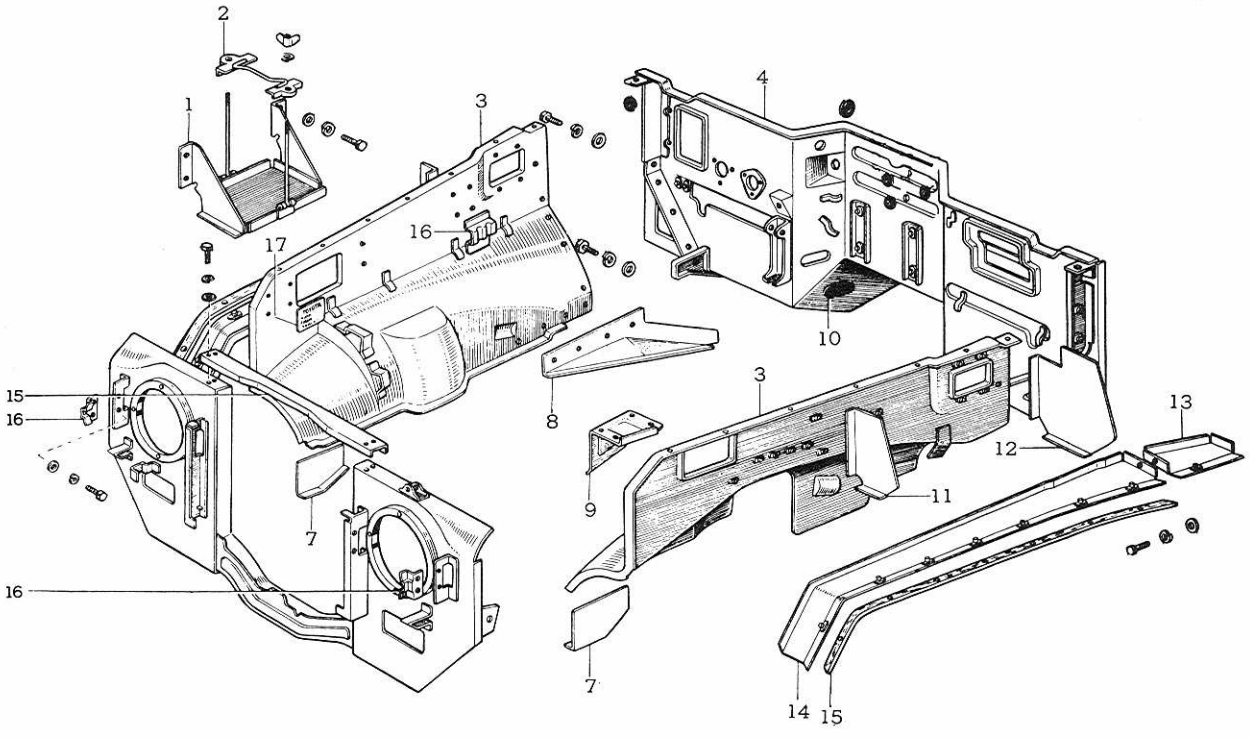


Fig.10-53 Body Mounting G1330 G1331 G1332

FRONT FENDER APRON & DASH PANEL



1. Battery set bracket
2. Battery set plate
3. Front fender apron
4. Dash panel
5. Radiator upper baffle
6. Headlight door support
7. Front fender apron front plate
8. Front fender apron splash plate
9. Brake booster bracket
10. Hole plug
11. Air duct separate
12. Air guide plate
13. Cowl side inner plate
14. Front fender apron inner plate
15. Front fender apron trim packing
16. Battery set bracket retainer
17. Patent bracket

Fig.10-54 Front Fender Apron & Dash Panel B3122

When a clash or turn-over has occurred by an accident, the fender apron and the dash panel may be bent or twisted. In this case, inspect, straighten and correct the damaged portions.

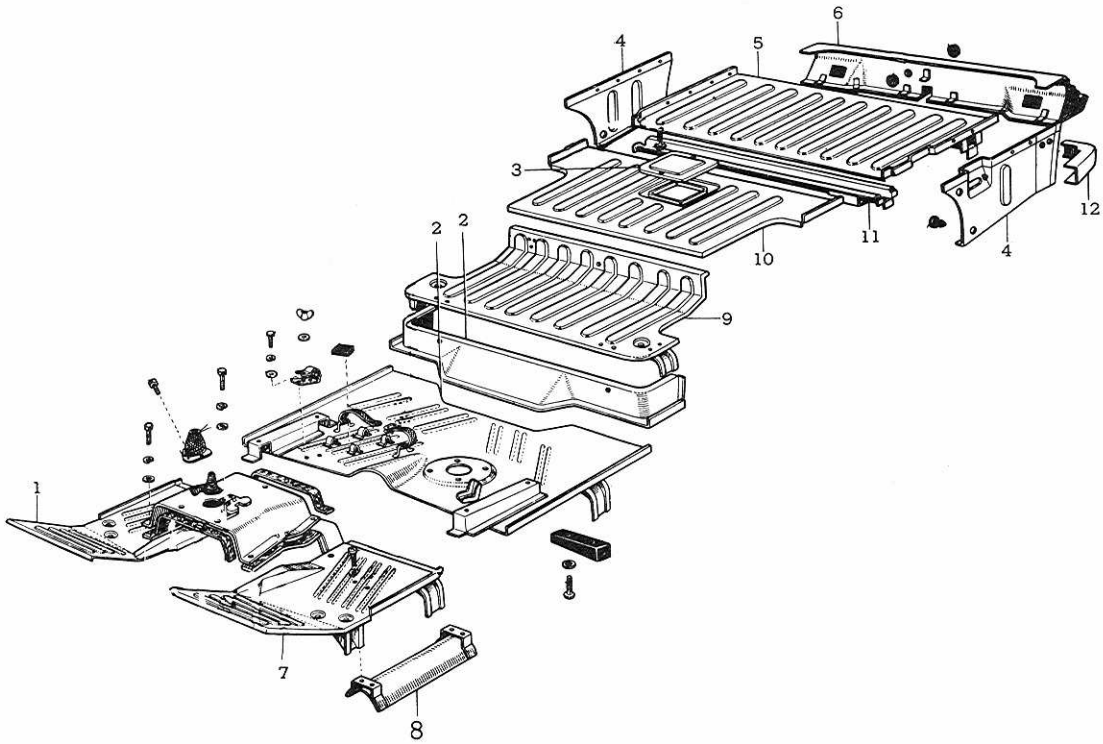
Repair or Crack

1. Cracking occurred in the member or bracket may be repaired by arc-welding. If the metal is of thick material, grind the cracked portion with a portable grinder in a V-shape to reinforce the crack.

2. Portions with lighter metal must be repaired by gas-welding, and if the finished surface requires painting, thoroughly clean the welded area.

3. After welding, remove the scaling and paint the welded portion with chassis paint to prevent rusting or match the paint color with the other area.

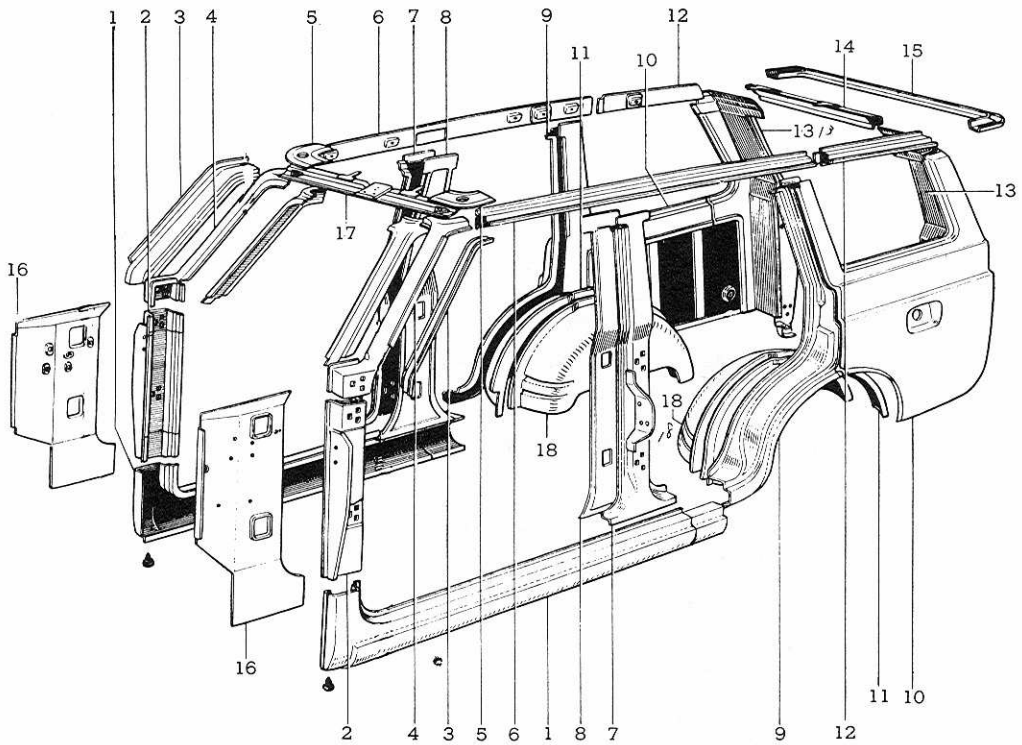
FLOOR PAN & TRANSMISSION COVER



1. Front floor
2. Center floor panel
3. Fuel tank inspection hole cover
4. Rear floor side panel
5. Rear floor rear panel
6. Rear lower pillar
7. Transmission cover
8. Insulator exhaust pipe plate
9. Rear floor front panel
10. Rear floor center panel
11. Rear floor rear cross-member
12. Rear floor side rear panel.

Fig.10-55 Floor Pan & Transmission Cover B3123

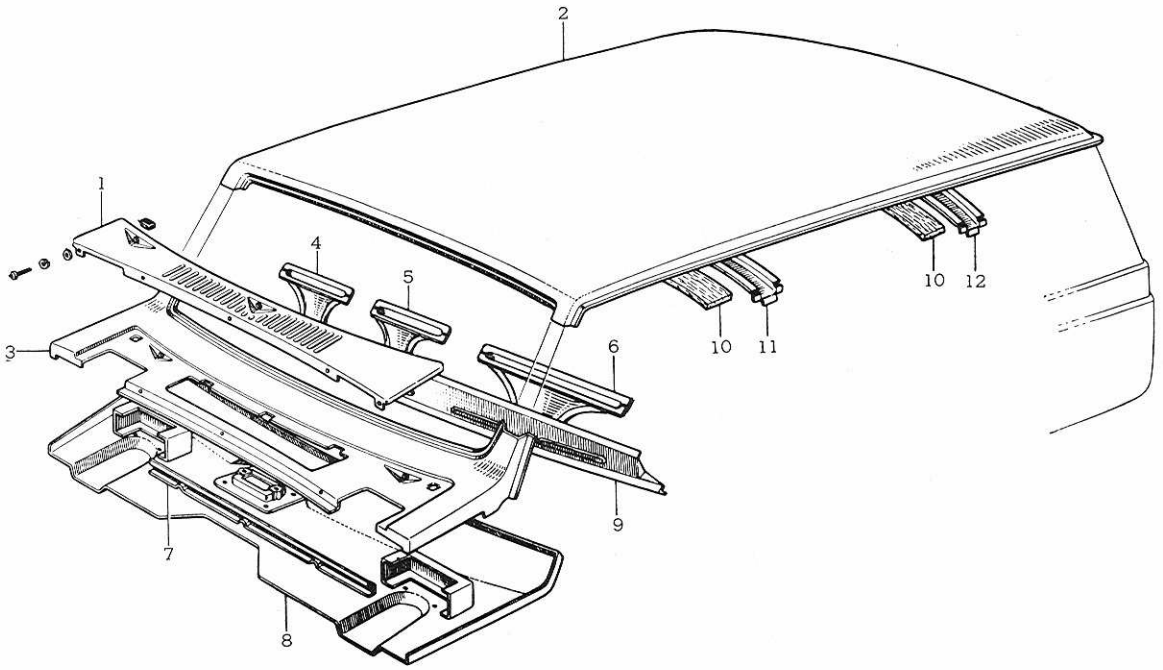
SIDE MEMBER



1. Rocker panel
2. Front body outer pillar
3. Front window rain pillar
4. Front window outer pillar
5. Front window upper corner plate
6. Roof side front frame
7. Center body outer pillar
8. Center body pillar inner panel
9. Second pillar
10. Rear side panel
11. Rear tire outer apron
12. Roof side rear frame
13. Rear pillar
14. Rear upper reinforcement
15. Back gutter
16. Cowl side panel
17. Front window center panel
18. Rear tire inner apron

Fig.10-56 Side Member B3124

ROOF PANEL & COWL PANEL



1. Cowl upper louver panel
2. Roof panel
3. Cowl upper panel
4. Defroster nozzle
5. Defroster nozzle
6. Assist defroster nozzle
7. Cowl upper front panel
8. Cowl inner panel
9. Cowl upper rear panel
10. Reinforcement silencer
11. Roof panel reinforcement No.1
12. Roof panel reinforcement No.2

Fig.10-57 Roof Panel & Cowl Panel B3125

BODY (HARD TOP)
HOOD

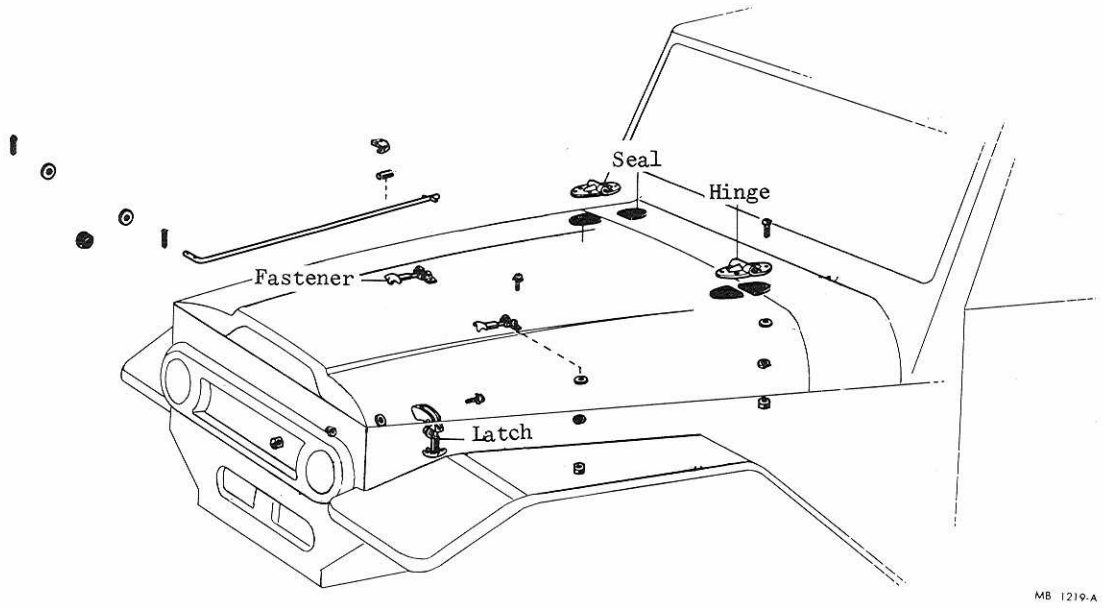


Fig.10-58 Hood Component Parts

Removal

1. Open the hood, and remove the hood attaching bolts, then remove the hood.

2. Remove the hinge attaching bolts, and remove the hinge.

3. Remove the hood lock, release lever, hood lock control cable and the hood lock.

Installation

Follow the removal procedures in the reverse order.

Adjustment

Hood

1. To adjust the to-and-fro position, loosen the hood attaching bolts, and move the hood to fit properly.

2. To adjust the side-to-side position, loosen the hinge attaching bolts, and move the hood to fit properly.

FRONT FENDER, RADIATOR GRILLE

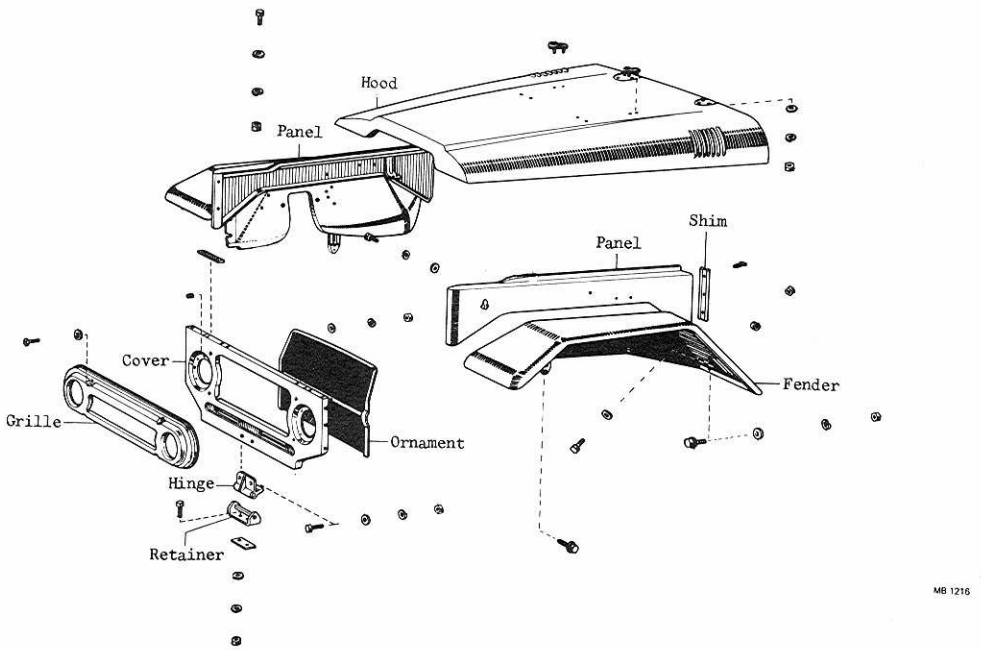
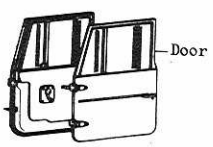


Fig.10-59 Front Fender, Radiator Grill Components

DOOR



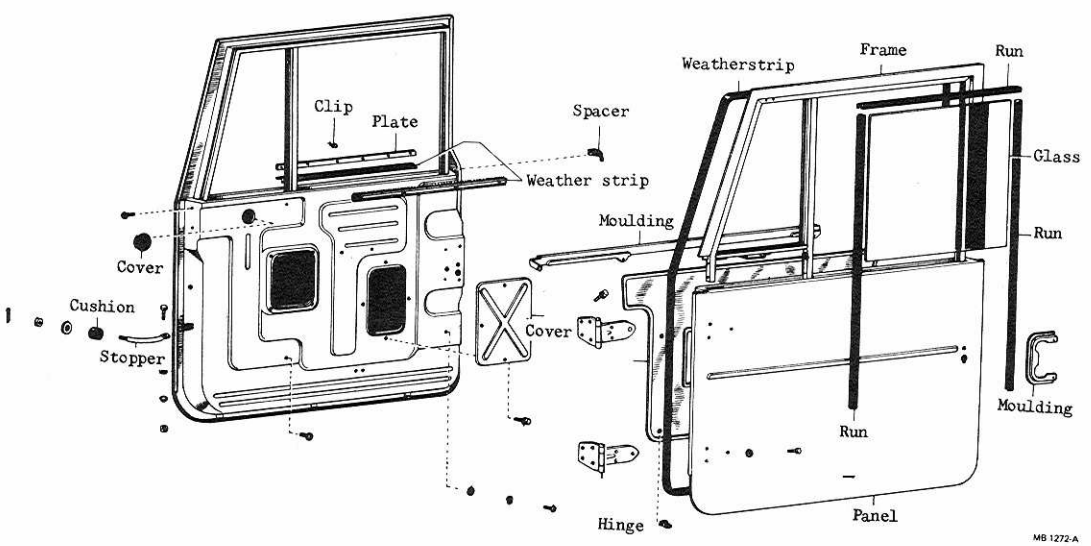


Fig.10-60 Door Components

Inspection & Adjustment

1. If some play is experienced in the axial or vertical direction of the door hinge, tighten the hinge attaching bolts.
   If a little play is still present after tightening the bolts, replace both the bushing and the pin.
2. To adjust the door for side-to-side position, loosen the hinge attaching bolts on the pillar side.
3. To adjust the door for up-and-down, and to-and-fro positions, loosen the hinge attaching bolts on the pillar side.
4. Adjust the door for closing by moving the striker plate as required.

Removal

1. Remove the door hinge attaching bolts on the door side, and remove the door.
   To facilitate the procedure, support the door with a jack.
2. Remove the door hinge attaching bolts on the pillar side, and remove the door hinge.

DOOR WINDOW GLASS AND WINDOW GLASS REGULATOR

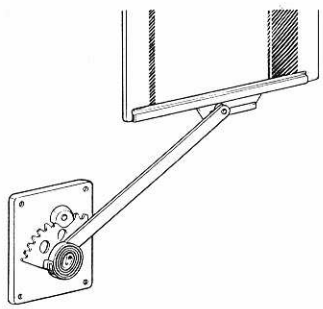


Fig.10-61 Window Glass Regulator X4789

Removal

1. Remove the weatherstrip from the window frame.
2. Remove the door window frame with the window glass out of the door by removing the window frame retaining bolts.
3. Remove the door glass from the door window frame.
4. Remove the door glass channel from the window glass.
5. Remove the door window regulator handle by removing the four attaching screws.
6. Remove the window regulator out of the door.

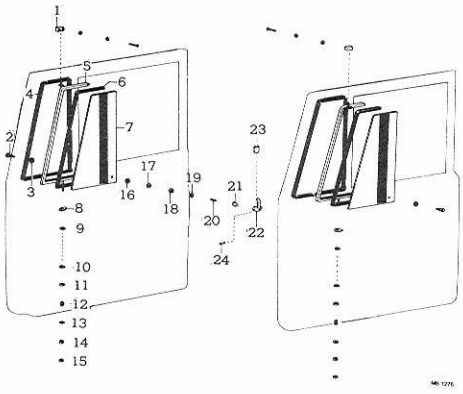
Inspection

1. Inspect the regulator gear and the spring for wear and damage.
2. If necessary, coat grease onto each operating portion.

Installation

1. Position the window regulator into the door, then install the window regulator handle by installing tightening the four screws.
2. Attach the door glass channel insert to the glass and put the glass channel. Then carefully aligning the roller guide on the glass channel to the roller at the end of the regulator bar, install the glass and frame into the door.
3. Install the door frame attaching bolts. Then check the operation of the window regulator.
4. Install the weatherstrip onto the window frame using a weatherstrip cement.

VENTILATOR WINDOW GLASS



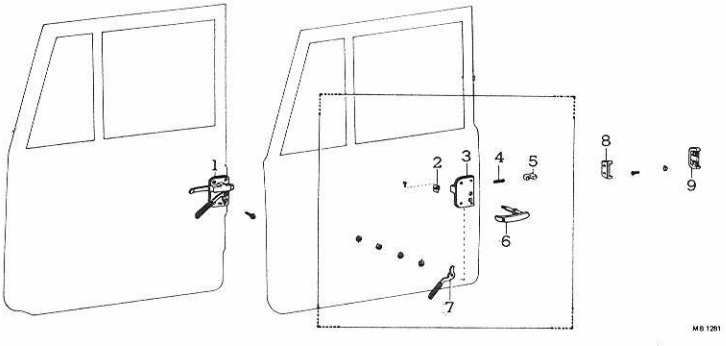
1. Upper pivot
2. Lock handle shaft
3. Grommet
4. Weatherstrip
5. Frame
6. Weatherstrip
7. Glass
8. Stopper
9. Washer
10. Washer
11. Washer
12. Spring
13. Washer
14. Nut
15. Nut
16. Washer
17. Washer
18. Nut
19. Wave washer
20. Spring
21. Lock handle button
22. Lock handle
23. Lock handle plate
24. Lock handle set pin

Fig.10-62 Ventilating Window

REPLACEMENT

To replace the window glass, remove out the ventilating window handle set pin from the ventilating window handle. Loosen and remove the ventilating window lock handle shaft nut, and remove the ventilating window lock handle shaft from the ventilating window glass frame.
Remove the ventilating window glass from the glass frame.
To install the window glass, reverse the above procedures.

DOOR LOCK



1. Door lock handle Assy
2. Door lock key knob
3. Door lock
4. Spring
5. Door lock stopper
6. Door outside handle
7. Door inside handle
8. Door down stopper
9. Door lock striker plate

Fig.10-63 Door Lock

DOOR LOCK REPLACEMENT

1. Remove the nuts and spring lock washer at the front door inside handle. Then, pull out the door outside handle.
2. Remove the door lock base plate by removeing the four attaching screws. The door lock key and its related parts can be easily disassembled.
3. To install, reverse the above procedures.

FRONT WINDSHIELD GLASS

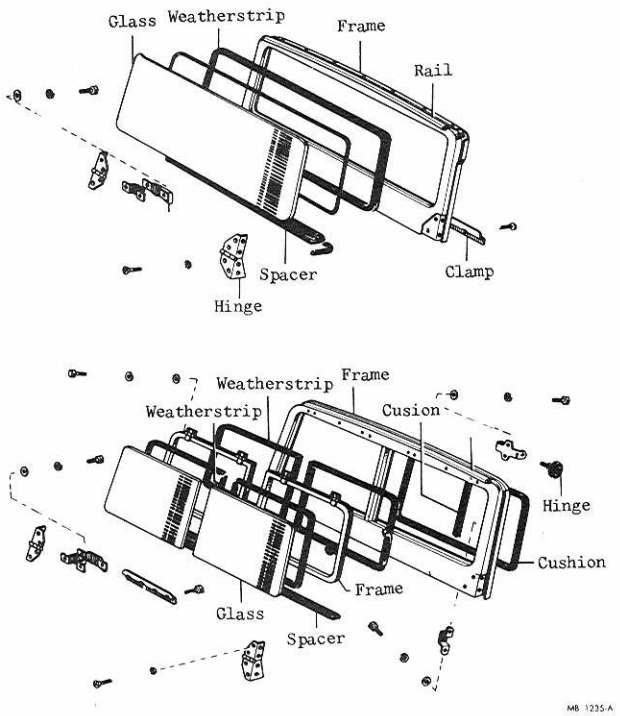


Fig.10-64 Front Windshield Components

Installation

1. Clean out old sealer in glass cavity of windshield channel and around the base of the rubber channel.
2. Install the rubber channel to the glass and insert a strong cord in the rubber channel around the windshield.
3. Position and center the windshield assembly in the windshield opening from the outside.
4. When the glass and channel are properly positioned in the windshield opening, pull the ends of the cord to the inside to seat lip of the rubber over the flange of the windshield cavity.
5. Install the outer weatherstrip using a sutable tool.
6. Using a pressure type applicator, seal the inner and outer lips of the rubber channel to the glass with an approved weatherstrip adhesive.
7. Clean off the excess sealer.

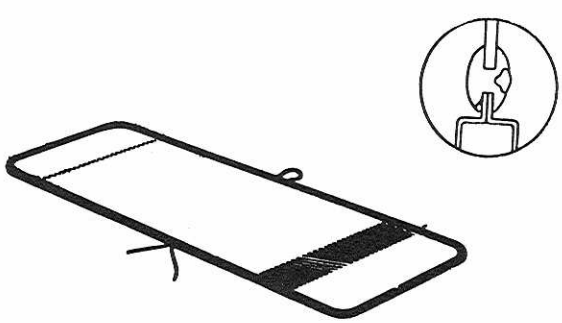


Fig.10-65 Windshield Glass Installation

SIDE WINDOW GLASS & REAR UPPER DOOR GLASS

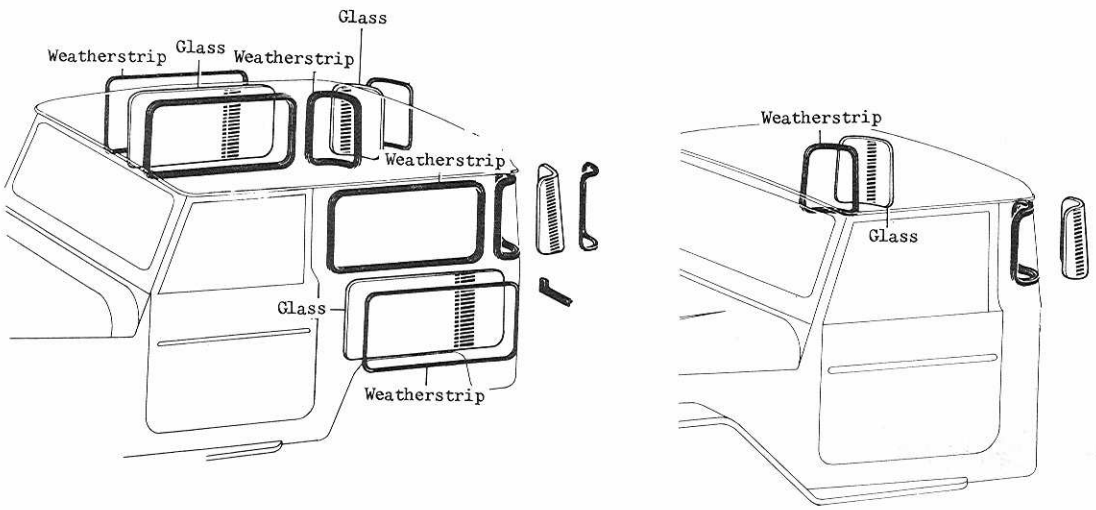


Fig.10-66 Side Window Glass & Rear Upper Door Glass

SIDE WINDOW GLASS INSTALLATION

1. Insert a strong cord around the base of the rubber channel and install the rubber channel to the glass.
2. Place the glass in position and pull the cord to the inside to seat the lip of the rubber in place.
3. Seal the inner and outer lips of the rubber channel with an approved weatherstrip adhesive.
4. Install the inner weatherstrip from the outside using a suitable tool.

REAR UPPER DOOR GLASS INSTALLATION

Insert a strong cord around the base of the rubber channel and install the rubber channel to the glass.

2. Place the glass in position and pull the cord to the inside to seat the lip of the rubber in place.

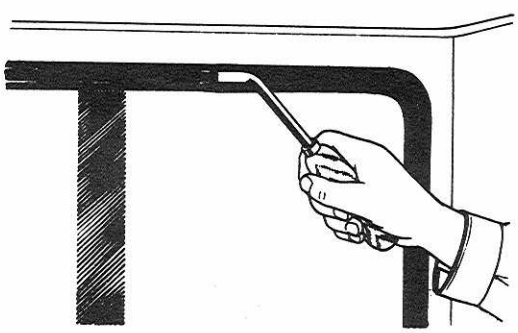


Fig.10-67 Inner Weatherstrip Installation

REAR DROP GATE & REAR SWING DOOR

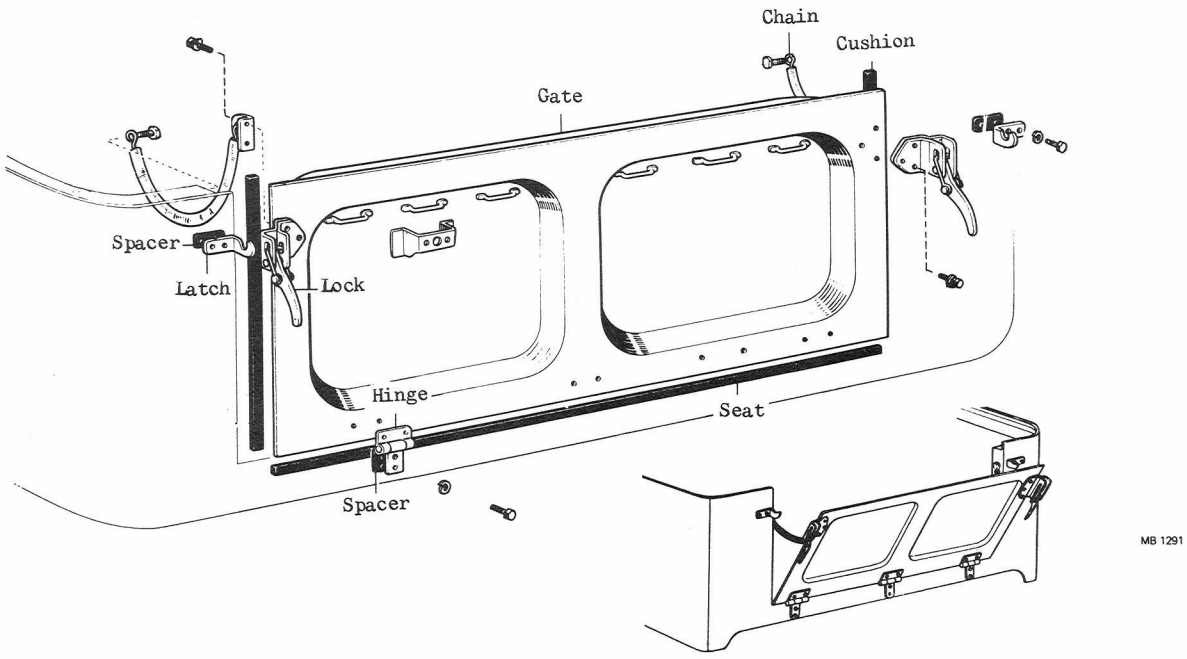


Fig.10-68 Rear Drop Gate Components

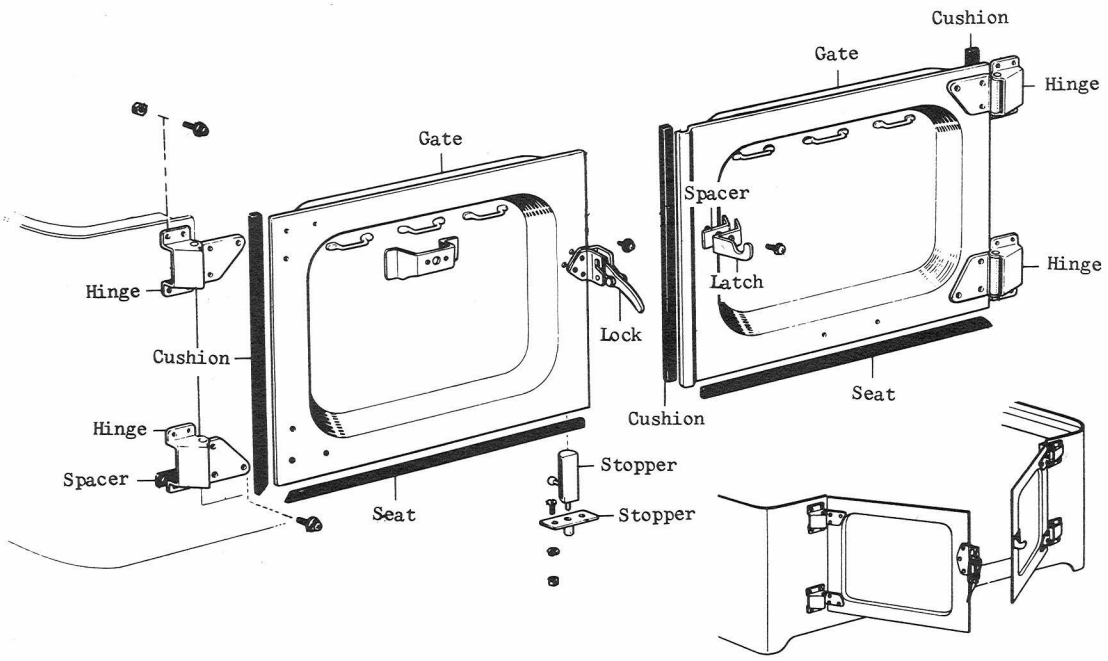


Fig.10-69 Rear Swing Door Components

REAR GATE

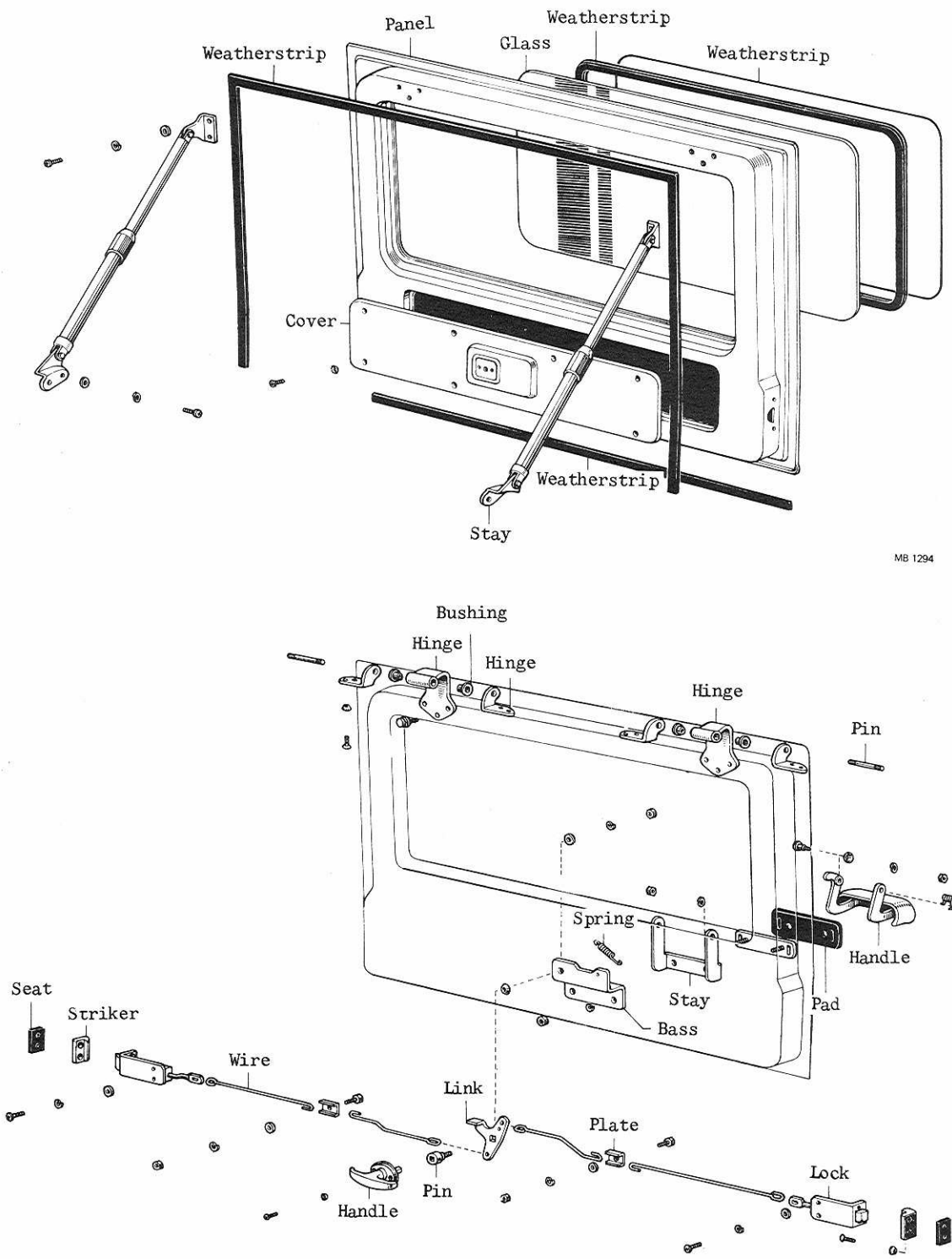


Fig.10-70 Rear Gate Components

HARD TOP ROOF

The hard top roof and side panels can be removed depending upon the usage of the vehicle.
To remove the roof assembly, remove the attaching screws. After removing the roof assembly, remove the side panels by loosening the attaching screws and lifting the front end of the panel.
The fiberglass reinforced plastic is used on the Hard Top and the method of the plastic body repair procedures is entirely different from the conventional pressed steel body repairs.

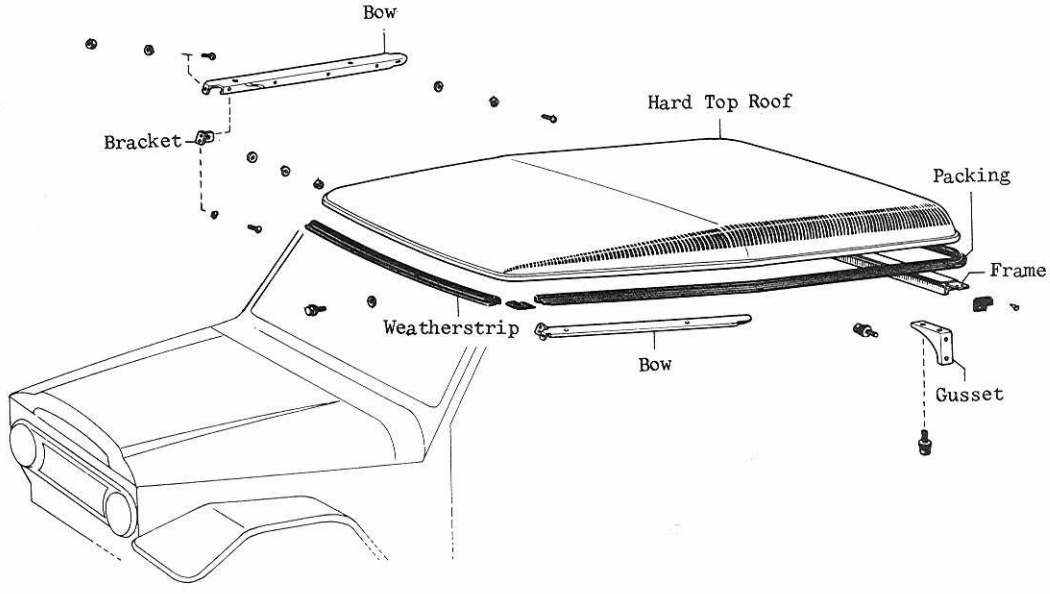


Fig.10-71 Hard Top Roof Components

SEAT & SEAT TRACK

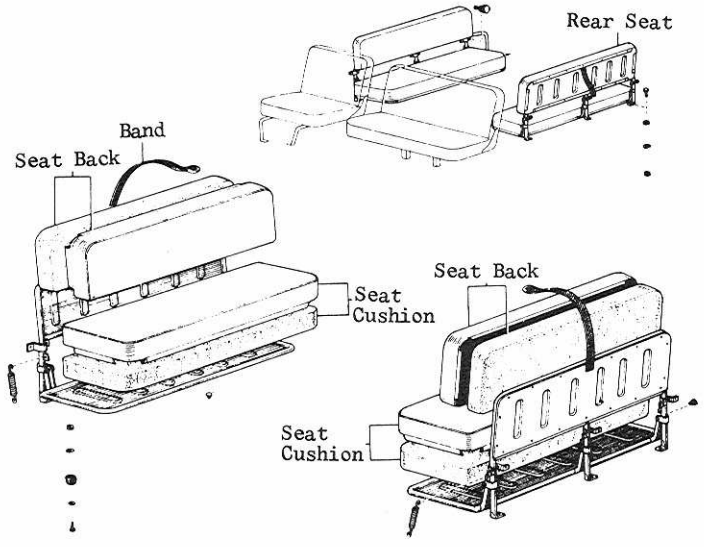


Fig.10-72 Rear Seat Components

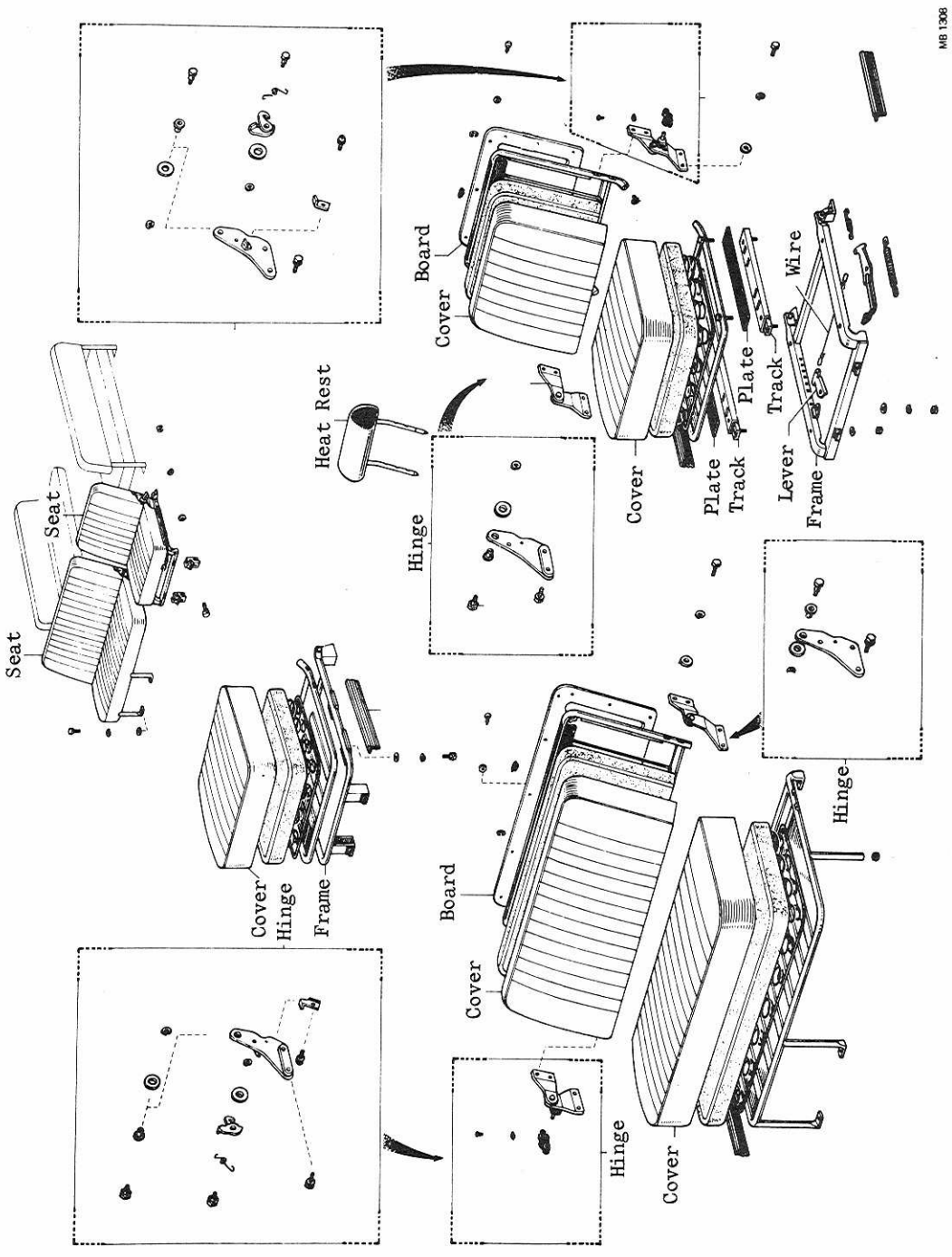


Fig.10-73 Front Seat Components

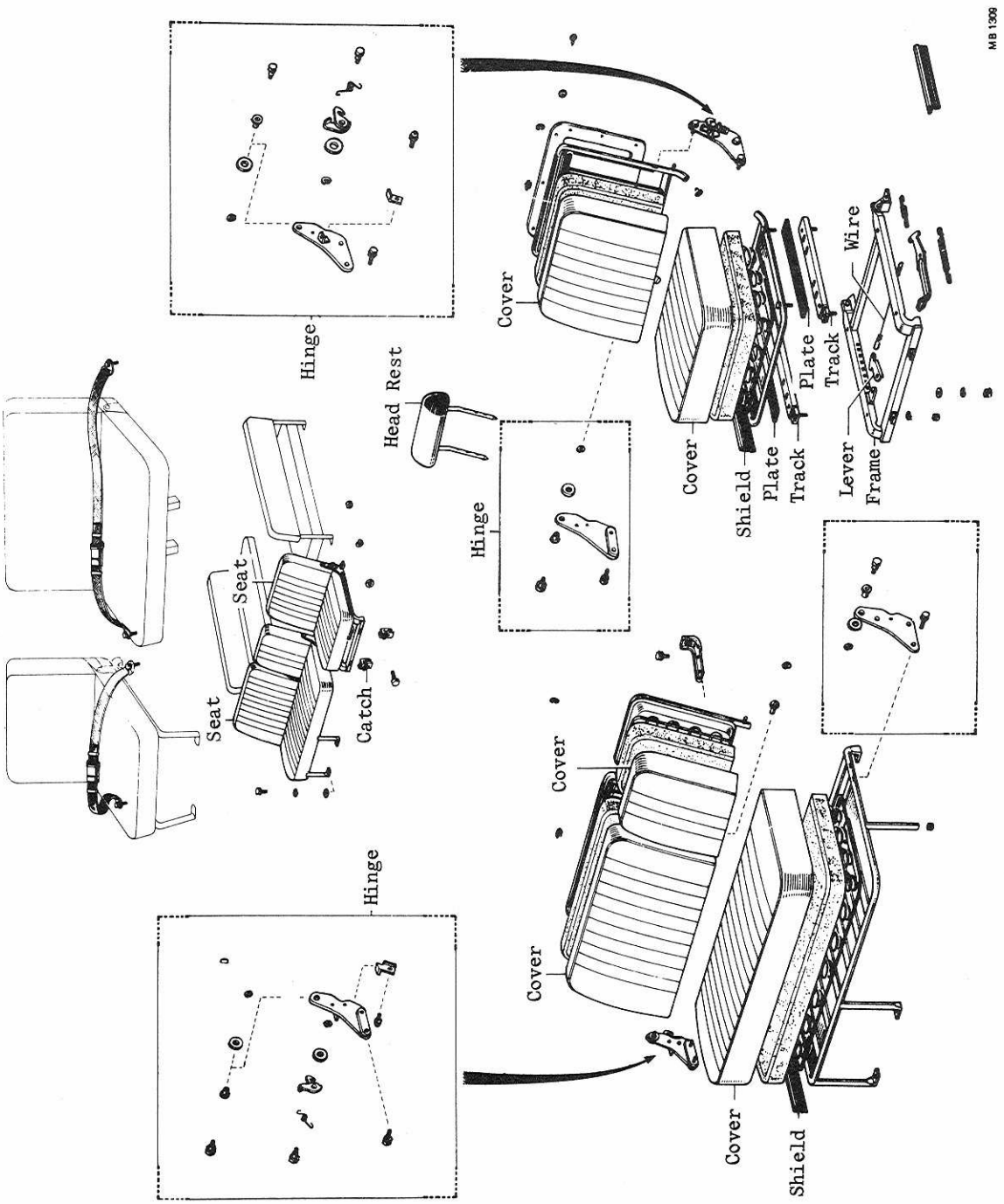


Fig.10-74 Front Seat Components (USA)

VENTILATOR

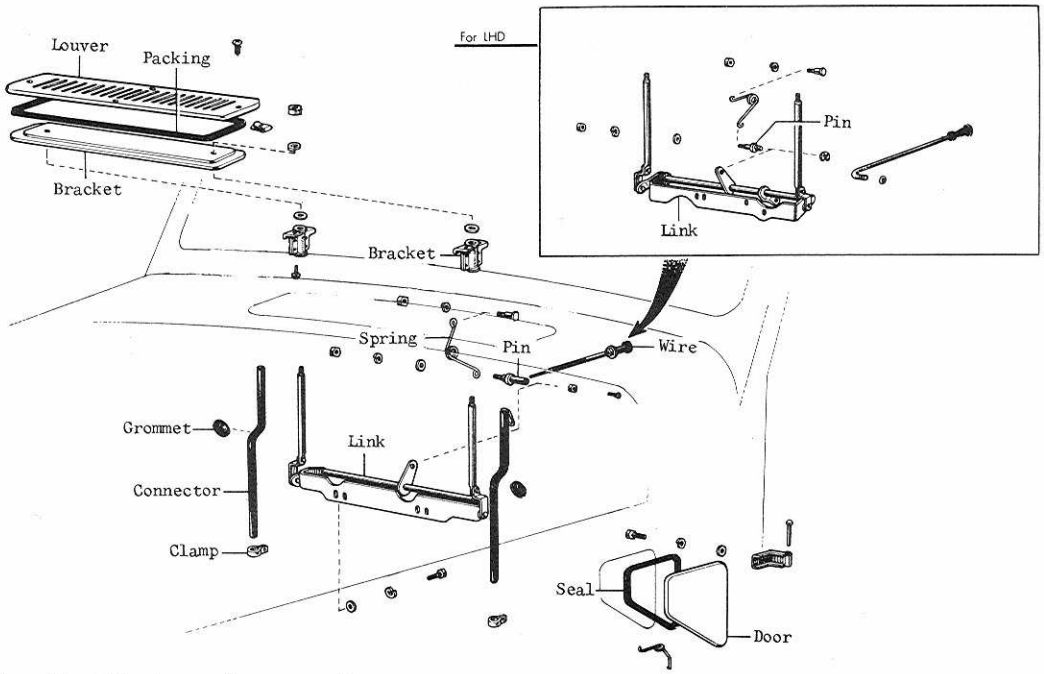


Fig.10-75 Ventilator Components

BODY MOUNTING

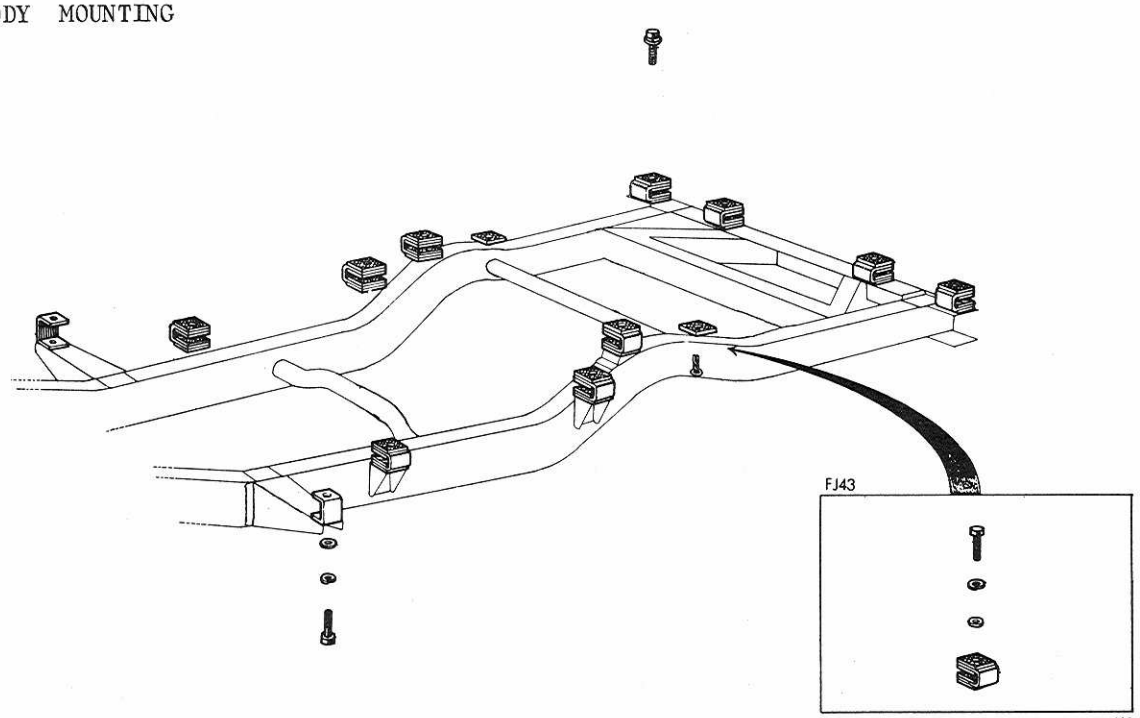
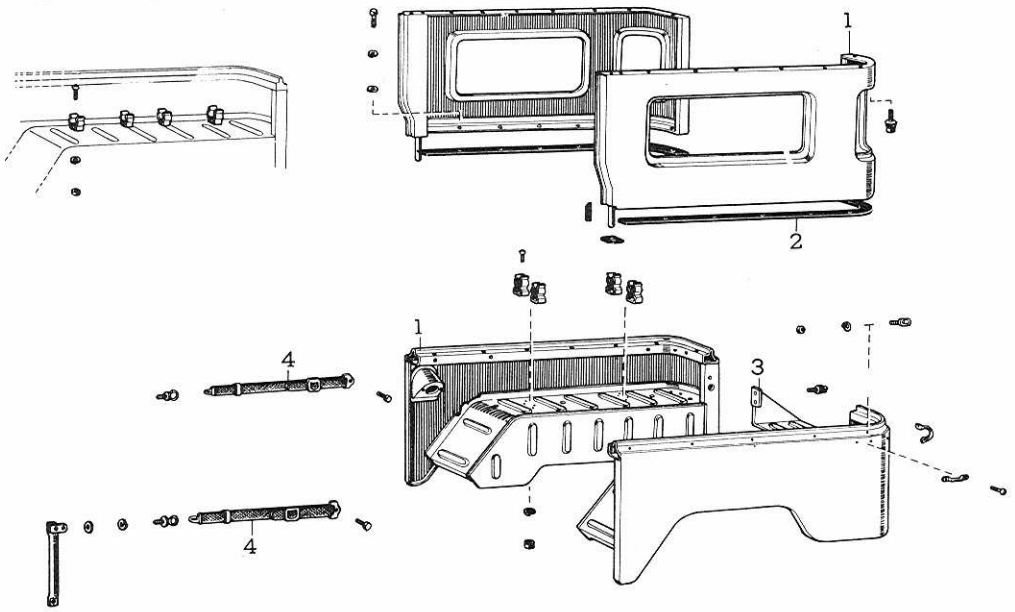


Fig.10-76 Body Mounting Components

BODY SIDE PANEL



1. Rear body side panel
2. Side panel set packing
3. Rear step
4. Safety strap

Fig.10-77 Body Side Panel Components

FLOOR PANEL

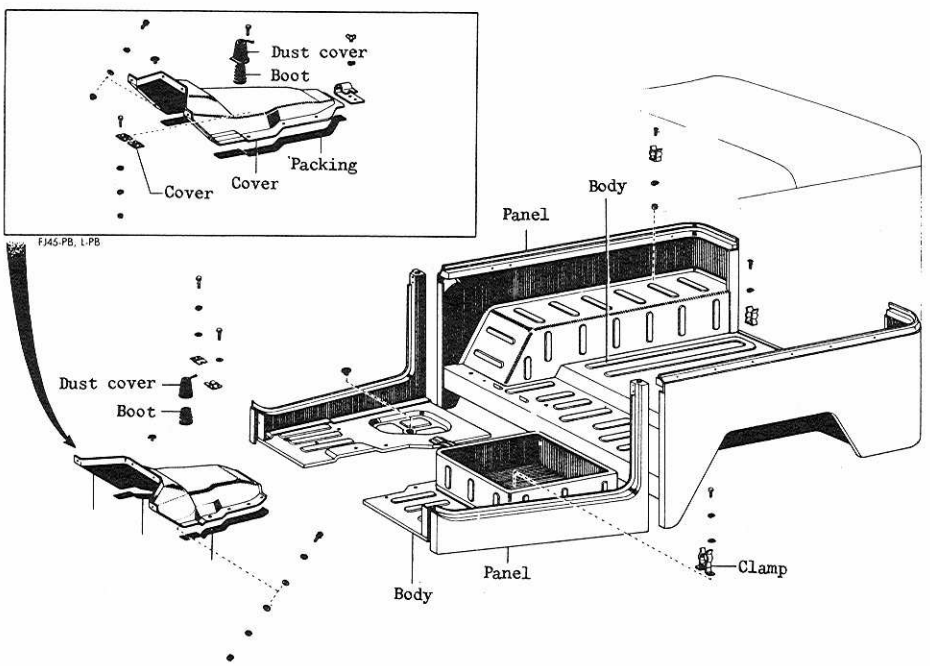


Fig.10-78 Floor Panel Components

BODY (CANVAS TOP)

DOOR

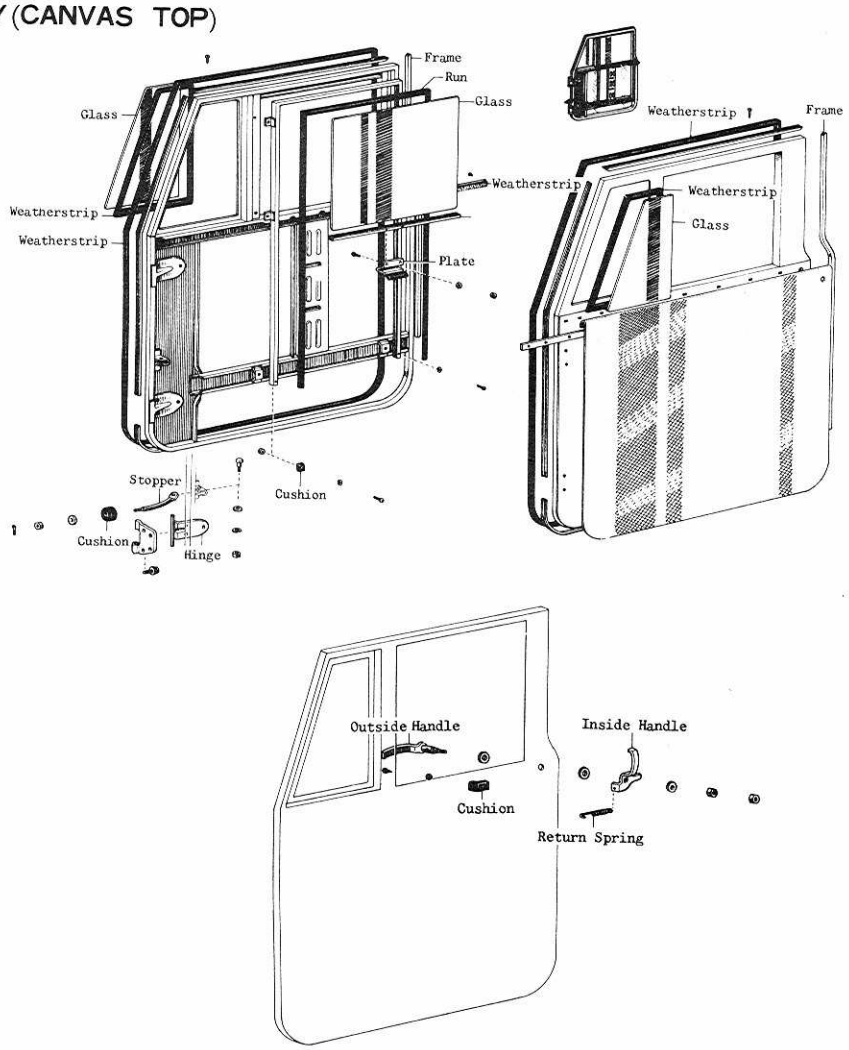


Fig.10-79 Door Components

The front door can be easily removed by pulling out the hing pins from the door hinges.

DOOR GLASS

To replace the door glass, remove the door bumper rubbers at the bottom ends of the door glass channels.
Then remove the door window set channel.

DOOR HANDLE

To install the door handle, first hook up the door lock spring to the door inside handle and side channel.

Position the door outside handle in place through the hole provided on the door and connect the door inside handle firmly in position by the nuts.
Using proper number of door handle adjusting washers, adjust the operation of the door handle if it latches properly without looseness.
The relative positions of the door handles and other parts are as Fig.10-79.

REAR SWING GATE

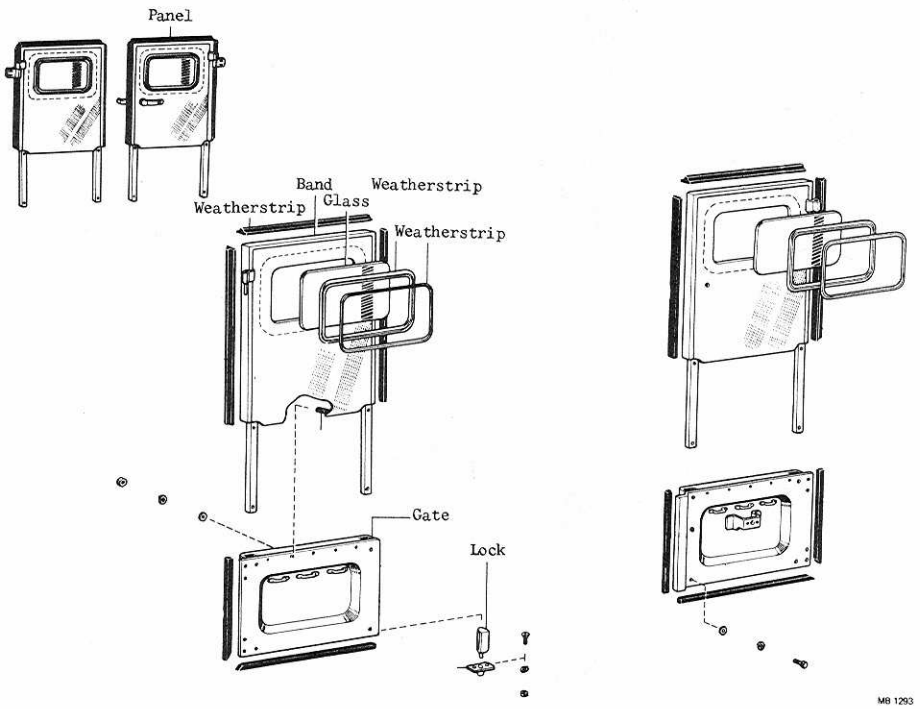


Fig.10-80 Rear Swing Gate Component

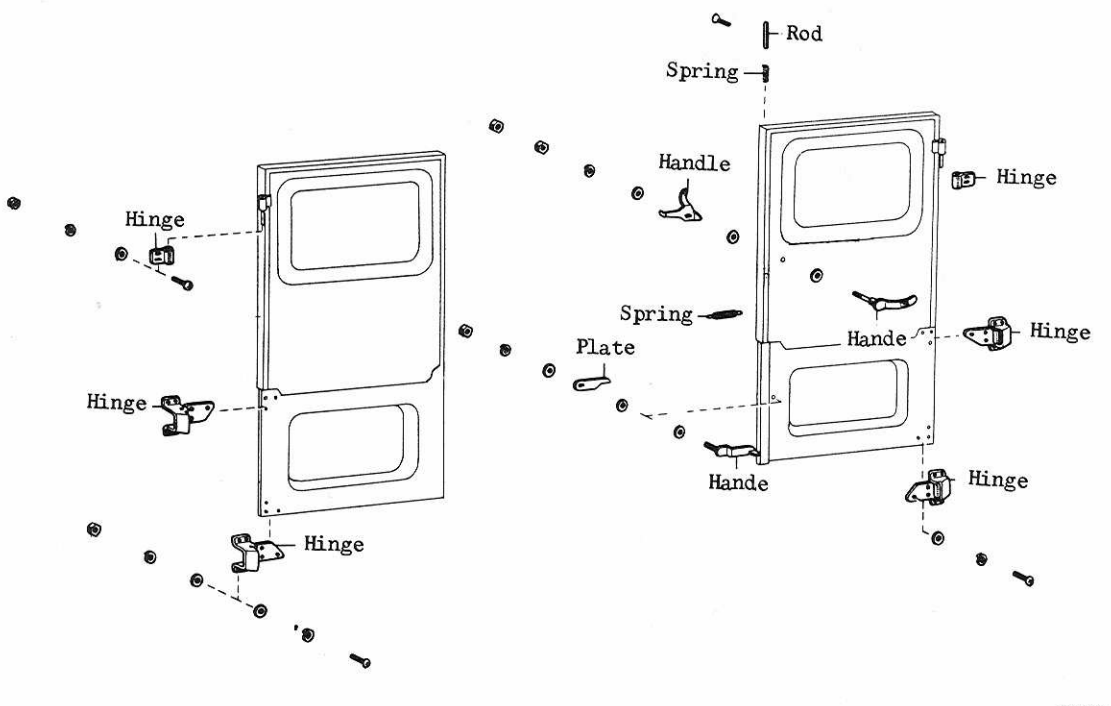


Fig.10-81 Rear Swing Gate Lock & Hinge

TOP BOW

Two types of top bows, A type and B type, are available. In case the top bow is to be replaced, remove the cnvas top and side curtain assemblies.

The top bow can be removed by loosening the attaching bolts and nuts as shown in the following figures.

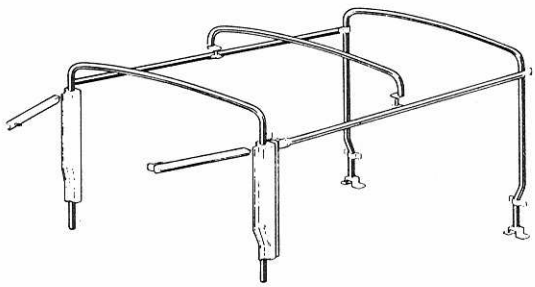


Fig.10-82 A Type Top Bow X4787

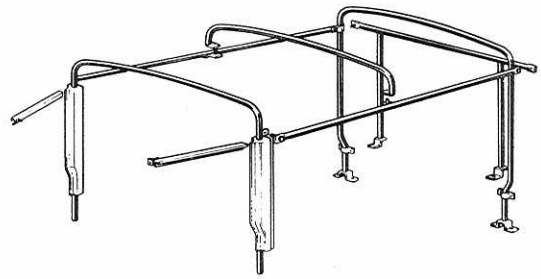


Fig.10-83 B Type Top Bow X7488

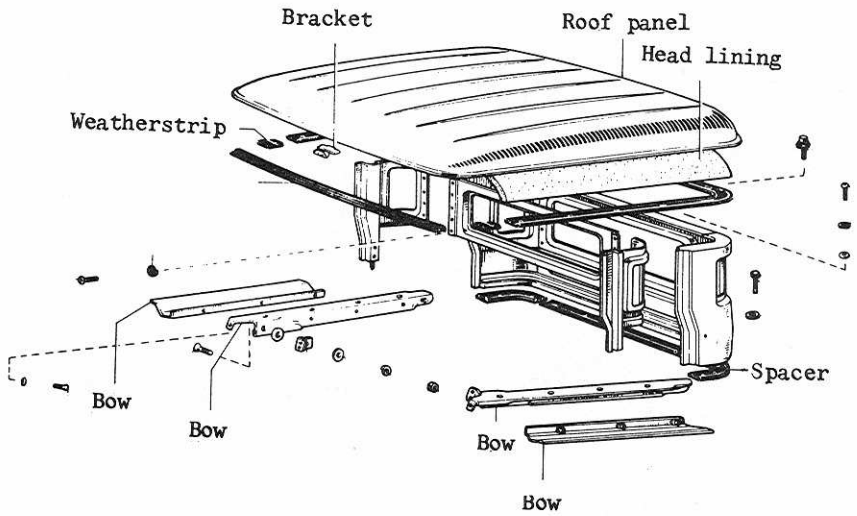
CANVAS TOP

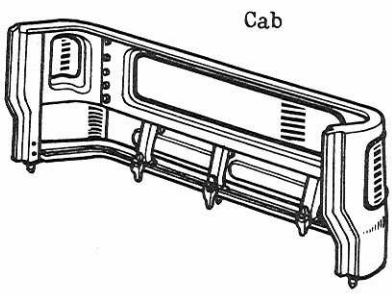
The top cover, side curtains, and rear curtain can be easily replaced by disconnecting the backles and fasteners. When installing the top cover, slide the front end of the cover through the front window frame. When the curtains have been removed for storage, fold them in an orderly manner and store them in a dry place.

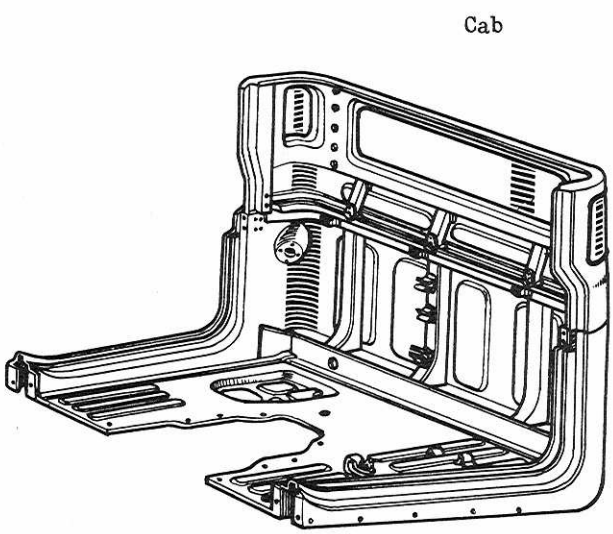
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BODY (PICK UP)

ROOF PANEL & BACK PANEL







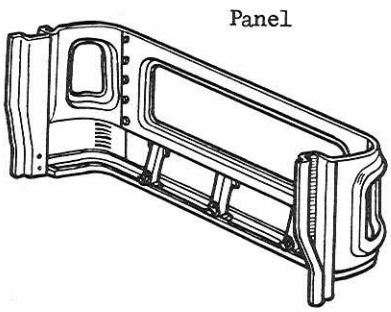


Fig.10-84 Roof Panel & Back Panel Components

SEAT & SEAT TRACK

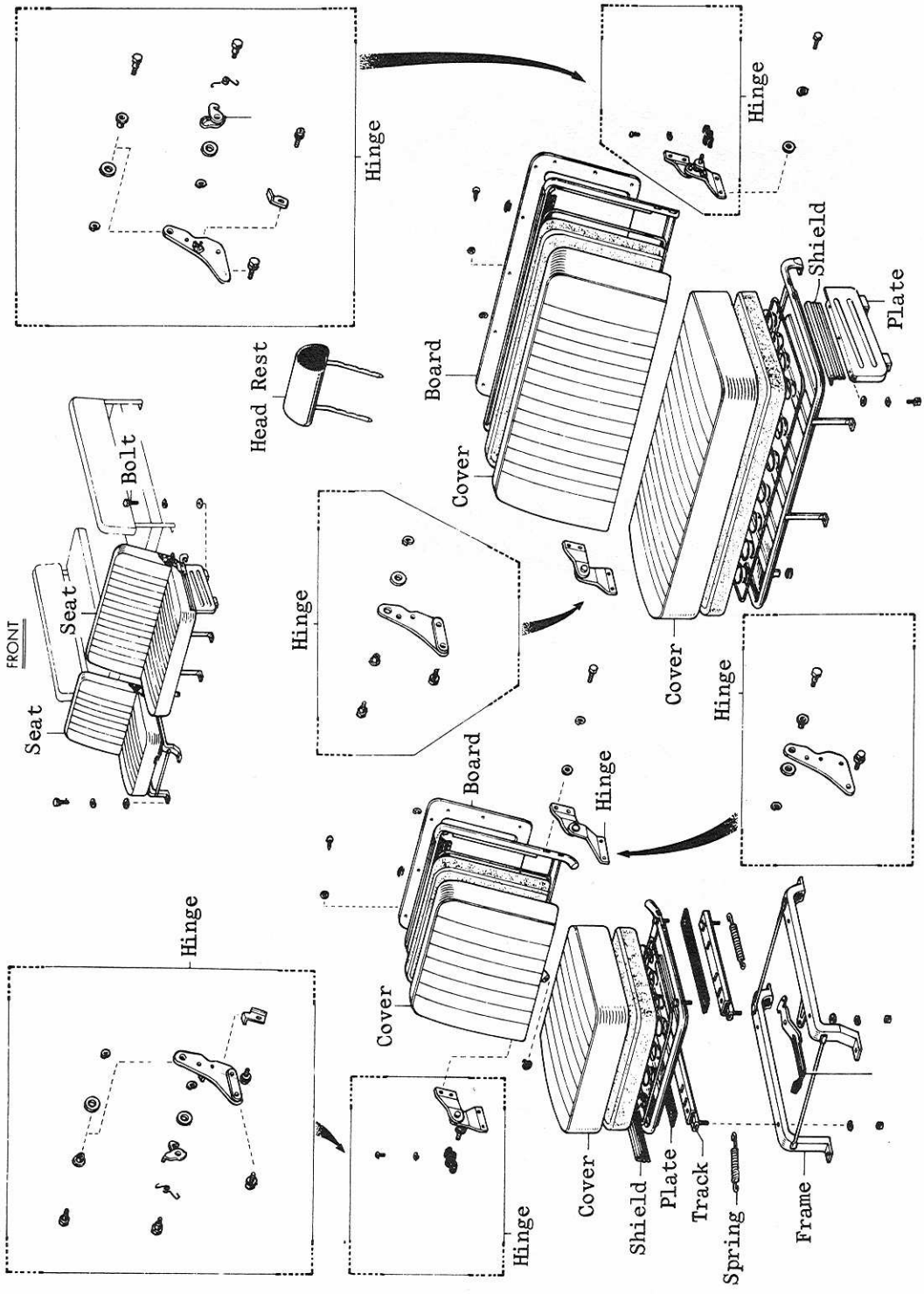
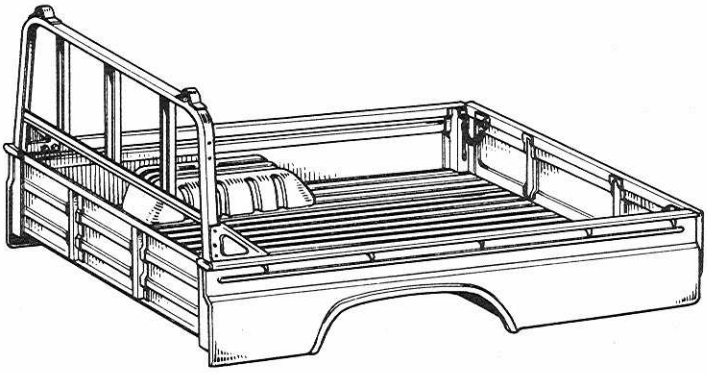
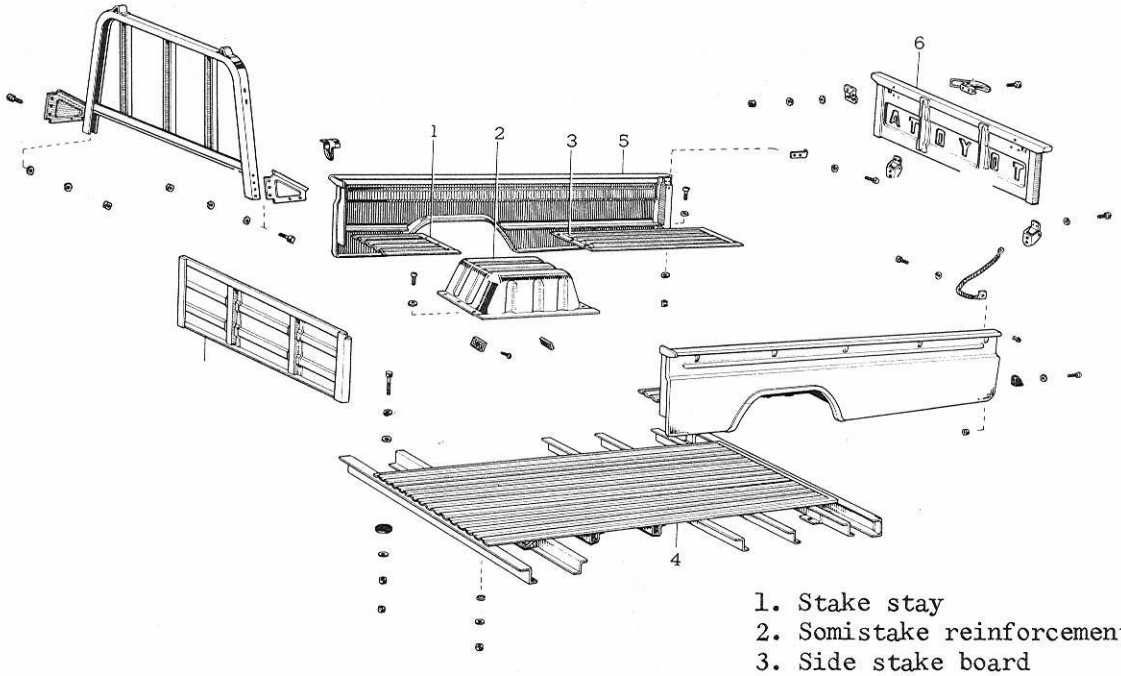


Fig.10-85 Seat & Seat Track Components

REAR BODY



1. Floor front panel
2. Wheel house panel
3. Floor rear panel
4. Floor center panel
5. Rear body side panel
6. Gate



1. Stake stay
2. Somistake reinforcement
3. Side stake board
4. Rear body side panel
5. Cab rear railing

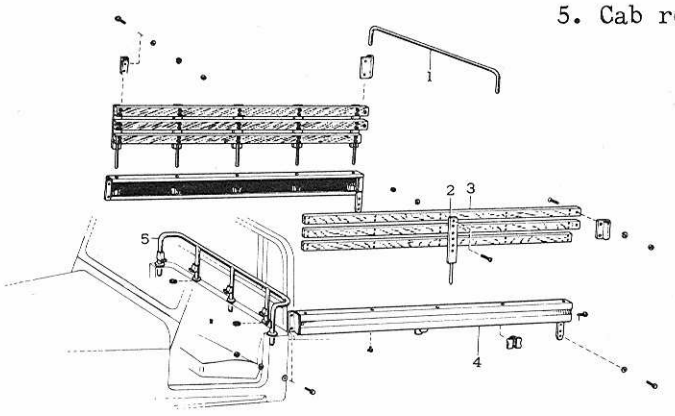


Fig.10-86 Rear Deck Components

CAB MOUNTING

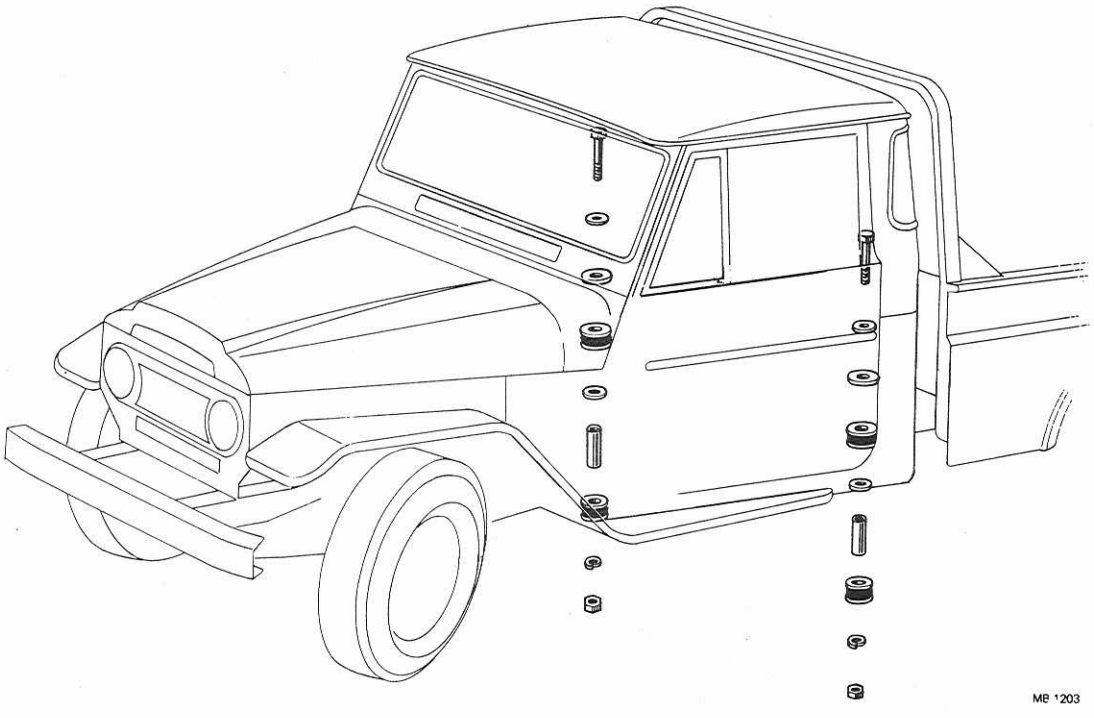


Fig.10-87 Cab Mounting Components

INSTRUMENTS

Combination Meter & Speedometer (FJ55) 11-1

Combination Meter & Speedometer (FJ40,43,45) 11-4

Instrument Panel & Glove Compartment 11-8

COMBINATION METER & SPEEDOMETER (FJ55)

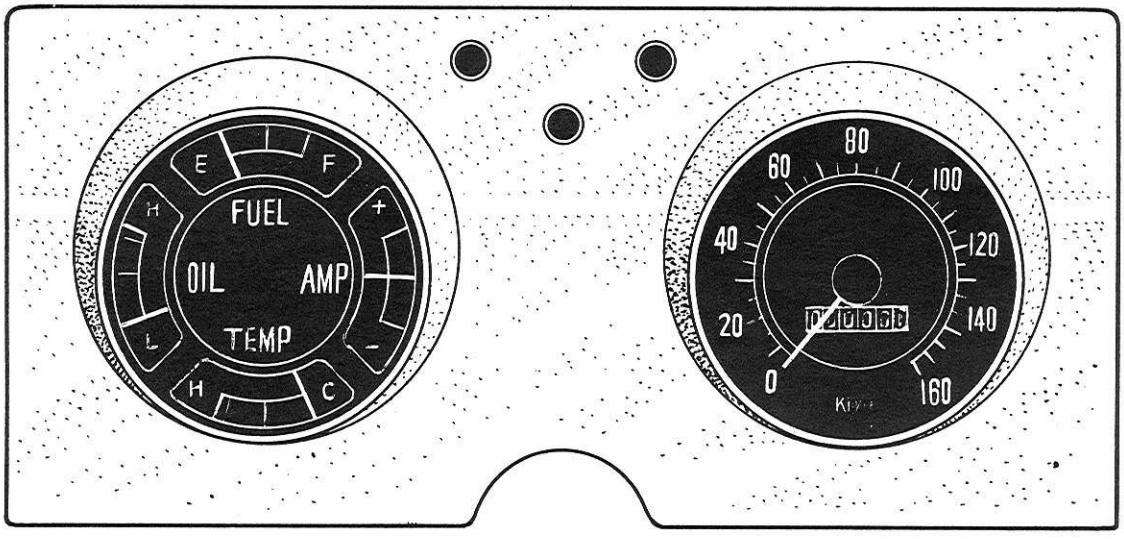


Fig.11-1 Combination Meter & Speedometer E003

Inspection

Speedometer

1. Inspect the speedometer with a master speedometer tester. The speedometer shaft with 637 rpm should indicate 60 kilos per hour. The odometer should integrate one kilometer when the speedometer shaft rotates 637 revolutions.

2. If the speedometer needle vibrates check the speedometer cable, and if necessary, replace the cable.

Fuel Gauge

1. Inspect the ground of each wiring, and check for broken wires.

2. Disconnect the wire at the fuel sending gauge and when the ignition switch is turned on, the fuel gauge should register to "E". Then if the wire is grounded, the fuel gauge registers to "F", and the gauge is satisfactory.

Caution:

Do not leave the sending wire grounded longer than necessary to make the test, as the gauge may be damaged.

Water Temperature Gauge

1. Inspect the ground of each wiring, and check the broken wires.

2. When the temperature sending gauge wire is disconnected, the temperature gauge should register to "H". If the wire is grounded, the temperature gauge registers to "C", and the gauge is satisfactory.

Ammeter

1. To test the ammeter, pull the headlight switch on with the engine stopped. The meter pointer should move towards the negative side or discharge scale. If the needle does not move, the wire of the meter circuit is loose or broken, or the meter is inoperative.

2. If the meter pointer does not move towards the positive side or charge scale with the engine operating, check the alternator and the re-

gulator. Replace the defective part or parts as necessary.

Oil Pressure Gauge

1. Inspect the ground of each wiring, and check for broken wires

2. Turn the ignition switch to ON position without starting the engine, and the gauge needle should be held in the "L" position. Then, disconnect the wire at the oil pressure sending gauge, and if the wire is grounded, the oil pressure gauge registers to "H", and the gauge is satisfactory.

3. Connect the sending gauge wire, and if the gauge needle does not point the second line from "H" mark with engine operating, check the engine oil level. Even replenishing the oil, still the gauge does not point the above line, remove the oil pressure sending gauge, and install a pressure gauge in its place, and check the oil pressure.

Removal

1. Disconnect the speedometer cable.

2. Remove the combination meter attaching screws.

3. Loosen the steering column clamp by removing the attaching bolts.

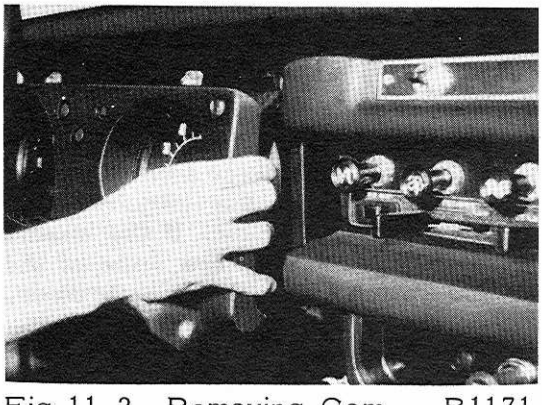


Fig.11-2 Removing Combination Meter & Speedometer B1171

4. Pull out the combination meter and the speedometer, disconnect the wiring connector, and remove the combination meter and the speedometer.

Disassembly

1. Remove the three attaching screws, and remove the turn-signal and high-beam indicator lights assembly.

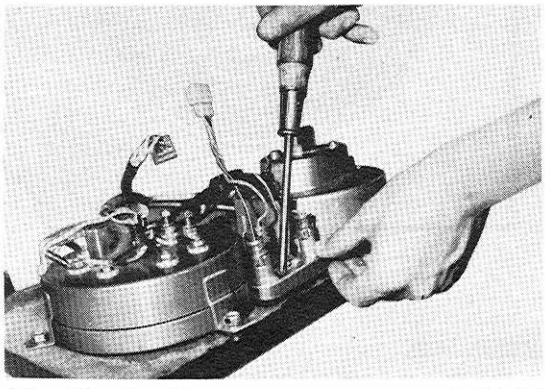


Fig.11-3 Removing Indicator Lights B1172

2. Remove the three attaching bolts, and remove the speedometer from the meter hood pad.
Remove each of the attaching screws, and disassemble the speedometer to the glass, cover and the meter assembly.

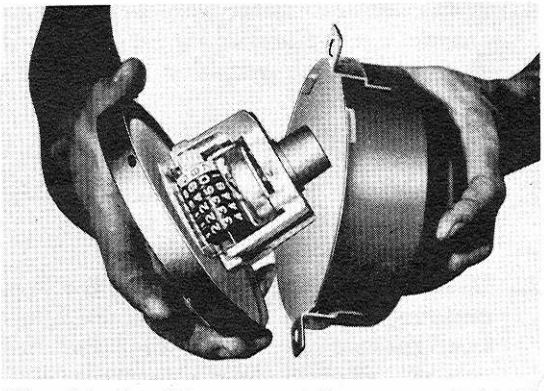


Fig.11-4 Disassembling Speedometer B1173

3. Remove the three screws and each attaching nut, and disassemble the combination meter to the fuel

gauge, oil pressure gauge, temperature gauge and the ammeter.

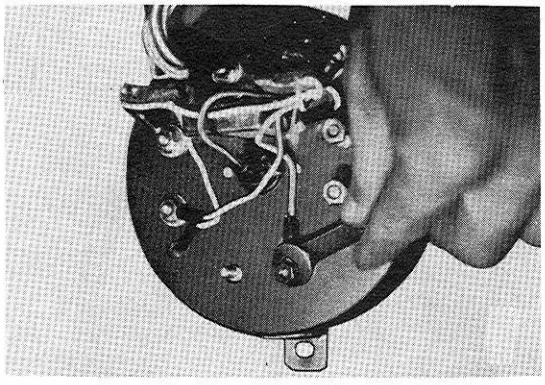


Fig.11-5 Removing Attaching Nut B1174

Assembly & Installation

Follow the disassembly and removal procedures in the reverse order.

INSTRUMENT PANEL PAD

Removal

1. Remove each attaching screw at both right and left sides.
2. Remove the tail gate switch and the two ornament plate attaching screws.
3. Remove the glove compartment assembly.
4. Remove the combination meter and the speedometer.

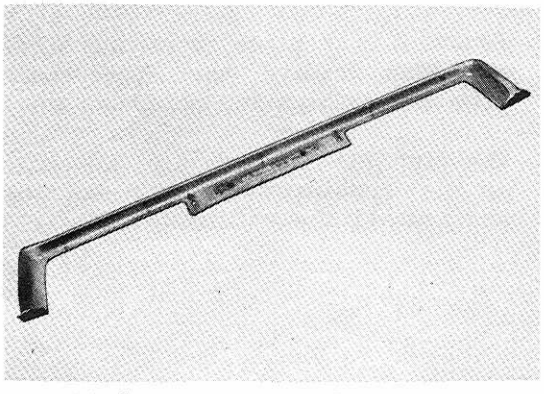


Fig.11-6 Instrument Panel Pad B1175

5. Remove the attaching nuts, and remove the instrument panel pad.

Installation

Follow the removal procedures in the reverse order.

GLOVE COMPARTMENT

Removal

1. Remove the two screws, and remove the glove compartment door.
2. Remove the two screws, and remove the lock assembly.
3. Remove the eight screws, and remove the glove box.

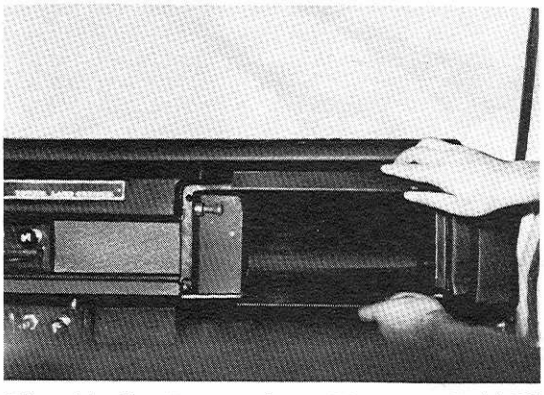


Fig.11-7 Removing Glove Box B1176

Installation

Follow the removal procedures in the reverse order.

COMBINATION METER & SPEEDOMETER (FJ40,43 45)

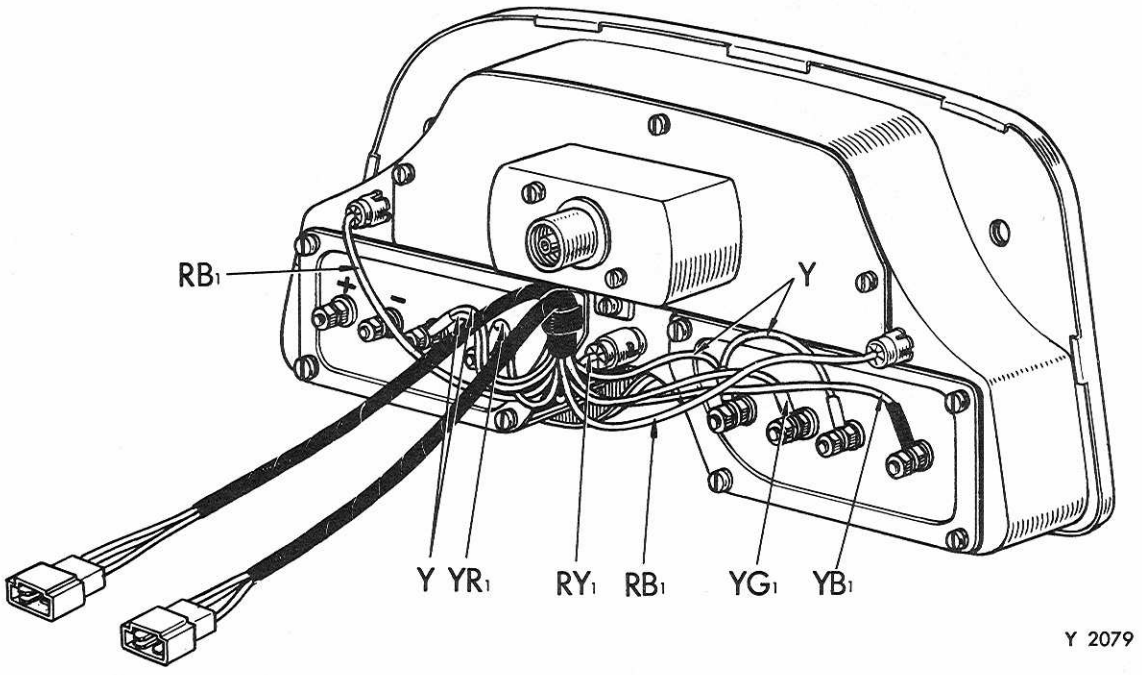


Fig.11-8 Combination Meter Assembly

REMOVAL OF COMBINATION METER ASSEMBLY

1. Disconnect the speedometer cable from the speedometer.
2. Remove the combination meter retaining screws.
3. Pull out the assembly from the instrument panel and disconnect the light bulbs and wirings from the meter assembly. Then remove the assembly from the instrument panel.
4. Remove the back plate retaining screws to expose each gauge cluster.

ASSEMBLY & INSTALLATION OF THE METER ASSEMBLY

Follow "Removal and Disassembly" in reverse order.

SPEEDOMETER

The speedometer is connected to the transfer drive shaft by means of a cable and a drive gear located inside the transfer case.

Speedometer Replacement

1. Remove 4 back plate retaining screws, then remove the speedometer from the combination meter housing.
2. Position the speedometer assembly in the combination meter housing and install the retaining screws.

FUEL GAUGE & FUEL GAUGE UNIT

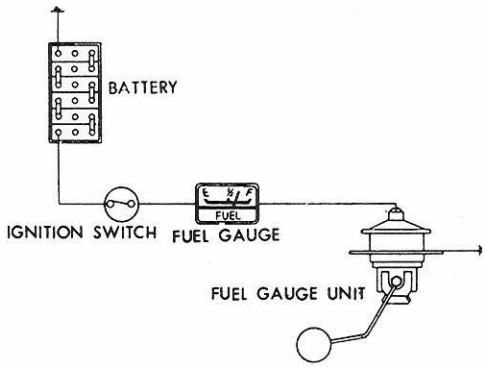


Fig.11-9 Fuel Gauge & Fuel Gauge Unit

Fuel Gauge Replacement

1. Remove four retaining screws from the back plate and pull the fuel gauge away from the combination meter housing. Disconnect the wires and remove the fuel gauge.

2. Position the fuel gauge to the housing and connect the wires.

3. Install the fuel gauge with the retaining screws.

Fuel Gauge Unit Replacement

1. Disconnect the wire at the fuel gauge unit, then remove the unit retaining screws from the unite and tank.

2. Remove the unit and packing carefully.

3. Clean the fuel gauge unit mounting surface at fuel tank.

4. Position the packing and unit to the fuel tank and secure them in place with retaining screws.

5. Connect the wire to the fuel gauge unit.

TEMPERATURE GAUGE

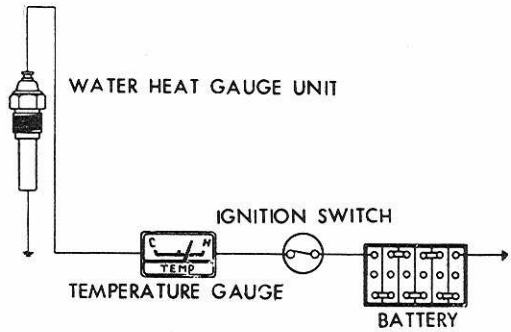


Fig.11-10 Temperature Gauge

The temerature gauge consists of a temperature gauge mounted on the gauge instrument panel and a heat indicator mounted in the cylinder head.

Temperature Gauge Replacement

1. Remove the retaining screws from the back plate and pull the gauge out of the housing.

2. Disconnect the wires and remove the temperature gauge.

3. Position the temperature gauge to the housing and connect the wires, then secure the back plate with retaining screws.

Water Heat Indicator Replacement

1. Disconnect the wire from the temperature gauge at the heat indicator, and relieve any pressure in the cooling system by loosening the radiator cap.

2. Prepare the new heat indicator and apply a small amount of sealer to the threads.

3. Remove the heat indicator from the cylinder head and immediately install the new heat indicator. Then connect the wire to the heat indicator.

AMMETER

The operating components of the ammeter are illustrated in figure 11-11. This gauge composes of the indicator needle installed on the moving plate, and is operated by the compound force of the magnetic force energized by the current passing through the electromagnet, and the magnet force of the permanent magnet. For this reason, the needle will always defect to the stronger side of the magnetic force induced in the magnet.

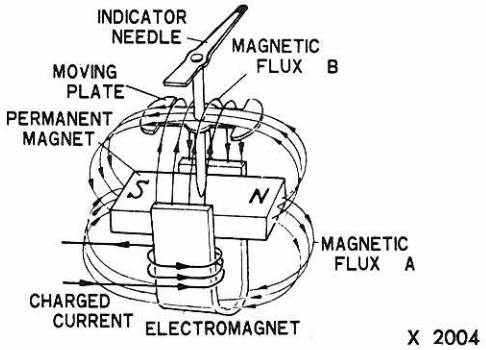


Fig.11-11 Operation

At state condition, the indicator needle registers the zero point by only the force of the permanent magnet. When charging becomes large, the current at the electomagnet becomes large, and the needle will defect to the positive side of the ammeter.

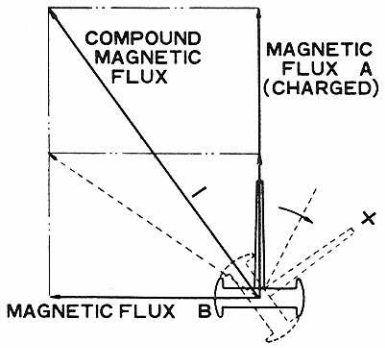


Fig.11-12 Charging Condition X0336

At discharged condition, the current flows to the opposite side causing the needle to defect to the negative side of the ammeter.

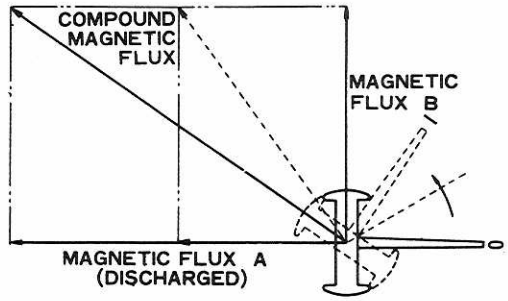


Fig.11-13 Discharging Condition X0337

Ammeter Replacement

1. Remove four retaining screws from the back plate and pull the ammeter away from the combination meter housing. Disconnect the wirers and remove the ammeter.

2. Position the ammeter to the housing and connect the wires.

3. Install the ammeter with the retaining screws.

OIL PRESSURE GAUGE

The oil pressure gauge consists of the oil pressure sending gauge, and the receiving gauge. Both gauges are constructed by utilizing the same bi-metal, and the same heating coils are wound on the bi-metal.

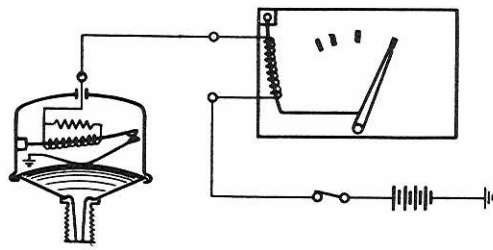


Fig.11-14 Operation X0340

The receiving gauge bi-metal is connected to the indicator needle. The sending gauge contact point operates in relative with the oil pressure, and is bent by the increase of the oil pressure.

When the ignition switch is turned to ON, the current from the battery flows through the receiving gauge heating coil to the sending gauge heating coil, and to the contact point, and is grounded.

By this current, both heating coils are energized, and this actuated heat is applied onto the bi-metal. When the bending of the bi-metal by heat becomes larger than that by the coil pressure at the sending gauge, the point opens, and the current will not flow. For this reason, the heating coil is cooled, and the bi-metal is straightened, and the point closes again. As the bi-metals of the sending gauge, and receiving gauge are the same, the operation of the sending gauge is transmitted all the same to the receiving gauge, and the above repetition registers the oil pressure. The graduation of the gauge dial is from 0, 2, 4 and 6 kg/cm^2 (0, 28.4, 56.8 and 85.2 psi).

Oil Pressure Gauge Replacement

1. Remove the retaining screws from the back plate and pull the gauge out of the housing.
2. Disconnect the wires and remove the oil pressure gauge.
3. Position the oil pressure gauge to the housing and connect the wires, then secure the back plate with the retaining screws.

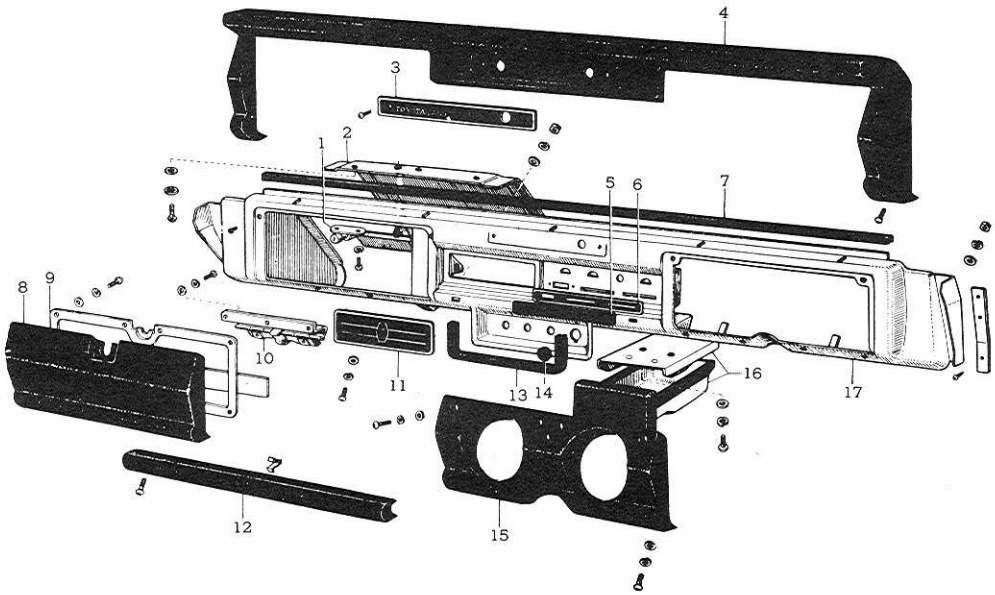
Oil Pressure Sender Gauge Replacement

The oil pressure sender gauge is installed at the left of the cylinder block and is connected to the oil pressure receiver gauge which in turn is connected to the ignition switch.

1. Disconnect the wire at the sender gauge, then remove the sender gauge from the engine.
2. Apply sealer to the threads of the new sender gauge, and install the sender gauge to the engine.
3. Connect the wire to the oil pressure sender gauge, and check the operation of the sender gauge.

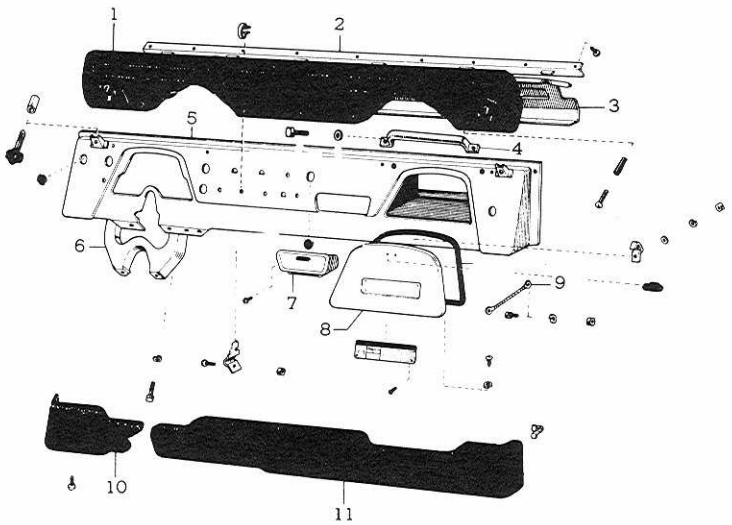
* *

INSTRUMENT PANEL & GLOVE COMPARTMENT



1. Glove compartment door lock cylinder housing
2. Glove compartment
3. Switch ornament plate
4. Instrument panel pad
5. Air control hole cover
6. Heater control ornament
7. Instrument panel upper cover
8. Glove compartment door pad
9. Glove compartment door inner panel
10. Glove compartment door hinge
11. Instrument panel radio opening cover
12. Instrument center upper pad
13. Instrument center lower cover
14. Ash tray hole cover
15. Meter hood pad
16. Ash tray
17. Instrument panel

Fig.11-15 Instrument Panel & Glove Compartment B3119



1. Upper safety pad
2. Safety pad retainer
3. Instrument impact panel
4. Assist front grip
5. Instrument lower panel
6. Steering column upper stay
7. Ash receptacle
8. Glove compartment door
9. Wire
10. Lower safety pad
11. Lower safety pad

BODY ELECTRICAL (FJ55)

Headlight 12- 1

Front Turn Signal Light 12- 2

Rear Combination Light 12- 2

Back-Up Light 12- 3

License Plate Light 12- 3

Parking Light 12- 4

Room Light 12- 4

Reflector 21- 4

Ignition Switch 12- 5

Lighting & Wiper Switches 12- 5

Back-Up Light Switch 12- 5

Water Temperature Sending Gauge 12- 5

Fuel Sending Gauge 12- 6

Oil Pressure Switch 12- 6

Horn Button 12- 6

Turn Signal, Dimmer & Headlight Flasher Switch 12- 6

Horn 12- 7

Turn Signal & Hazard Warning Flashers..... 12- 7

Horn Relay 12- 7

Wiper 12- 9

Wiring Harness & Grommet 12-13

BODY ELECTRICAL (FJ40,43,45)

Headlamps 12-13

Lamp bulb replacement 12-14

Turn signal control 12-17

Windshield wiper 12-18

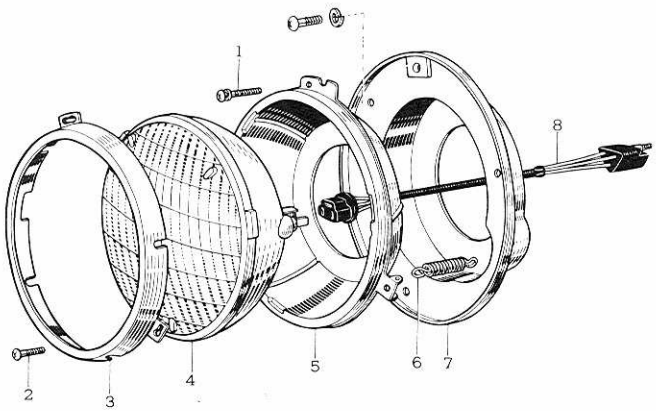
Switches 12-20

Horns 12-22

Wiring harness & clamp 12-24

BODY ELECTRICAL (FJ55)

HEADLIGHT



1. Headlight adjusting screw
2. Screw
3. Sealed-beam retaining ring
4. Sealed-beam
5. Sealed-beam mounting ring
6. Tension spring
7. Headlight housing
8. Headlight socket & wire

Fig.12-1 Headlight E1870

Removal

1. Remove the headlight door.

2. Remove the sealed-beam retaining ring attaching screws, and turn the retaining ring counterclockwise, then remove it.

3. Pull out the sealed-beam, and disconnect the headlight socket and the wire.
   Remove the headlight door support.

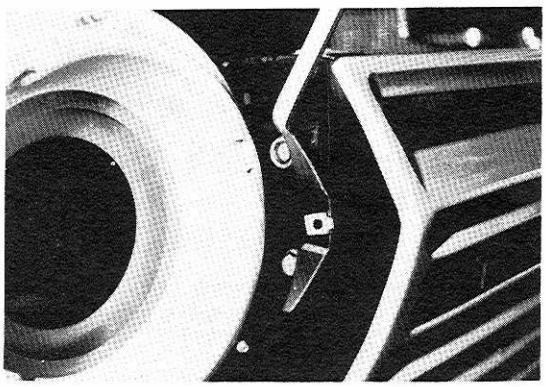


Fig.12-2 Removing Headlight B1178 Door Support

4. Remove the attaching screws, and remove the packing and headlight housing with the sealed-beam mounting ring.

Installation

Reverse the removal procedures. The headlight should be adjusted before installing the headlight door.

Adjustment

The headlight adjustment should be made with all the tires inflated to the specified pressure, and the vehicle unloaded.
To align the headlights by means of a wall screen, select a level portion of the shop floor.

1. Position the vehicle so that the aiming plane of the sealed-beam unit shall be located parallel to a vertical screen at a distance of 25 feet.

2. Draw a horizontal adjusting line 2 inches below parallel to the headlight horizontal centerline.

3. Draw the headlight vertical centerline, and get the intersection "f" of the adjusting line and vertical centerline.

4. Adjust the headlight by means of the adjusting screws so that the headlight high-beam will come to "f".

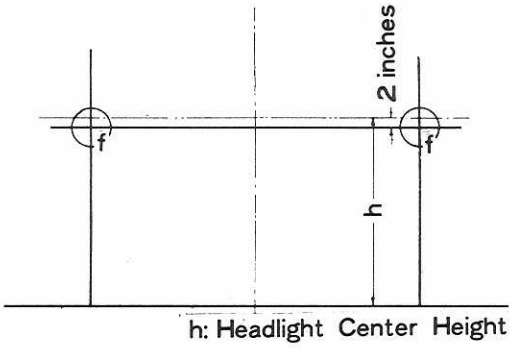
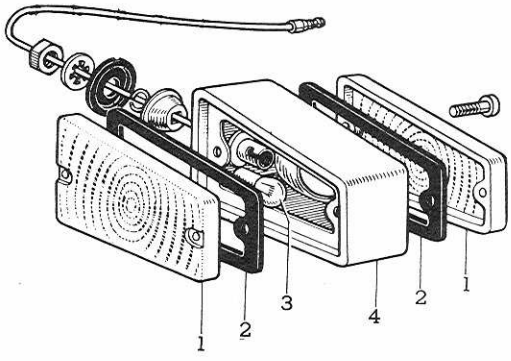


Fig.12-3 Headlight Adjustment X4898

Tire Inflation

	Unladen kg/cm² (psi)
FJ55(L)V-(B)	
Front 7.00 - 15 6 p:	1.75 (25.0)
Rear 7.00 - 15 6 p:	1.75 (25.0)
Front 7.00 - 15 8 p:	2.50 (35.7)
Rear 7.00 - 15 8 p:	2.50 (35.7)
Front 7.00 - 16 6 p:	1.75 (25.0)
Rear 7.00 - 16 6 p:	1.75 (25.0)
Front 7.60 - 15 6 p:	1.10 (15.7)
Rear 7.60 - 15 6 p:	1.20 (17.3)
Front 9.00 - 15 6 p:	0.70 (10.0)
Rear 9.00 - 15 6 p:	0.70 (10.0)
FJ55LG	
Front 7.60 - 15 4 p:	1.14 (16.3)
Rear 7.60 - 15 4 p:	1.30 (18.6)
Front 7.60 - 15 6 p:	1.14 (16.3)
Rear 7.60 - 15 6 p:	1.30 (18.6)

FRONT TURN-SIGNAL LIGHT



1. Turn-signal light lens
2. Turn-signal light lens gasket
3. Bulb
4. Turn-signal light body

Fig.12-4 Front Turn-Signal Light E1870

Removal

1. Remove the attaching screws, and remove the light lens.
2. Push the bulb, and turning it counterclockwise, then remove the bulb.
3. Disconnect the wiring connector, remove the attaching nut from the engine compartment, and remove the turn-signal light body.

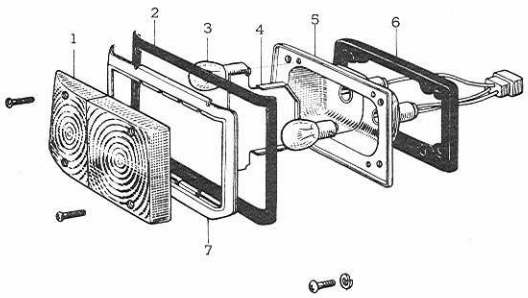
Installation

Reverse the removal procedures.

REAR COMBINATION LIGHT

Removal

1. Remove the attaching screws, and remove the light lens, light rim and the gasket.
2. Turn the bulbs counterclockwise while pushing them lightly, and remove the bulbs.
3. Remove the side window trim panel.



1. Rear combination light lens
2. Rear combination light pad
3. Bulb
4. Rear combination light shade
5. Rear combination light body
6. Rear combination light body gasket
7. Rear combination light rim

Fig.12-5 Rear Combination Light E1871

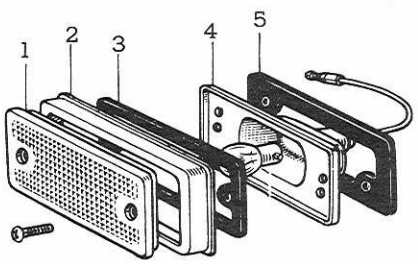
4. Disconnect the wiring connector.

5. Remove the attaching nuts, and remove the packing and the light body.

Installation

Reverse the removal procedures.

BACK-UP LIGHT



1. Back-up light lens
2. Back-up light rim
3. Back-up light lens gasket
4. Back-up light body
5. Back-up light body gasket

Fig.12-6 Back-Up Light E1871

Removal

1. Remove the attaching screws, and remove the light lens.

2. Turn the bulb counterclockwise while pushing it lightly, and remove it.

3. Remove the side window trim panel.

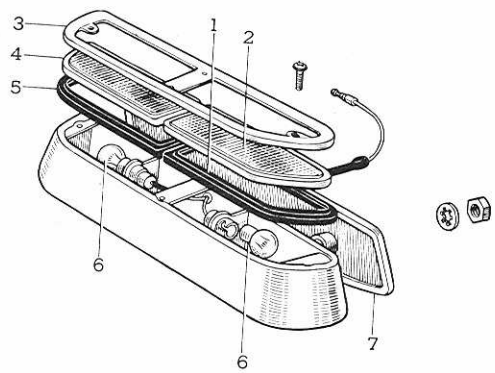
4. Disconnect the wiring connector.

5. Remove the attaching nuts, and remove the light body.

Installation

Reverse the removal procedures.

LICENSE PLATE LIGHT



1. License plate light lens packing No.1
2. License plate light lens No.1
3. License plate light rim
4. License plate light lens No.2
5. License plate light lens packing No.2
6. Bulb
7. License plate light body packing

Fig.12-7 License Plate Light E1871

Removal

1. Remove the attaching screws, and remove the light rim and the light lens.

2. Turn the bulb counterclockwise

while pushing it lightly, and remove it.

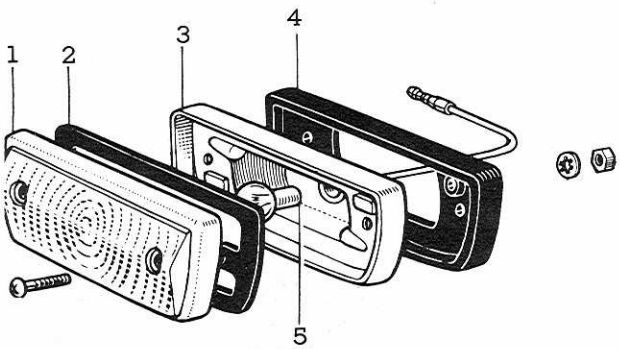
3. Remove the tail gate inside panel.

4. Lift the tail gate window glass half-way, disconnect the wiring connector, and remove the attaching nuts, then remove the light body.

Installation

Reverse the removal procedures.

PARKING LIGHT



1. Parking light lens
2. Parking light lens gasket
3. Parking light body
4. Parking light body gasket
5. Bulb

Fig.12-8 Parking Light E1870

Removal

1. Remove the two attaching screws.

2. Remove the lens and the gasket.

3. Turn the bulb counterclockwise, and remove the bulb.
   Disconnect the wiring connector.

4. Remove the two attaching nuts, and remove the parking light body.

Installation

Follow the removal procedures in the reverse order.

REFLECTOR

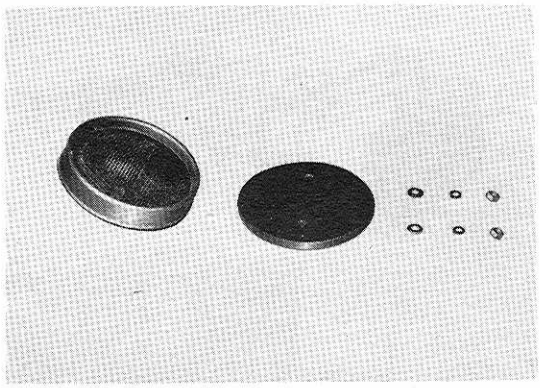


Fig.12-9 Reflector B1179

Removal

1. Remove the side window trim panel. (only the rear reflectors)

2. Remove the two attaching nuts, and remove the reflector and the rubber packing.

ROOM LIGHT

Removal

1. Remove the room light lens by turning it counterclockwise.

2. Remove the bulb.

3. Remove the room light body retaining screws, disconnect the wiring connector, and remove the room light assembly.

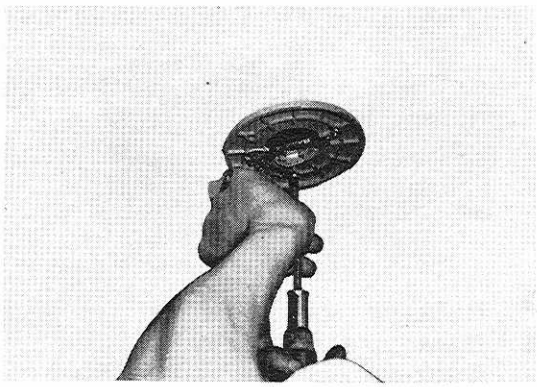


Fig.12-10 Removing Room Light B1180

Installation

Reverse the removal procedures.

IGNITION SWITCH

Removal

1. Disconnect the wiring connector.
2. Remove the ignition switch from the rear of the instrument panel using the Switch Wrench 09802-12010.

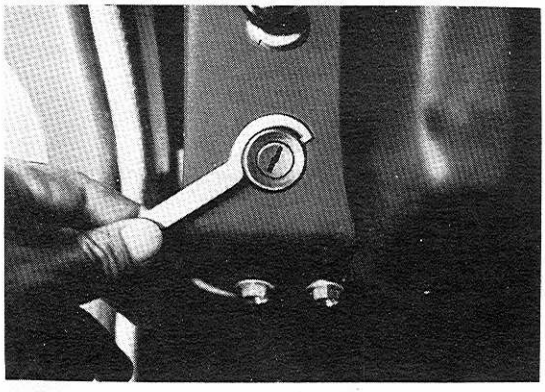


Fig.12-11 Ignition Switch Removal B1181

Installation

Follow the removal procedures in the reverse order.

LIGHTING & WIPER SWITCHES

Removal

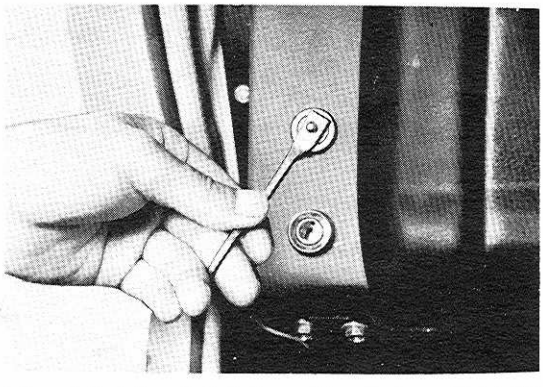


Fig.12-12 Lighting Switch Removal B1182

1. Remove the lock screw, and remove the knob.
2. Remove the switch with the Switch Wrench 09802-12010.
3. Disconnect the wiring connector, and remove the switch.

Installation

Follow the removal procedures in the reverse order.

BACK-UP LIGHT SWITCH

The back-up light switch is installed at the end of the remote control shaft. To remove, disconnect the wiring connector, and remove one attaching screw.

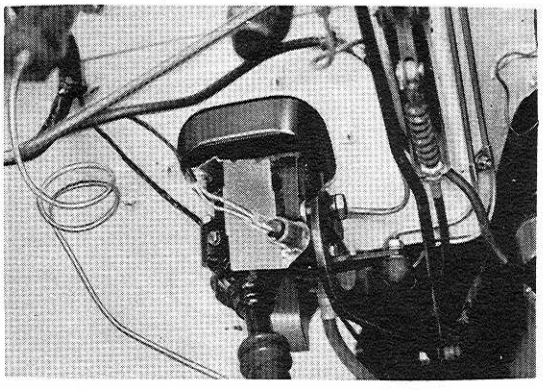


Fig.12-13 Back-Up Light Switch B1183

WATER TEMPERATURE SENDING GAUGE

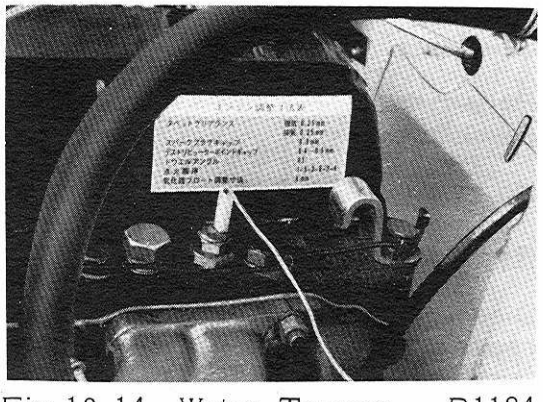


Fig.12-14 Water Temperature Sending Gauge B1184

Removal

1. Disconnect the wiring connector.
2. Turn the gauge counterclockwise, and remove it.

Installation

Follow the removal procedures in the reverse order.

FUEL SENDING GAUGE

Removal

1. Remove the fuel tank inspection hole cover.
2. Disconnect the wiring connector.
3. Remove the sending gauge attaching screws, and remove the fuel sending gauge.

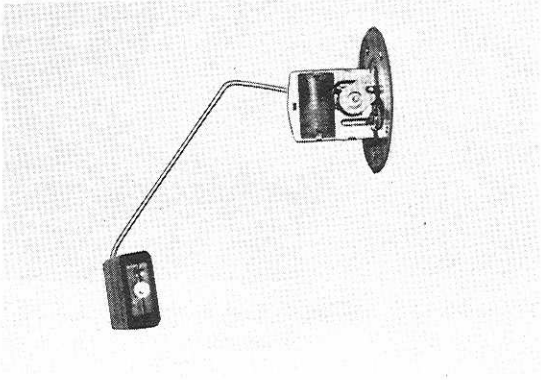


Fig.12-15 Fuel Sending Gauge B1185

Installation

Follow the removal procedures in the reverse order.

OIL PRESSURE SWITCH

Removal & Installation

Disconnect the wiring connector, and remove the oil pressure switch.

Follow the removal procedures in the reverse order.

HORN BUTTON

Removal

1. Remove the three attaching screws from underneath of the steering wheel, and remove the steering pad.
2. Remove the horn button cover attaching screw from underneath of the steering wheel, and remove the horn button cover.
3. Remove the horn button attaching screw, and remove the horn button.

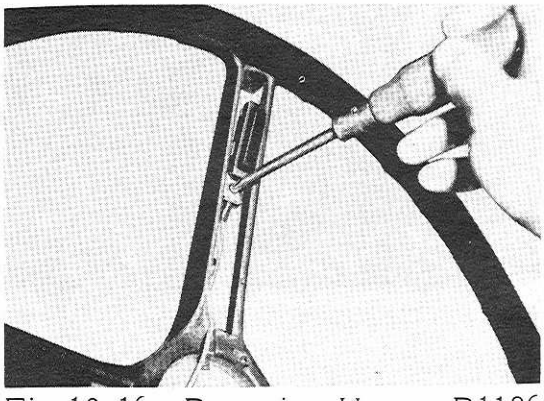


Fig.12-16 Removing Horn Button B1186

Installation

Follow the removal procedures in the reverse order.

TURN-SIGNAL, DIMMER & HEADLIGHT FLASHER SWITCH

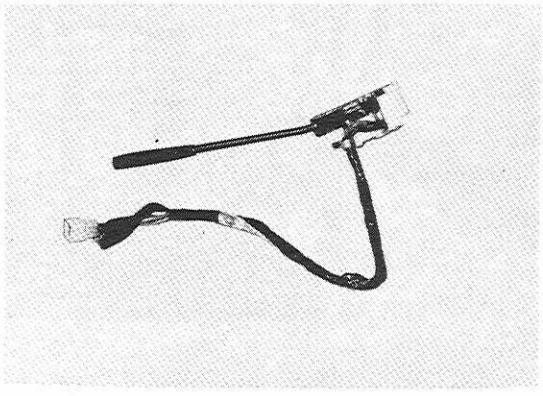


Fig.12-17 Turn-Signal Switch B1187

Removal

1. Remove the steering pad.
2. Remove the steering wheel securing nut, and remove the steering wheel using the Steering Wheel Puller 09609-20010.
3. Disconnect the wiring connector.
4. Remove the three attaching screws, and remove the switch assembly.

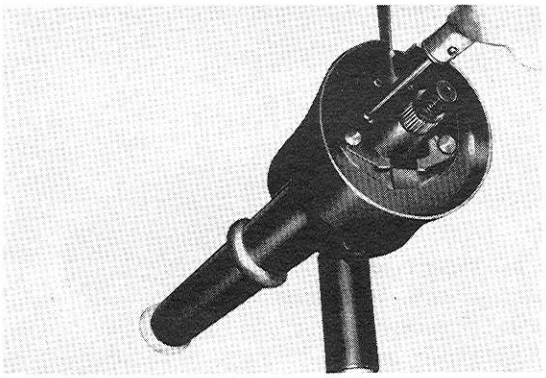


Fig.12-18 Removing Attaching Screws B1188

Installation

Follow the removal procedures in the reverse order.

HORN

Trouble Shooting

Symptoms & Probable Causes	Remedies
Horns Do Not Sound	
1. Fuse burnt out	Replace
2. Wire broken	Replace
3. Point wrong contacted with horn contact plate	Repair
4. Horn defective	Repair or replace
Insufficient Volume or Improper Tone	
1. Wire loose	Repair
2. Wire incorrect	Repair
3. Horn switch poor contact	Repair
4. Horn out of adjustment	Repair
5. Horn contact plate poor contact	Repair
6. Condenser or resistor defective	Replace
7. Diaphragm defective	Replace

TURN-SIGNAL & HAZARD WARNING FLASHERS

Both the turn-signal flasher and the hazard warning flasher are installed inside of the instrument panel.
To remove, disconnect each wiring connector, and remove the attaching screws.

HORN RELAY

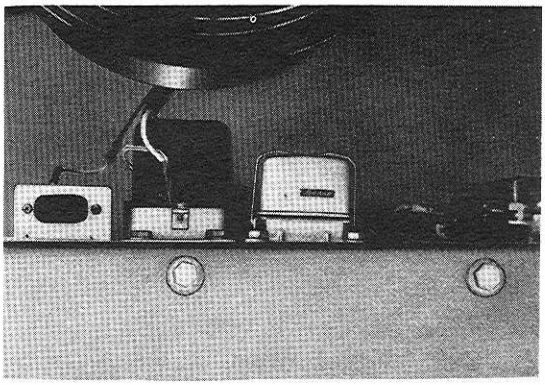


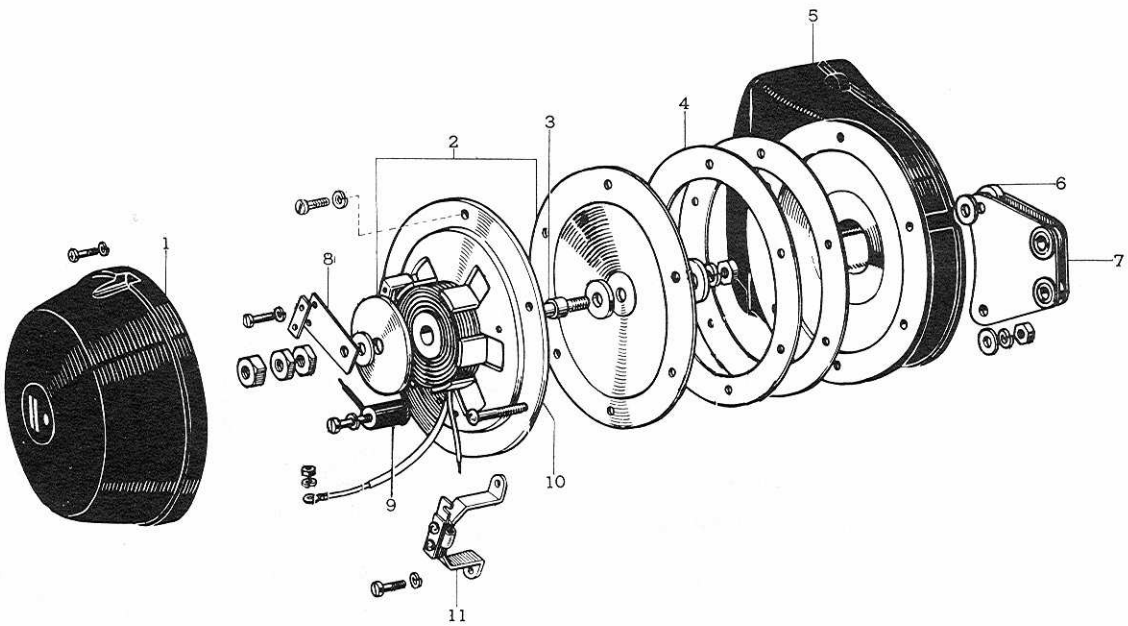
Fig.12-19 Horn Relay B1189

Removal

1. Disconnect the wiring connector.
2. Remove the two attaching bolts, and remove the horn relay.

Installation

Follow the removal procedures in the reverse order.



1. Horn cover
2. High pitched horn diaphragm
3. Moving bolt
4. Horn gasket
5. Low pitched horn trumpet
6. Collar
7. Horn stay
8. Horn breaker spring
9. Resistor
10. High pitched horn magnet
11. Horn breaker

Fig.12-20 Horn E1875

Removal

1. Disconnect the wiring connector.

2. Remove the horn.

Installation

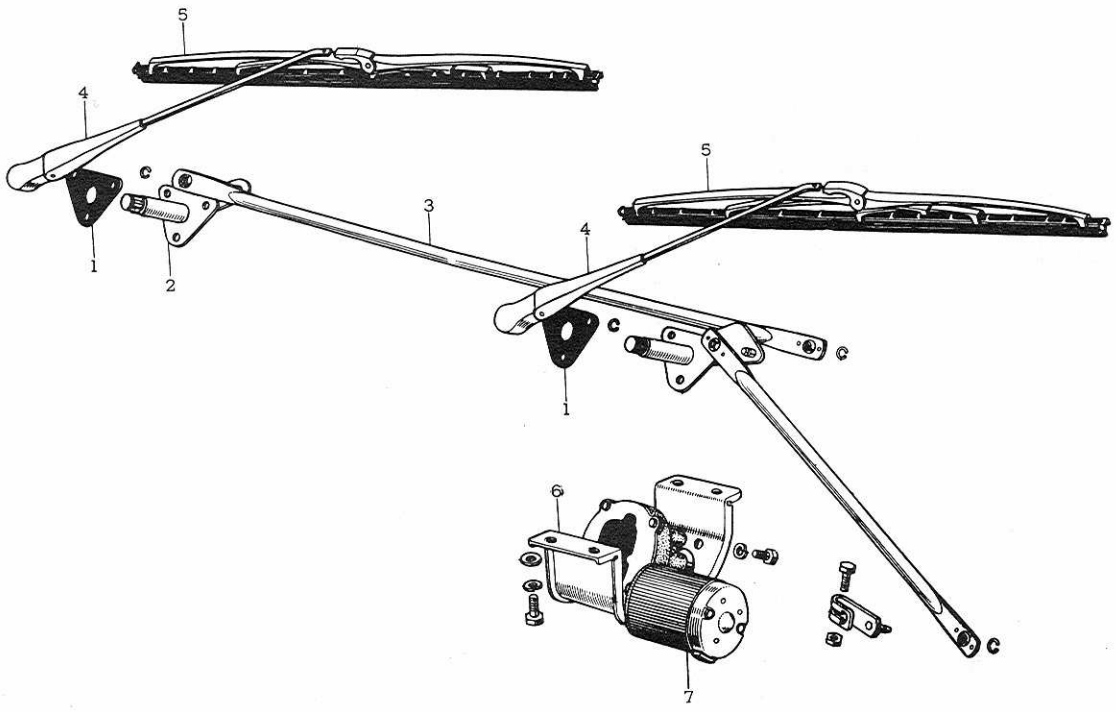
Follow the removal procedures in the reverse order.

Adjustment

1. Install an ammeter to the horn, and measure the amperage of the current.
   To adjust the amperage of the current, loosen the lock nut, and turn the adjusting nut to obtain the amperage of 3.5 amperes. To increase the amperage, turn the adjusting nut counterclockwise, and to decrease the amperage, turn the adjusting nut clockwise. After adjusting, tighten the lock nut.

2. To adjust the horn sound, loosen the lock nut, and turn the moving plate to obtain proper contact gap so that at 9 volts the horn will sound and at 15 volts the moving plate will not contact with the core. To increase the gap, turn the moving plate counterclockwise, and to decrease the gap, turn the moving plate clockwise.
   After adjusting, tighten the lock nut.

WIPER



1. Windshield wiper link gasket
2. Windshield wiper link pivot
3. Windshield wiper link rod
4. Windshield wiper arm
5. Windshield wiper blade
6. Wiper motor bracket
7. Wiper motor

Fig.12-21 Windshield Wiper E1873

Description

The windshield wiper composes of the electric motor and cranking mechanism. The cranking mechanism is provided with an electric brake for automatic stopping at the same position whenever the wiper motor is switched off.
As the wiper arms are connected to the linkage shaft with serration, the adjustment of the wiping angle can be made easily.

Voltage	12 volts
No-load revolution at high speed	65 ~ 95 rpm
No-load revolution at low speed	45 ~ 55 rpm
No-load operating current	Less than 1.8 amperes
Blade tension	400 ~ 460 grams
Blade movement	Parallel
Arm connection	Serration
Starting torque at high speed	More than 60 kg-cm
Starting torque at low speed	More than 80 kg-cm

Trouble Shooting

Symptoms & Probable Causes	Remedies
Wiper Motor Does Not Operate	
1. Fuse burnt or poor contact	Repair or replace
2. Connector poor contact	Repair
3. Wiper arm defective	Replace
4. Wiper switch defective	Replace
5. Wire in the motor broken or shorted	Repair or replace
6. Brush worn or poor contact	Replace brush spring
7. Commutator burnt or dirty	Repair
8. Bearing bushing stuck	Repair or replace
9. Gear defective	Replace
Wiper Will Not Stop	
1. Wiring connection incorrect	Correct
2. Wiper switch defective	Replace
3. Electric brake defective	Repair or replace
Wiper Blade Stops Improperly	
1. Wiper arm improperly installed	Correct
2. Contact point poor contact	Repair
3. Cam plate improperly installed	Repair
Improper Wiping	
1. Wiper blade pressure insufficient	Repair or replace
2. Oil on windshield glass	Clean
3. Wiper blade rubber harden or worn	Replace

Removal

1. Disconnect the wiper link from the motor.

2. Remove the two bracket attaching bolts at the rear side.

3. Remove the wiper motor attaching screws, and disconnect the wiring, then remove the wiper motor.

4. Remove the wiper arms with the blades.
   Remove the combination meter with the speedometer, and loosen the throttle wire to facilitate the removal of the wiper link.

5. Remove the wiper link attaching bolts, and remove the wiper link.

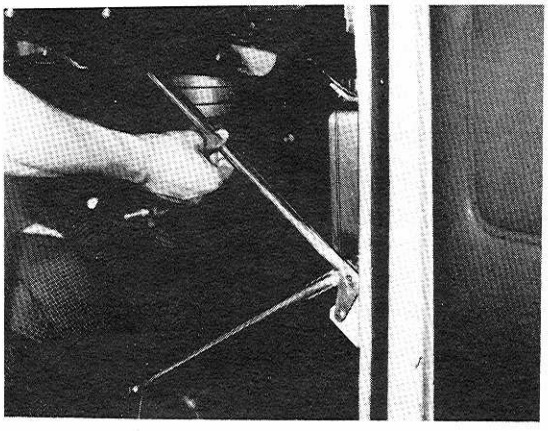
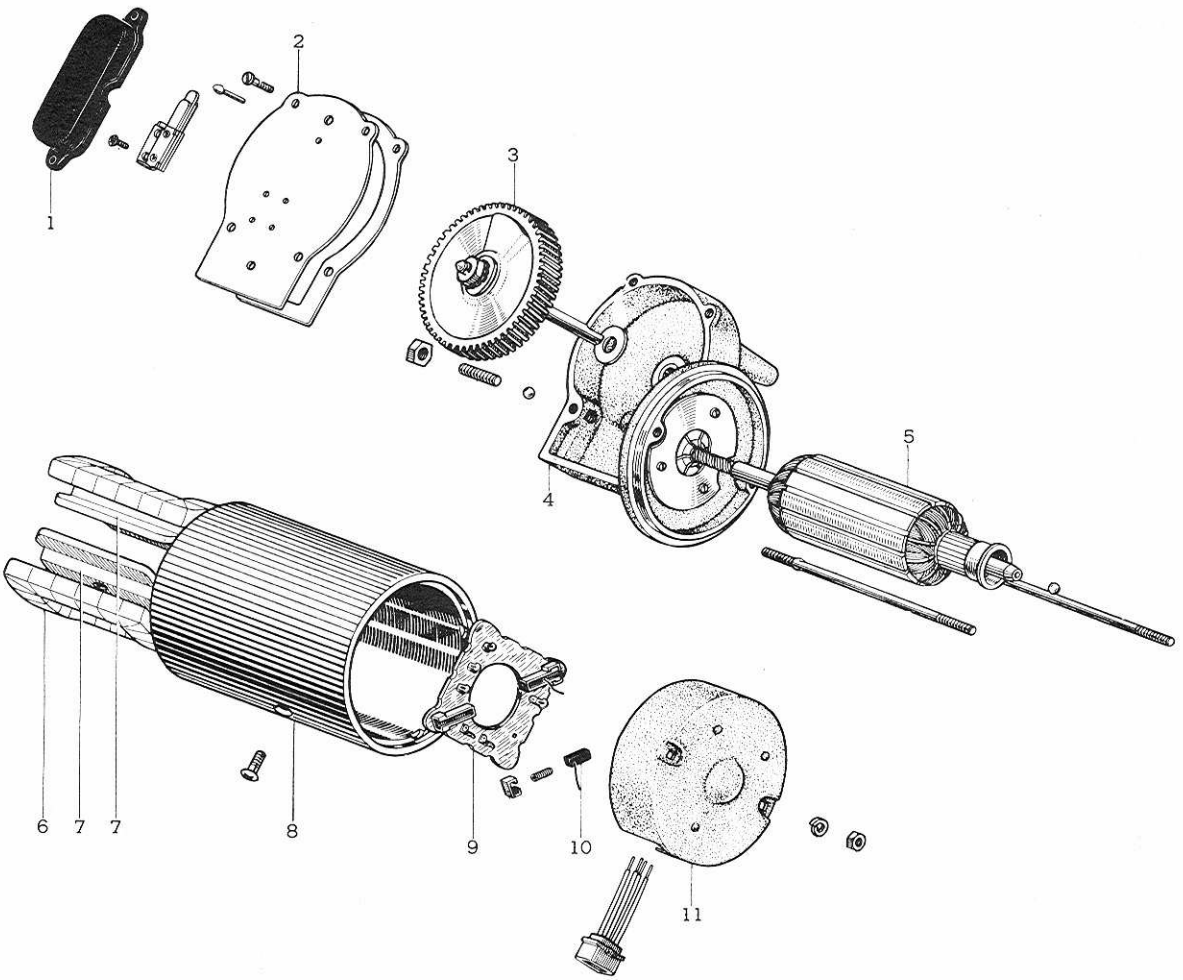


Fig.12-22 Removing Wiper Link B1190

Disassembly

1. Remove the wiper motor cover, and disconnect the wire by melting the solder.



1. Wiper motor cover
2. Wiper motor crank housing cover plate
3. Wiper motor gear
4. Wiper motor gear housing
5. Armature
6. Field coil
7. Pole core
8. Yoke
9. Brush holder
10. Carbon brush
11. Commutator end frame

Fig.12-23 Wiper Motor E1874

2. Remove the housing cover plate, and remove the wiper motor gear. Next, remove the attaching nut, and remove the cam plate.

3. Remove the two nuts, and remove the end frame.
Do not lose the ball.

4. Remove the thrust gap adjusting screw, and remove the armature. If necessary, remove the brush by melting the solder.

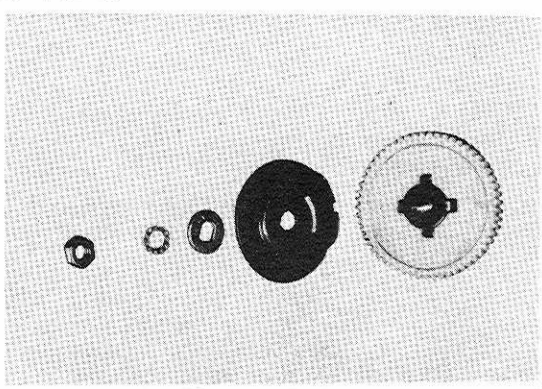


Fig.12-24 Removing Cam Plate B1191

Assembly

Follow the disassembly procedures in the reverse order. Apply grease onto the gears.

To obtain a proper armature thrust gap, screw in the wiper motor screw fully, unscrew it 1/8 ~ 1/10 of a turn from the fully screwed position, and lock it with the lock nut.

To install the cam plate, gear and the crank arm into correct position, the convex portion of the cam plate should be located to the positive terminal with the crank arm positioned to the stopping position.

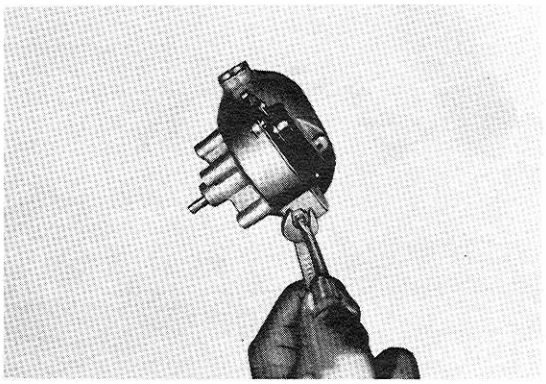


Fig.12-25 Installing Lock Nut B1192

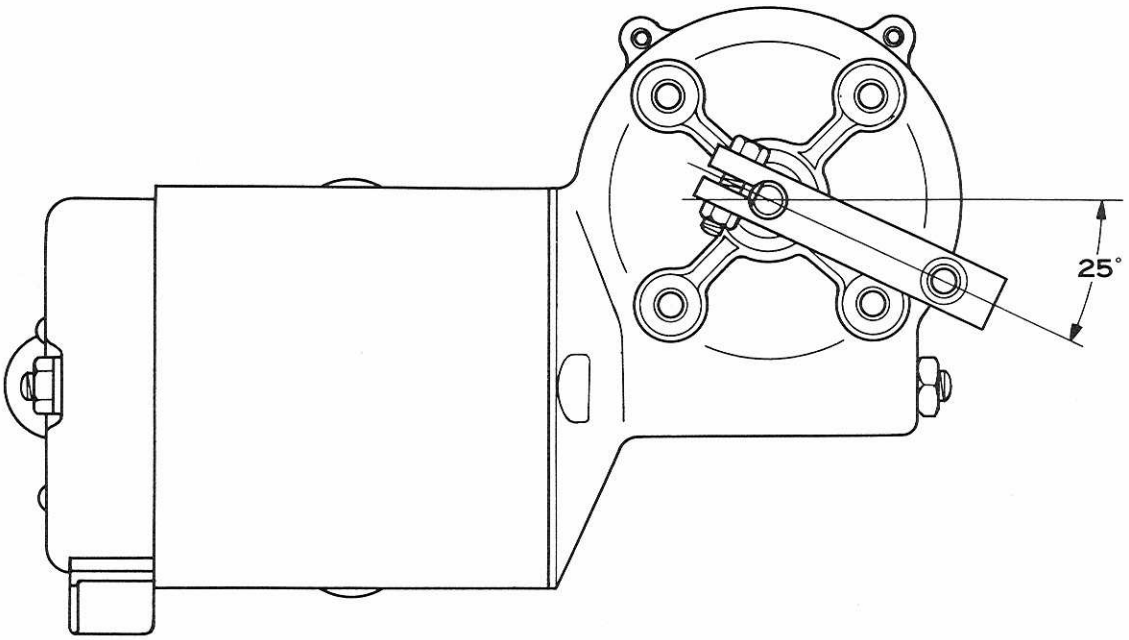


Fig.12-26 Arm Installing Position G2755

BODY ELECTRICAL (FJ40,43,45)

HEADLAMPS

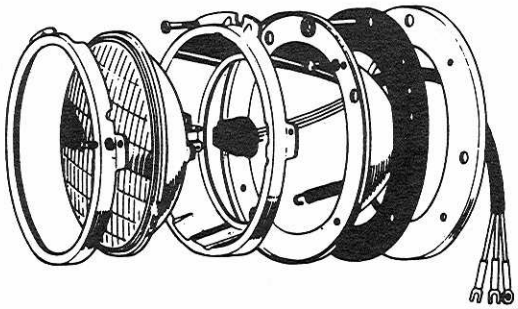


Fig.12-27 Headlamp

REMOVAL & INSTALLATION

1. To remove the headlamps, first remove the radiator grille.
2. Remove the headlamp sealed beam retaining ring by unscrewing three attaching screws.
3. The sealed beam unit can be taken out. Disconnect the headlamp from the socket & cord complete.
4. Unloosen the headlamp adjusting bolts and remove the headlamp sealed beam seating ring.
5. Remove the screws retaining the headlamp body, and then remove the headlamp packing and headlamp housing ring.
6. To install, follow the removal procedure in reverse order.

AIMING

Headlamp can be adjusted quickly and accurately with a headlamp tester. If this equipment is not available, however, the adjustment can be made as follows.

1. Place the vehicle on a level floor so that the headlamps are 33 feet (10 m) from a smooth vertical surface, such as a door or wall, preferably of a light color.
   The centerline of the vehicle should be at right angles to the vertical surface.
2. Measure the height of the headlamp center from the floor, then draw a horizontal line on the vertical surface at this point. Locate the point on this line at which projected centerline of the vehicle intersects. Measure the distance between the headlamp centers and divide this distance equally on both sides of the center mark.
   Draw a vertical line through each of these points. The points at which these two vertical lines intersect the horizontal line represent the centers of the right and left headlamps.

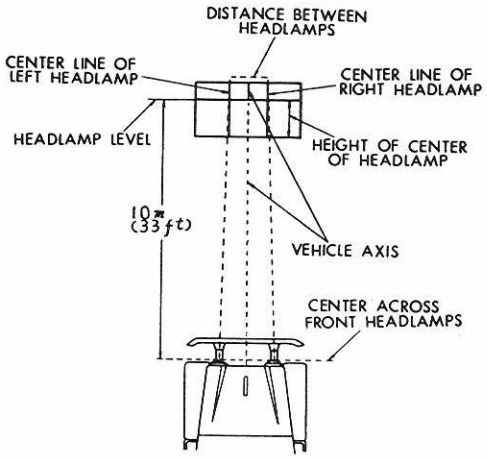


Fig.12-28 Headlamp Adjusting Chart

3. Thrn on the headlamps and select the high beam with the dimmer switch.
4. Cover one headlamp while adjusting the other. The adjustment can be made with a vertical adjusting bolt and a lateral adjusting bolt located at the headlamp sealed beam seating ring.
   Aim the headlamp so that the beam pattern registers with horizontal and vertical lines in manner shown in the figure.

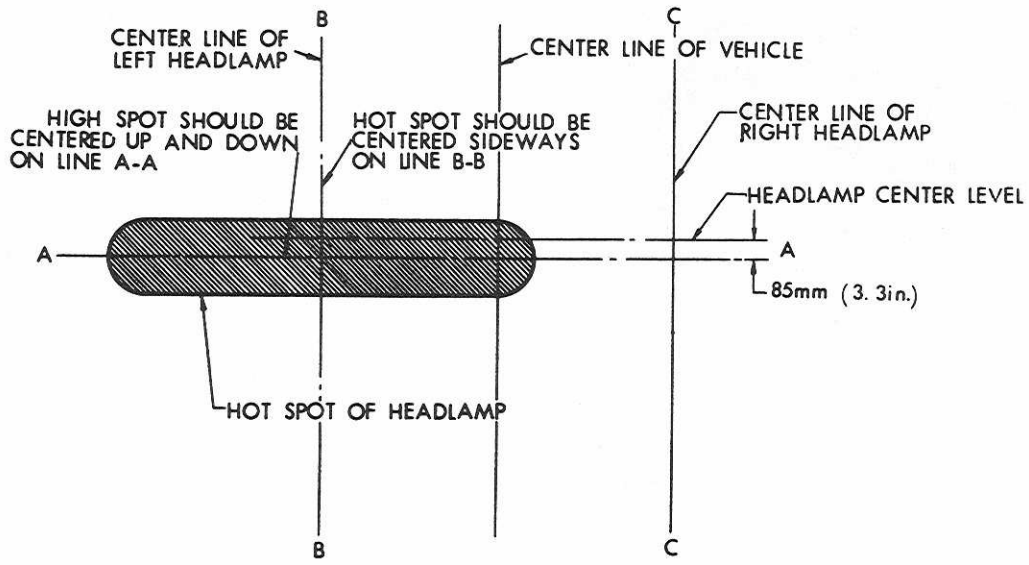


Fig.12-29 Headlamp Aiming Pattern

LAMP BULB REPLACEMENT

PARKING LAMPS

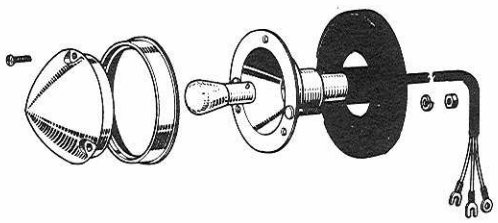


Fig.12-30 Parking Lamp

To replace the bulb in the parking lamp, remove the parking lamp lens by removing the three attaching screws. To remove the bulb, push in the bulb and turn it counterclockwise. To install the new bulb, push in the bulb and turn it clockwise.

FOG LAMPS

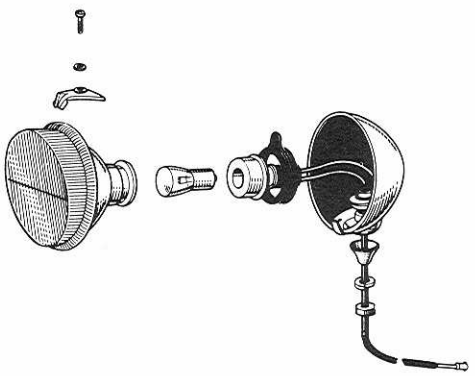


Fig.12-31 Fog Lamp X4777

To replace the fog lamp bulb, remove the fog lamp reflector stopper screw and the fog lamp reflector, and then remove the bulb.

FRONT TURN SIGNAL LAMPS

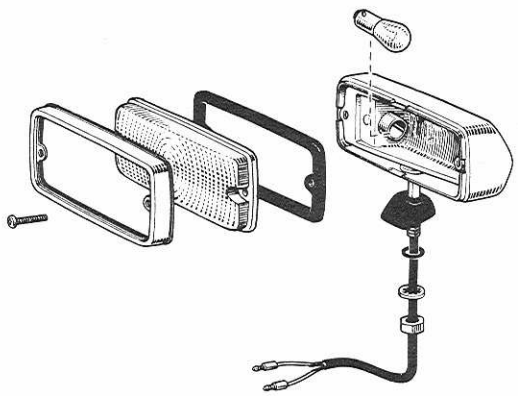


Fig.12-32 Front Turn Signal Lamp (FJ40,43 & 45)

To replace the front turn signal lamp bulb, remove the three attaching screws, and then remove the turn signal lamp lens. Push down the bulb and remove.

COMBINATION REAR LAMPS

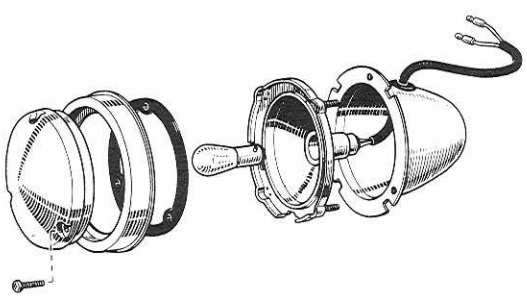


Fig.12-33 Combination Rear Lamp (FJ40 & 43)

To replace the bulb in the combination rear lamp, remove the combination rear lamp lens by removing the three attaching screws. To remove the bulb, push in the bulb and turn it counterclockwise. To install the new bulb, push in the bulb and turn it clockwise.

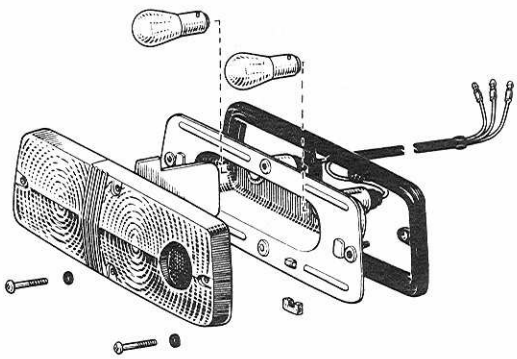


Fig.12-34 Combination Rear Lamp X4793

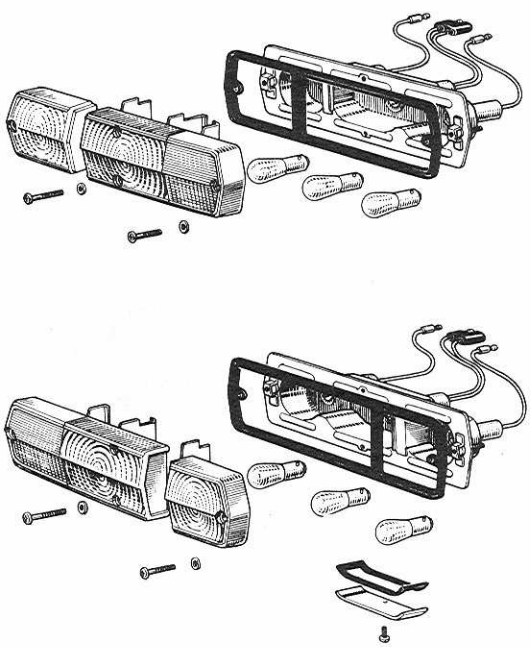


Fig.12-35 Combination Rear Lamp X4780

To replace the bulb, loosen and remove the four attaching screws and remove the lens.
To remove the bulbs, push in the bulbs and turn it counterclockwise. Replace the bulbs and reinstall the lens and the attaching screws.

LICENSE PLATE LAMPS

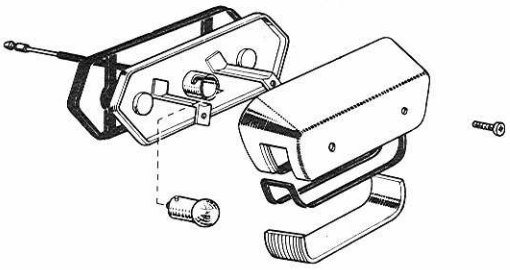


Fig.12-36 License Plate Lamp

To replace the bulb, remove the license plate lamp cover by loowening the two attaching screws.
Push and turn the bulb counterclockwise to remove, and clockwise to install.

INTERIOR LAMPS

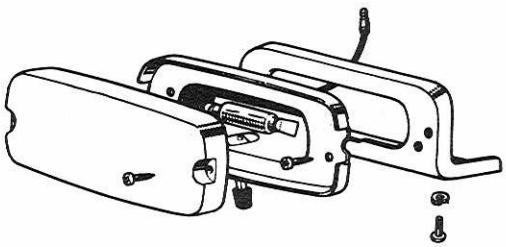


Fig.12-37 Interior Lamp (FJ40(L)V) X4782

To replace the lamp bulb, first remove the interior lamp glass and remove the bulb.

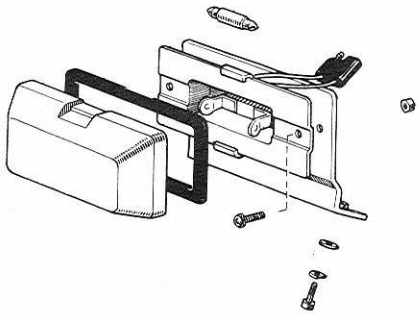


Fig.12-38 Interior Lamp (FJ45(L)P-B) X4783

To remove the piller lamp bulb, first remove the lamp glass and remove the bulb.

SIDE TURN SIGNAL LAMPS

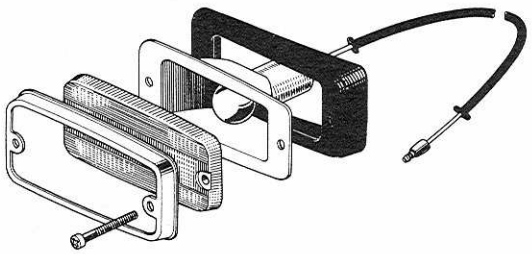


Fig.12-39 Side Turn Signal Lamps (Except USA) 10859

To replace the lamp bulb, first remove the interior lamp glass and remove the bulb.

TURN SIGNAL CONTROL

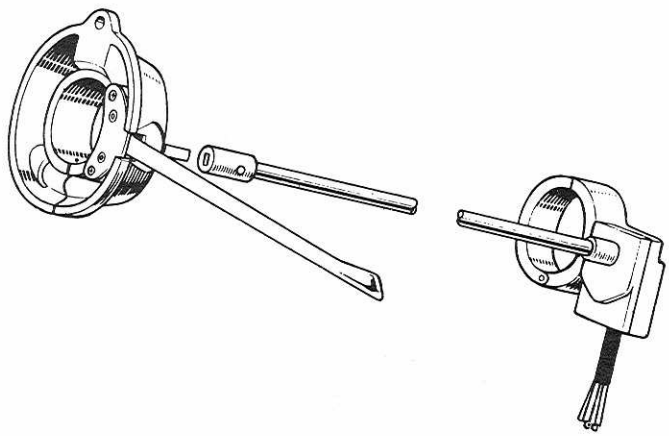


Fig.12-40 Turn Signal Control

TURN SIGNAL SWITCH

The turn signal switch assembly is mounted on the steering post. The upper half of the switch is located right below the steering wheel and a rod extends from it to the lower half of the switch clamped on to the lower part of the steering post.

Removal

1. Remove the plate from the instrument panel, then remove the screw from the lower switch clamp. Open the clamp and remove the lower switch and intermediate rod.
2. Remove the control lever pin from the control shaft and lever.
3. Pull the control lever out of the control shaft half away.
4. Remove the horn button from the steering wheel, then remove the steering wheel retaining nut.
5. Remove the contact spring, spacer, plate and horn brush from the wheel Then remove the steering wheel using Steering Wheel Puller (09609-20010).
6. Remove the screw from the upper switch clamp, then pull the upper half of the switch from the steering post with the upper bracket shaft.
7. Remove the upper bracket shaft from the switch by turning it counterclockwise.

Installation

Follow "Removal" in reverse order.

TURN SIGNAL INDICATOR LAMPS

The turn signal indicator lamps are installed on each side of the speedometer. To remove the lamps for replacement, pull out the cord and socket from the combination meter housing. Pushing the light bulb, turn it counterclockwise to remove.

FLASHER UNIT

The flasher unit is installed on the dash board adjacent to the fuse box.

Replacement

1. Disconnect wires from the flasher unit, the remove the clamp screw. Open the clamp wide enough to remove the flasher unit.
2. Install a good flasher unit in the clamp and secure it in place by a screw. Connect the wire to the flasher unit and check the operation of the flasher unit.

WINDSHIELD WIPER

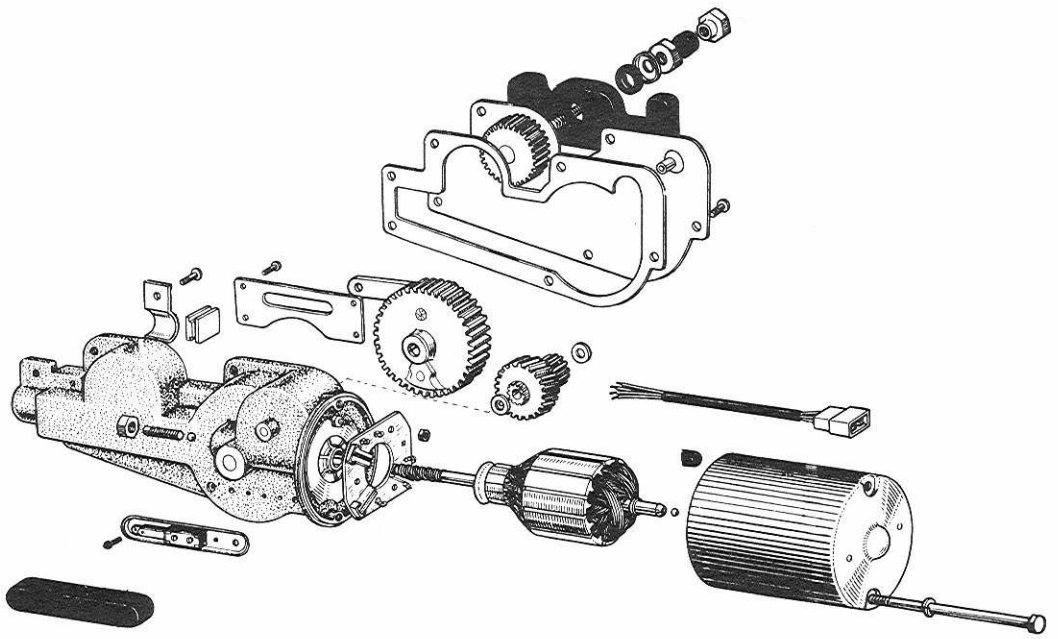


Fig.12-41 Windshield Wiper 10867

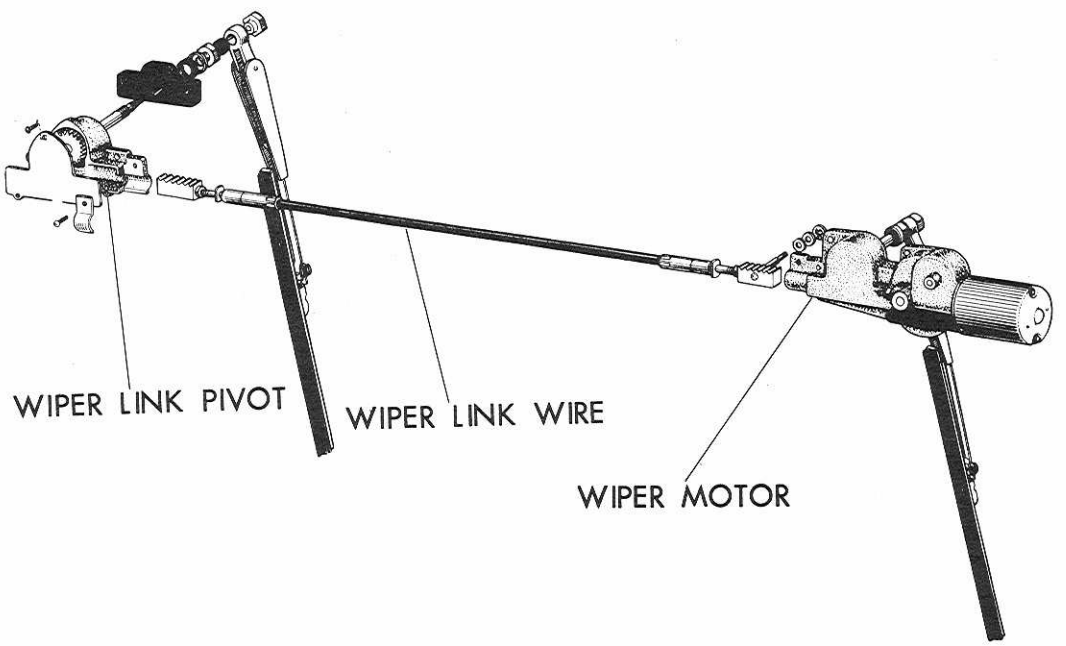


Fig.12-42 Windshield Wiper System 10868

WIPER SWITCH

The wiper switch is located approximately at the center of the instrument panel near the choke button.

Replacement

1. Loosen the lock screw of the switch button and remove the button from the switch.
2. Remove the retaining ring from the switch, then remove the switch toward the back of the instrument panel.
3. Disconnect wires at the switch terminals.
4. Connect the wires to the switch terminals. Position the switch in the instrument panel and install the retaining ring on the switch.
5. After securing the switch in the instrument panel, install the switch button and tighten the lock screw.

WIPER MOTOR

The electrically operated windsield wiper motor is mounted at the top of the windsield. The motion of the wiper motor is controlled by a switch installed on the instrument panel.

Removal

1. Remove the wiper arm and brade.
2. Remove the pivot housing end plate from the pivot housing.
3. Remove the wiper motor with the wiper link wire.
4. If necessary, take of the wire from the wiper motor. Remove the wiper motor drive shaft assembly. Them remove the wiper motor gear plate and wire clamp. And, remove the wire from wiper motor gear housing.

Installation

Follow "Removal" in reverse order.

Note: Pull the wiper switch and check wiper blade position. If the wiper does not wipe the desired ared loosen the lock bolt nut and adjust the wiper blade.

WINDSHIELD WIPER ARM & BLADE

The windshield wipers are mounted at

the bottom of the left and right sections of the windshield.

Replacement

1. Remove the wiper blade from the wiper arm, and remove the wiper arm lock nut. Temove the wiper arm.
2. Install the wiper arm to the shaft and lock the arm in place with the lock bolt and nut.
3. Install the wiper blade on the wiper arm and check the wiper blade position. If the wiper does not operate in desired area, loosen the lock bolt nut and adjust the wiper blade.

WIPER LINK WIRE

Removal

1. Remove the wiper arm and brade.
2. Remove the pivot housing end plate from the pivot housing.
3. Remove the wiper motor with the wiper link wire.
4. Remove the wiper motor drive shaft assembly. Then remove the wiper motor gear plate and wire clamp.
5. Take off the wire from the wiper motor.

Installation

Follow "Removal" in reverse order.

OTHER SWITCHES

LIGHTING SWITCH

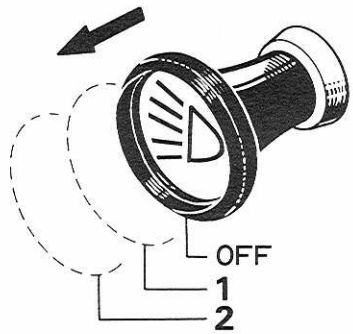


Fig.12-43 Lighting Swith E 004

The Land Cruiser has a rotary type lighting switch on the instrument panel. The switch has three positions and controls all the vehicle lights and trailer socket.

Replacement

1. Remove the screw from the switch knob, then remove the knob.
2. Remove the switch retaining ring by turning it counter-clockwise.
3. Remove the switch from the back of the instrument panel, and disconnect all wires at switch terminals.
4. Connect all wires to the respective terminals of the new switch.
5. Install the switch in the instrument panel, and secure it in place with the retaining ring.
6. Install the switch knob and lock it firmly in position with a screw.

IGNITION & STARTER SWITCH

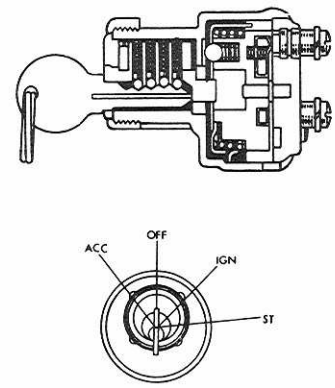


Fig.12-44 Ignition & Starter Switch

Replacement

1. Disconnect wires from the switch terminals.
2. Remove the switch retaining ring, and push the switch toward the back of the instrument panel to remove it.
3. Position the new switch in the instrument panel, and install the retaining ring on the switch.
4. Tighten the retaining switch using a pair of pliers. It is good idea to protect the retaining ring with a rag before applying the pliers.

FRONT DRIVE INDICATOR SWITCH

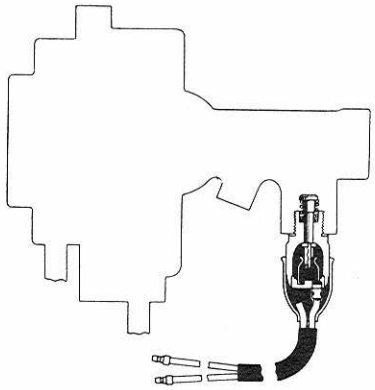


Fig.12-45 Front Drive Indicator Switch

The switch is installed on the diaphragm cylinder body, and when the front drive shift button is operated (pulled out), the push rod moves forward. Then the indecator switch ball seats in the slot of push rod, thus completing the circuit to the indicator.

Replacement

Disconnect the wires at the socket, then unscrew the entire assembly counter-clockwise. Replace the switch and/or the ball. Install the ball in the diaphragm cylinder body, then install the switch assembly in the diaphragm.

STOP SWITCH

The stop switch is installed on the pedal bracket underneath the instrument panel and is always in contact with the brake pedal except when the brake pedal is depressed.

Replacement

1. Screw back the lock nut, then remove the stop switch by turning it counter-clockwise.
2. Disconnect the wires at snap terminals.
3. Connect the wires of new switch, and install the switch in the pedal bracket

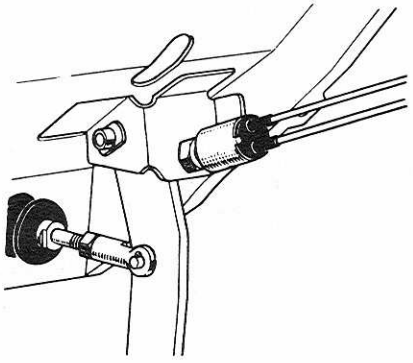


Fig.12-46 Stop Switch

Replacement

4. Check the operation of the stop switch by depressing the brake pedal. If its operation is not satisfactory, screw in or screw back the switch until the switch operates properly. Lock the switch securely with the nut.

DIMMER SWITCH

The dimmer switch is installed on the toeboard to the right of the clutch pedal. High and low beam changeovers are made by this foot-operated dimmer switch.

Replacement

1. Remove two bolts attaching the switch to the toe-board.
2. Remove the switch from the back of the toe-board.
3. Disconnect the wires at the switch terminals.
4. Connect the wires to the terminals of the dimmer switch.
5. Position the switch in the toeboard from the its back and secure it in place with two bolts.

HORNS

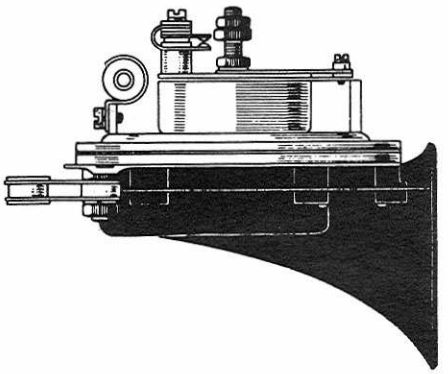


Fig.12-47 Horn

A pair of horns is mounted on the tire aprons in the engine compartment, and is controlled by means of a relay. The horn button closes the relay contacts, completing the circuit to the horns. A high pitch toned horn is mounted on the right tire apron, and a low pitch toned horn is installed on the left side tire apron.

CURRENT DRAW TEST

Connect a voltmeter and ammeter to the horn and to a voltage supply. The current draw for the horns is 7 amperes at 13 volts.

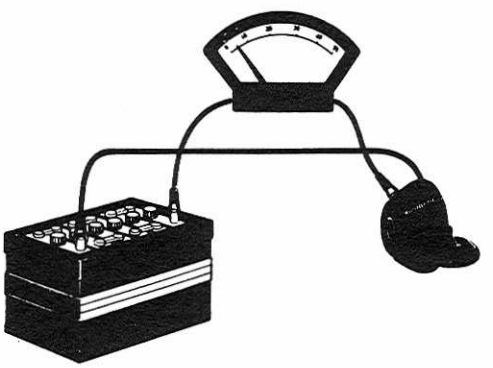


Fig.12-48 Current Draw Test

Adjustment

The adjustments necessary for the horns are current draw and air gap adjustments.

Current Draw Adjustment

Loosen the center bolt nut then turn the nut counter-clockwise to increase the current and the other way to decrease the current. Make sure to lock the nut securely after the adjustment is finished.

Air Gap Adjustment

Denso-made
The air gap is defined as the clearance between the moving plate coil case. To adjust the gap, loosen the plate lock nut that is located under the nut and turn the moving plate clockwise to make the gap smaller. When the gap is excessive, the horns will not operate under the low voltage. If the gap is small, it makes the plate and the case come in contact at high voltage and disturbs the horns' tone. Furthermore, it causes a damage to the diaphragm. For these reasons, the gap should be adjusted so that the horns operate at 10 volts, and the plate and case do not come in contact at 15 volts, specified clearance is 0.6mm (0.024 in.).

Maruko-made
To adjust the gap, loosen the nut which retains the horn cone to the horn base, then adjust the gap to the specified clearance.

HORN RELAY

The horn relay is installed at the right side of the cowl and it protects the horn button switch from burning and prevents voltage drop in the horn circuit. The main trouble in the horn relay is burned contact points. They should be dressed down with a fine file or sandpaper until the points contact evenly. If the horn relay does not operate when the horn button is depressed, the trouble is due to break in wire or coil.

Specifications for Adjustment

Voltage for points to close	6~8 volts
Coil resistance	
Air gap	0.4 mm (0.016 in.)
Point gap	0.8 mm (0.032 in.)

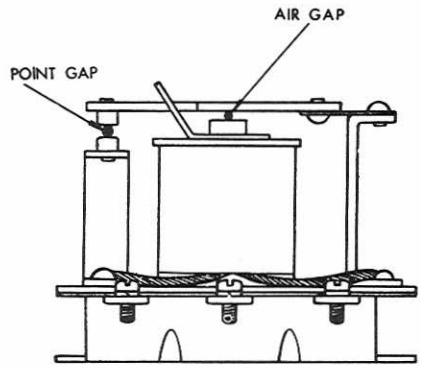


Fig.12-49 Horn Relay

Replacement

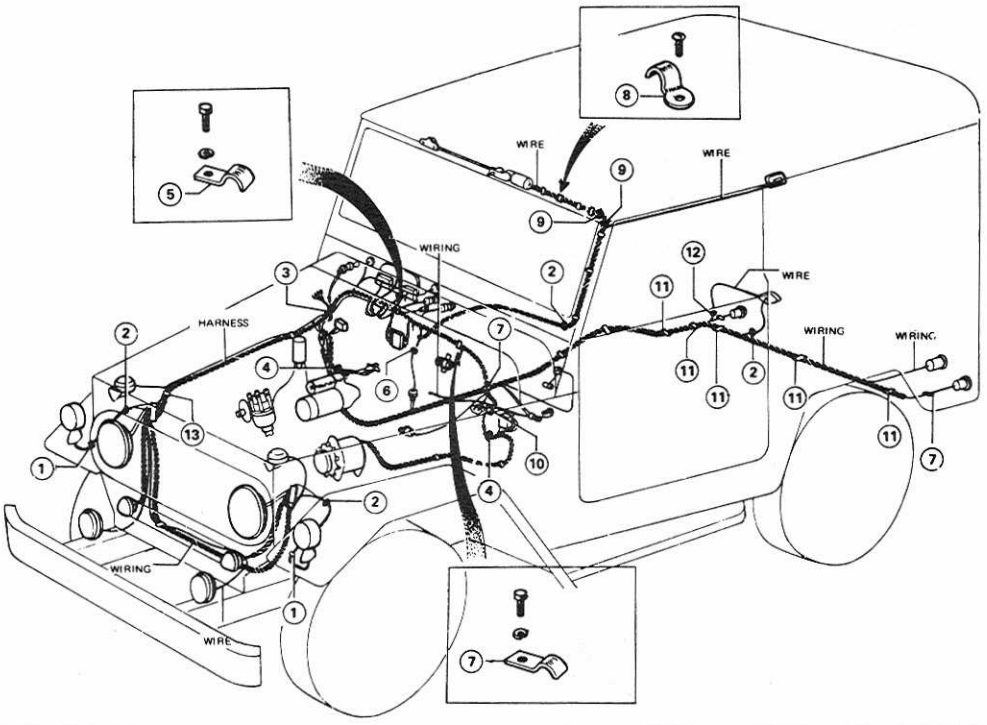
1. Disconnect the wires from the horn relay, then remove bolts and spring washers attaching the horn relay to the cowl.
2. Install the relay to the cowl with spring washers and bolts.
3. Connect the wires to the terminals of the horn relay.

* *

WIRING HARNESS & CLAMP

NOTE

When wiring harness repairing, disconnect the battery cable.

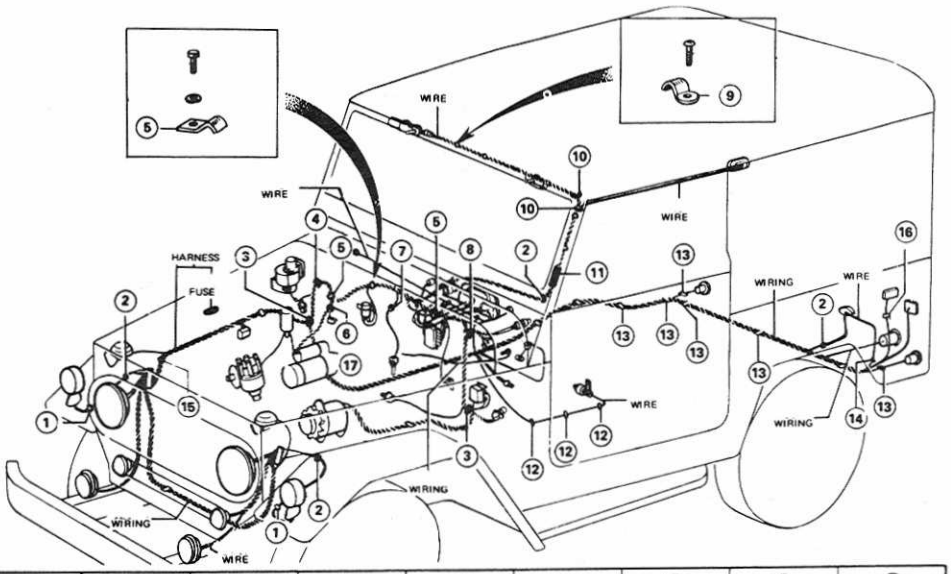


	①	②	③	④	⑤	⑥	⑦	⑧
TYPE								
PART NO.	90462-10006	90480-15007	90480-46032	90480-01050	90462-10004	90480-19048	90462-10008	90462-08002
MODELS	all	all	all	all	all	all	all	all
PROD. DATE	6903-	6903-	6903-	6903-	6903-	6903-	6903-	6903-
QTY.	2	4	1	2	1	1	4	9

	⑨	⑩	⑪	⑫	⑬			
TYPE								
PART NO.	56381-90301	90480-46033	90463-08030	90480-17008	82711-10010			
MODELS	all	all	all	all	all			
PROD. DATE	6903-	6903-	6903-	6903-	6910-			
QTY.	2	1	7	2	4			

ME 063

Fig.12-50 Wiring Harness & Clamp (Hard Top-RHD)

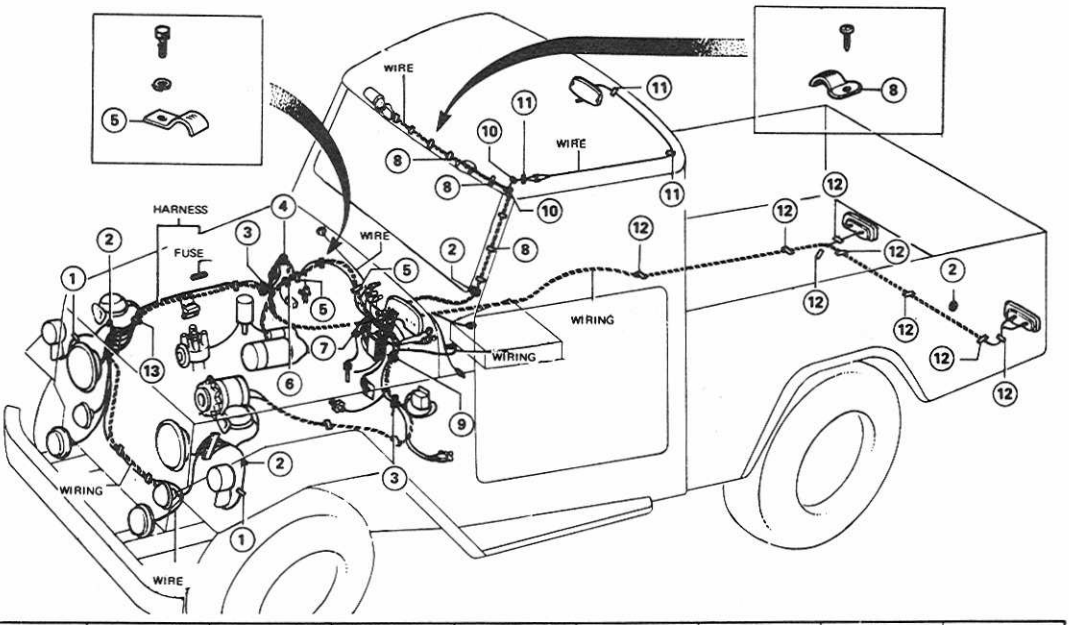


	①	②	③	④	⑤	⑥	⑦	⑧
TYPE								
PART NO.	90462-10006	90480-15007	90480-01050	90480-46032	90462-10004	90480-37293	90480-19048	90480-46041
MODELS	all	all	all	all	all	ex/40LA, LV-A	all	all
PROD. DATE	6903-	6903-	6903-	6903-	6903-	6903-	6903-	6903-
QTY.	2	4	2	1	3	1	1	1

	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯
TYPE								
PART NO.	90482-08002	56381-90301	82818-60010	90463-09097	90463-08030	90480-17008	82711-10010	90461-06404
MODELS	all	all	40L-A, LV-A	40L-A, LV-A	all	40L-B, L-C 43L-B, L-C 40L-A, LV-A	all	40L-A, LV-A
PROD. DATE	6903-	6903-	6903-	6903-	6903-	6903-	6910-	6906-
QTY.	9	2	1	3	9	1	6	2

	⑰							
TYPE								
PART NO.	90480-37297							
MODELS	40L-A, LV-A							
PROD. DATE	6903-							
QTY.	1							

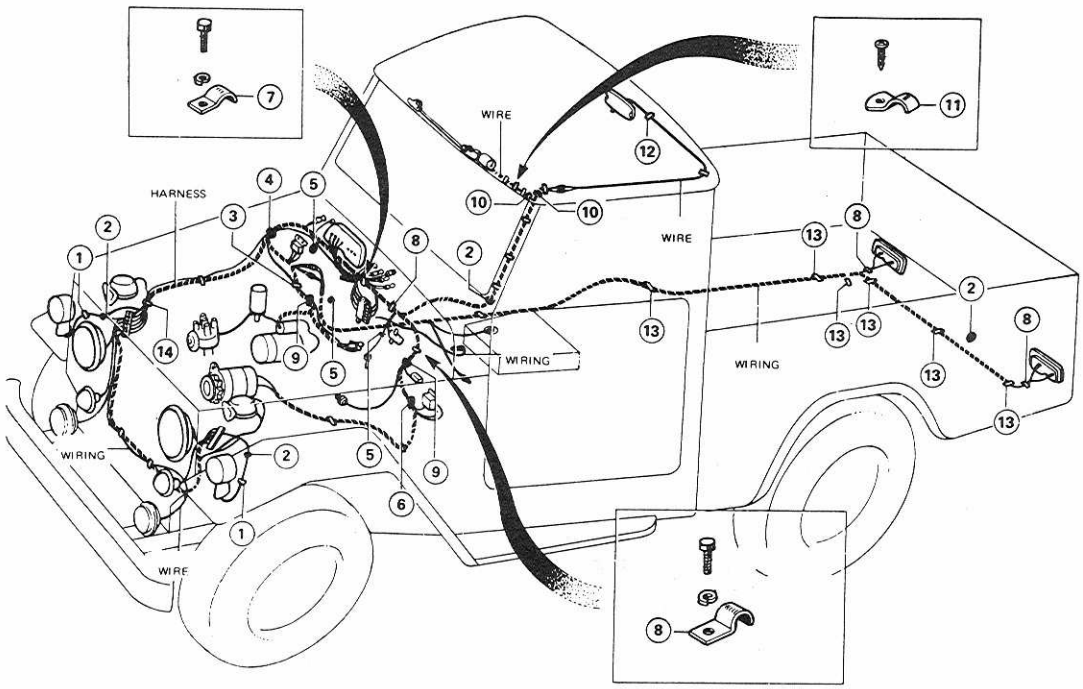
Fig.12-51 Wiring Harness & Clamp (Hard Top-LHD)



	①	②	③	④	⑤	⑥	⑦	⑧
TYPE								
PART NO.	90462-10006	90480-15007	90480-01050	90480-46032	90462-10004	90480-46033	90480-19048	90462-08002
MODLES	FJ45LP-B	FJ45LP-B	FJ45LP-B	FJ45LP-B	FJ45LP-B	FJ45LP-B	FJ45LP-B	FJ45LP-B
PROD. DATE	6903-	6903-	6903-	6903-	6903-	6903-	6903-	6903-
QTY.	2	4	2	1	3	1	1	9

	⑨	⑩	⑪	⑫	⑬			
TYPE								
PART NO.	90480-46041	56381-90301	90463-06010	90463-08030	82711-10010			
MODELS	FJ45LP-B	FJ45LP-B	FJ45LP-B	FJ45LP-B	FJ45LP-B			
PROD. DATE	6903-	6903-	6903-	6903-	6910-			
QTY.	1	2	3	7	4			

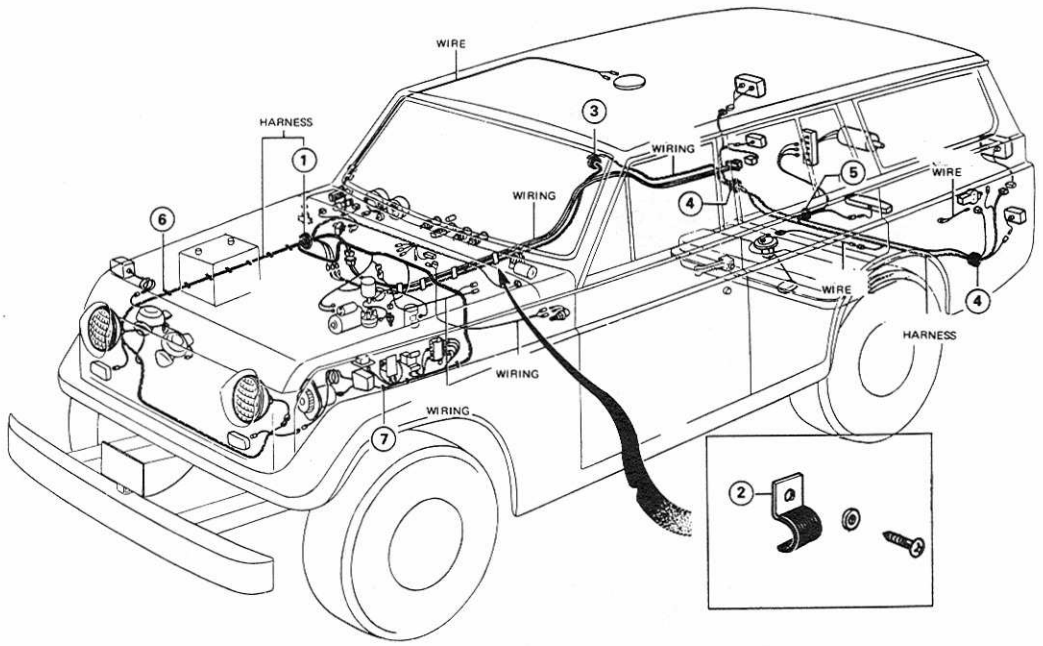
Fig.12-52 Wiring Harness & Clamp (Pick-up-LHD)



	①	②	③	④	⑤	⑥	⑦	⑧
TYPE								
PART NO.	90462-10006	90480-15007	90463-10045	90480-46032	90480-19048	90480-01050	90462-10004	90462-10008
MODELS	FJ45P-B	FJ45P-B	FJ45P-B	FJ45P-B	FJ45P-B	FJ45P-B	FJ45P-B	FJ45P-B
PROD. DATE	6903-	6903-	6903-	6903-	6903-	6903-	6903-	6903-
QTY.	2	4	1	1	2	2	1	1

	⑨	⑩	⑪	⑫	⑬	⑭		
TYPE								
PART NO.	90480-46033	56381-90301	90462-08002	90463-06010	90463-08030	82711-10010		
MODELS	FJ45P-B	FJ45P-B	FJ45P-B	FJ45P-B	FJ45P-B	FJ45P-B		
PROD. DATE	6903-	6903-	6903-	6903-	6903-	6910-		
QTY.	1	2	9	3	7	4		

Fig.12-53 Wiring Harness & Clamp (Pick-up-RHD)



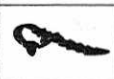
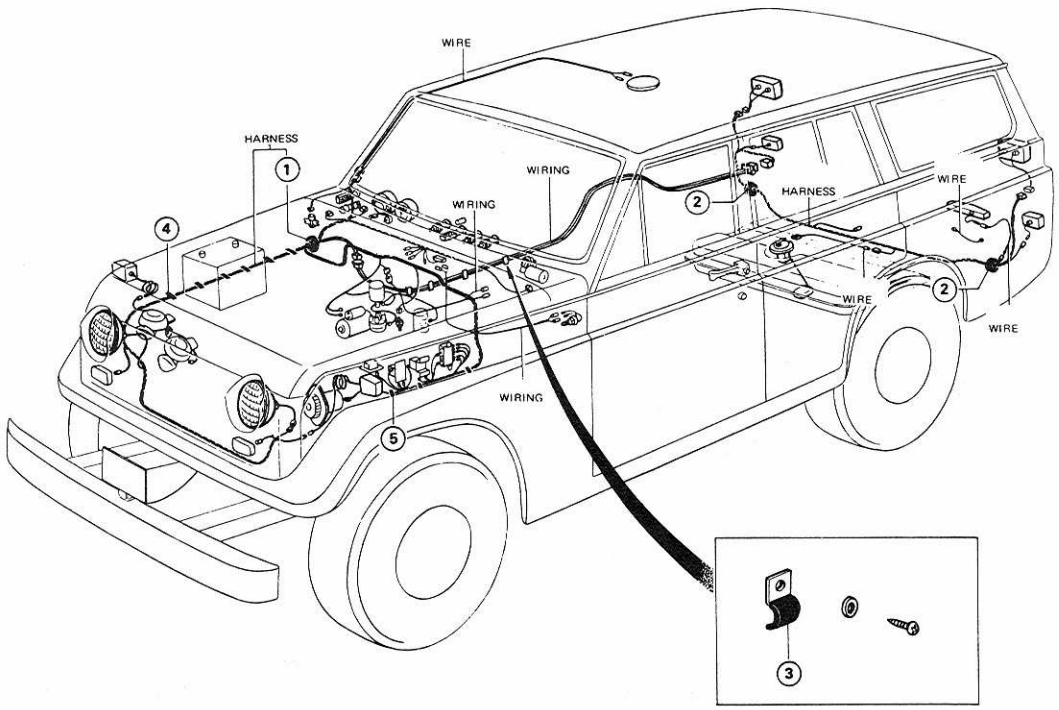
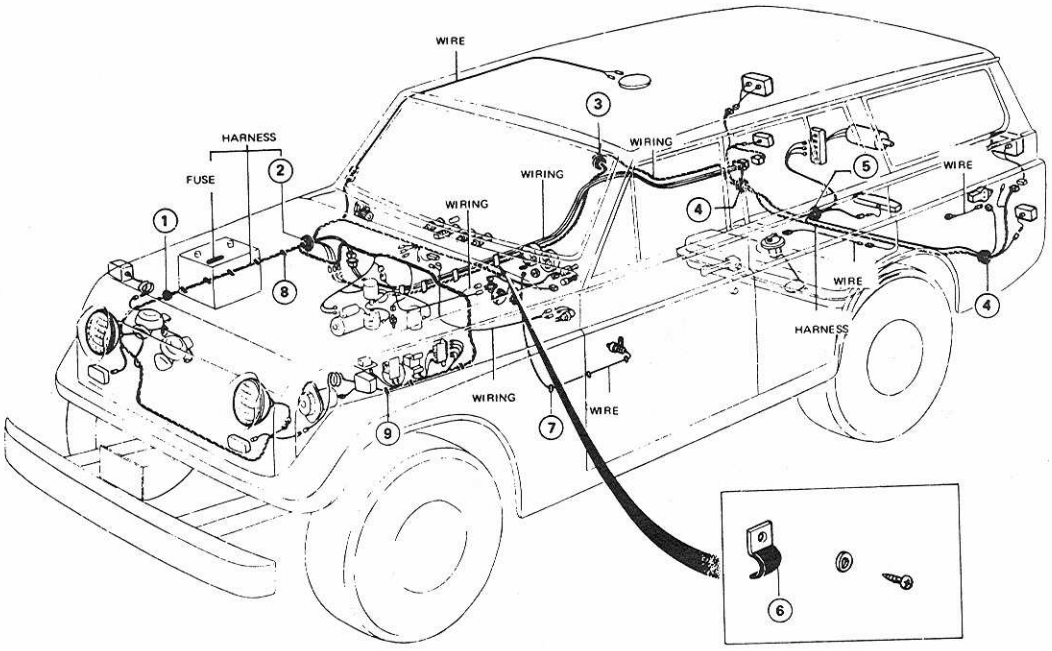
	①	②	③	④	⑤	⑥	⑦	
TYPE								
PART NO.	82819-20010	90462-10126	90480-15045	90480-19048	90480-23021	82714-30020	82714-30010	
MODELS	all	all	all	all	all	all	all	
PROD. DATE	6903-	6908-	6903-	6903-	6903-	6911-	7006-	
QTY.	1	4		2	1	13	3	

Fig.12-54 Wiring Harness & Clamp (Wagon-FJ55V,LV)



	①	②	③	④	⑤			
TYPE								
PART NO.	82819-20010	90480-19048	90462-10126	82714-30020	82714-30010			
MODELS	all	all	all	all	all			
PROD. DATE	6903-	6903-	6903-	6911-	7006-			
QTY.	1	2	4	13	3			

Fig.12-55 Wiring Harness & Clamp (Wagon-FJ55V-B,LV-B)



	①	②	③	④	⑤	⑥	⑦	⑧
TYPE								
PART NO.	90480-15007	82819-20010	90480-15045	90480-19048	90480-23021	90462-10126	90463-06097	82714-30020
MODELS	FJ55LG	FJ55LG	FJ55LG	FJ55LG	FJ55LG	FJ55LG	FJ55LG	FJ55LG
PROD. DATE	6903	6903	6903	6903	6903	6903	6903	6911
QTY.	2	1	1	2	1	4	3	13

	⑨							
TYPE								
PART NO.	82714-30010							
MODELS	FJ55LG							
PROD. DATE	7006-							
QTY.	3							

Fig.12-56 Wiring Harness & Clamp (Wagon-FJ55LG)

ACCESSORIES & AVAILABLE EQUIPMENT

Heater (FJ55 series) 13- 1

Heater Blower 13- 2

Heater Radiator 13- 3

Heater Control 13- 4

Heater (for rear seat occupants) 13- 4

Heater (FJ45 series) 13- 5

Windshield Washer 13- 7

HEATER (FJ55V series)

Description

The heater is a fresh air type heater utilizing the temperature of the cooling system. This heater can also used as a recirculating type.
The heater consists of the corrugated type heating radiator and the air blower made integral for compact construction.
The heating controls are provided within easy reach of the front seat occupants to enable temperature comfortable control of the vehicle interior. The temperature control can be accomplished by the air blower speed, and also by the water control valve.
Heater operation and defroster operation are controlled by the heater control lever (for the water valve).

	Front Seat	Rear Seat
Heating capacity	3,200 Kcal/hour	1,300 Kcal/hour
Blower capacity	250 cu. meters/hour	130 cu. meters/hour
Motor capacity	80 watts	20 watts
Motor speed	2,500 rpm	2,600 rpm
Motor voltage	12 volts	12 volts

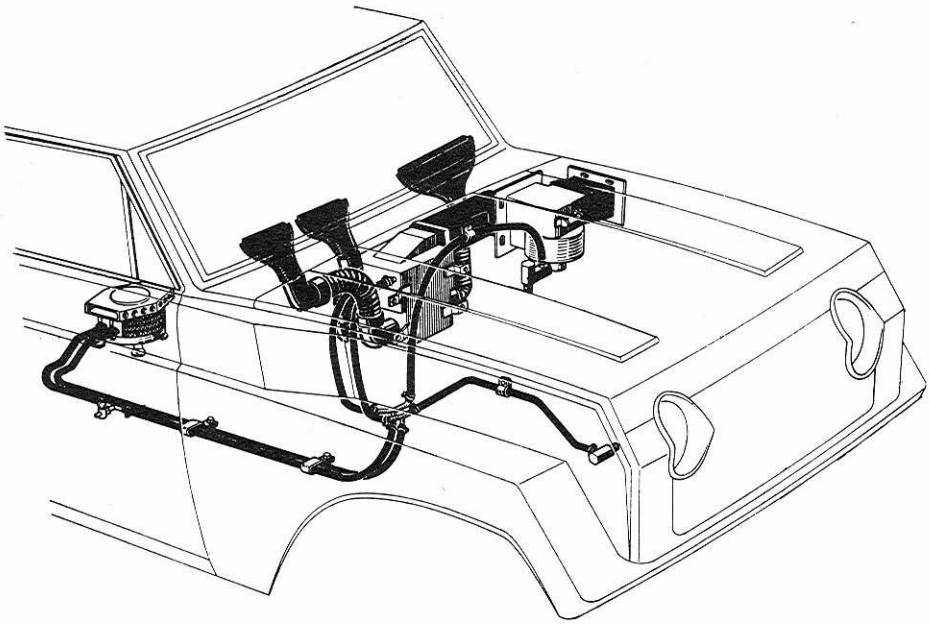


Fig.13-1 Heater Y5361

Trouble Shooting

Symptoms & Probable Causes	Remedies
Insufficient Heating	
1. Wiring poorly contacted or broken	Repair
2. Fuse burnt or poorly contacted	Repair or replace
3. Heater switch poorly contacted	Repair or replace
4. Valve opening incorrect	Correct
5. Motor not turning	Repair or replace
6. Brush worn or poorly contacted	Repair or replace
7. Armature defective	Repair or replace
8. Field coil defective	Repair or replace
Insufficient Incoming Air	
1. Fan mounting nut loose	Tighte
2. Heater radiator clogged	Clean
3. Blower revolution insufficient	Repair or replace
Insufficient Heating of Coolant	
1. Thermostat defective	Replace
2. Weather extremely cold	Cover the radiator
Insufficient Coolant	
1. Water pump capacity insufficient	Repair
2. Fan belt loose or slipping	Adjust
3. Hose bent excessively	Repair or replace
4. Hose pipe or joint clogged	Clean or replace
Leakage of Hose or Piping	
1. Water hose defective	Replace
2. Water hose clamp loose	Tighten
3. Heater radiator defective	Repair or replace
Insufficient Defrosting	
1. Defroster hose disconnected	Repair
2. Hose bent excessively	Repair or replace
3. Packing fitting improperly	Repair

HEATER BLOWER

Removal

1. Loosen the air duct clamp, and remove the attaching bolts, then remove the air duct.
2. Remove the air duct net to remove the heater blower.
3. Remove the attaching bolts, and remove the heater blower.

Disassembly

1. Remove the blower motor attaching screws, and remove the blower motor assembly.

2. Remove the blower fan attaching nut, and remove the fan.

3. Remove the motor housing, and disconnect the wiring by melting the solder, and remove the brushes.

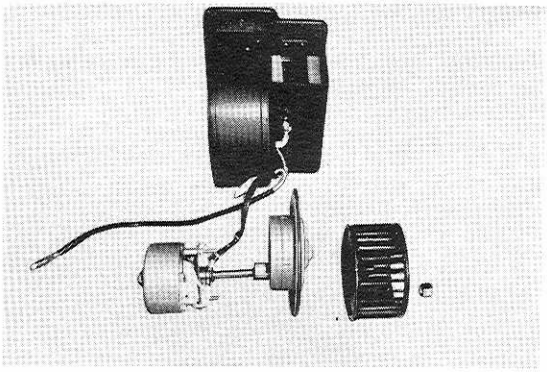


Fig.13-2 Disassembling Heater Blower B1195

4. Inspect the brush and the commutator or wear and damage.

Assembly & Installation

Follow the disassembly and removal procedures in the reverse order.

HEATER RADIATOR

Removal

1. Shut the water hose valve to prevent the water from flowing out.

2. Disconnect the inlet hose and outlet hose from the heater radiator.

3. Loosen the air duct clamp.

4. Disconnect the defroster hoses from the heater radiator.

5. Remove the heater radiator attaching bolts, and remove the heater radiator.

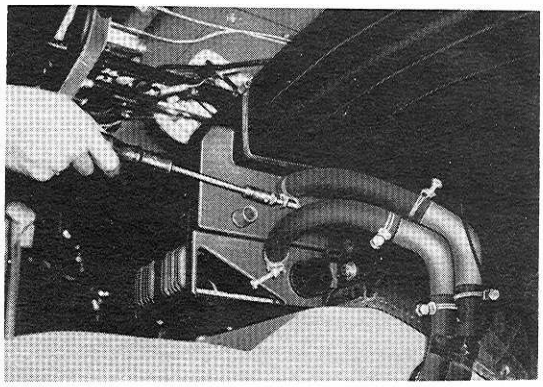


Fig.13-3 Disconnecting Hoses B1196

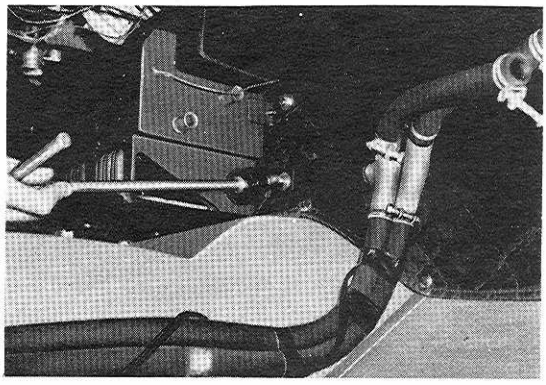


Fig.13-4 Removing Bolts B1202

6. Remove the cover, and remove the heater radiator from the radiator case.

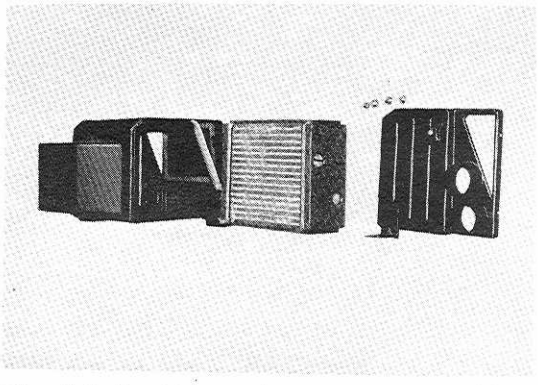


Fig.13-5 Removing Heater Radiator B1197

Installation

Follow the removal procedures in the reverse order.

HEATER CONTROL

Removal

1. Remove the heater control knobs.

2. Remove the heater control ornament.

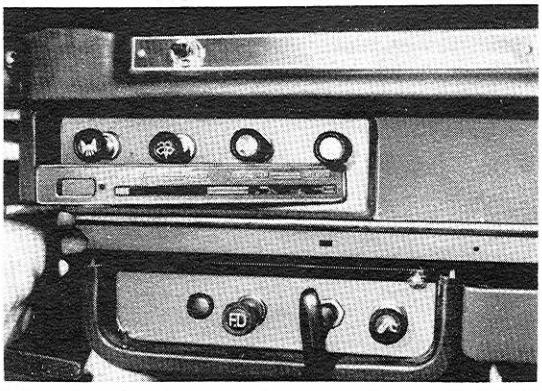


Fig.13-6 Removing Ornament B1198

3. Disconnect the control cables from the heater unit.

4. Remove the heater control bracket and lever from the inside of the instrument panel.

5. Remove the switch.

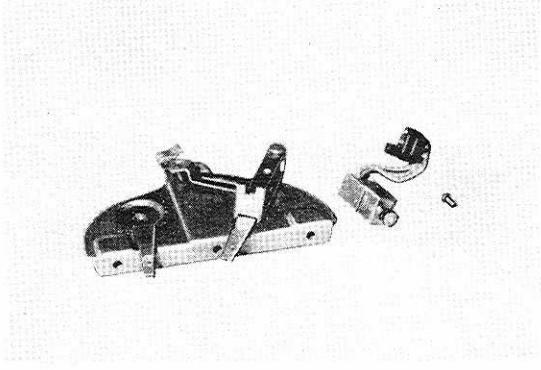


Fig.13-7 Switch & Lever B1199

6. To replace the control wire for fresh and recirculating;

   a. Remove the ventilating hole cover installed on the fender.

   b. Push in the control wire to close the valve.

   c. Pull out the valve from the ventilating hole with a suitable wire, and remove the control wire securing bolt inside the heater blower case.

   d. Remove the wire towards the vehicle interior.

   e. Install a new wire by reversing the removal procedures.

Installation

Follow the removal procedures in the reverse order.

HEATER (for rear seat occupants)

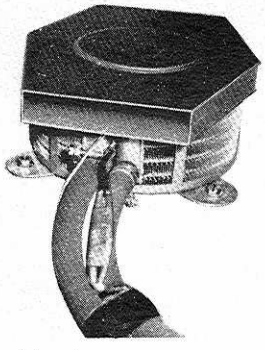


Fig.13-8 Heater B1200

Removal

1. Shut the water hose valve to prevent water from flowing out.

2. Disconnect the inlet and outlet hoses from the heater.

3. Disconnect the wiring.

4. Remove the attaching bolts, and remove the heater assembly.

Disassembly

1. Remove the clamp, and remove the deflector.

2. Loosen the blower fan securing screw, and remove the blower fan.

3. Detach the felt installed onto the radiator.

4. Remove the blower motor attaching screws, and remove the blower motor.

5. Remove the radiator.

6. Remove the motor housing, and disconnect the wiring by melting the solder, and remove the brushes.

7. Inspect the brush and the commutator for wear and damage.

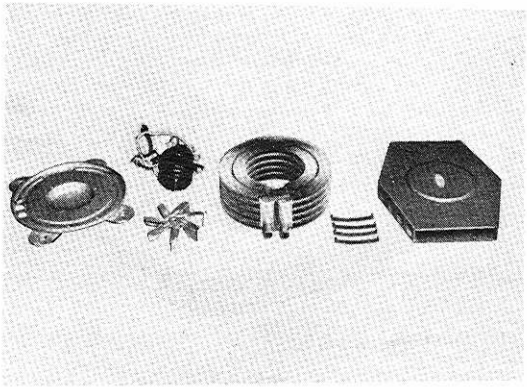
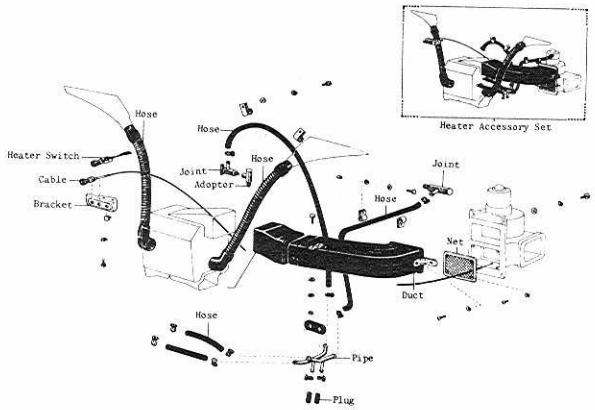


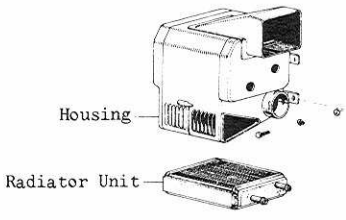
Fig.13-9 Disassembling Heater B1201

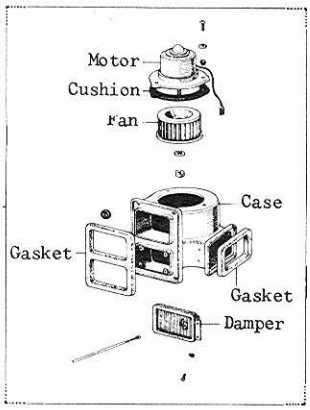
Assembly & Installation

Follow the disassembly and removal procedures in the reverse order.

HEATER (FJ40 series)







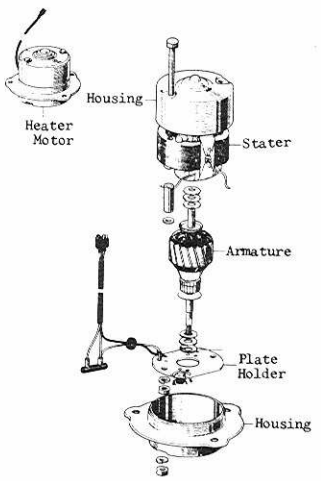
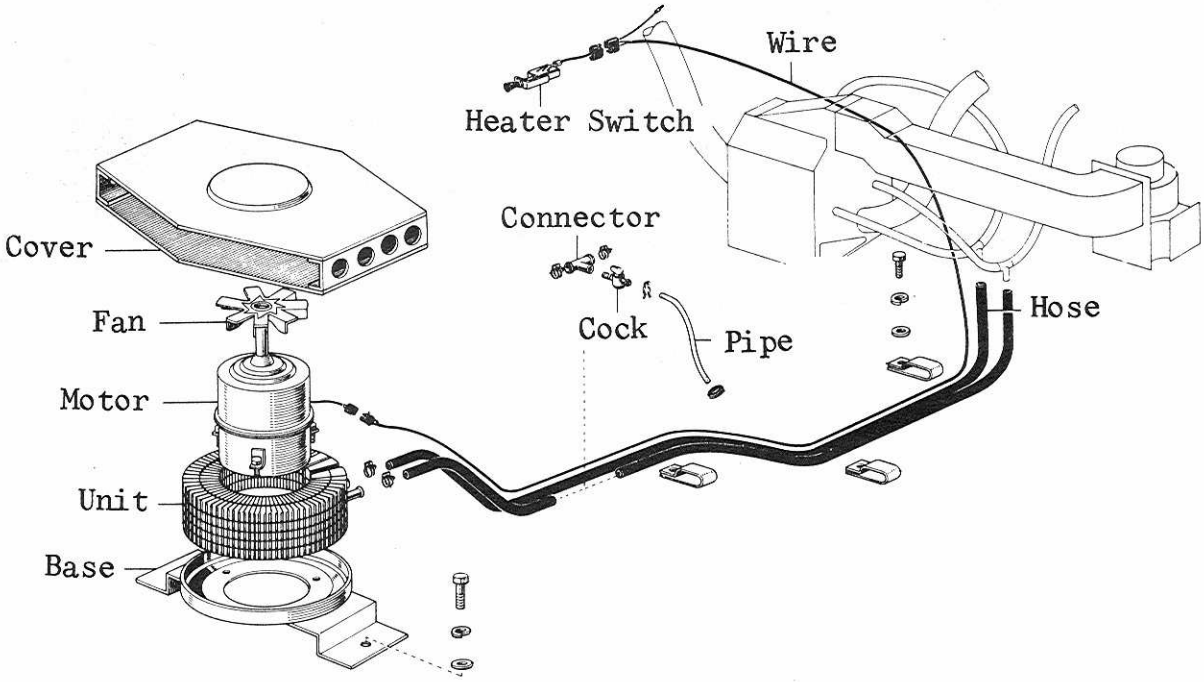
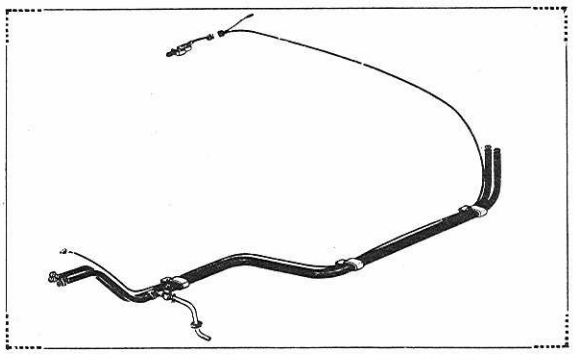


Fig.13-10 Heater Components (1)





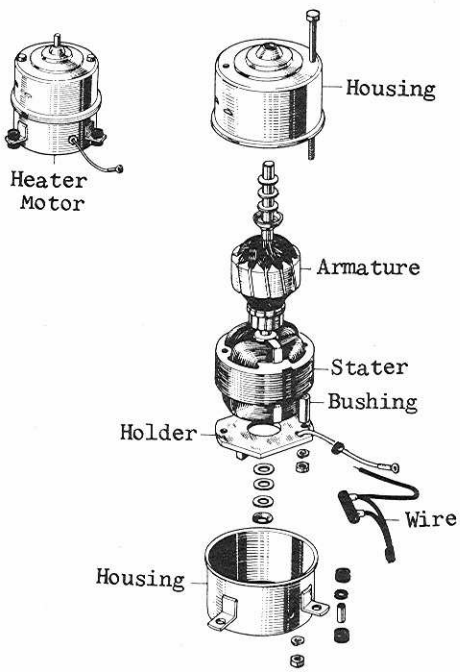
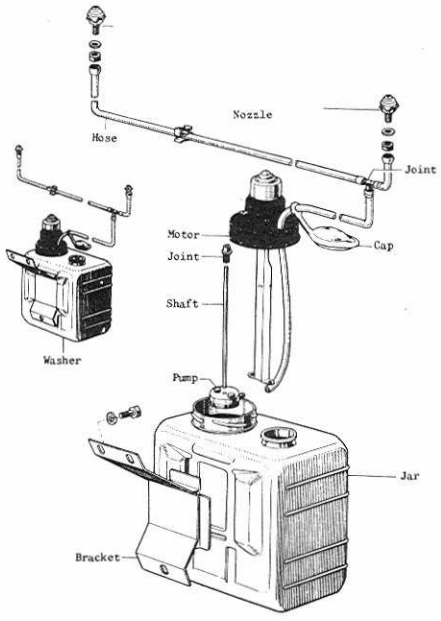


Fig.13-11 Heater Components (2)

WINDSHIELD WASHER

FJ40 series



FJ55 series

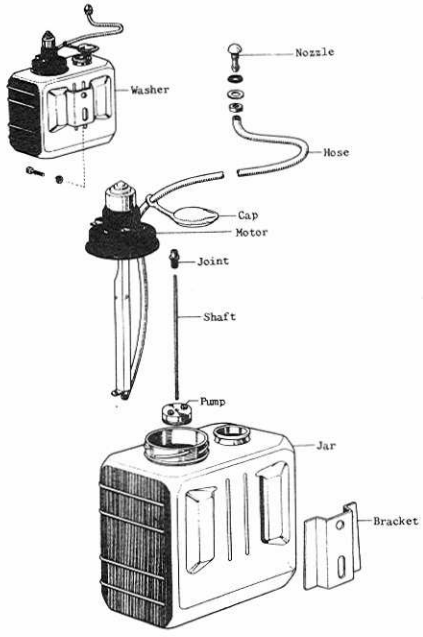


Fig.13-12 Windshield Washer

windshield washer is installed for providing safe driving with clear visibility.

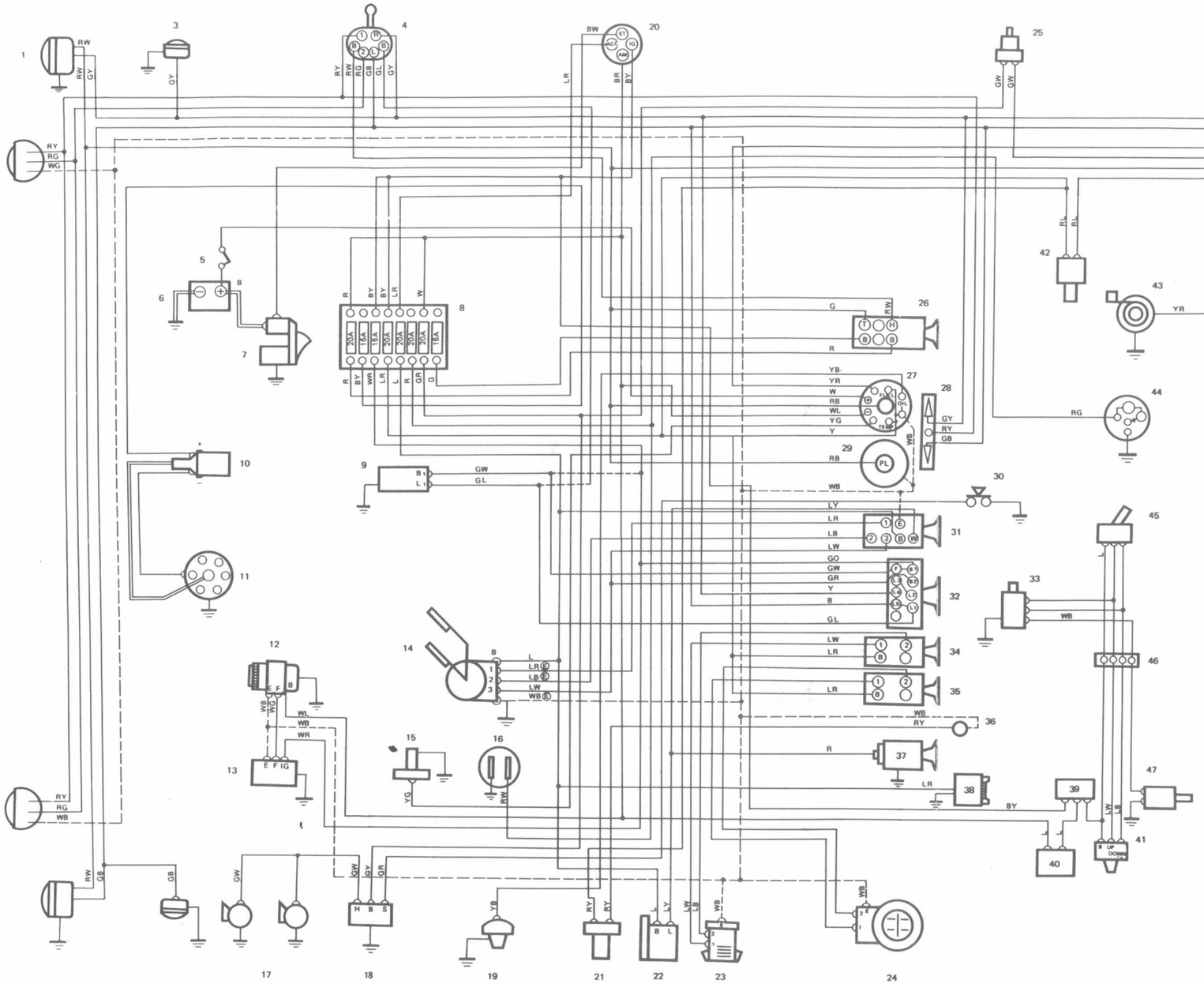
Operation Precautions

1. The windshield washer is actuated whenever the windshield wiper switch knob is turned clockwise. This switch can be operated together with the wiper operation.
2. Do not operate the windshield washer without the washer fluid to prevent the overload of the motor. Do not operate the washer over 30 seconds continuously.

Trouble Shooting

Symptoms & Probable Causes	Remedies
Washer Motor Does Not Turn	
1. Fuse burnt out	Replace
2. Wiring broken	Repair
3. Switch defective	Replace
4. Motor Defective	Replace
5. Armature shaft rusty	Replace motor
Motor Turns, but Will Not Pump Washer Fluid	
1. Fluid lacking	Replenish
2. Nozzle clogged	Clean
3. Hose defective	Replace
4. Wiring incorrect	Correct
5. Pump defective	Replace motor

ELECTRICAL WIRING DIAGRAM – FJ55(L)V Series



1. Front turn signal light (12V, 25W, 8W)
2. Head light (12V 50/40W)
3. Side turn signal light (12V 8W)
4. Turn signal & Head light dimmer switch
5. Fusible link
6. Battery
7. Starter
8. Fuse block
9. Turn signal flasher
10. Ignition coil
11. Distributor
12. Alternator
13. Alternator regulator
14. Windshield wiper motor
15. Water temperature sender gauge
16. Inspection lamp consent
17. Horn
18. Horn relay
19. Oil pressure sender gauge
20. Ignition switch
21. Front drive indicator lamp switch
22. Windshield washer (OPT)
23. Heater (for Front seat) (OPT)
24. Heater (for Rear seat) (OPT)
25. Stop light switch
26. Light control switch
27. Combination meter
28. Turn signal indicator light
29. Speedometer
30. Horn switch
31. Windshield wiper switch
32. Hazard warning signal switch (OPT)
33. Tail gate motor
34. Heater blower switch (for Front seat) (OPT)
35. Heater blower switch (for Rear seat) (OPT)
36. Front drive indicator light (12V, 3.4W)
37. Cigarette light (OPT)
38. Radio (OPT)
39. Tail gate relay
40. Circuit breaker
41. Tail gate remote control switch
42. Back-up light switch
43. Fuel sender gauge
44. Interior dome light (12V 10W)
45. Tail gate control switch
46. Junction
47. Tail gate safety switch
48. Rear combination light (12V 23/23/8W)
49. Back-up light (12V, 25W)
50. License plate light (12V, 7.5W x 2)
51. Trailer socket switch (OPT)
52. Trailer socket (OPT)

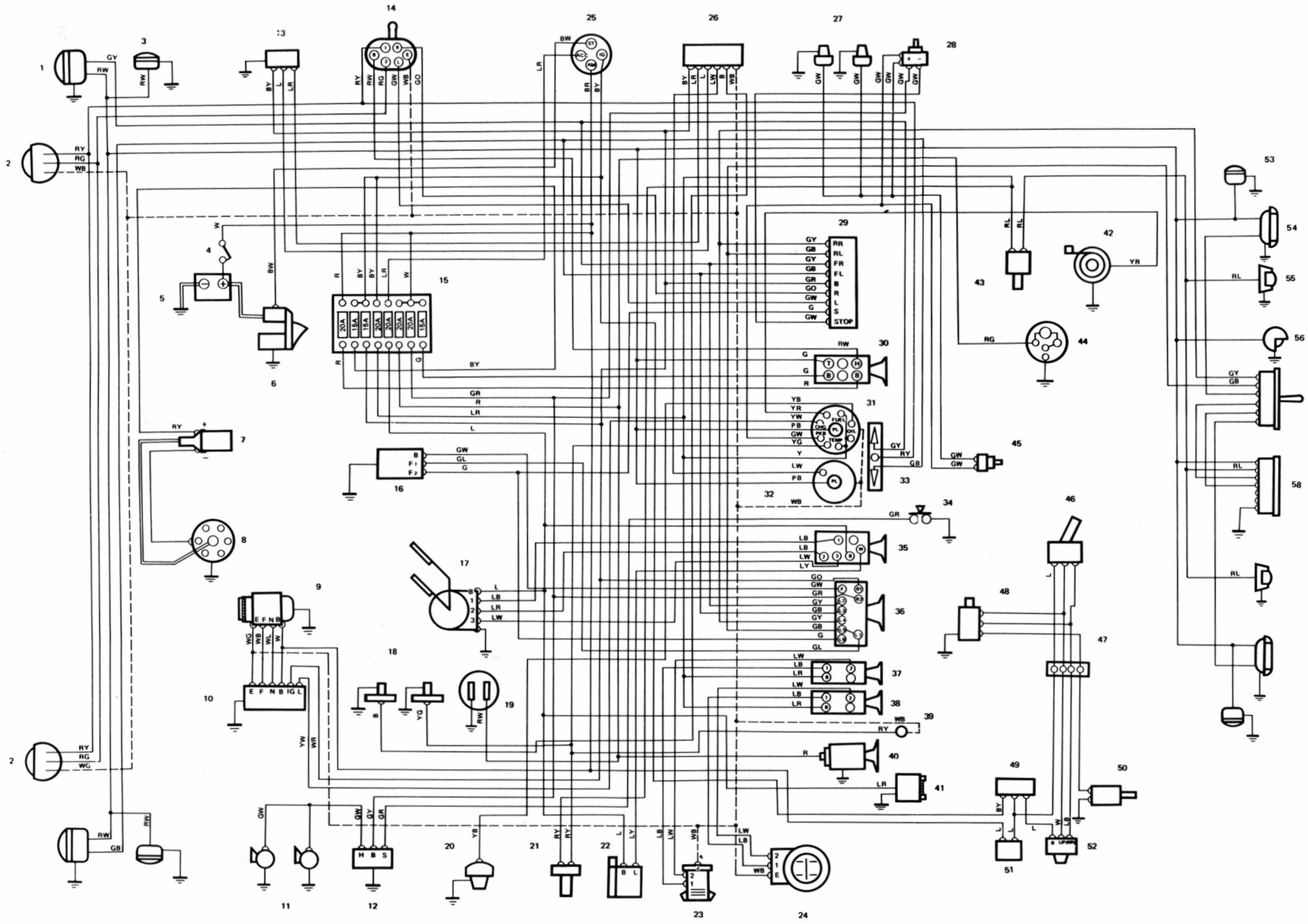
WIRING HARNESS COLOR CODES

This first alphabet indicates the basic color for the wire, and the second alphabet indicates the spiral line color.

R = red W = white L = light purple G = Green
Y = yellow B = black O = orange

Example: RG is for red and green line.

ELECTRICAL WIRING DIAGRAM – FJ55LG



1. Front turn signal light (12V, 25W, 8W)
2. Head light (12V, 50/40W)
3. Side marker light (12V, 8W)
4. Fusible link
5. Battery
6. Starter
7. Ignition coil
8. Distributor
9. Alternator
10. Alternator regulator
11. Horn
12. Horn relay
13. Vacuum switching valve
14. Turn signal & head light dimmer switch
15. Fuse block
16. Turn signal flasher
17. Windshield wiper motor
18. Water temperature sender gauge
19. Inspection lamp content
20. Oil pressure sender gauge
21. Front drive indicator light switch
22. Windshield washer
23. Heater (for Front seat)
24. Heater (for Rear seat)
25. Ignition switch
26. Spark control computor
27. Brake oil pressure switch
28. Stop light switch
29. Turn signal relay
30. Light control switch
31. Combination meter
32. Speedometer
33. Turn signal indicator light
34. Horn switch
35. Windshield wiper switch
36. Hazard warning signal switch
37. Heater blower switch (for Front seat)
38. Heater blower switch (for Rear seat)
39. Front drive indicator light (12V, 3.4W)
40. Cigarette lighter (OPT)
41. Radio (OPT)
42. Fuel sender gauge
43. Back-up light switch
44. Interior dome lamp (12V, 10W)
45. Brake worning testing switch
46. Tail gate control switch
47. Junction
48. Tail gate motor
49. Tail gate relay
50. Tail gate safety switch
51. Circuit breaker
52. Tail gate remote control switch
53. Side marker light (12V, 8W)
54. Rear combination light (12V, 23W, 23W, 8W)
55. Back-up light (12V, 25W)
56. License plate light (12V, 7.5W x 2)
57. Trailer socket change over switch (OPT)
58. Trailer socket (OPT)

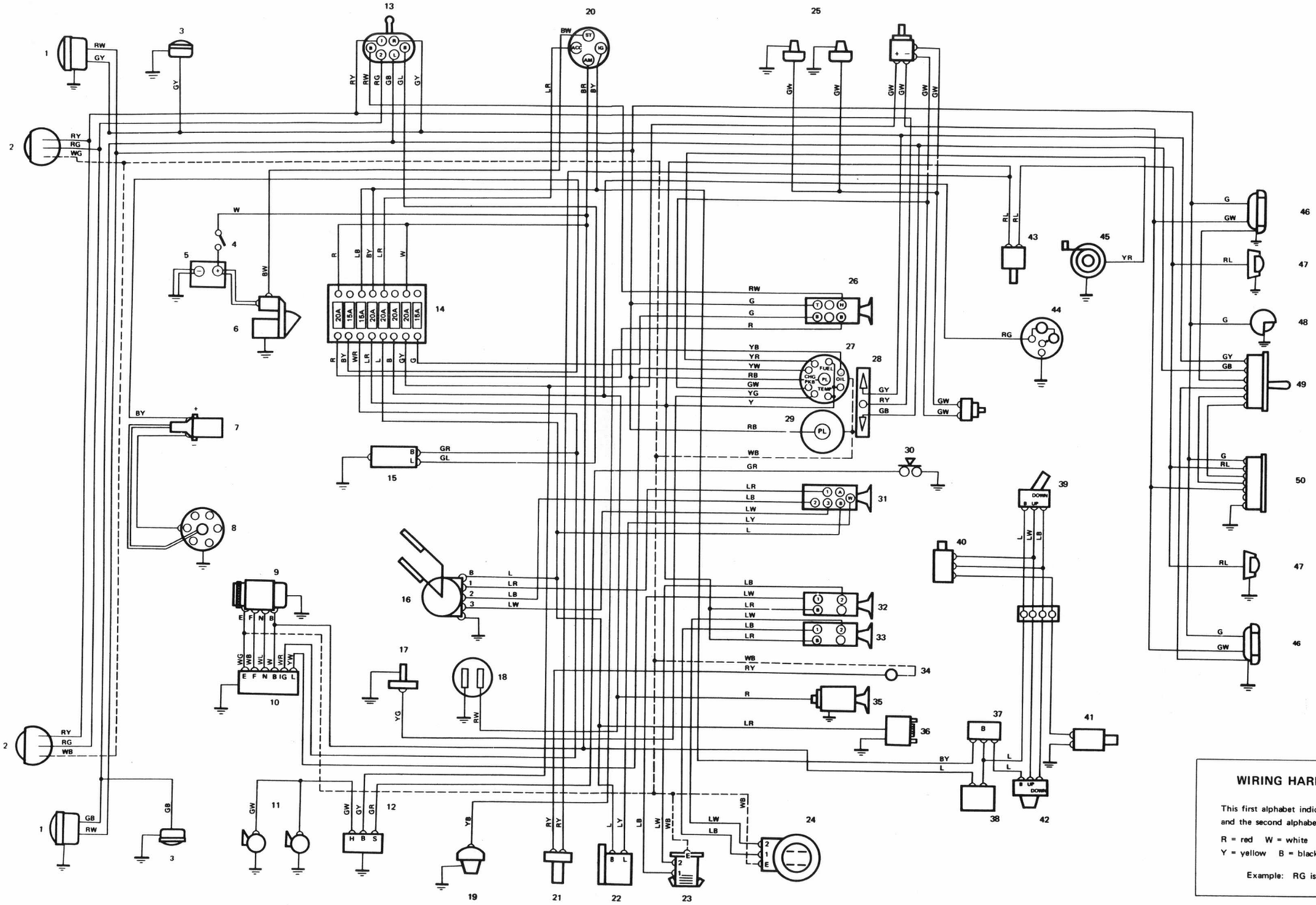
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Y = yellow B = black O = orange

Example: RG is for red and green line.

ELECTRICAL WIRING DIAGRAM — FJ55V (Australia)



1. Front turn signal light (12V, 25W, 8W)
2. Headlight (12V 50/40W)
3. Side turn signal light (12V 8W)
4. Fusible link
5. Battery
6. Starter
7. Ignition coil
8. Distributor
9. Alternator
10. Alternator regulator
11. Horn
12. Horn relay
13. Turn signal & Headlight dimmer switch
14. Fuse block
15. Turn signal flasher
16. Wiper motor
17. Water temperature sending gauge
18. Inspection lamp socket
19. Oil pressure sending gauge
20. Ignition switch
21. Front drive indicator light switch
22. Windshield washer
23. Heater-for Front seat (OPT)
24. Heater-for Rear seat (OPT)
25. Brake oil pressure switch
26. Light control switch
27. Combination meter
28. Turn signal indicator light
29. Speedometer
30. Horn switch
31. Windshield wiper motor switch
32. Heater blower switch-for Front seat (OPT)
33. Heater blower switch-for Rear seat (OPT)
34. Front drive indicator light (12V 3.4W)
35. Cigaretta lighter (OPT)
36. Radio (OPT)
37. Tail gate relay
38. Circuit breaker
39. Tail gate control switch
40. Tail gate motor
41. Tail gate safety switch
42. Tail gate remote control switch
43. Back-up light switch
44. Dome lamp (12V, 10W)
45. Fuel sending gauge
46. Rear combination light (12V-23W, 23W, 8W)
47. Back-up light (12V-26W)
48. License plate light (12V-7.5W x 2)
49. Trailer socket change over switch (OPT)
50. Trailer socket (OPT)

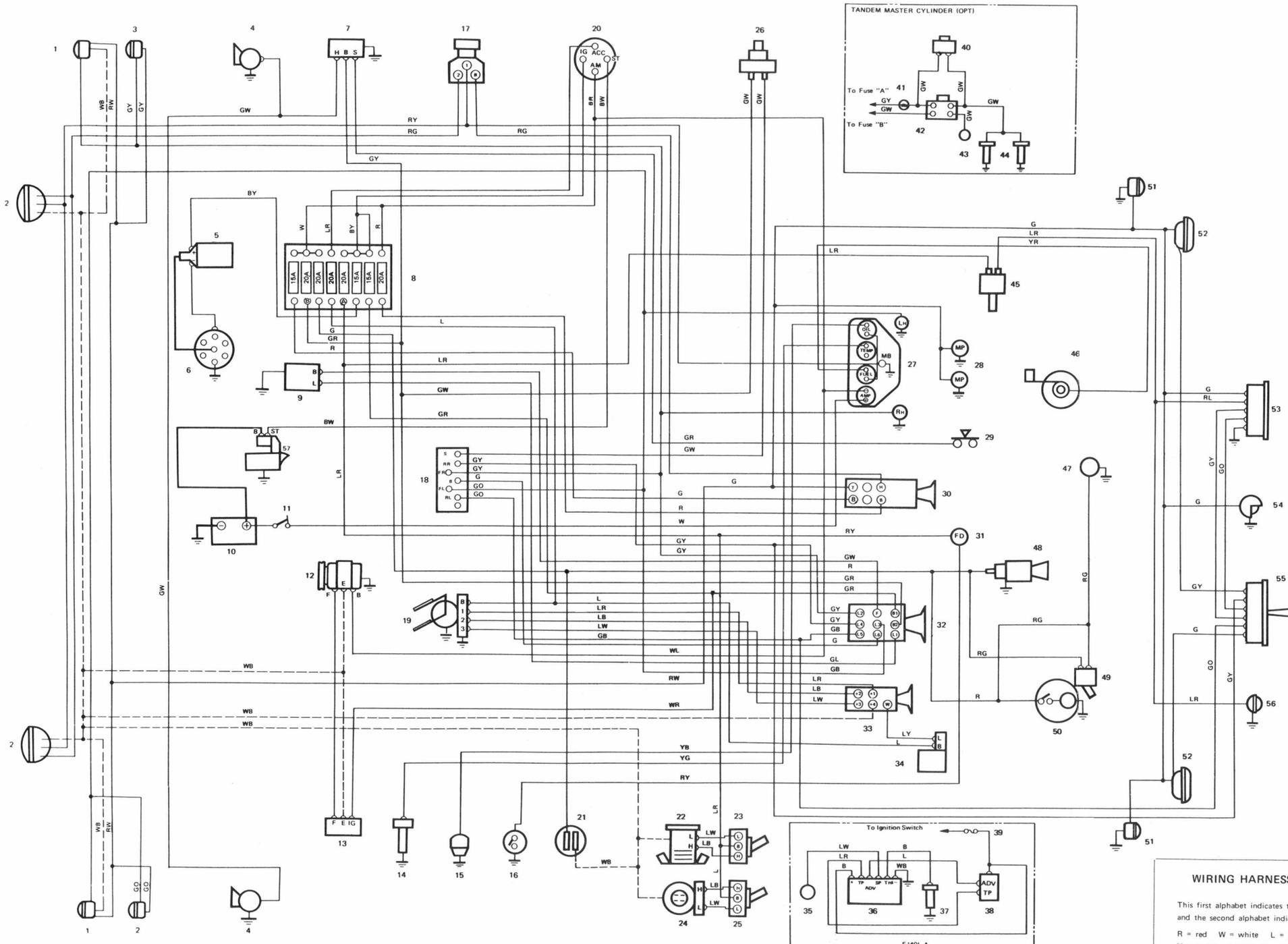
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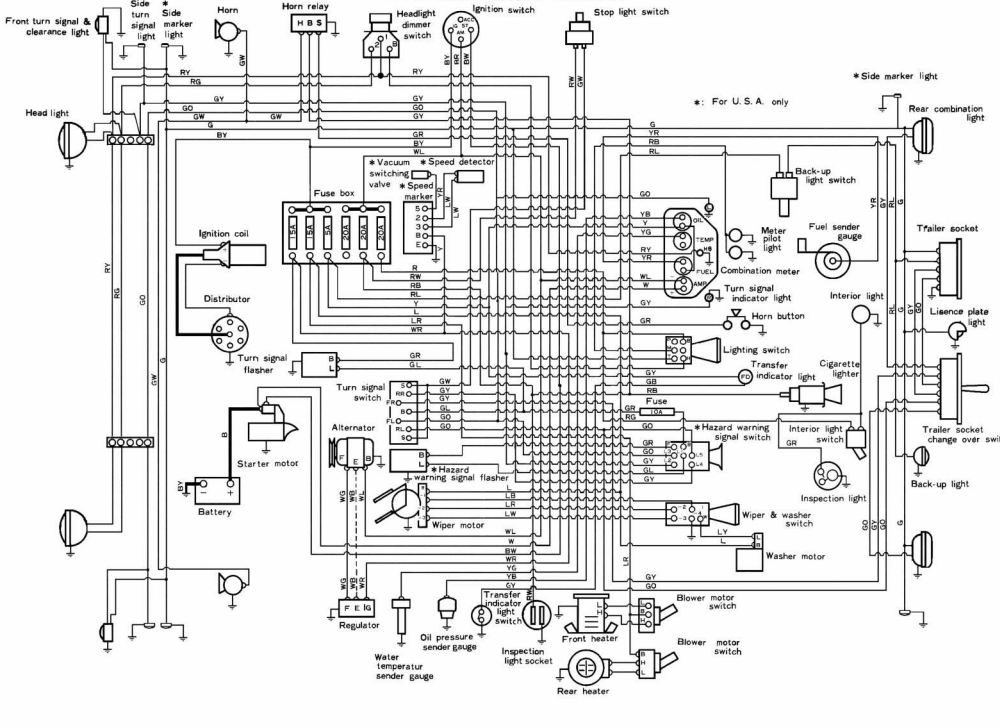
Example: RG is for red and green line.

ELECTRICAL WIRING DIAGRAM — FJ40(L) Series



1. Front turn signal light (12V 23/8W)
2. Head light (12V 50/40W)
3. Side marker (12V 8W)
4. Horn
5. Ignition coil
6. Distributor
7. Horn relay
8. Fuse block
9. Turn signal flasher
10. Battery
11. Fusible link
12. Alternator
13. Alternator regulator
14. Water temperature sender gauge
15. Oil pressure sender gauge
16. Transfer indicator light switch
17. Headlight dimmer switch
18. Turn signal switch
19. Windshield wiper motor
20. Ignition switch
21. Inspection lamp switch
22. Heater (for Front seat)
23. Heater blower switch
24. Heater (for Rear seat)
25. Heater blower switch
26. Stop light switch
27. Combination meter
28. Combination pilot lamp
29. Horn switch
30. Light control switch
31. Transfer indicator light (12V, 3.4W)
32. Hazard worning light switch (OPT)
33. Windshield wiper switch
34. Windshield washer (OPT)
35. Speed sensor
36. Spark control computor
37. Thermo sensor
38. Vacuum switching valve
39. Fuse (turn)
40. Brake testing switch
41. Brake lamp
42. Stop switch
43. Turn switch
44. Oil pressure gauge
45. Back-up light switch
46. Fuel sender gauge
47. Courtesy light
48. Cigarette lighter (OPT)
49. Courtesy light switch
50. Dome lamp
51. Side marker light
52. Rear combination light (12V, 23/8W)
53. Trailer socket
54. License light (12V 10W)
55. Trailer socket change over switch
56. Back-up light switch (12V, 12W)
57. Starter

ELECTRICAL WIRING DIAGRAM



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