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who, well, didn't do much this time, since Paul Lee provided the thing already scanned and compiled into a PDF! (Thanks!). Go visit his website: <http://www.iluvmyrx7.com/index.htm> Lots of RX-7 goodness there.

There are several ways to get around in the document. I have provided Bookmarks to all the sections, and thumbnails are also provided in the Thumbnails side bar.

I have also included a label for the spine of a binder, for those who wish to print out all the pages and keep a dead-tree edition handy.☺

The original document is © 1979 Toyo Kogyo Co., Ltd., and remains so. This version is provided as a service for owners of first generation Mazda RX-7s who are having a devil of a time locating the factory service manual for a reasonable price.

If you really want to send me money, email me and I'll tell you where to send it, but it's not necessary. Consider this payback for all the good advice and information gleaned from the various RX-7 email lists!

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09/16/03

STEERING

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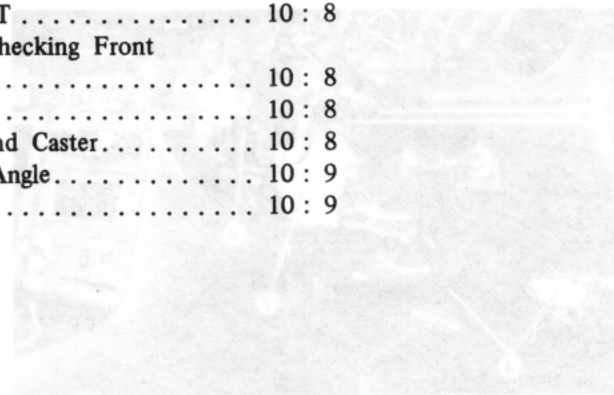
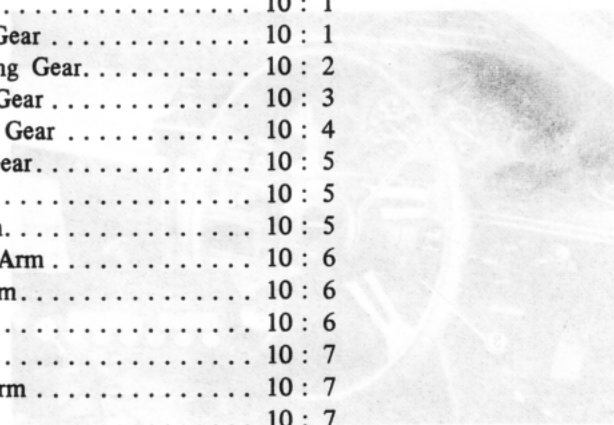


FIG. 10-1

FIG. 10-2

FIG. 10-3

FIG. 10-4

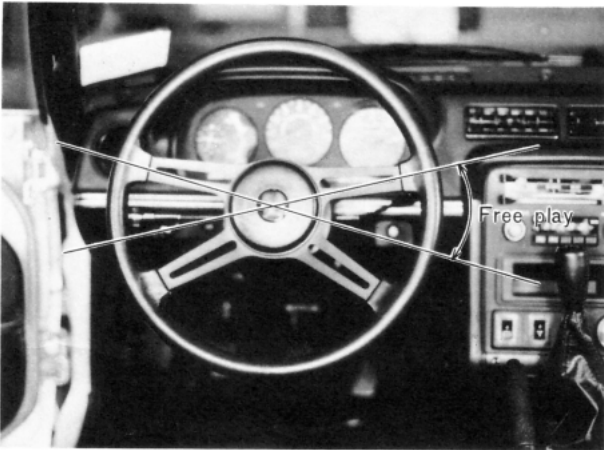


Fig. 10-1

10-A. STEERING WHEEL PLAY

Check the free play at the circumference of the steering wheel.

Standard free play: 5 ~ 20 mm (0.2 ~ 0.8 in)

To check the free play, place the front wheels straight ahead and turn the steering wheel slowly.

The free play is taken when the front wheel begins to move.

If excessive play is found, the following points should be carefully checked.

1. Fitting condition of the center link ball joints
2. Looseness of the idler arm bushes
3. Looseness of the wheel bearing
4. Backlash between the sector shaft and ball nut

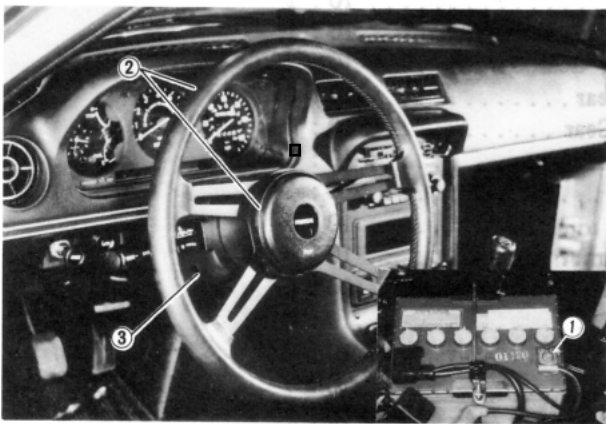


Fig. 10-2

10-B. STEERING GEAR

10-B-1. Removing Steering Gear

1. Disconnect the battery negative cable.
2. Remove the horn cap and steering wheel.

Note:

- a) Before removing the steering wheel, apply identification marks on the steering column shaft and steering wheel.
- b) Do not strike the steering column shaft end with a hammer. Striking shaft will damage the bearing or collapsible shaft.

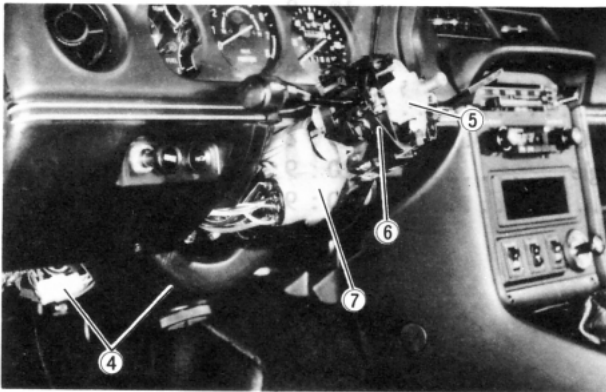


Fig. 10-3

3. Remove the steering column covers.
4. Remove the air duct and disconnect the couplers of the combination switch.
5. Remove the stop ring, cancel cam and spring.
6. Remove the combination switch assembly.
7. Remove the steering lock assembly referring to Par. 10-E.

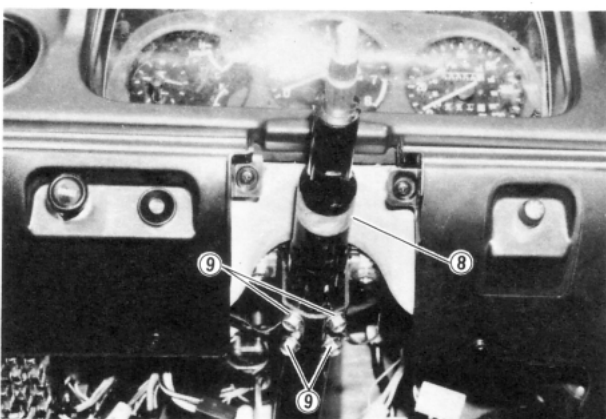


Fig. 10-4

8. Wrap the steering lock hole on the column jacket with tape to prevent lubricant from leaking out of the jacket.
9. Remove the column jacket fixing bracket.



Fig. 10-5

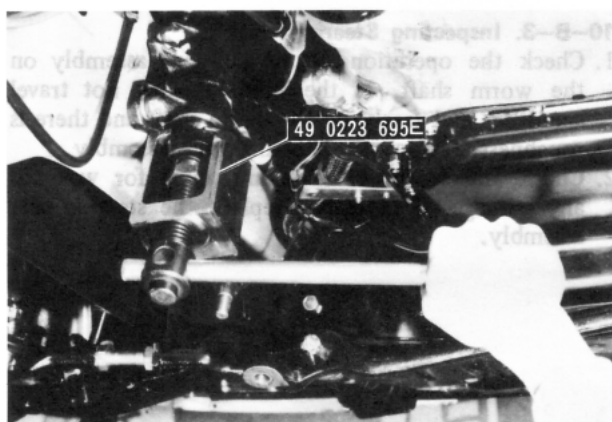


Fig. 10-6

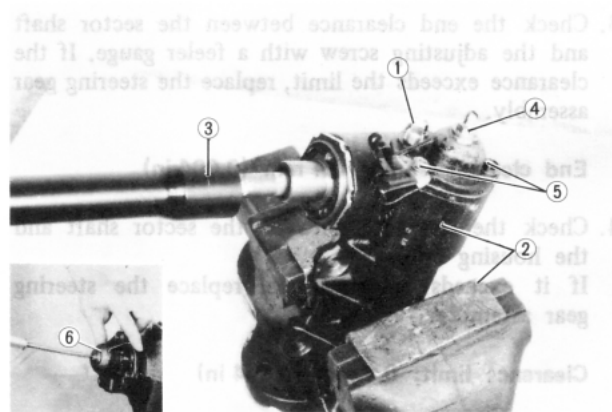


Fig. 10-7



Fig. 10-8

10. Mark the bonnet hinge locations on the bonnet and remove the bonnet.
11. Raise the front end of the vehicle and support it with stands.
12. Disconnect the center link from the pitman arm with puller (49 0118 850C).

13. Remove the pitman arm from sector shaft with puller (49 0223 695E).
14. Remove the steering gear housing attaching bolts and remove the steering gear housing assembly through the engine compartment.

Note:

If the car has any collision, check the steering wheel for axial play before removing the steering gear assembly. If the steering column shaft is crushed or axial play occurs, replace the steering gear and column shaft as an assembly.

10-B-2. Disassembling Steering Gear

1. Drain the lubricant.
2. Hold the steering gear housing in a vise.
3. Slide the column jacket off the column shaft.
4. Loosen the adjusting screw lock nut.
5. Remove the side cover attaching bolts.
6. Remove the side cover by turning the adjusting screw clockwise through the cover.

7. Remove the sector shaft from the gear housing, being careful not to damage the shaft.

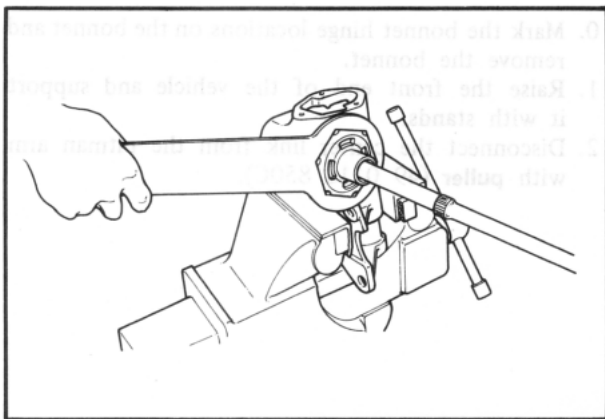


Fig. 10-9

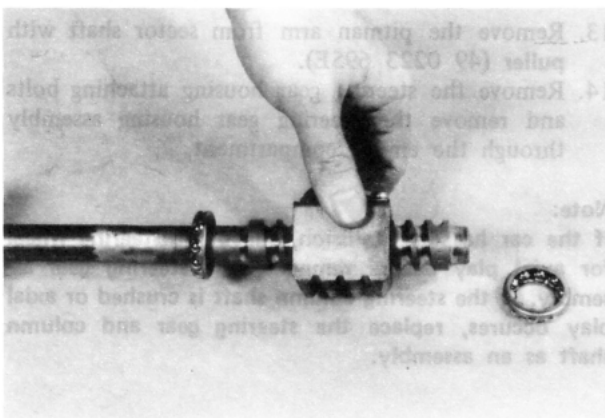


Fig. 10-10

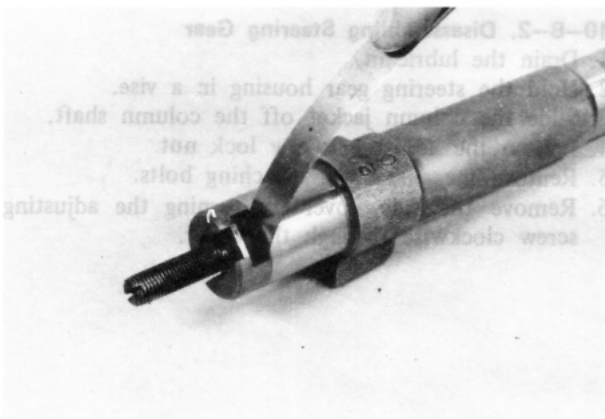


Fig. 10-11



Fig. 10-12

8. Unscrew the end cover lock nut with the suitable wrench.
9. Loosen the end cover.
10. Remove the worm shaft and ball nut assembly.
Do not disassemble the worm shaft and ball nut assembly.
11. Remove the oil seal with suitable tool.
Do not remove unless the oil seal is necessary to replace.

10-B-3. Inspecting Steering Gear

1. Check the operation of the ball nut assembly on the worm shaft. If the ball nut does not travel smoothly and freely on the worm shaft and there is roughness, replace the steering gear assembly.
2. Check the worm bearings and cups for wear or any damage. If defective, replace the steering gear assembly.

3. Check the end clearance between the sector shaft and the adjusting screw with a feeler gauge. If the clearance exceeds the limit, replace the steering gear assembly.

End clearance limit: 0.1 mm (0.004 in)

4. Check the clearance between the sector shaft and the housing bore.
If it exceeds specifications, replace the steering gear assembly.

Clearance limit: 0.1 mm (0.004 in)

5. Check the oil seal for wear, flaw or any damage.
If there is any possibility of oil leakage, replace the oil seal.

Note:

When installing, do not tap the oil seal directly with a hammer.

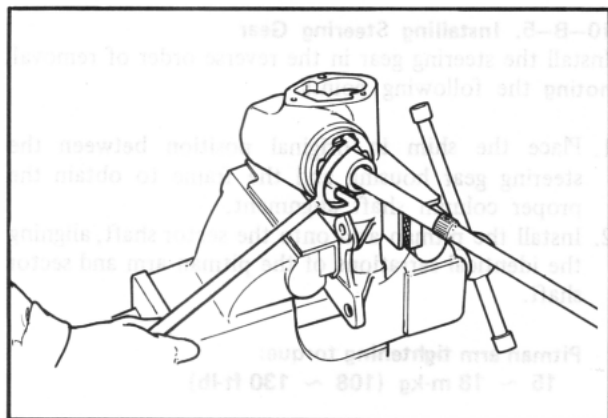


Fig. 10-13

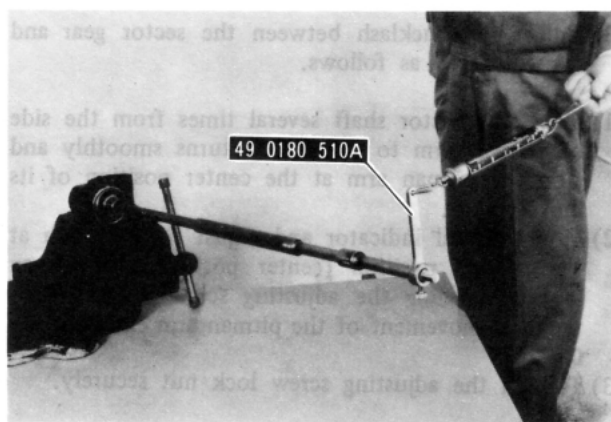


Fig. 10-14

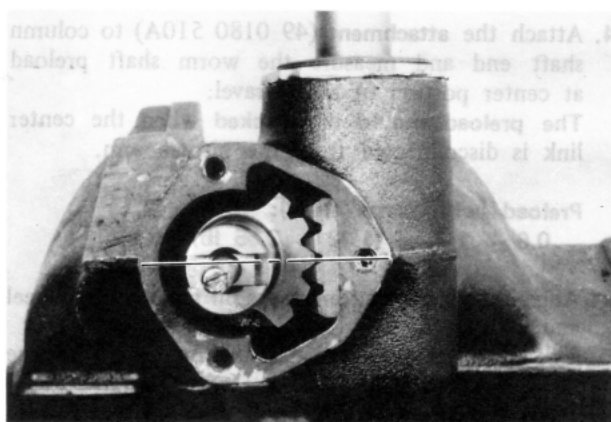


Fig. 10-15

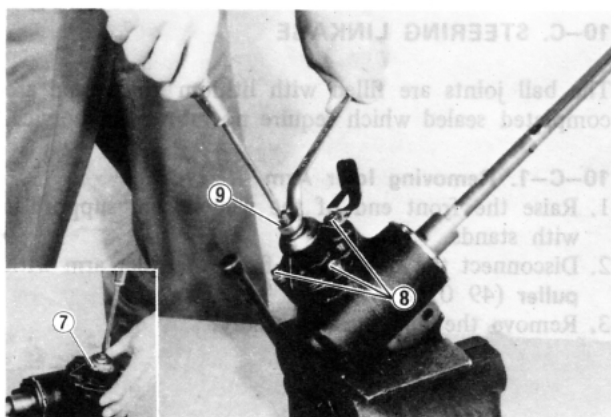


Fig. 10-16

10-B-4. Assembling Steering Gear

1. Install the oil seal with suitable tool (if removed).
When installing, do not tap the oil seal directly with a hammer.
2. Install the worm shaft and ball nut assembly into the gear housing.
3. Screw in the end cover until the preload of the worm shaft becomes 0.2 ~ 0.5 kg (0.44 ~ 1.1 lb).

To measure the preload, attach the attachment (49 0180 510A) to the column shaft end and pull the spring scale squarely and then, take a reading of the scale when the shaft starts to turn.

4. After adjusting the preload, tighten the end cover lock nut with suitable wrench and recheck the preload.

5. Turn the worm shaft and place the rack in the center position of the worm.
6. Install the adjusting screw and shim into the slot at the end of the sector shaft, and install them into the gear housing, being careful not to damage the oil seal.
Make sure the center of the sector gear is in alignment with the center of the worm shaft rack.

7. Apply sealing agent to side cover and place the side cover onto the adjusting screw, then turn the adjusting screw counter-clockwise until it is screwed into proper position.
8. Tighten the side cover attaching bolts.
9. Temporarily tighten the adjusting screw lock nut.
The adjustment of the backlash between the sector gear and rack is explained in Par. 10-B-5.
10. Install the column jacket onto the end cover.

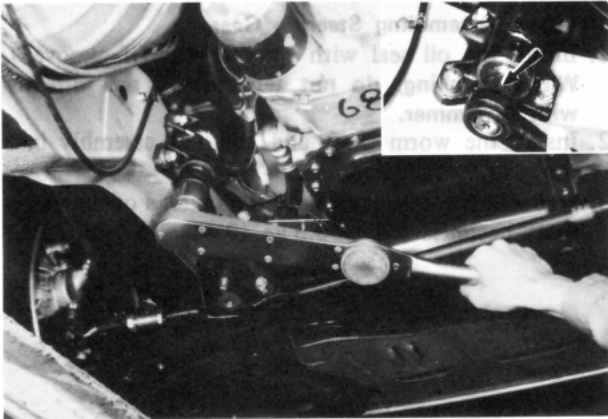


Fig. 10-17

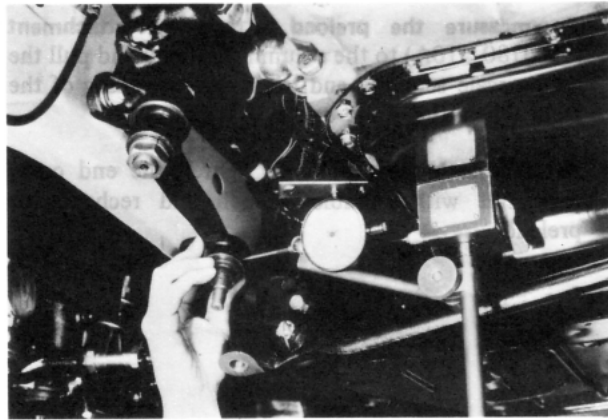


Fig. 10-18

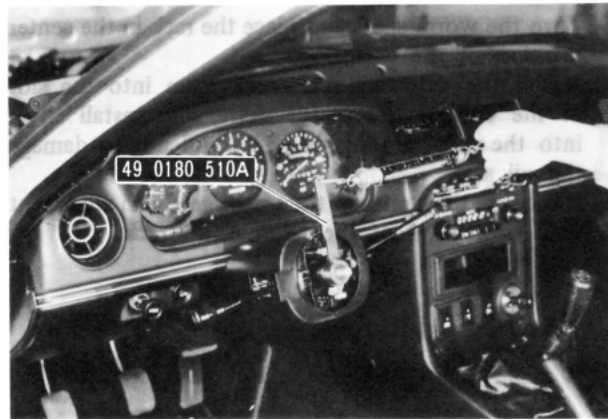


Fig. 10-19

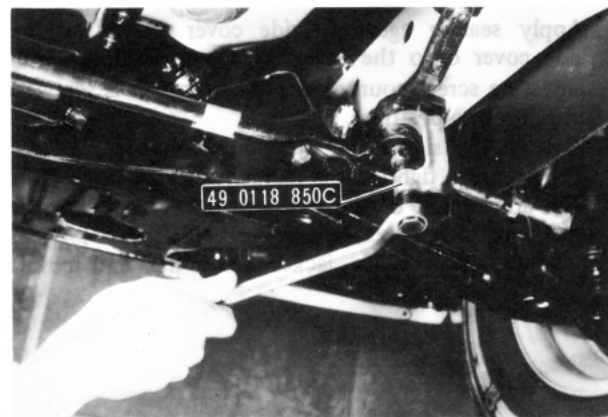


Fig. 10-20

10-B-5. Installing Steering Gear

Install the steering gear in the reverse order of removal, noting the following points.

1. Place the shim in original position between the steering gear housing and the frame to obtain the proper column shaft alignment.
2. Install the pitman arm onto the sector shaft, aligning the identical serrations of the pitman arm and sector shaft.

Pitman arm tightening torque:

15 ~ 18 m-kg (108 ~ 130 ft-lb)

3. Adjust the backlash between the sector gear and rack, proceed as follows.

- 1) Move the sector shaft several times from the side of pitman arm to see that it turns smoothly and stop the pitman arm at the center position of its movable range.
- 2) Mount a dial indicator and adjust the backlash at the neutral position (center position) of pitman arm by turning the adjusting screw in or out so that the movement of the pitman arm end becomes **0 mm**.
- 3) Tighten the adjusting screw lock nut securely.

4. Attach the **attachment** (49 0180 510A) to column shaft end and measure the worm shaft preload at center portion of shaft travel.

The preload should be checked when the center link is disconnected from the pitman arm.

Preload (with sector shaft):

0.6 ~ 1.2 kg (1.32 ~ 2.65 lb)

5. Align the identification marks on the steering wheel and column shaft.
6. Fill the gear housing with lubricant (A.P.I. Service GL-4, SAE 90).

10-C. STEERING LINKAGE

The ball joints are filled with lithium grease and are completed sealed which require no lubrication service.

10-C-1. Removing Idler Arm

1. Raise the front end of the vehicle and support it with stands.
2. Disconnect the center link from the idler arm with **puller** (49 0118 850C).
3. Remove the idler arm assembly.

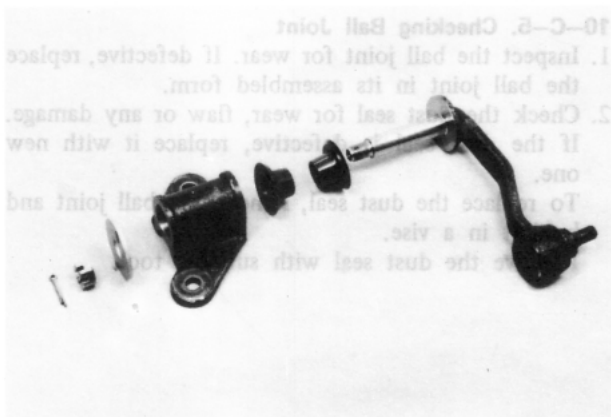


Fig. 10-21

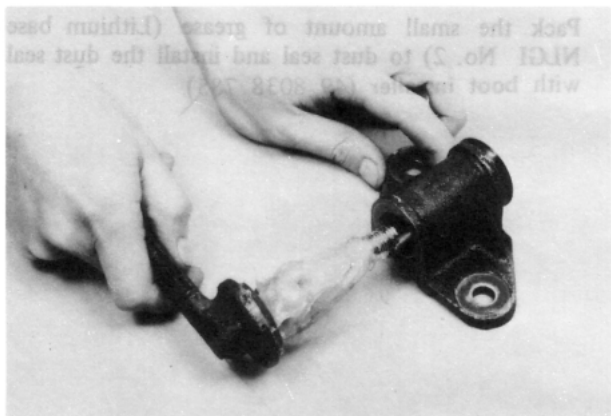


Fig. 10-22



Fig. 10-23

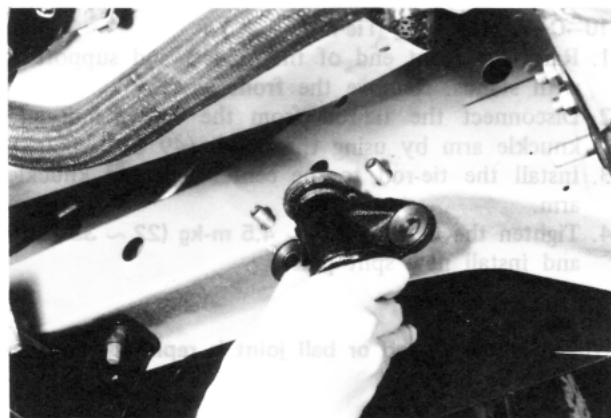


Fig. 10-24

10-C-2. Disassembling Idler Arm

1. Hold the idler arm assembly in a vise.
2. Remove the split pin, nut and washer.
3. Remove the idler arm and bushes from the bracket.
4. Check the bushes and replace if they are worn excessively.

10-C-3. Assembling Idler Arm

1. Position the bush on the idler arm spindle and fill grease (Lithium base NLGI No. 2) to bush and spindle.
2. Install the idler arm to bracket and pack the grease into the bracket.
3. Position the bush and washer.
4. Tighten the spindle nut and install the new split pin.

5. Check the revolving torque of the idler arm by using a spring scale. The reading should be **within 2 ~ 6 kg (4.4 ~ 13.2 lb)**.
If the specified reading is not obtained, replace the idler arm bushes.

10-C-4. Installing Idler Arm

1. Install the idler arm assembly to the frame and tighten the attaching bolts to **4.4 ~ 5.5 m-kg (32 ~ 40 ft-lb)**.
2. Connect the center link to the idler arm. Tighten the nut to **2.5 ~ 3.5 m-kg (18 ~ 25 ft-lb)** and install a new split pin.

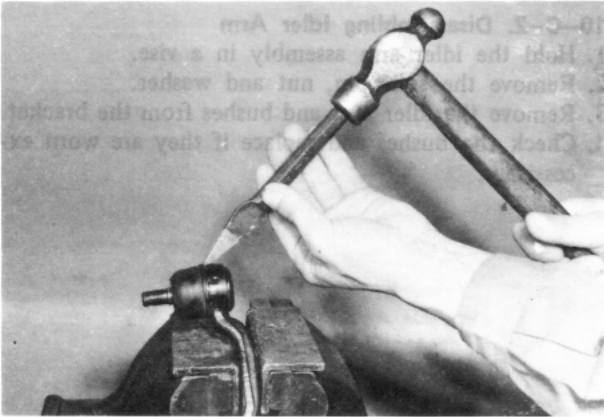


Fig. 10-25

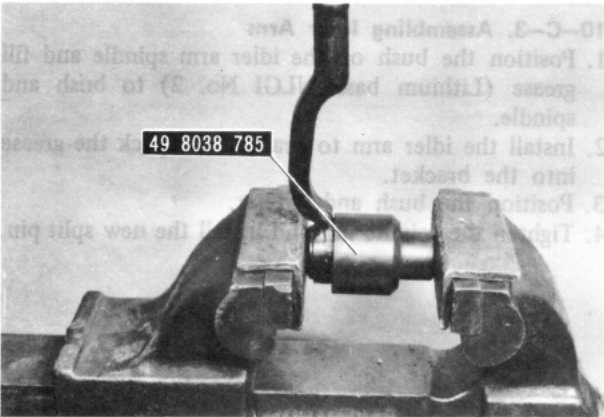


Fig. 10-26

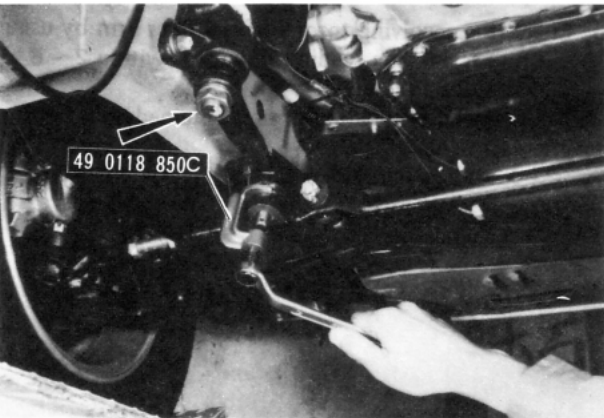


Fig. 10-27

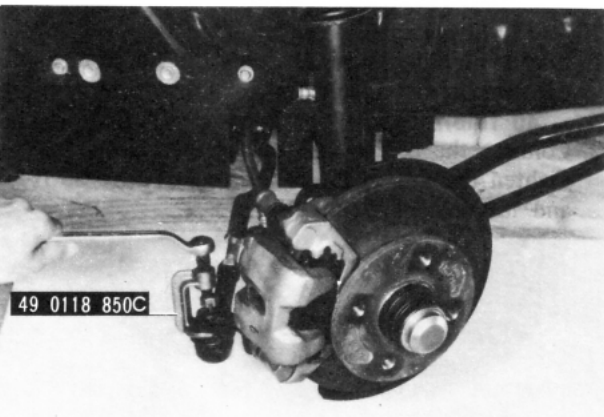


Fig. 10-28

10-C-5. Checking Ball Joint

1. Inspect the ball joint for wear. If defective, replace the ball joint in its assembled form.
2. Check the dust seal for wear, flaw or any damage. If the dust seal is defective, replace it with new one.
To replace the dust seal, remove the ball joint and hold it in a vise.
Remove the dust seal with suitable tool.

Pack the small amount of grease (Lithium base NLGI No. 2) to dust seal and install the dust seal with **boot installer** (49 8038 785).

10-C-6. Replacing Pitman Arm

1. Raise the front end of the vehicle and support it with stands.
2. Disconnect the center link from the pitman arm with **puller** (49 0118 850C).
3. Loosen the nut and remove the pitman arm from the sector shaft with **puller** (49 0223 695E).
4. Install the pitman arm onto the sector shaft, aligning the identical serrations of the pitman arm and sector shaft. Tighten the nut to **15 ~ 18 m-kg (108 ~ 130 ft-lb)**.
5. Connect the center link to the pitman arm and tighten the nut to **3.0 ~ 4.5 m-kg (22 ~ 33 ft-lb)**. Install a new split pin.

10-C-7. Replacing Tie-rod

1. Raise the front end of the vehicle and support it with stands. Remove the front wheel.
2. Disconnect the tie-rod from the center link and knuckle arm by using the **puller** (49 0118 850C).
3. Install the tie-rod to the center link and knuckle arm.
4. Tighten the nuts to **3.0 ~ 4.5 m-kg (22 ~ 33 ft-lb)** and install new split pins.

Note:

Whenever the tie-rod or ball joint is replaced, the toe-in must be reset.

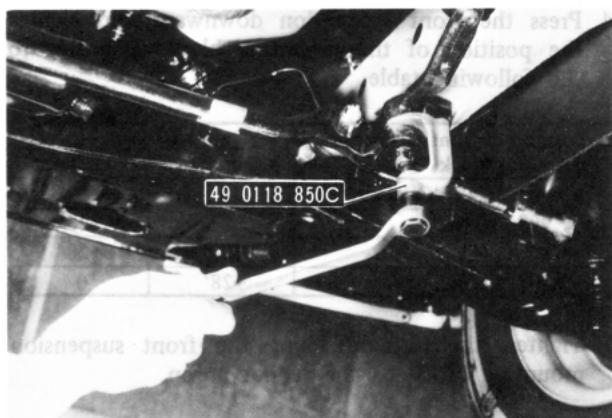


Fig. 10-29

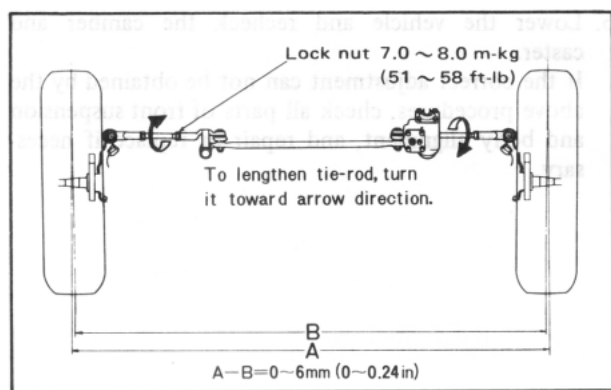


Fig. 10-30

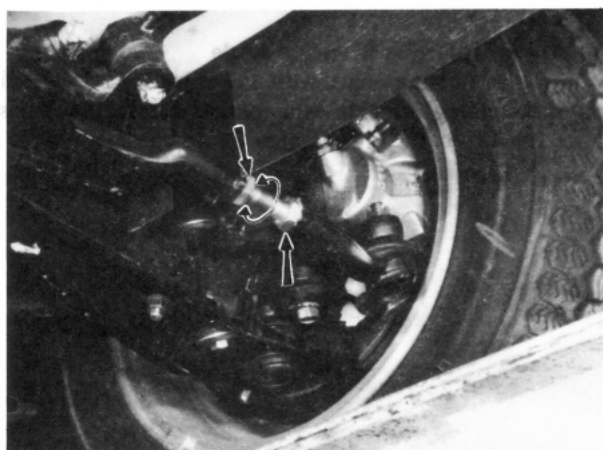


Fig. 10-31

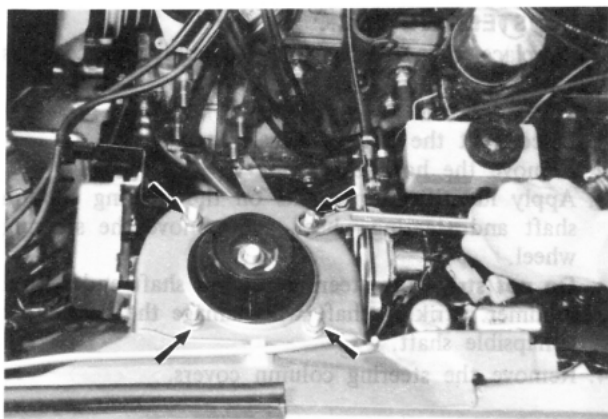


Fig. 10-32

10-C-8. Replacing Center Link

1. Raise the front end of the vehicle and support it with stands.
2. Remove the center link from both tie-rods, pitman arm and idler arm by using the puller (49 0118 850C).
3. Install the center link to the pitman arm, idler arm and tie-rods.
4. Install and tighten the nuts to specifications. Install new split pins.

Tightening torque:

Center link to idler arm

2.5 ~ 3.5 m-k (18 ~ 25 ft-lb)

Other ball joints 3.0 ~ 4.5 m-k (22 ~ 33 ft-lb)

10-D. FRONT WHEEL ALIGNMENT

10-D-1. Inspection Before Checking Front Wheel Alignment

1. Check the tire inflation and bring to recommended pressure.
2. Inspect the front wheel bearing play and correct if necessary.
3. Inspect the wheel and tire run-out and balance.
4. Inspect the ball joints of the front suspension and steering linkage for any excessive looseness.
5. The vehicle must be on level ground and have no luggage or passenger load.

10-D-2. Checking Toe-in

1. Raise the front end of the vehicle until the wheels clear the ground.
2. Turning the wheels by hand, mark a line in the center of each tire tread by using a scribing block.
3. Lower the vehicle and place the front wheels in the straight-ahead position.
4. Measure the distance between the marked lines at the front and rear of the wheels.

Both measurements must be taken at equal distances from the ground.

If the distance between the wheels at the rear is greater than that at the front by 0 ~ 6 mm (0 ~ 0.24 in), it is correct.

If it is found to be incorrect, adjust the toe-in by turning the tie-rods by equal amounts.

10-D-3. Checking Camber and Caster

To check the camber and caster, use a wheel aligning gauge following the manufacturer's instructions.

Camber: $1^{\circ}10' \pm 30'$

Caster: $4^{\circ}30' \pm 30'$ (Right hand side)

$4^{\circ}00' \pm 30'$ (Left hand side)

If it is found to be incorrect, adjust the camber and caster as follows:

1. Raise the front end of the vehicle and support it with stands.
2. Open the bonnet.
3. Remove the four nuts attaching the front suspension mounting block to the fender apron.

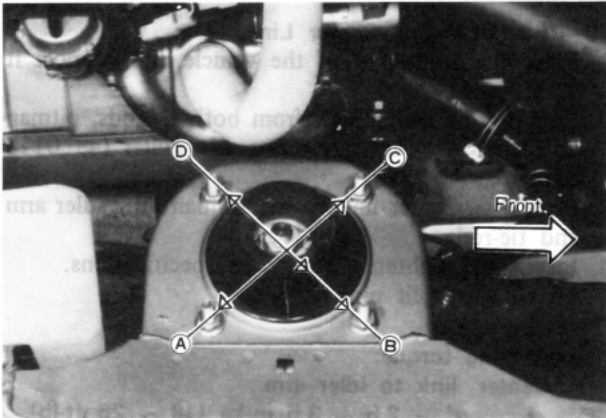


Fig. 10-33

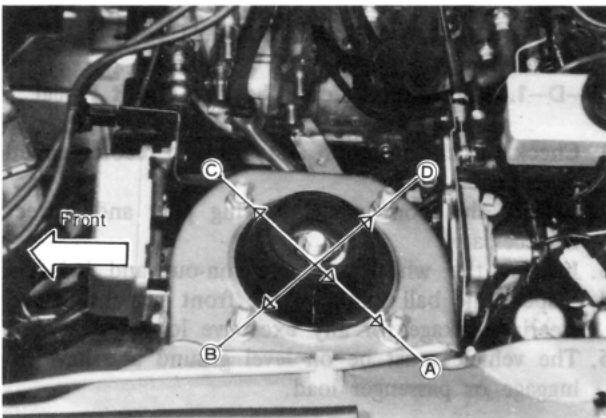


Fig. 10-34

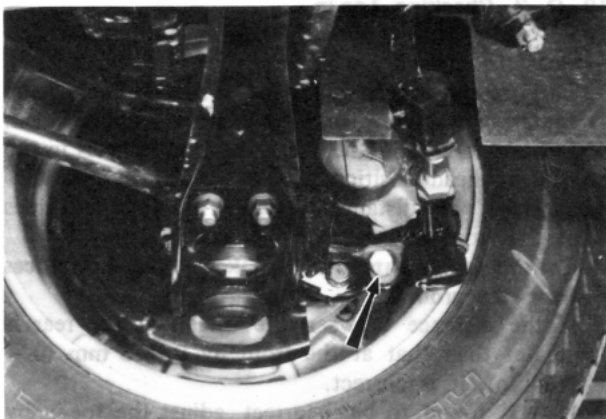


Fig. 10-35

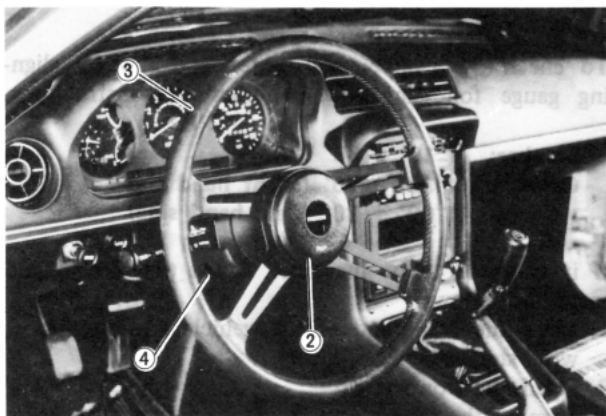


Fig. 10-36

4. Press the front suspension downward and change the position of the mounting block according to the following table.

Position of front suspension mounting block	Variation	
	Camber	Caster
0° (A) "Original"	0	0
90° (B)	0	+28'
180° (C)	+28'	+28'
270° (D)	+28'	0

5. Tighten the nuts attaching the front suspension mounting block to the fender apron.

Tightening torque 2.3 ~ 3.0 m-kg (17 ~ 22 ft-lb)

6. Lower the vehicle and recheck the camber and caster.

If the correct adjustment can not be obtained by the above procedures, check all parts of front suspension and body alignment, and repair or replace if necessary.

10-D-4. Adjusting Steering Angle

Adjust the steering angle with the adjusting bolt fitted on the steering knuckle arm so that the front wheels turn $39^{\circ}40' \pm 2^{\circ}$ inward and $32^{\circ}14' \pm 2^{\circ}$ outward.

10-E. STEERING LOCK

To replace the steering lock assembly, proceed as follows.

1. Disconnect the battery negative cable.
2. Remove the horn cap.
3. Apply identification marks on the steering column shaft and steering wheel, and remove the steering wheel.

Do not strike the steering column shaft end with a hammer. Striking shaft will damage the bearing or collapsible shaft.

4. Remove the steering column covers.



Fig. 10-37

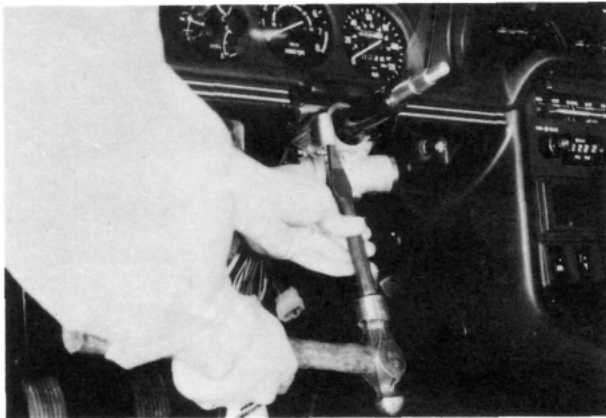


Fig. 10-38

5. Remove the air duct and disconnect the couplers of the combination switch.
6. Remove the stop ring, cancel cam and spring.
7. Remove the combination switch assembly.

8. Make a groove on the head of the bolts attaching the steering lock body to the column jacket by using a chisel so that the screwdriver can be used to loosen the screws.
9. Position a new steering lock assembly to the column jacket and tighten the bolts until the head of the bolts snaps-off.
10. Install the combination switch, column covers and steering wheel in the reverse order of removal.