[redacted]

WORKSHOP MANUAL

TRUCK VAN COACH

FOREWORD

This workshop manual has been prepared to provide information covering normal service, repair and maintenance for METRO vehicles.

Information in this manual is divided into Groups, each Group covers a general vehicle system like brakes, steering, etc.

Each Group also contains Summary, Specification, Trouble shooting, Removal and Installation, Adjustment, Diagnosis and Testing. The first page of each Group contains an index of the component and service operation.

For satisfaction of Asia customers, proper service and maintenance by technician is essential. So it is important that service personel fully understand the contents of this manual which should be kept in a handy place for quick and easy reference.

The information, photographs, drawings and specifications contained in this manual are best available at the time of printing. So, it is recommended that this manual should be kept up-to-date by receiving new information.

METRO MOTORS. reserves the right to make changes in this manual at any time without prior notice.

We sure this workshop manual will help you keep the best condition of this vehicle.

Technology Management Department.
METRO MOTORS.

CONTENTS

CONTENTS

GENERAL INFORMATION 0

FUNDAMENTAL PROCEDURE

PROTECTION OF THE VEHICLE

Always be sure to cover fenders, seats, and floor areas before starting to work.

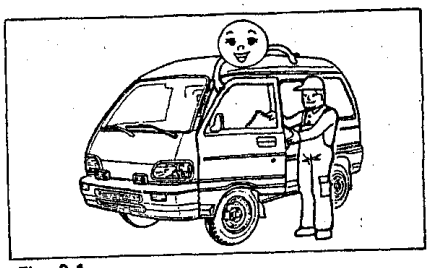

Fig. 0-1

A WORD ABOUT SAFETY

The following precautions must be followed when jacking up the vehicle.

1. Block wheels.
2. Use only specified jacking positions.
3. Support vehicle with safety stands(rigid racks).

Start the engine only after making certain the engine compartment is clear of tools and people.

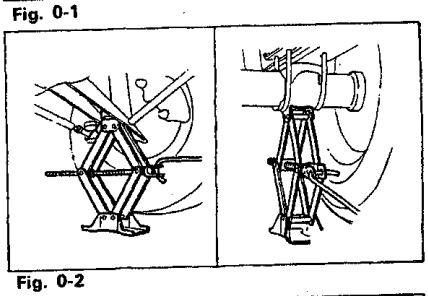

Fig. 0-2

PREPARATION OF TOOLS AND MEASURING EQUIPMENT

Be sure that all necessary tools and measuring equipment are available before starting to work actively.

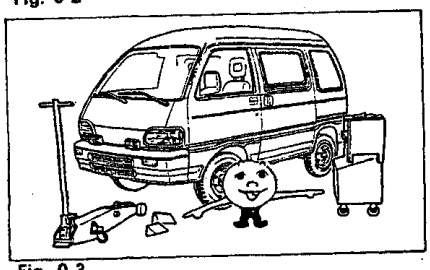

Fig. 0-3

SPECIAL TOOLS

Use special tools when they are required.

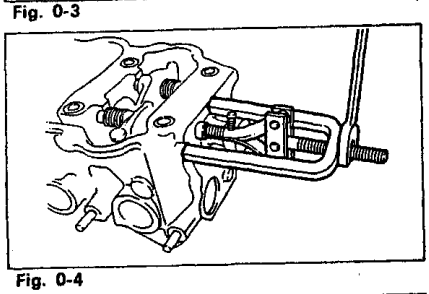

Fig. 0-4

REMOVAL OF PARTS

While correcting a problem, try also to determine its cause. Begine to work only after learning which parts and subassemblies must be removed and disassembled for replacement or repair.

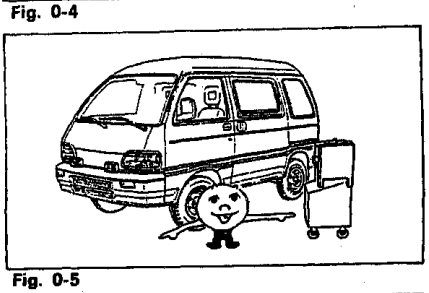

Fig. 0-5

◆ DISASSEMBLEY

If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be disassembled in the way that will not affect their performance or external apperance and can be identified so that reassembly can be performed efficiently.

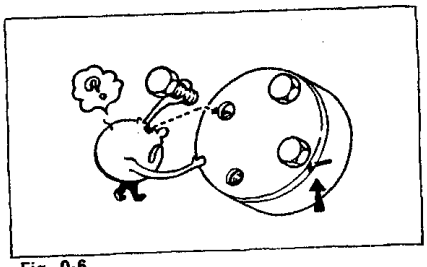

Fig. 0-6

1. Inspection of parts

Each part when removed should be carefully inspected for malfunction, deformation, damage or other problems.

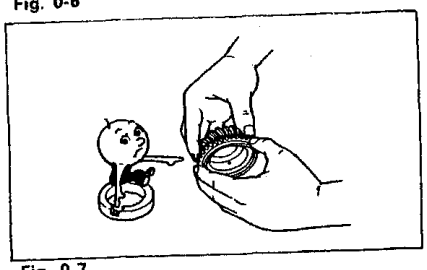

Fig. 0-7

2. Arrangememt of parts

All disassembled parts should be carefully arranged for reassembly.

Be sure to separate or otherwise identify the parts to be replaced from those that will be reused.

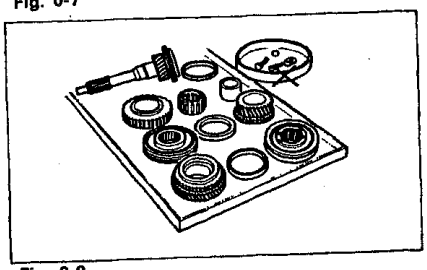

Fig. 0-8

3. Cleaning of parts for reuse

All parts to be reused should be carefully and thoroughly cleaned by the appropriate method.

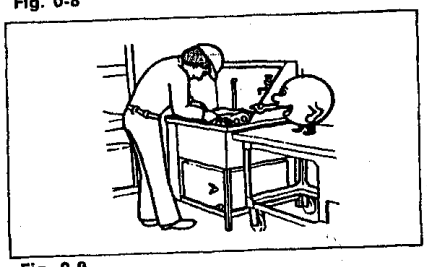

Fig. 0-9

◆ REASSEMBLY

Standard values, such as torque and certain adjustments, must be strictly observed in the reassembly of all parts.

If removed, these parts should be replaced with new ones.

1. Oil seals
2. Gaskets
3. O-rings
4. Lock washers
5. Cotter pins (split pins)
6. Nylon nuts

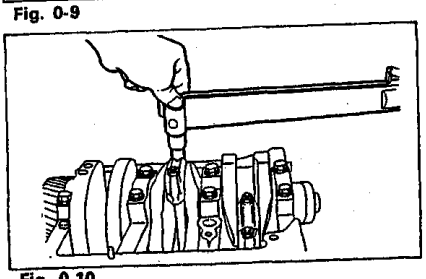

Fig. 0-10

Depending on where they are;

1. Sealant should be applied to gaskets.
2. Oil should be applied to moving components of parts.
3. Specified oil or grease should be applied at the prescribed locations(oil seals, etc.) before assembly.

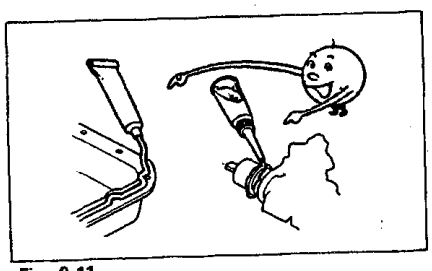

Fig. 0-11

◆ ADJUSTMENTS

Use gauges and testers to make adjustments to the standard values.

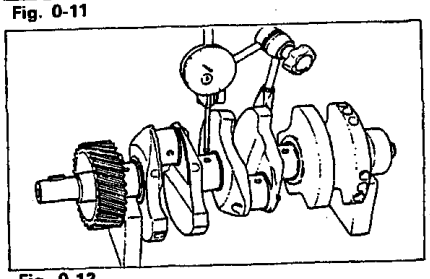

Fig. 0-12

◆ ELECTRICAL SYSTEM

Be sure to disconnect the battery cable from the negative(−) terminal of the battery.
Never pull on the wiring when disconnecting connectors.
Locking connectors must be heard to click if the connector to be secured.
Handle sensors and relays carefully. Be careful not to drop them or hit them against other parts.

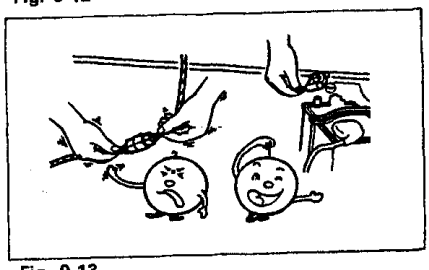

Fig. 0-13

◆ RUBBER PARTS AND TUBING

Always prevent gasoline or oil from touching rubber parts or tubing.

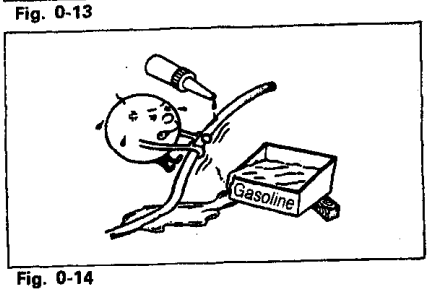

Fig. 0-14

VEHICLE LIFT POSITIONS

FRONT

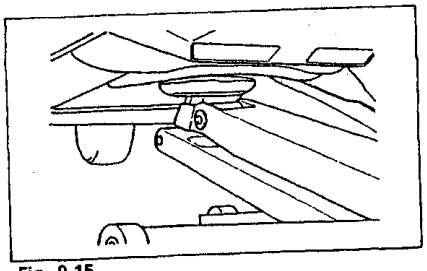

Fig. 0-15

REAR

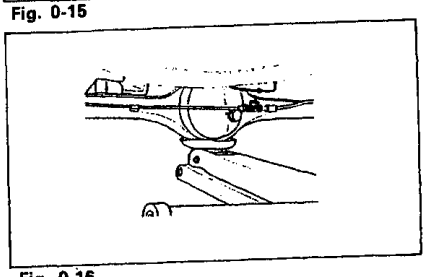

Fig. 0-16

TOWING

Proper towing equipment is necessary to prevent damage to the vehicle during any towing operation. Laws and regulations applicable to vehicles in tow must always be observed.

Release the parking brake, place the shift lever in neutral, and set the ignition key in the "ACC" position. As a rule, towed vehicles should be pulled with the drive wheels off the ground.

If the transmission, rear axle, or steering systems is not damaged, the vehicle may be towed on all four wheels. If any is damaged, a towing dolly must be used.

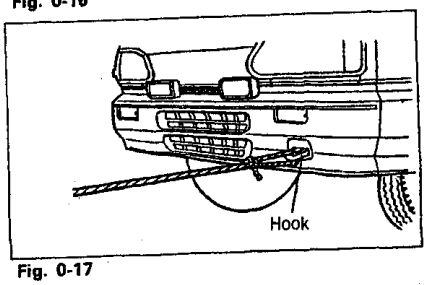

Fig. 0-17

CAUTIONS

a) The power assist for the brakes will be inoperable while the engine is off.

b) When either towing hooks are used, always pull the cable or chain straight away from the hook and do not apply any sideways force to it. To further help prevent damage, do not take up slack too quickly in the cable or chain.

ABBREVIATION CODES

The abbreviation codes that appear in this workshop manual stand for the following, respectively.

RH	Right Hand
LH	Left Hand
FR	Front
RR	Rear
O/S	Over Size
U/S	Under Size
ATDC	After Top Dead Center
BTDC	Before Top Dead Center
IN	Intake
EX	Exhaust
PR	Pry Rating
SAE	Society of Automotive Engineers
API	American Petroleum Institute
SST	Special Service Tool
T	Torque
S/A	Sub-assembly
Ay	Assembly
W/	With
L/	Less

UNITS

m-kg(ft-lb or in-lb)	Torque
rpm	Revolutions per minute
A	Ampere(s)
V	Volt(s)
Ω	Ohm(s) (resistance)
kg/cm^2 (psi)	Pressure (usually positive)
mm Hg(in Hg)	Pressure (usually negative)
W	Watt

ENGINE 1

SECTION 1. ENGINE TUNE-UP

SECTION 2. ENGINE PROPER

1D

SECTION 1. ENGINE TUNE-UP

⊠ ENGINE SERVICE HOLE

VAN · COACH

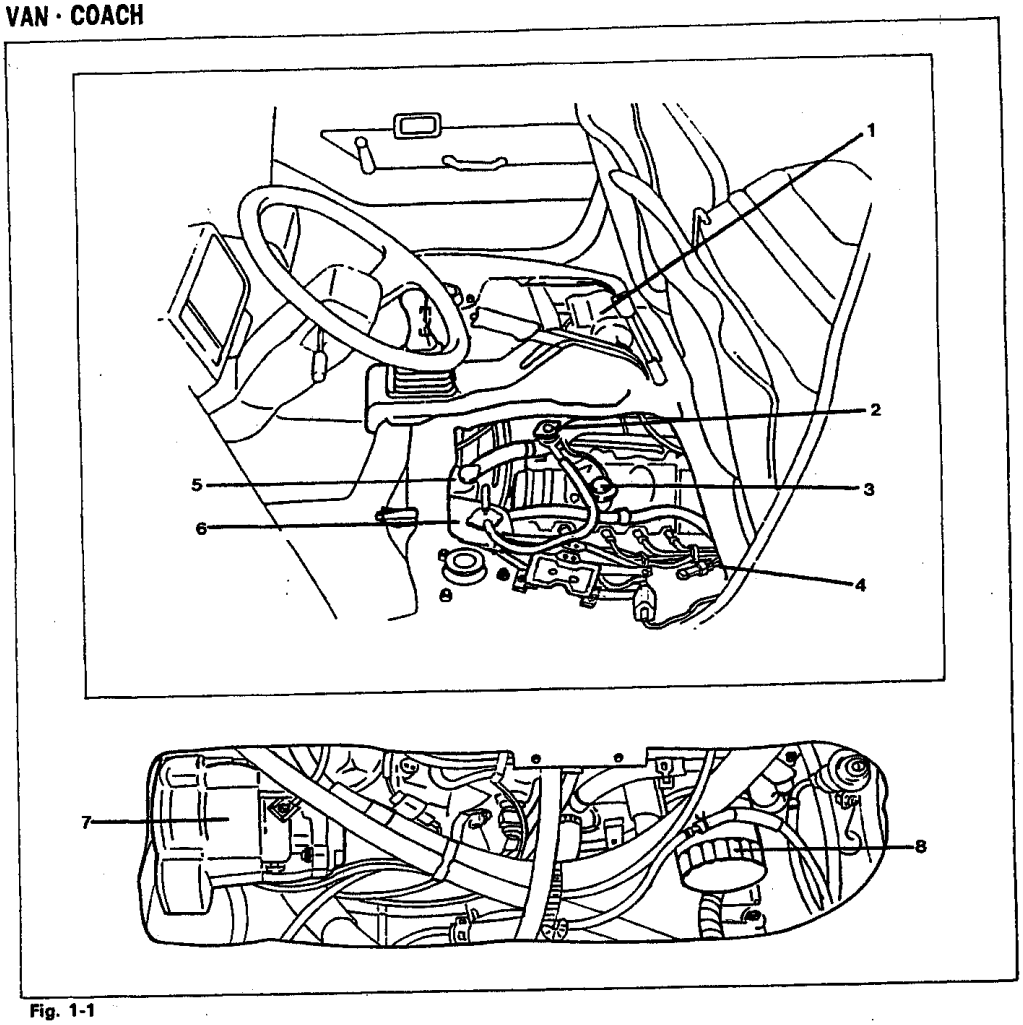

Fig. 1-1

1. Air cleaner
2. Pressure valve cap
3. Engine oil filler cap
4. High tension cord
5. Washer fluid tank
6. Coolant reservoir
7. Distributor
8. Engine oil filter

TRUCK

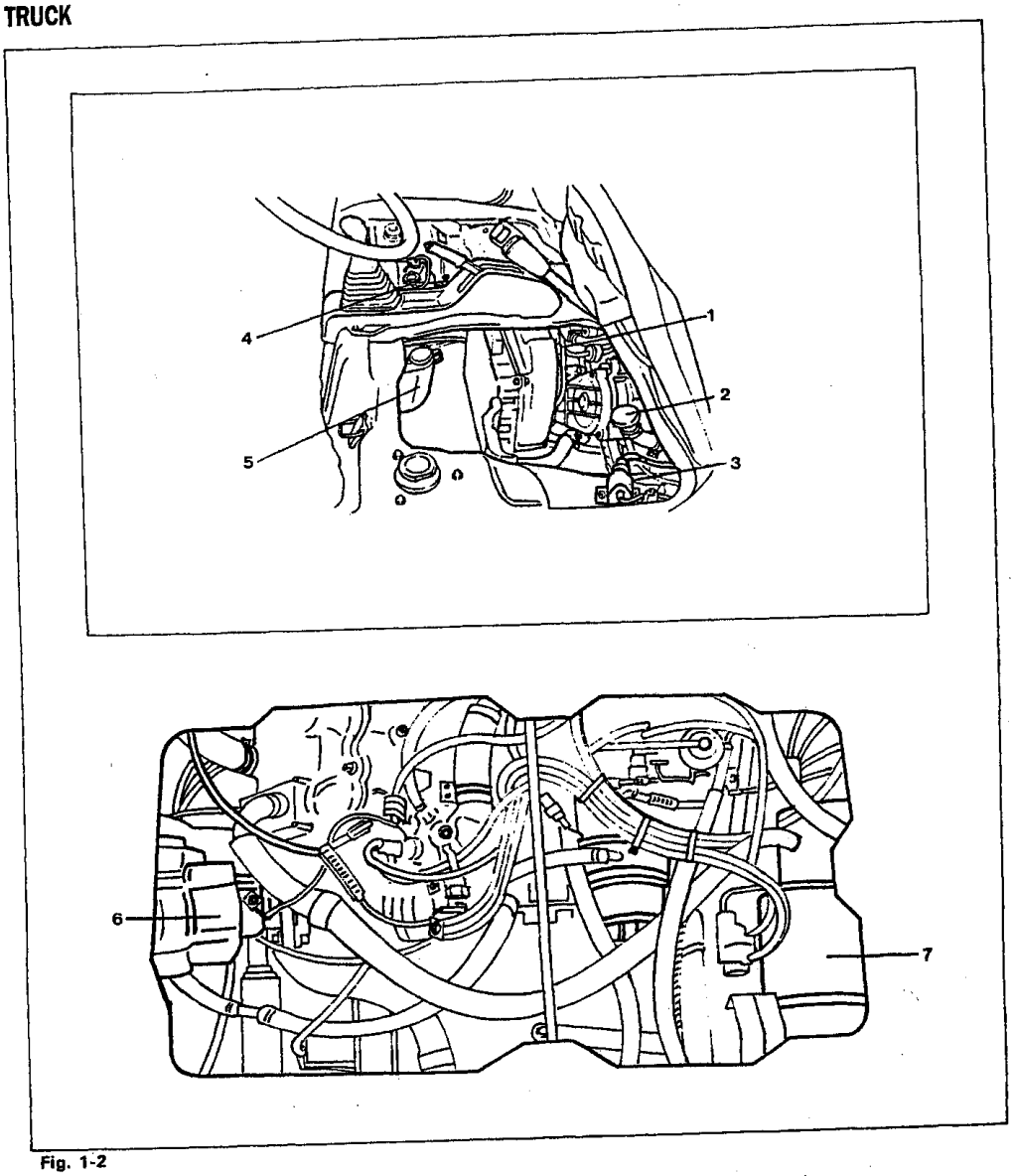

Fig. 1-2

1. V-belt
2. Engine oil filler cap
3. Ignition coil
4. Radiator cap
5. Washer fluid tank
6. Distributor
7. Air cleaner

ENGINE TUNE-UP PROCEDURE

1. Checking cooling water level and engine oil level

Specified value:
Cooling water capacity: 4.0 liters(Truck), 5.0liters (Van, Coach)
(including reserve tank capacity of 0.65 liter and heater capacity of 0.7 liter)
Specified value:
Engine oil capacity: 2.9 liters
(including oil filter of 0.2 liter)

Checking battery electrolyte level and specific gravity

Specified value:
Battery electrolyte specific gravity:
(at electrolyte temperature of 20℃) 1.27 to 1.29

Checking and cleaning air cleaner

2. Checking and adjusting spark plugs

Spark plug gap: 0.8 to 0.9mm

Checking resistive cords

Specified value: 16±6kΩ/m
Cord No.1 5.0 to 11.0kΩ
Cord No.2 3.5 to 7.7kΩ
Cord No.3 3.1 to 6.82kΩ
Center cord
Truck 4.25 to 9.35kΩ
Van, Coach 3.0 to 6.6kΩ

3. Checking and adjusting "V" belt for deflection

Specified deflection:
5 to 7mm/10kg
(0.20 to 0.28 inch/22.05 lb)

Checking cylinder head and manifolds for tightening condition

Specified value:
Cylinder head tightening torque:
5.5 to 6.5 kg-m (39.8 to 47.0 ft-lb)
Manifold tightening torque:
1.0 to 1.6 kg-m (7.2 to 11.6 ft-lb)

Warming-up engine
(Cooling water temperature: 75 to 80℃)

4. Checking valve clearances

Specified clearance:
Intake: 0.20mm±0.05 (when hot)
Exhaust: 0.20mm±0.05 (when hot)
(Clearance between adjusting screw and valve stem head)

5. Checking compression pressure ... Specified value:
12.5kg/cm² (177.8 psi) (350 rpm)
Minimum requirement:
10.0kg/cm² (142.2 psi) (350 rpm)
Difference between cylinders:
Not to exceed 1.5kg/cm² (21.3 psi)

6. Checking and adjusting distributor ... Dwell angle: 40°~56°(1500 rpm)
30°~46°(1000 rpm)
15°~18°(300 rpm)

7. Checking and adjusting ignition timing ... Specified value: BTDC 5°C±2°

8. Checking idling speed ... Specified value: 950±50 rpm
NOTE
Make sure that no additional electrical load such as head lamps is applied to the engine

Measuring CO and HC concentrations ... Specified value: CO below 4.5%

Not confirmed to specifications → Adjusting idling speed

9. Checking and adjusting fast idling speed ... Specified speed: 3000±300 rpm(1st stage of choke knob)
2000±300 rpm(2nd stage of choke knob)

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⊠ MAIN POINTS OF ENGINE TUNE-UP

1. Checking of engine oil level

The oil level should be between upper and lower level line.

Engine oil capacity: 2.9ℓ
(including oil filter of 0.2ℓ)

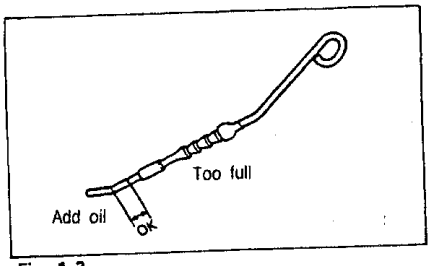


Fig. 1-3

2. Checking and adjusting of spark plugs

1) Check to see whether the spark plugs indicate cracks. Clean the spark plugs.
2) Check and adjust the spark plug gaps.

Specified spark plug gap: 0.8 to 0.9mm
(0.0315 to 0.0354 in.)

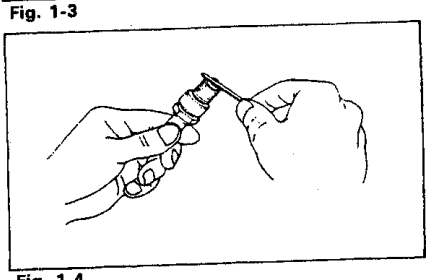


Fig. 1-4

3. Checking and adjusting of "V" belt

1) Check the "V" belt for wear or cracks.
2) Check the deflection amount of the belt.
   Adjust the deflective if necessary.

Deflective amount
Specified value: 5.0 to 7.0mm(0.20 to 0.28 inch)
(with a force of 10kg applied)

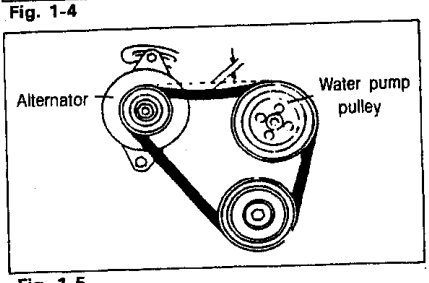


Fig. 1-5

NOTE

If the engine has been operated for more than 5 minutes since a new belt was installed, readjust the belt tension so as to obtain a deflective amount of 6.0 to 7.0mm(0.24 to 0.28 inch).

4. Valve clearance adjustment

Specified value(hot): Intake: 0.20±0.05mm
Exhaust: 0.20±0.05mm

NOTE

Carry out the check and adjustment between the camshaft and the rocker arm adjusting screw.

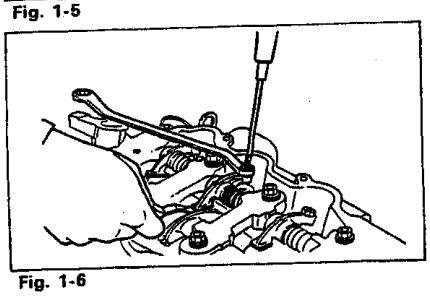


Fig. 1-6

Carry out the check and adjustment of valve clearances, with the piston of the No. 1 cylinder set at the end of the compression stroke as well as at the tops of the intake and exhaust strokes, respectively. See the table for the adjustable valves for the respective positions of the No. 1 piston.

Crank angle \ Cylinder		1	2	3
When No. 1 piston is set at the end of compression stroke	IN	o	—	o
	EX	o	o	—
When No. 1 piston is set at the tops of intake and exhaust strokes, respectively	IN	—	o	—
	EX	—	—	o

Reference information:

Valve clearance approximate to the specified valve(0. 20mm) can be obtained first by turning the adjusting screw until the clearance becomes zero and then by backing off the adjusting screw about 90 degrees.

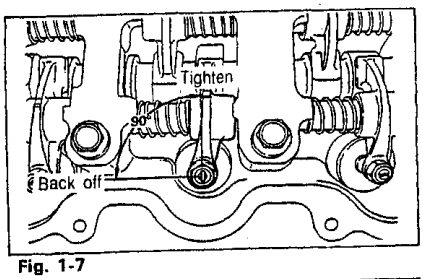


Fig. 1-7

5. Compression pressure check

Compression Pressure	kg/cm²–rpm
Specified Value	12.5–350
Minimum Requirement	10.0–350
Variation Among Cylinders	1.5–350

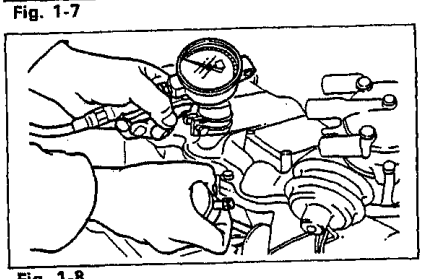


Fig. 1-8

NOTE

The measurement of compression pressure should be performed for a short period of time. Moreover care must be exercised to ensure that the measurement time for each cylinder becomes equal.

6. Check and adjustment of contact points

1) Check to see if the contact points exhibit the trace of burning.
2) Check and adjust the gap of the contact points.
   Specified heel gap: 0.4 to 0.5mm
   Specified dwell angle: 40° to 56° (1500 rpm)

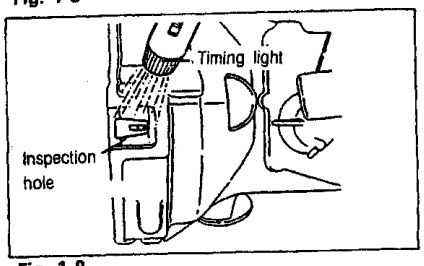


Fig. 1-9

7. Check and adjustment of ignition timing

Check

Disconnect the secondary vacuum hose from the vacuum advancer.

Specified Ignition timing: BTDC 5°±2°/950 rpm

NOTE

1. Be sure to plug the disconnected vacuum hose, before the ignition timing check is started.
2. Upon completion of the ignition timing check operation, be certain to install the clutch housing cover on the inspection window.

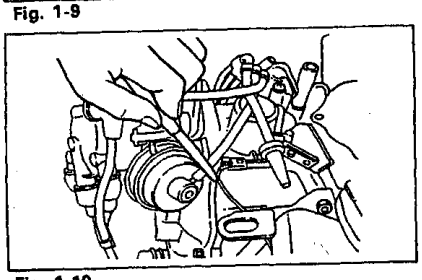


Fig. 1-10

Adjustment

1) The ignition timing can be adjusted by turning the distributor body.

NOTE

When the distributor body is turned counterclockwise, the ignition timing will be advanced, whereas when the distributor body is turned clockwise, the ignition timing will be retarded.

2) After the adjustment has been completed, reconnect the vacuum hose to the advancer.

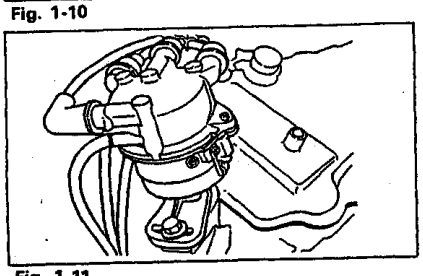


Fig. 1-11

Checking the operation of the governor

1. Rotor should be returned quickly when turned clockwise by hand and released.
2. Rotor should not be excessively loose.
3. Start the engine and disconnect the vacuum hose from the distributor.
   The timing mark should vary in accordance with the engine speed.

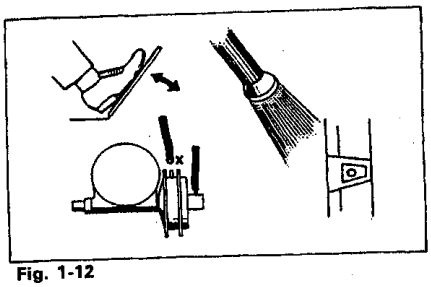


Fig. 1-12

8. Idling adjustment

(1) Initial check and adjustment of warming up engine and test equipment → (2) Installing test equipment → (3) Check and adjustment of idling

Conditions under which engine idling speed must be adjusted

1. Warm up the engine thoroughly.
2. Do not perform the engine idling speed adjustment while the fan motor is still functioning.
3. Turn-off the head lamps, etc.

1) Check the adjustment of idling
   1) Back off the idle adjusting screw about 4 turns from the fully-closed position.
   2) Start the engine. Turn the throttle adjusting screw until the engine runs at 950 rpm
      Specified idling speed: 950±50 rpm
2) Measure the CO concentration.
3) If the CO concentration does not comply with the specified value, turn the idle adjusting screw.
   If the engine runs roughly, check to see if the CO concentration or engine revolution speed drops excessively. Set these values to the higher points within the allowable range.

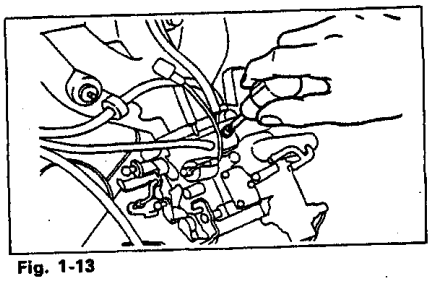


Fig. 1-13

9. Adjustment of fast idle speed

1) Warm-up the engine.
2) Pull the choke button out fully. Then, return the choke button to the second detent position.

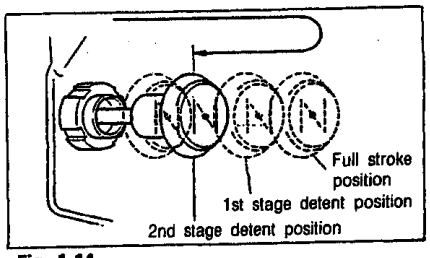


Fig. 1-14

3) Determine the clamping position of the choke outer cable in such a way that the engine revolution speed may become the specified speed(3000±200 rpm).

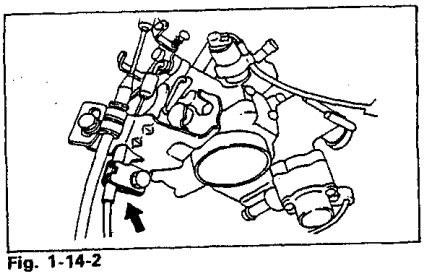


Fig. 1-14-2

SECTION 2. ENGINE PROPER

⊠ REMOVAL AND INSTALLATION OF ENGINE

When removing and installing the engine, lower the engine together with the transmission, after performing the following preparatory operations.

1. Perform the following work before lifting up the vehicle.

Drain engine oil and cooling water
↓
Disconnect battery terminal
↓
Remove service hole cover
↓
Remove fuel hose and fuel return hose
↓
Remove air intake hose
↓
Disconnect throttle cable and choke cable
↓
Remove ventilation hose
↓
Remove radiator hose(upper)
↓
Remove heater hose(upper)

2. Perform the following work after lifting up the vehicle.

Remove engine under cover
↓
Disconnect multi-connector and ground cable
↓
Remove clutch cable and speedometer cable
↓
Disconnect starter terminal
↓
Remove shift and select cable
↓
Remove radiator hose(lower) and heater hose
↓
Remove exhaust pipe
↓
Remove propeller shaft

NOTE

Utmost caution must be exercised to ensure that no gasoline is applied to the engine mountings during the servicing operations, especially when there is a possibility that gasoline may leak because of the removal of the fuel hose and so forth. Furthermore, if gasoline should be applied the engine mountings, be certain to replace the affected parts.

⊠ INSPECTION (AFTER INSTALLATION)

1. Check for oil and water leakage, rattle, abnormal noise, and piping.
2. Check for distortion of the mounting insulator.
3. Check for operation of the shift lever.
4. Adjustment for clutch cable.
5. Adjustment for engine.

DISASSEMBLY

REMOVAL OF PARTS

1. Attach the SST onto the cylinder block. And attach this SST to the engine overhaul stand.
   ⓐ **SST: Engine overhaul stand**
   09219-87202-000
   ⓑ **SST: Piston replacing guide**
   09219-87701-000

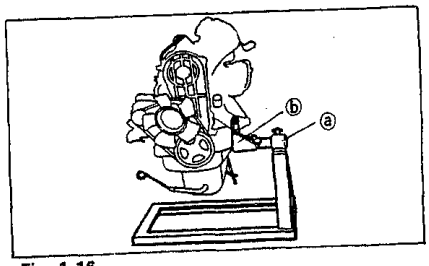


Fig. 1-16

2. Remove the following parts from the front side and right side of the engine.
   1) Water pump pulley
   2) "V" belt
   3) Exhaust manifold
   4) Crankshaft pulley

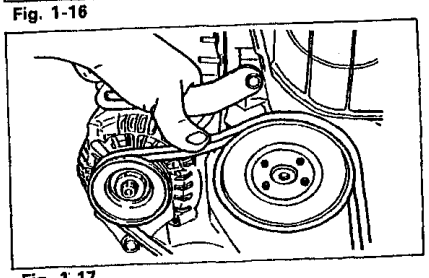


Fig. 1-17

3. Remove the following parts.
   1) Distributor with high tension cord
   2) Cylinder head cover
   3) Timing belt cover

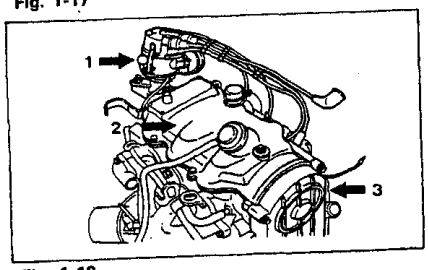


Fig. 1-18

4. Remove the following parts from the left side of the engine.
   1) Alternator
   2) Fuel pipe
   3) Water by-pass hose No. 2 and No. 3
   4) Intake manifold(together with carburetor)

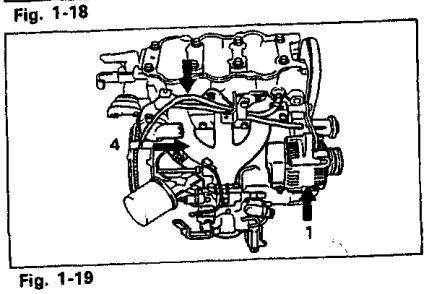


Fig. 1-19

5. Oil filter & oil cooler removal

Remove the parts in numerical order shown in the figure below.

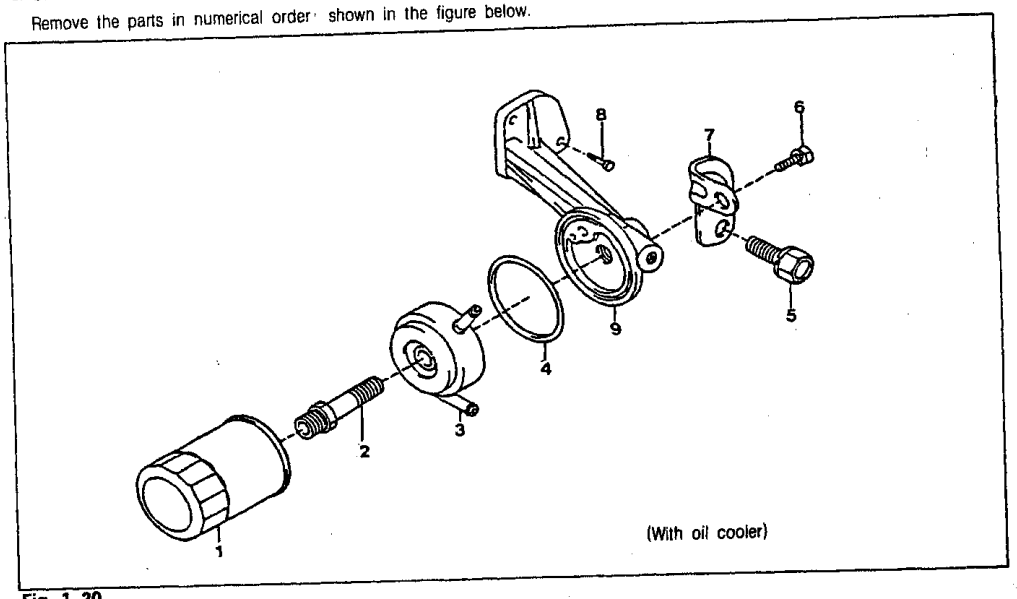


Fig. 1-20

1. Oil filter element S/A
2. Oil cooler set bolt
3. Oil cooler Ay.
4. "O" ring
5. Bolt
6. Bolt
7. Stay oil filter bracket
8. Bolt
9. Oil filter bracket

6. Remove the distributor housing.

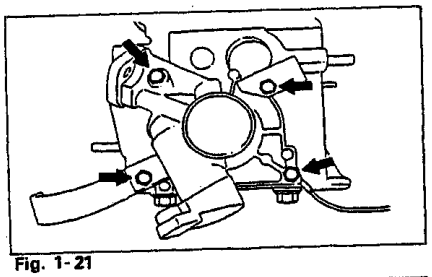


Fig. 1-21

7. Remove the following parts from the rear side of the engine.
   1) Clutch cover and clutch disc
      SST: Flywheel holder
      09210-87701-000
   2) Flywheel

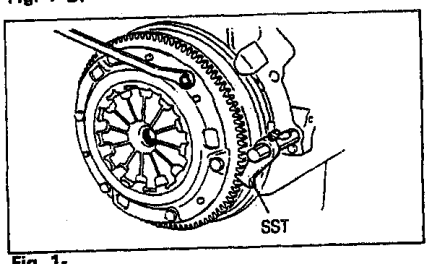


Fig. 1-

8. Remove the rear end plate.

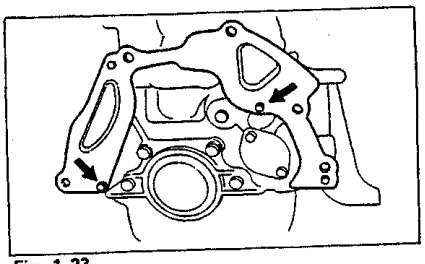


Fig. 1-23

9. Remove the timing belt and the related parts following the procedure.
   1) Timing belt tensioner
   2) Timing belt
   3) Tensioner spring

NOTE

1. **While removing the timing belt, make sure not to bend the belt sharply to from a small radius.**
2. **Utmost care must be exercised to keep the timing belt from oils, grease, or water, etc.**

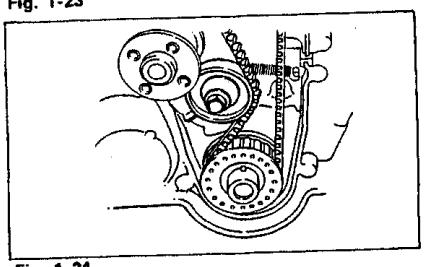


Fig. 1-24

10. Remove the camshaft belt pulley.

NOTE

During the timing belt pulley removal operation of the camshaft can be prevented from rotation, by inserting a screwdriver through the opening of the pulley.

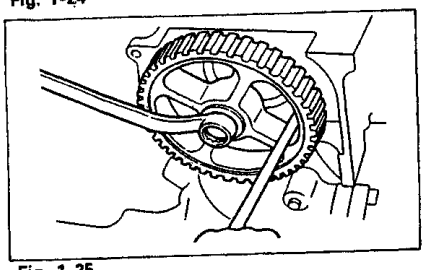


Fig. 1-25

11. Remove the crankshaft timing belt pulley.

NOTE

If any difficulty should be encountered in removing the crankshaft timing belt pulley, screw-in bolts into the threaded holes provided in the side of the pulley.

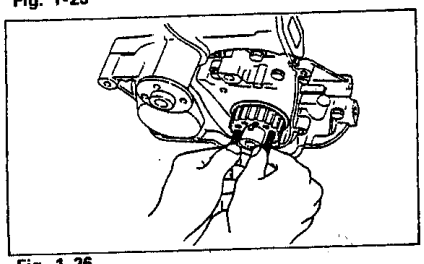


Fig. 1-26

12. Remove the cylinder head.

NOTE

Loosen cylinder head bolts little by little, in two or three steps, in the specified numerical sequence.

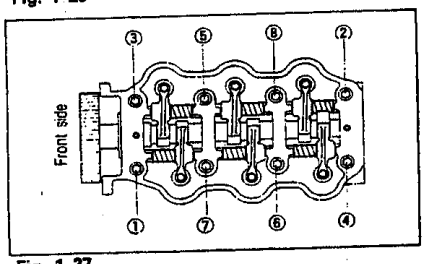


Fig. 1-27

◆ DISASSEMBLY OF PARTS RELATED TO THE CYLINDER HEAD

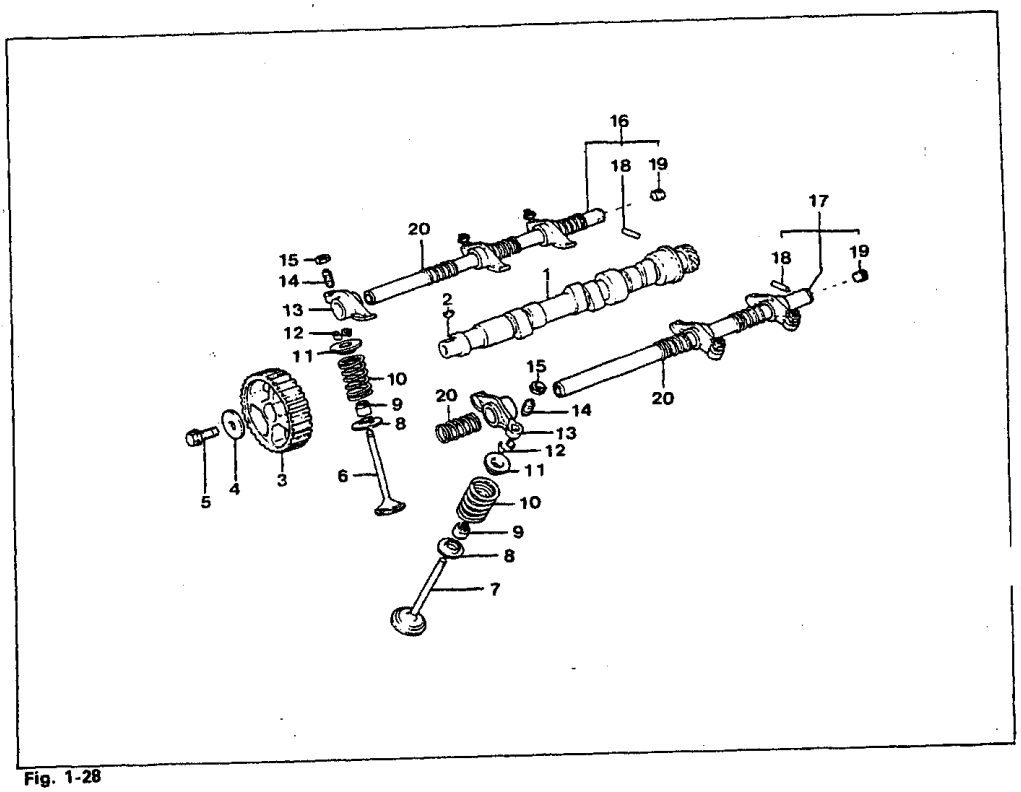


Fig. 1-28

1. Camshaft
2. Woodruff key
3. Camshaft timing belt pulley
4. Plate washer
5. Flange bolt
6. Intake valve
7. Exhaust valve
8. Valve spring seat
9. Valve stem oil seal
10. Compression spring
11. Valve spring retainer
12. Valve spring retainer lock
13. Valve rocker arm S/A
14. Valve adjusting screw
15. Hexagon nut
16. Valve rocker shaft S/A No. 1
17. Valve rocker shaft S/A No. 1
18. Roller
19. Straight screw plug
20. Compression plug

1. Mount the cylinder head on the SST. And clamp the special tool in a vise. Remove the following parts in this sequence.
   SST: Cylinder head holder
   09219-87703-000

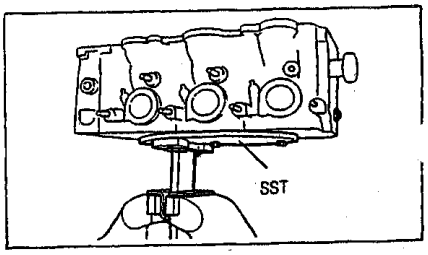


Fig. 1-29

2. Fully slacken the adjusting screws of the valve rocker arms. Extract the valve rocker shaft.

   SST: Valve spring replacer
   09202-87701-000

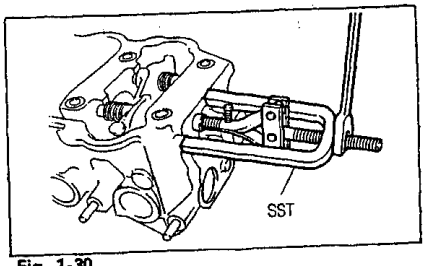


Fig. 1-30

3. Extract the camshaft from the rear end of the cylinder head.

   NOTE

   While removing the camshaft, be sure to exercise caution to avoid damaging the bearing journals or cam lobe surfaces of the camshaft.

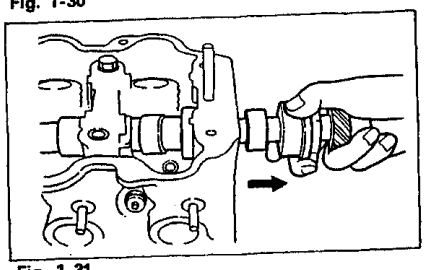


Fig. 1-31

4. Remove the valve and parts related to the compression spring.

   SST: Valve spring replacer
   09202-87701-000

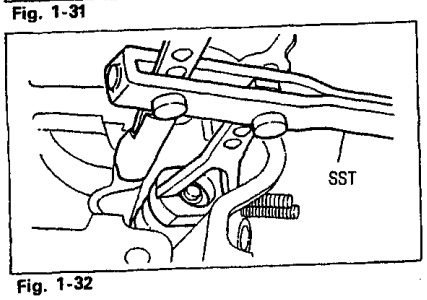


Fig. 1-32

◆ DISASSEMBLY OF THE PARTS RELATED TO THE CYLINDER BLOCK

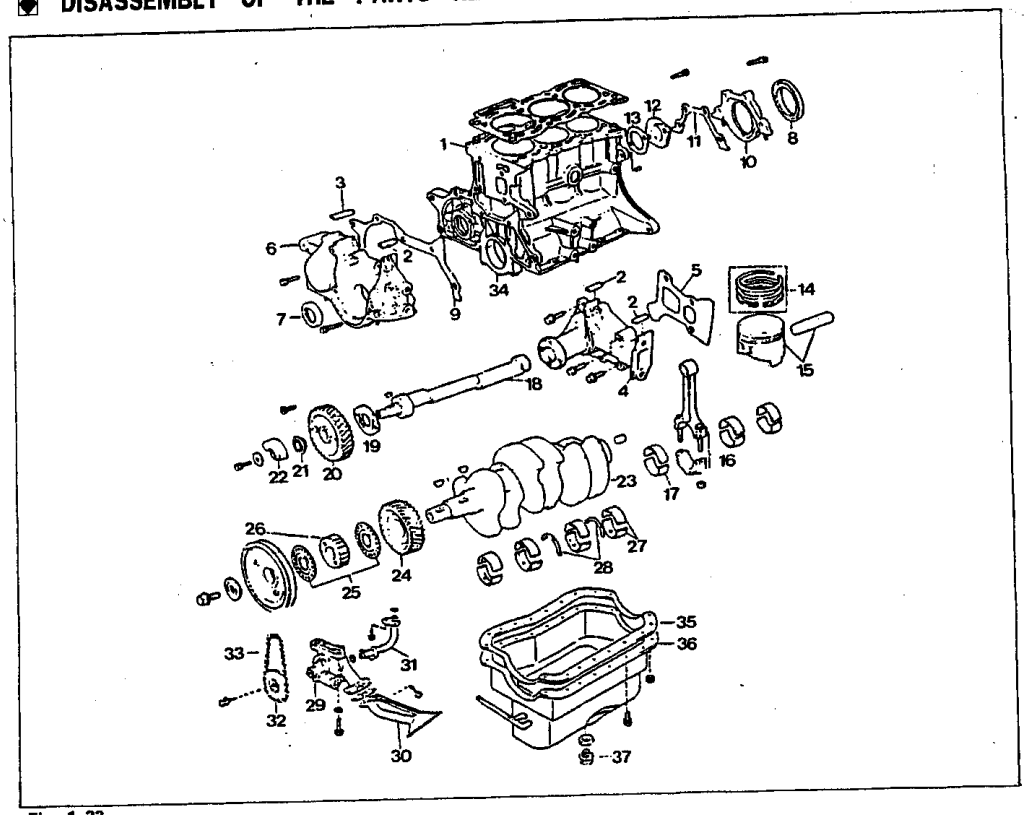


Fig. 1-33

1. Cylinder S/A
2. Dust seal
3. Dust seal Ay
4. Water pump Ay
5. Water pump gasket
6. Balance shaft gear cover
7, 8. T type oil seal
9. Balance shaft gear cover gasket
10. Oil seal retainer
11. Oil seal retainer gasket
12. Balance shaft rear cover
13. Balance shaft rear cover gasket
14. Piston ring set
15. Piston S/A with pin
16. Connecting rod S/A
17. Connecting rod bearing set
18. Balance shaft
19. Balance shaft thrust plate
20. Balance shaft gear
21. Oil pump drive sprocket
22. Balance weight
23. Crankshaft S/A
24. Balance shaft drive gear
25. Crankshaft timing belt pulley flange
26. Crankshaft timing belt pulley
27. Crankshaft bearing set
28. Crankshaft thrust washer set
29. Oil pump Ay less strainer
30. Oil pump strainer Ay
31. Oil pump outlet pipe S/A
32. Oil pump drive shaft sprocket
33. Oil pump chain Ay
34. Crankshaft cap
35. Oil pan gasket
36. Oil pan Ay
37. Straight screw plug with head

1. Remove the water pump Ay.

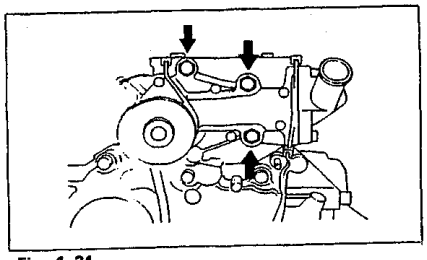


Fig. 1-34

2. Remove the oil pan.

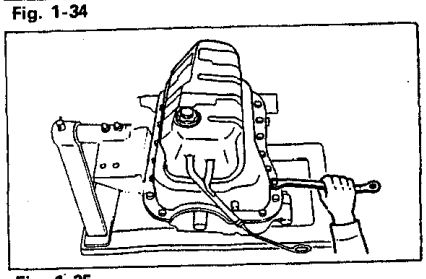


Fig. 1-35

3. Remove the rear oil pan retainer.

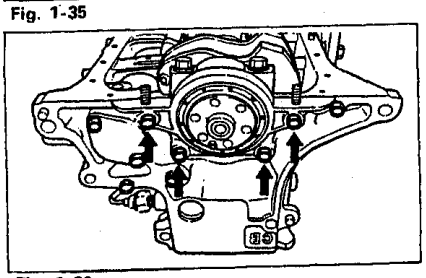


Fig. 1-36

4. Detach the balance shaft gear cover and rear oil seal retainer.

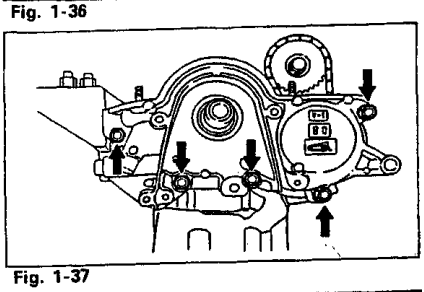


Fig. 1-37

5. Remove the oil pump drive shaft sprocket and oil pump drive chain.

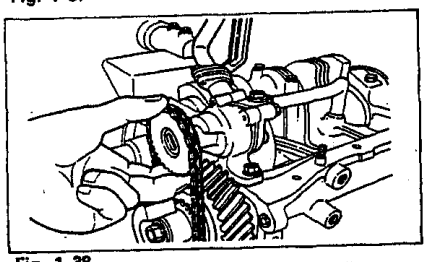


Fig. 1-38

6. Remove the oil pump together with the oil pump outlet pipe.

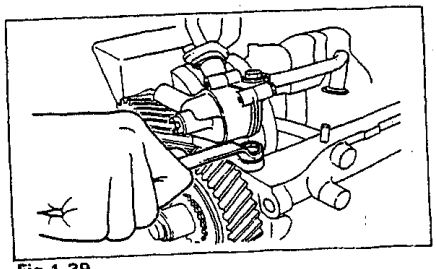


Fig.1-39

7. Remove the balance weight.

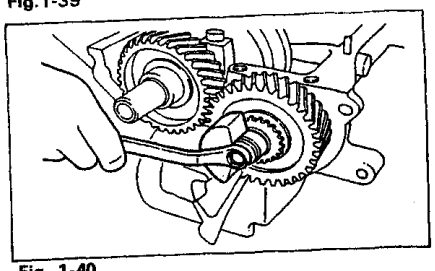


Fig. 1-40

8. Remove the balance shaft, as follows.
   1) Align the stamped mark on the balance shaft gear with the stamped mark on the balance shaft drive gear.

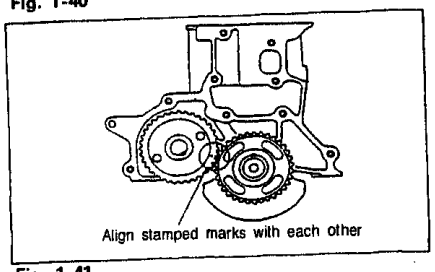


Fig. 1-41

   2) Remove the hexagon socket head cap bolts, by using a hexagon rod wrench.
      Extract the balance shaft toward the front side of the cylinder block.

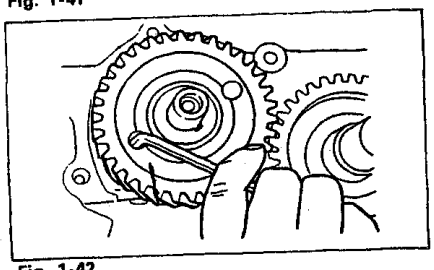


Fig. 1-42

9. Remove the connecting rod cap nuts and caps.
   Push the connecting rod and piston assembly upward out the top of the cylinder block.

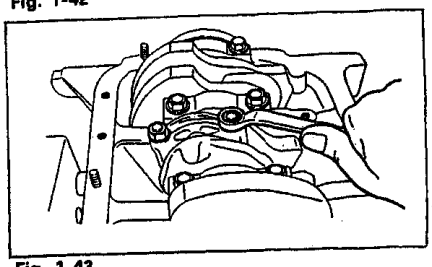


Fig. 1-43

10. Keep the connecting rods and bearings in correct order.

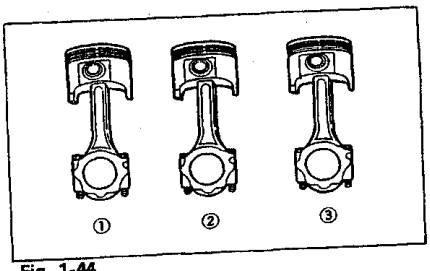


Fig. 1-44

11. Remove the piston pins, following the procedure.

SST: Piston pin remover & replacer
09221-25018-000 (Main body)
SST: Piston pin remover & replacer
09221-87702-000

1) Attach the fitting piece ② onto the stand ①.
2) Place the spring ③ and the bar(small) ⑤ into the stand.
3) Position the piston on the stand ①.
4) Insert the bar(large) ④ into the piston pin. Press the pin off from the piston.

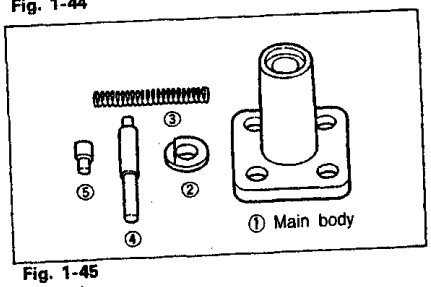


Fig. 1-45

12. Remove the crankshaft bearings caps
Remove the crankshaft.

NOTE

The crankshaft bearings should be placed correctly in cylinder sequence so that they can be reassembled properly in their original position.

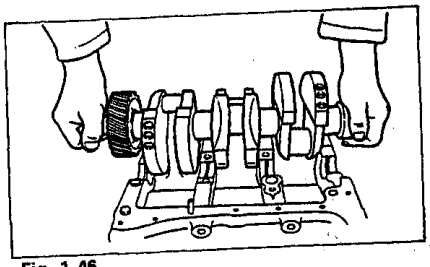


Fig. 1-46

13. Remove the crankshaft bearing & thrust washer.

NOTE

Crankshaft thrust washers are provided only at the front and rear sides of the cylinder block No. 3 bearing.

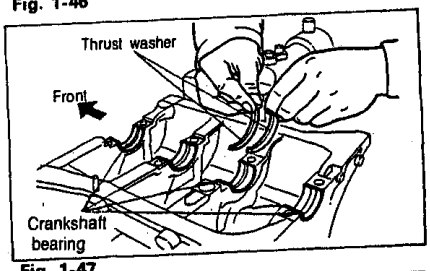


Fig. 1-47

◆ INSPECTION AND REPAIR OF ENGINE COMPONENTS

1. Checking valve guide bush-to-valve stem clearence

Item		Specified value	Limit	Measuring instrument
Bush inner diameter mm(inch)	IN	$7^{+0.020}_{0}$	7.04 (0.277)	Caliper gauge
	EX	$(0.276^{+0.0008}_{0})$		
Stem outer diameter mm(inch)	IN	$7^{-0.040}_{-0.055}$	6.92 (0.272)	Micrometer for measuring outer diameter
		$(0.276^{-0.0016}_{-0.0022})$		
	EX	$7^{-0.045}_{-0.060}$	6.91 (0.272)	
		$(0.276^{-0.0018}_{-0.0024})$		
Bush-to-stem clerance mm(inch)	IN	0.040 to 0.075 (0.0016 to 0.0030)	0.09 (0.004)	
	EX	0.045 to 0.080 (0.0018 to 0.0031)	0.10 (0.004)	

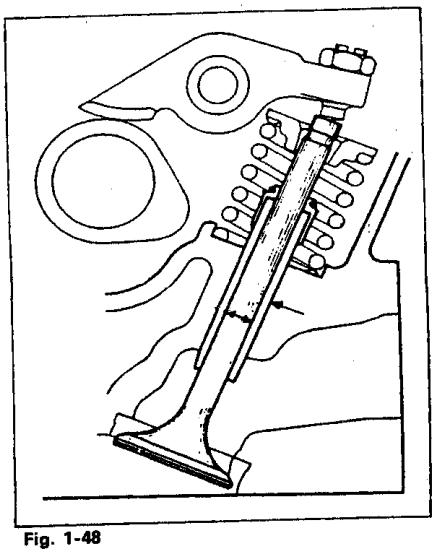


Fig. 1-48

2. Replacing valve guide bush

Bush projection height

15.2mm to 15.8mm(0.598 to 0.622 inch)

1) Drive the valve guide bush out toward the combustion chamber side.
2) Discard the old valve guide that has been driven out, since it can no longer provide proper fitting.
   Be sure to install a valve guide bush [O/S 0.03mm(0.0012 inch)] for replacement use.

3. Checking valve stem oil seal
   1) Be certain not to reuse the valve stem oil seal that has been removed from the engine. When assenbling, make sure to use a new oil seal.

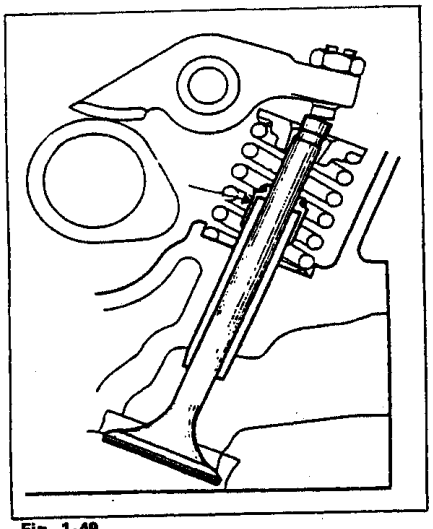


Fig. 1-49

4. Checking cylinder head
   1) **Limit of distortion: 0.1mm(0.0039 inch)**
   2) **Grinding tolerance: 0.3mm(0.0118 inch)**
      (Specified height: 126±0.1mm)
   3) **Measuring instrument: Straightedge,**
      Thickness gauge.

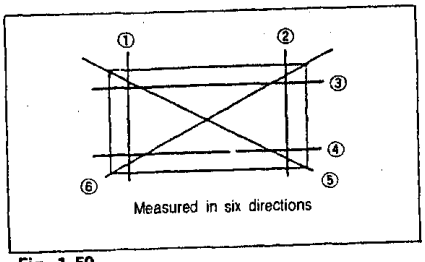


Fig. 1-50

5. Checking valve springs

Item	Specified value	Limit	Measuring instrument
Free length mm(inch)	43.3 (1.705)	42.0 (1.654)	Vernier calipers
Squareness mm(inch)	—	1.5 (0.059)	Surface plate and steel square
Tension as assembled kg(lb) (at assembled height of 34.9 mm 1.34 inch)	29.9±1.4 (65.9±3.1)	25.7 (56.7)	Spring tester

6. Checking IN and EX valves

Item		Specified value	Limit	Measuring instrument
Valve head stock thickness mm(inch)	IN	1.2±0.3 (0.0472±0.012)	0.8 (0.031)	Vernier calipers
	EX	1.5±0.3 (0.059±0.012)	1.0 (0.039)	
Recession mm(inch)		—	0.4 (0.016)	
Overall length mm(inch)		101.65±0.3 (4.002±0.012)	100.85 (3.970)	

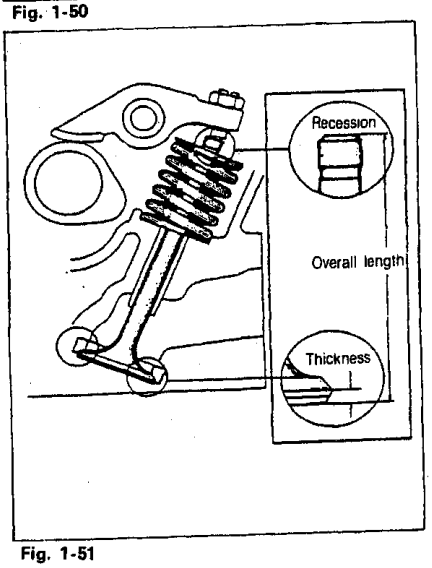


Fig. 1-51

7. Checking valve seats

Seat contact width:

Specified value: 1.4±0.5mm(0.055±0.020 inch)

Limit of valve seat recession: 0.5mm(0.020 inch)

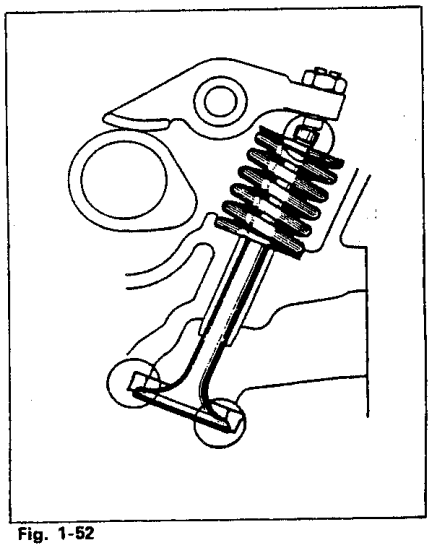


Fig. 1-52

1) In order to ascertain the valve seat width and position, thinly apply a film of red lead to the valve seat. Let the valve drop by its own weight onto the valve seat two or three times. Check the seat width and contact position by observing the obtained red lead pattern.
2) Refacing operation of the valve should be performed as follows: First, use a 45-degree cutter to recondition the rough seat surface. Check the valve-to-valve seat contact position. Use a 30-degree cutter(a 20-degree cutter for use exhaust valve seat) or a 70-degree cutter(a 60-degree cutter for the exhaust valve seat) so that the contact area comes at the center of the value face and also the contact width becomes the specified valve at this point. After the valve seat has been ground by the cutters, carry out hand grinding of the valves, using valve grinding compound.
3) Before you begin refacing the valve seats, be sure to check the valve guide bushes for their wear condition. If the valve guide bushes should prove to be worn out beyond the tolerable limit, first replace these worn bushes. Then, proceed to perform the refacing operation of the valve.

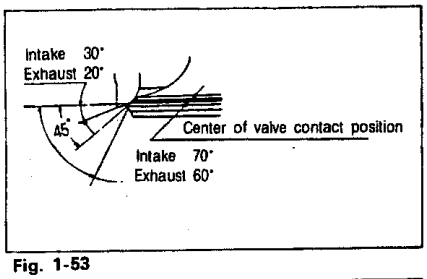


Fig. 1-53

8. Checking clearance of valve arm-to-valve rocker shaft

Item	Specified value	Limit	Measuring instrument
Arm inner diameter mm(inch)	16 +0 018 (0.0630 +0.0007 0)	16.06 (0.6323)	Caliper gauge
Shaft outer diameter mm(inch)	16 0 -0 (0.630 -0.0006 -0.0017)	15.93 (0.6272)	Micrometer for measuring outer diameter
Arm-to-shaft oil clearance mm(inch)	0.016 to 0.060 (0.0006 to 0.0024)	0.09 (0.0035)	

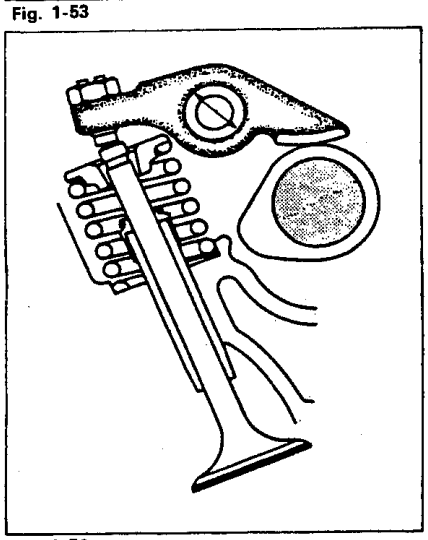


Fig. 1-54

9. Checking camshaft lobe height

Item	Specified value	Limit	Measuring instrument
Cam lobe height (Overall height) mm(inch)	40.087±0.1 (1.5782±0.0039)	39.80 (1.567)	Micrometer for measuring outer diameter

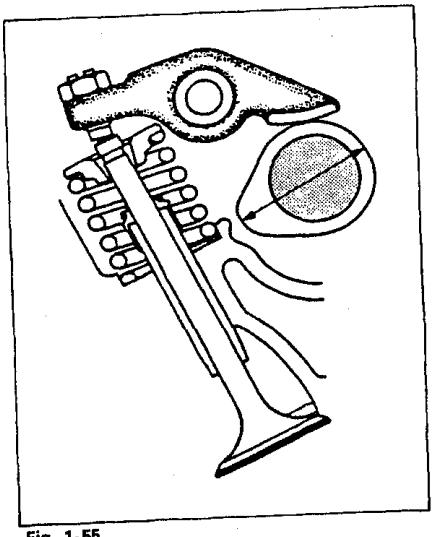


Fig. 1-55

10. Checking clearance of camshaft-to-cylinder head

Item		Specified value	Limit	Measuring instrument
Camshaft journal outer diameter mm(inch)	Front	$32.0^{-0.020}_{-0.040}$ ($1.2598^{-0.0008}_{-0.0016}$)	31.92 (1.2567)	Micrometer for measuring outer diameter
	Center	$47.5^{-0.090}_{-0.115}$ ($1.8701^{-0.0035}_{-0.0045}$)	47.34 (1.8638)	
	Rear	$48.5^{-0.060}_{-0.085}$ ($1.9094^{-0.0024}_{-0.0033}$)	48.37 (1.9043)	
Cylinder head journal section inner diameter mm(inch)	Front	$32.0^{+0.045}_{+0.020}$ ($1.2598^{+0.0018}_{+0.0008}$)	32.11 (1.2642)	Caliper gauge
	Center	$47.5^{+0.025}_{0}$ ($1.8701^{+0.0010}_{0}$)	47.59 (1.8736)	
	Rear	$48.5^{+0.025}_{0}$ ($1.9094^{+0.0010}_{0}$)	47.59 (1.8736)	
Camshaft-to-cylinder head oil clearance mm(inch)	Front	0.04 to 0.085 (0.0016 to 0.0033)	0.14 (0.0055)	—
	Center	0.09 to 0.14 (0.0035 to 0.0055)	0.19 (0.0075)	
	Rear	0.06 to 0.11 (0.0024 to 0.0043)	0.16 (0.0063)	

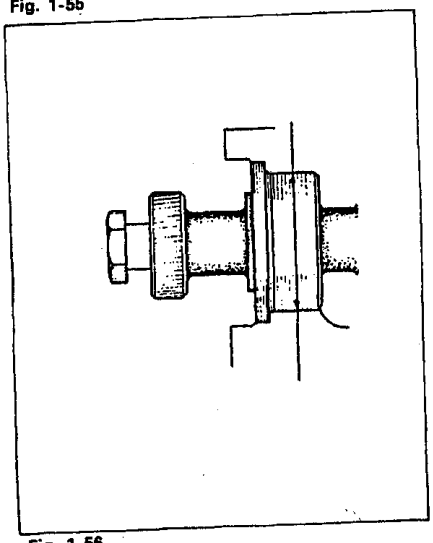


Fig. 1-56

11. Checking camshaft

Support the camshaft at its front and rear journals with a Vee-shaped block. Measure the camshaft runout at the center of journal section.

Limit of runout: 0.03mm(0.0012 inch)

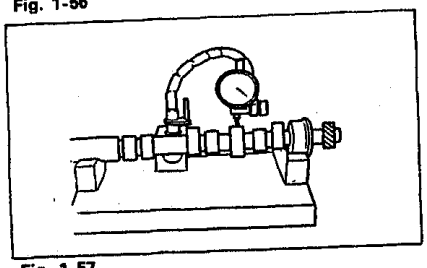


Fig. 1-57

12. Checking clearance of cylinder-to-piston

Item	Specified value	Limit	Measuring instrument
Cylinder bore measurement (Measure bore diameter at specified six measuring points. including those in thrust and longitudinal direction) mm(inch)	70 $^{+0.03}_{+0}$ (2.76 $^{+0.0012}_{+0}$)	0.10 (0.0039)	Cylinder gauge
Piston outer diameter measurement (Measure piston outer diameter at specified measuring point in thrust direction) mm(inch)	70 $^{-0.025}_{-0.055}$ (2.76 $^{0.0006}_{0.0018}$)	—	Micrometer for measuring outer diameter
Cylinder-to-piston clearance mm(inch)	0.045 to 0.065 (0.0018 to 0.0026)	0.12 (0.0047)	Thickness gauge

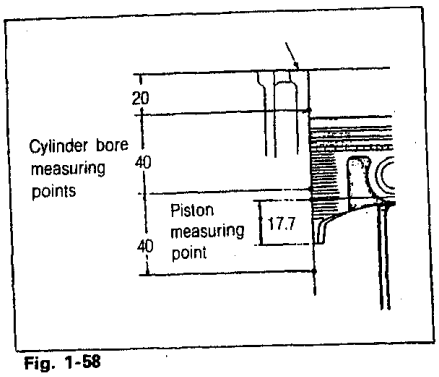


Fig. 1-58

NOTE

When it becomes necessary to carry out cylinder boring, first use [0.5mm(0.020 inch)] O/S pistons for replacement use.

13. Checking cylinder block

Allowable limit of distortion: 0.05mm(0.0020 inch)
Grinding tolerance: 0.3mm(0.012 inch)
[Specified height: 201±0.15mm(7.91±0.0059 inches)]
Measuring instrument: straightedge, thickness gauge

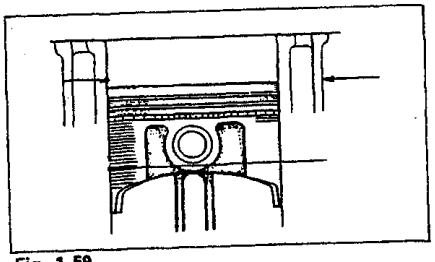


Fig. 1-59

14. Checking piston ring

NOTE

The piston ring end gap must be measured by inserting each piston ring into its cylinder bore down to a lower part where very little wear exists and by squaring the piston ring using the head section of the piston placed upside down.

Item		Specified value	Limit	Measuring instrument
Ring end gap mm(inch)	No.1	0.20 to 0.40 (0.0079 to 0.0157)	0.7 (0.0276)	Thickness gauge
	No.2			
	Oil ring	0.20 to 0.80 (0.0079 to 0.0315)	1.3 (0.0512)	
Side clearance mm(inch)	No.1	0.03 to 0.07 (0.0012 to 0.0028)	0.12 (0.0047)	Thickness gauge
	No.2	0.02 to 0.06 (0.0008 to 0.0024)	0.12 (0.0047)	
	Oil ring	—	—	

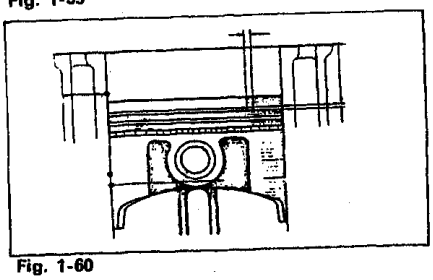


Fig. 1-60

15. Checking clearance of piston-to-piston pin oil
(Reference information)

Item	Specified value
Piston pin bore diameter ㎜(inch)	$18^{+0.008}_{-0.001}$ ($0.7087^{+0.0003}_{-0.00004}$)
Piston pin ㎜(inch)	$18^{0}_{-0.009}$ ($0.7087^{0}_{-0.0004}$)
Piston-to-piston pin oil clearance ㎜(inch)	0.005 to 0.011 (0.0002 to 0.0004)

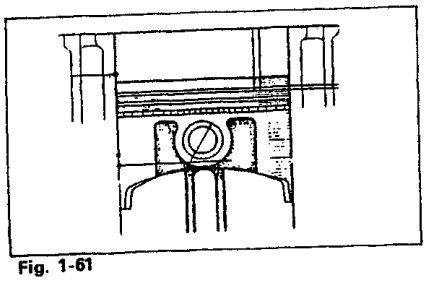


Fig. 1-61

16. Checking crankshaft for runout or wear
1) Measuring the crankshaft runout at the crankshaft journal No.3.
Limit of runout: 0.03mm(0.0012 inch)
2) Inspect the main and crankpin journals of the crankshaft for damage or uneven wear.
(Out-of-roundness and taper)

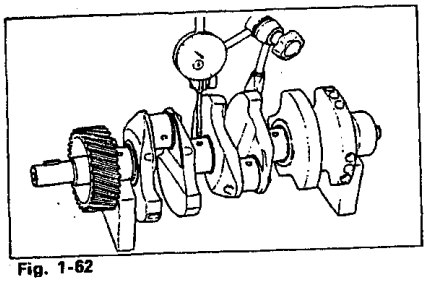


Fig. 1-62

Crankshaft finishing dimensions

Bearing size	Main journal outer diameter finishing dimensions ㎜(inch)	Crankpin journal outer diameter finishing dimensions ㎜(inch)
Repair STD	41.976 to 42.000 (1.6526 to 1.6535)	39.976 to 40.000 (1.5739 to 1.5748)
U/S 0.25	41.732 to 41.742 (1.6430 to 1.6434)	39.732 to 39.742 (1.5642 to 1.5646)
U/S 0.50	41.482 to 41.492 (1.6331 to 1.6335)	39.482 to 39.492 (1.5544 to 1.5548)

Removal
Press the balance shaft drive gear off, using the SST.
SST: Crankshaft center bearing anvil
09253-87202-000

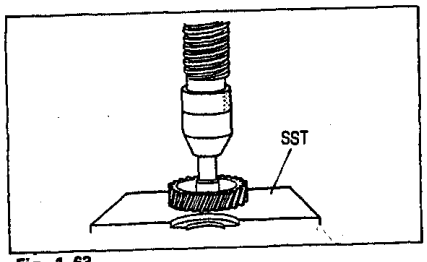


Fig. 1-63

Installation
Press the balance shaft drive gear into position, using the SST.
ⓐ **SST: Differential drive pinion bearing cone replacer**
09506-87303-000
ⓑ **SST: Crankshaft center bearing anvil**
09253-87202-000

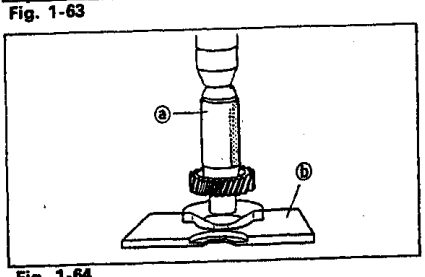


Fig. 1-64

17. Checking flywheel
If the flywheel should exhibit any excessive damage or if the runout should exceed the tolerable limit, recodition or replace such flywheel.
Limit of runout: 0.10mm(0.0039 inch)

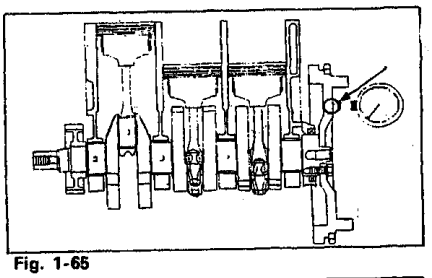


Fig. 1-65

18. Checking connecting rod
Limit of bend: 0.05mm(0.0020 inch)
Limit of twist: 0.05mm(0.0020 inch)

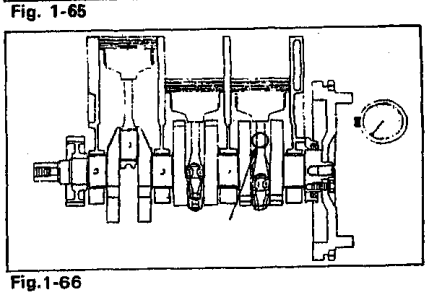


Fig.1-66

19. Checking clearance of crankshaft oil
1) Cut a piece of plastigage to the full width as the bearing. Place the plastigage on the crankshaft journal in parallel with the crankshaft longitudinal center.
Be sure that, when the bearing cap is installed, the plastigage will not be at the oil hole in the journal.

NOTE
Ensure that the measuring place and the backside of the bearing insert are free from oil.
Place the plastigage on the side where the weight of the crankshaft is not applied.

2) Position the crankshaft bearing and bearing cap. And tighten the bearing cap to the specified torque.
Be certain not to turn the crankshaft with the platigage in place.

Crankshaft bearing cap
Tightening torque: 5.4 to 6.6kg-m(39.1 to 47.7 ft-lb)
Connecting rod bearing cap
Tightening torque: 2.1 to 2.9kg-m(15.2 to 21.0 ft-lb)

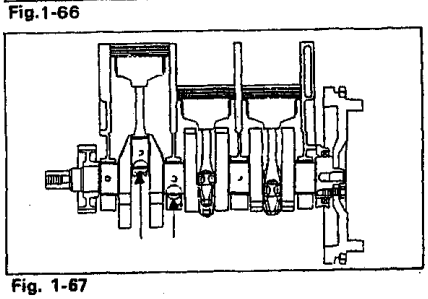


Fig. 1-67

3) Remove the bearing cap. Measure the width of the squeezed-out plasitic gauge, using the scale printed on the plastic gauge's envelope. The measurement should be made at the widest point of the flattened plastic gauge. Nevertheless, care must be exercised as to the difference in dimension at both ends of the plastic gauge.

Specified oil clearance:
0.020 to 0.044mm(0.0008 to 0.0017 inch)
Limit of oil clearance: 0.07mm(0.0028 inch)

4) If the oil clearances of the bearing have exceeded the tolerable limit, replace the bearings with suitable ones.

20. Checking clearance of crankshaft thrust

Specified thrust clearance: 0.020 to 0.220mm (0.0008 to 0.0087 inch)
Limit of thrust clearance: 0.30mm(0.0118 inch)

If the clearance of crankshaft thrust has exceeded the tolerable limit, replace the existing thrust washer with a suitable washer within suitable washer which should be selected from among those listed in the table below.

Kind	Thickness mm(inch)
Repair STD	$2.000^{-0.010}_{-0.060}$ ($0.0787^{-0.0004}_{-0.0024}$)
O/S 0.125	$2.125^{-0.010}_{-0.060}$ ($0.0837^{-0.0004}_{-0.0024}$)
O/S 0.250	$2.250^{-0.010}_{-0.060}$ ($0.0886^{-0.0004}_{-0.0024}$)

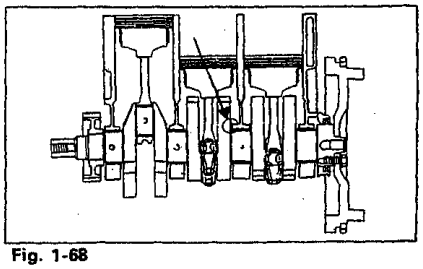


Fig. 1-68

21. Checking clearance of connecting rod thrust

Item	Specified value	Limit	Measuring instrument
Crankpin journal width mm(inch)	$22^{+0.13}_{0}$ ($0.8661^{+0.0051}_{0}$)	—	Caliper gauge
Connecting rod width mm(inch)	$22^{-0.15}_{-0.20}$ ($0.8661^{-0.0059}_{-0.0079}$)	—	Micrometer for measuring outer diameter
Thrust clearance mm(inch)	0.15 to 0.25 (0.0059 to 0.0098)	0.30 (0.0118)	gauge

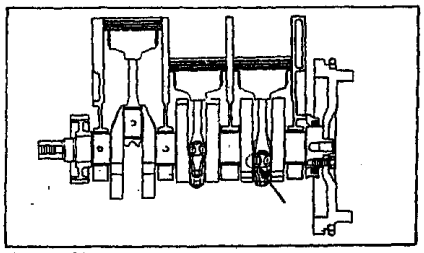


Fig. 1-69

22. Checking thrust and oil clearance of balance shaft

Specified thrust clearance:
0.03 to 0.13mm(0.0012 to 0.0051 inch)
Limit of thrust clearance:
0.20mm(0.0079 inch)

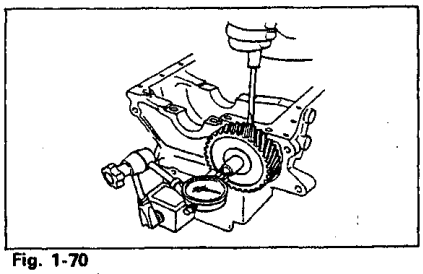


Fig. 1-70

Removal

Remove the balance shaft gear.

ⓐ **SST: Balance shaft gear anvil**
09214-87701-000
ⓑ **SST: Crankshaft center bearing anvil**
09253-87202-000

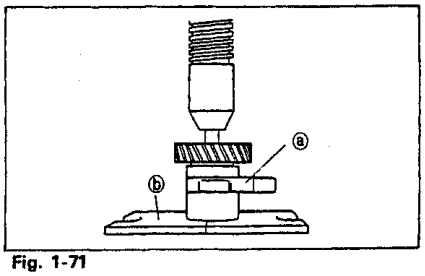


Fig. 1-71

Installation

Install the balance shaft gear.

ⓐ **SST: Balance shaft gear anvil**
09214-87701-000
ⓑ **SST: Crankshaft center bearing anvil**
09253-87202-000
ⓒ **SST: Differential drive pinion bearing cone replacer**
09506-87303-000

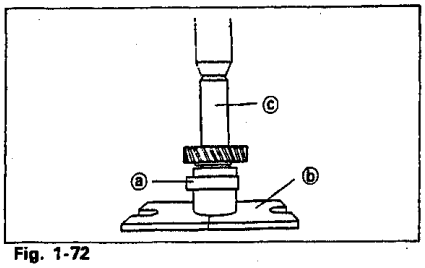


Fig. 1-72

23. Checking balance shaft oil clearance.

Item		Specified value	Limit
Bearing inner diameter mm(inch)	Front	45.000 to 45.025 (1.7717 to 1.7726)	—
	Rear	34.000 to 34.025 (1.3386 to 1.3396)	—
Shaft outer diameter mm(inch)	Front	44.959 to 44.975 (1.7700 to 1.7707)	—
	Rear	33.959 to 33.975 (1.3370 to 1.3376)	—
Oil clearance mm(inch)		0.025 to 0.066 (0.0010 to 0.0026)	0.1

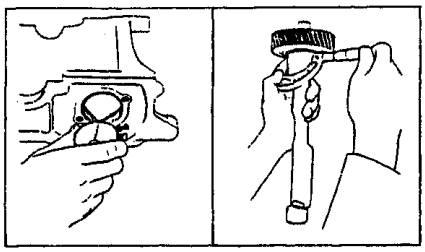


Fig. 1-73

Bearing under size

Bearing size		Bearing inner diameter mm(inch)	Shaft outer diameter finishing dimensions mm(inch)
U/S 0.5	Front	44.526 to 44.556 (1.7530 to 1.7542)	44.960 to 44.500 (1.7516 to 1.7520)
	Rear	33.526 to 33.566 (1.3199 to 1.3211)	33.490 to 33.500 (1.3185 to 1.3189)

Remove and install the balance shaft bearing.

SST: Balance shaft bearing remover & replacer 09215-87701-000

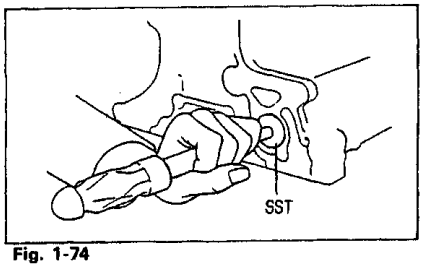


Fig. 1-74

24. Checking timing belt for peeled teeth, deformed teeth and replace when faulty.

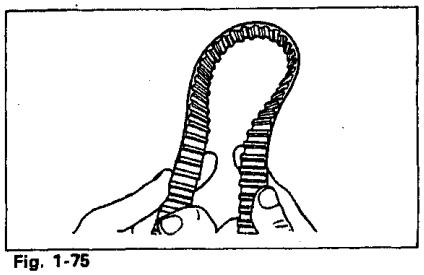


Fig. 1-75

25. Check the timing belt tensioner for abnormal noise and damage at the belt contact point.

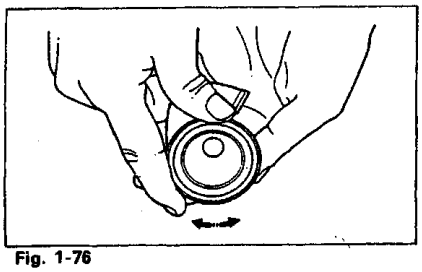


Fig. 1-76

26. Checking timing belt pulleys for wear.

Item	Specified value	Limit
Crankshaft pulley mm(inch)	$59.26^{+0.1}_{0}$ ($2.3331^{+0.0039}_{0}$)	59.2 (2.3307)
Camshaft pulley mm(inch)	$119.9^{+0.14}_{-0.04}$ ($4.7205^{+0.0055}_{-0.0016}$)	119.8 (4.7165)

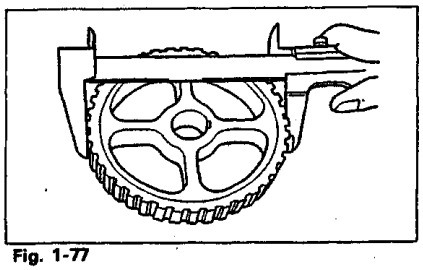


Fig. 1-77

◆ REPLACING CAMSHAFT OIL SEAL

1. Remove the camshaft oil seal with a screwdriver or the like.

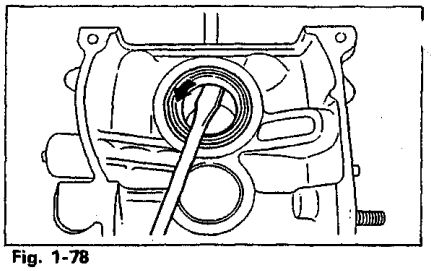


Fig. 1-78

2. Install the new oil seal with SST.

   SST: Rear axle inner bearing replacer
   09515-87202-000

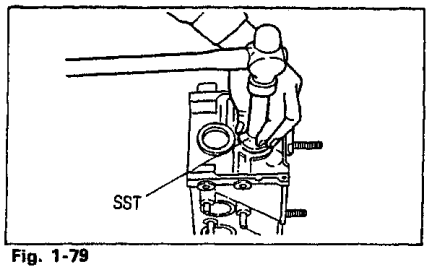


Fig. 1-79

◆ REPLACING CRANKSHAFT FRONT OIL SEAL

1. Remove the oil seal by suitable means.

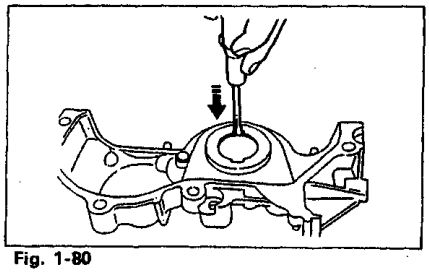


Fig. 1-80

2. Install the new oil with SST.

   SST: Rear axle inner bearing replacer
   09515-87202-000

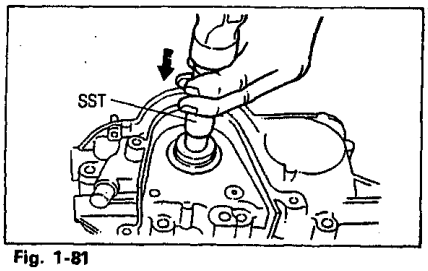


Fig. 1-81

◆ REPLACING CRANKSHAFT REAR OIL SEAL

1. Remove the crankshaft rear oil seal by suitable means.

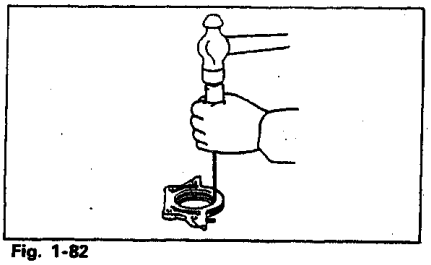


Fig. 1-82

2. Install the new oil seal with SST.

SST: Axle hub & pinion bearing tool set
09608-87302-000

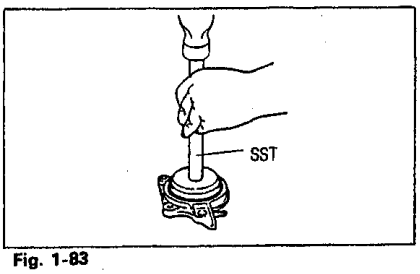


Fig. 1-83

After installing the new oil seal, coat the oil seal lip with MP grease.

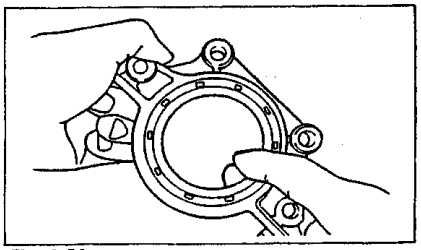


Fig. 1-84

ASSEMBLY

CAUTION

1. **Clean all the parts thoroughly.**
2. **Coat the sliding and rotating parts with new engine oil before assembling.**
3. **Replace all the gaskets and "O" rings.**
4. **Use liguid packing as required to prevent water and oil leakage.**
5. **Use the proper mounting bolts, nuts, and washers and tighten the nuts and bolts to the prescribed torque. Be especially careful not to tighten the studs installed to aluminum alloy parts excessively.**
6. **When marks were made during disassembly, reassemble in accordance with these marks and confirm that the piston and other parts assembled under prescribed clearances are assembled correctly.**

ASSEMBLY OF CYLINDER BLOCK RELATED PARTS

1. Assemble the piston and connecting rod.

NOTE

The front mark located at the side of the connecting rod and the front mark provided on the top of the piston come on the same side.

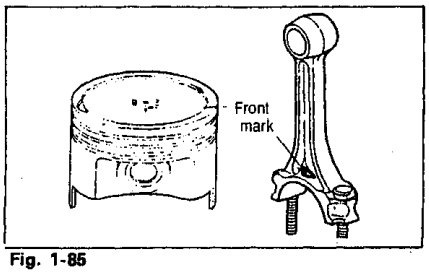


Fig. 1-85

1) Using SST as follows.

SST: Piston pin remover & replacer
09221-25018-000 (Main body)
SST: Piston pin remover & replacer
09221-87702-000

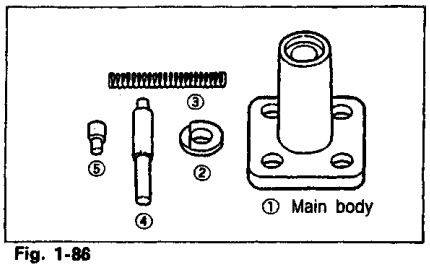


Fig. 1-86

2) Place the bar(small) ⑤ into the pin. Then, press the piston pin into position, using a press.

NOTE

After the connecting rod has been assembled in the piston, ensure that the piston can move freely, when tested with the connecting rod held by one's hand.

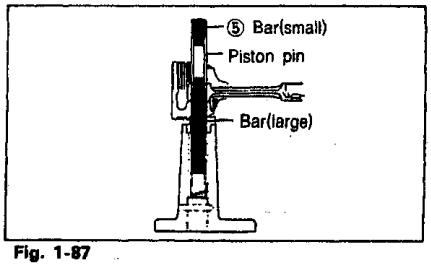


Fig. 1-87

2. Install the piston rings.

NOTE

When installing these piston rings, make sure that the marks stamped by the manufacturer face upward.

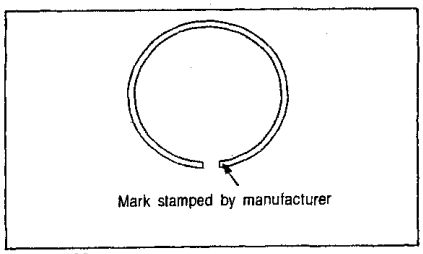


Fig. 1-88

3. Install the crankshaft upper bearing.
   1) Install the upper bearing which is provided oil groove to the cylinder block.
   2) Apply a small amount of engine oil to the bearing face.

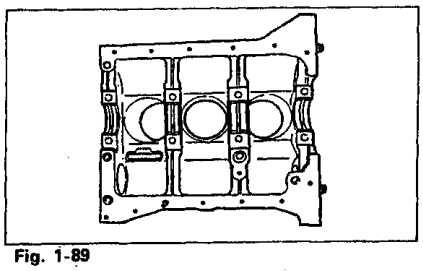


Fig. 1-89

4. Install the crankshaft.

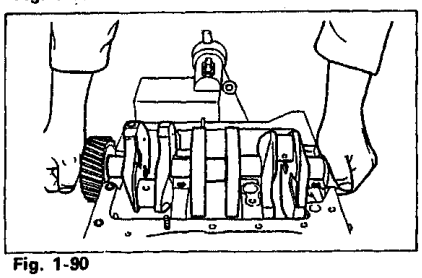


Fig. 1-90

5. Attach the thrust washers on the cylinder block at the front and rear sides of the No. 3 bearing.

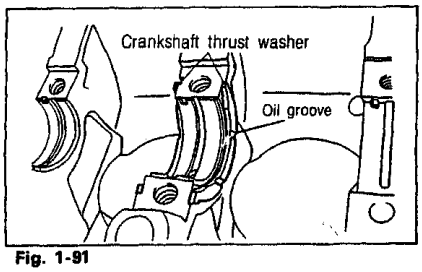


Fig. 1-91

6. Install the crankshaft bearing cap with crankshaft lower bearing.
   Apply a small amount of engine oil to the threaded portion of each attaching bolt.
   Install the bearing cap with its front mark facing toward the front side.

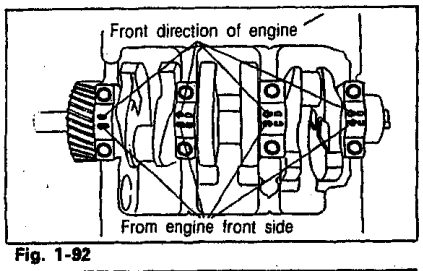


Fig. 1-92

7. Tighten the bearing caps to specified torque.
   Main bearing cap bolt:
   5.4 to 6.6 kg-m(39.1 to 47.7 ft-lb)

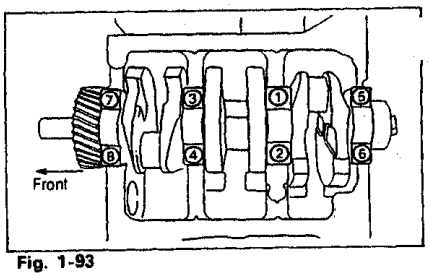


Fig. 1-93

8. Position the piston ring gaps in the direction shown in the right figure.

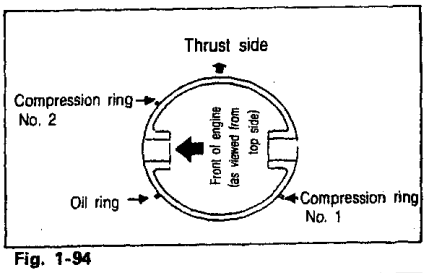


Fig. 1-94

9. Insert the connecting rod and piston assembly into the cylinder block with SST.
   SST: Piston replacing guide
   09217-87001-000

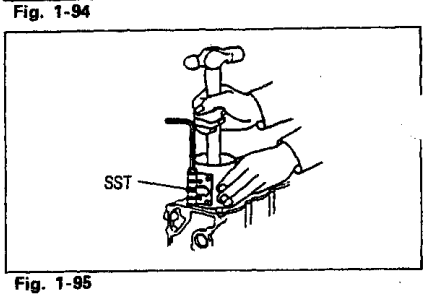


Fig. 1-95

10. Install the cap on the connecting rod, making sure that the front mark(projected) on the bearing cap is aligned with the mark provided on the connecting rod.

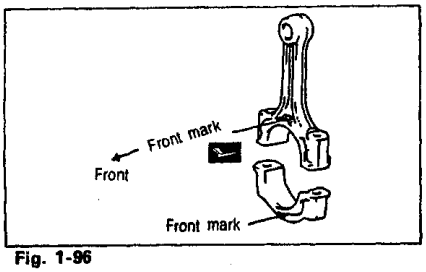


Fig. 1-96

11. Tighten the connecting rod cap to specified torque.
    Tightening torque:
    2.1 to 2.9 kg-m(15.2 to 21.0 ft-lb)

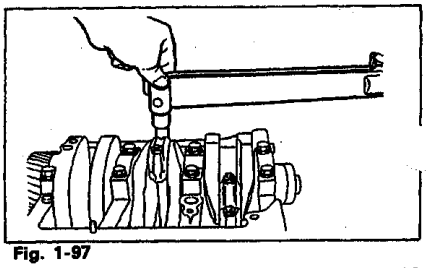


Fig. 1-97

12. Install the balance shaft.
Align the stamped mark on the balance shaft drive gear with the stamped mark on the balance shaft gear.

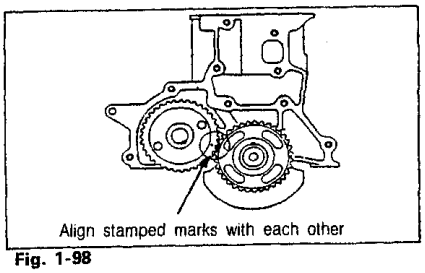


Fig. 1-98

13. Install the oil pump together with the outlet pipe.
NOTE
Apply engine oil to the "O" ring.

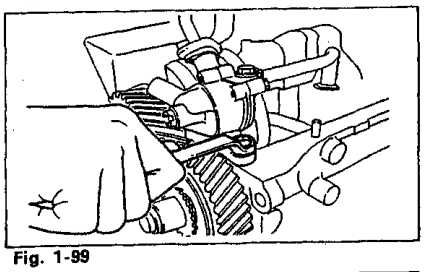


Fig. 1-99

14. Attach the chain over the sprocket at the balance shaft side. (CB-OUTSIDE face toward the outside)
Tightening torque:
1.0 to 1.6 kg-m (72 to 11.6 ft-lb)

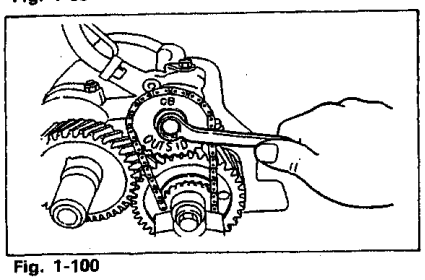


Fig. 1-100

15. Attach the balance shaft gear cover.
Tightening torgue
1.0 to 1.6 kg-m (7.2 to 11.6 ft-lb)

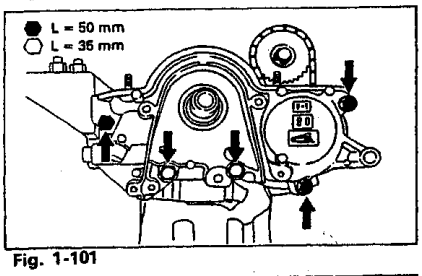


Fig. 1-101

16. Attach the rear oil seal retainer.
Tightening torque:
1.0 to 1.6 kg-m (7.2 to 11.6 ft-lb)

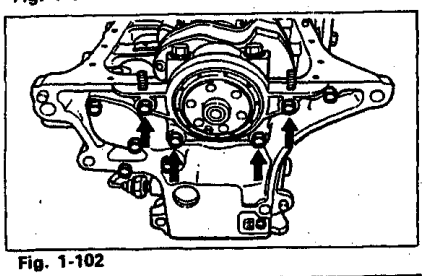


Fig. 1-102

17. Assemble the oil pan gasket S/A.
   1) Apply the sealer to the cylinder block, following the procedure indicated in the illustration at the right.
      Sealer to be used: Silicon bond

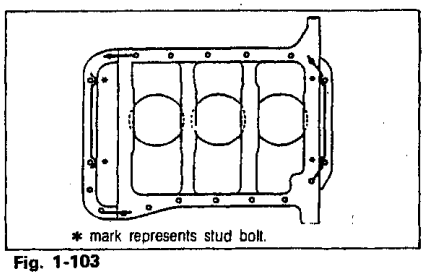


Fig. 1-103

   2) Apply the sealer to the oil pan gasket at the oil pan side, following the procedure indicated in the illustration at the right. Place the oil pan gasket on the cylinder block.
   3) Install the oil pan.

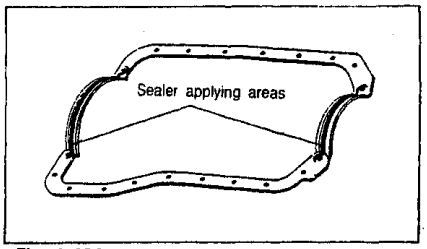


Fig. 1-104

   4) Tighten the stud bolt sections temporarily. Then, tighten the oil pan attaching bolts in the sequence as shown in the illustration at the right.
      Tightening torque:
      0.4 to 0.7 kg-m (2.9 to 5.1 ft-lb)

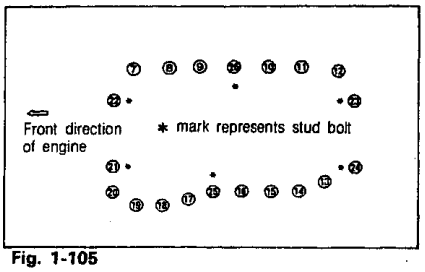


Fig. 1-105

18. Install the water pump.
   Tightening torque:
   1.5 to 2.2 kg-m (10.8 to 15.9 ft-lb)

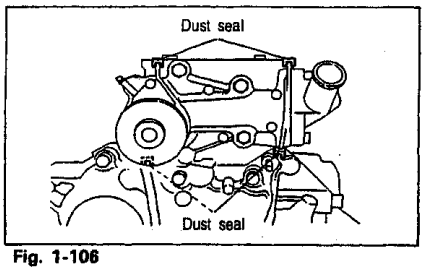


Fig. 1-106

◆ ASSEMBLY OF PARTS RELATED TO CYLINDER HEAD

1. Assemble the parts related to the valve.
   1) Place the plate washer.
   2) Position the valve into the valve guide bush in the cylinder head.
   3) Fit a new valve stem oil seal, with SST.
      SST: Valve stem oil seal replacer
      09201-87703-000

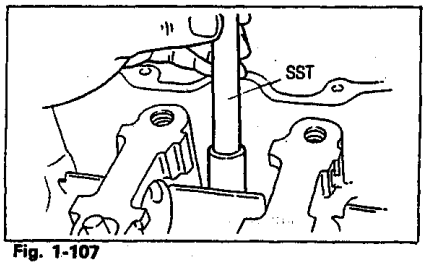


Fig. 1-107

4) Install the compression spring and valve spring retainer in this sequence. And install the valve spring retainer locks with SST.

SST: Valve spring replacer
09202-87701-000

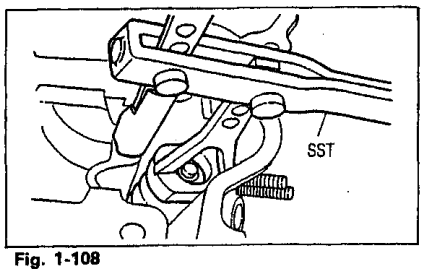


Fig. 1-108

2. Install the camshaft and camshaft timing belt pulley.

Tightening torque:
3.0 to 4.5kg-m(21.7 to 32.5 ft-lb)

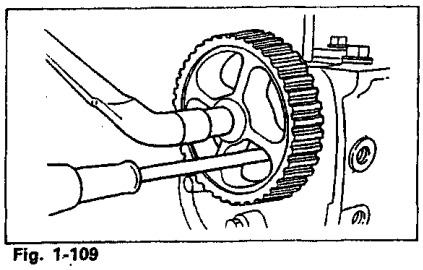


Fig. 1-109

3. Install the parts related to the valve rocker shaft.

NOTE

The valve rocker shaft for exhaust side, which is a longer shaft, must be installed at the right side as viewed from the front of the engine.

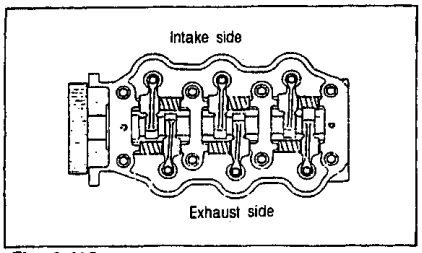


Fig. 1-110

4. Insert the wave washer.

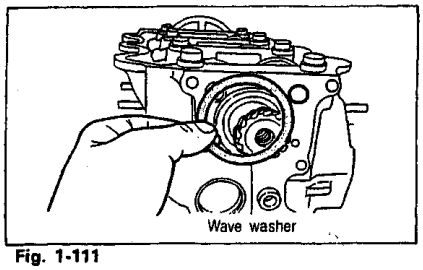


Fig. 1-111

5. Attach the distributor housing.

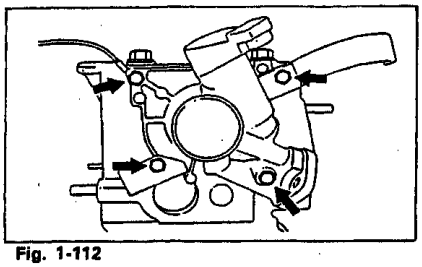


Fig. 1-112

6. Assemble the cylinder head gasket.

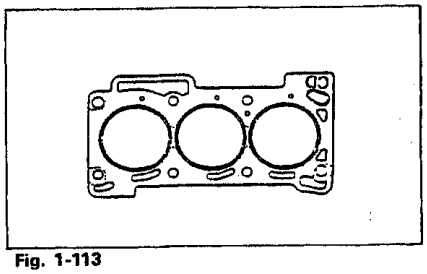


Fig. 1-113

7. Mount the cylinder head on the cylinder block.

NOTE

Be sure to align the stamped mark on the camshaft timing belt pulley with the indicator of the cylinder head.

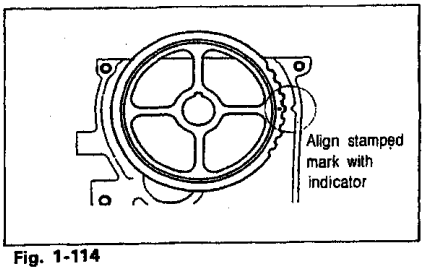


Fig. 1-114

8. Make sure to use a new cylinder head gasket. And tighten the cylinder head bolts to the specified torque.

Tightening torque:

5.5 to 6.5kg-m(39.8 to 47.0 ft-lb)

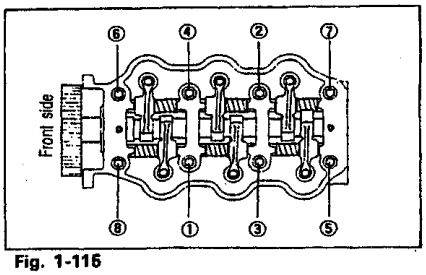


Fig. 1-115

9. Install the crankshaft timing belt pulley.

NOTE

Ensure that the flanges are installed only in the correct direction.

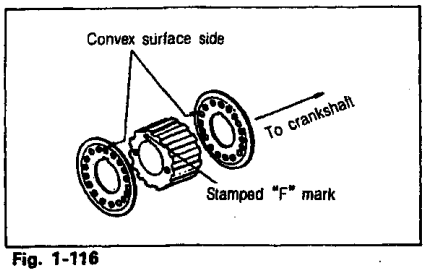


Fig. 1-116

Install the timing belt.

1) Ensure that the stamped marks are aligned with the indicator marks, respectively, as indicated.
2) Temporarily attach the timing belt tensioner. The setting bolt of the timing belt tensioner should be backed off about half a turn from the completely tightened position.
3) Install the tension spring bracket and tension spring.
4) Install the timing belt, making sure that the assembly mark scribed at the time of disassembly is lined up with the pulley mark.

NOTE

1) While installing the timing belt, be certain that the belt is not slackened at the side indicated by the arrow-head in Fig. 1-117.
2) The timing belt must be installed by one's hand. Never try to pry the timing belt with a screw driver or the like. Such practice would damage the belt.

5) Rotate the crankshaft further two turns in the normal direction, until the position comes again at the top dead center. Make sure that the timing belt pulley assumes again the correct relationship.

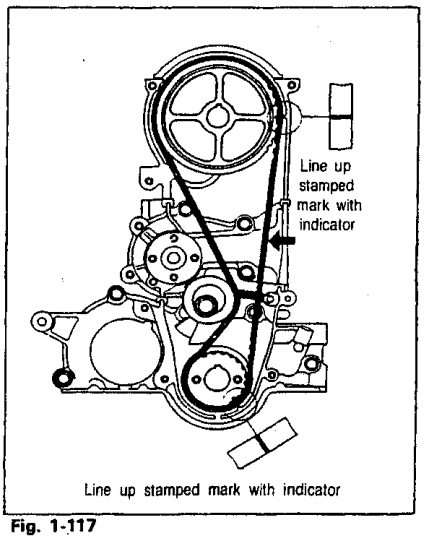


Fig. 1-117

10. Tighten the setting bolts of the timing belt tensioner.

Tightening torque:
1.9 to 3.1 kg-m (13.7 to 22.4 ft-lb)

NOTE

Be very careful not to push the tensioner by one's finger.

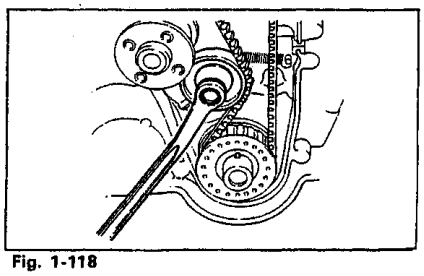


Fig. 1-118

11. Adjust the valve clearance.

Valve clearance(cold): Reference information
Intake, Exhaust: 0.18 mm (0.007 inch)

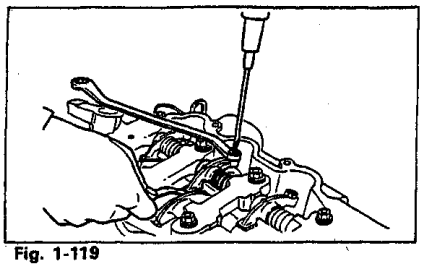


Fig. 1-119

12. Install the timing belt cover and crankshaft pulley

Tightening torque:
9.0 to 10.0 kg-m (65.1 to 72.3 ft-lb)

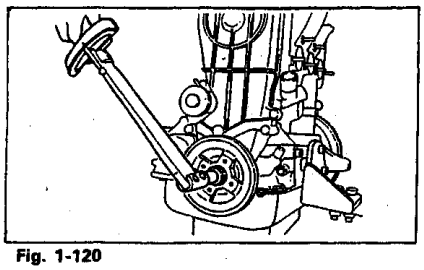


Fig. 1-120

13. Install the cylinder head cover.
    Install the water pump pulley with cooling fan.

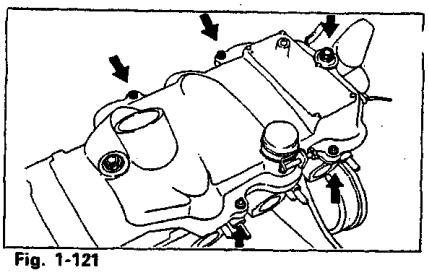


Fig. 1-121

14. Mount the exhaust manifold.
    Tightening torque:
    1.0 to 1.6kg-m (7.2 to 11.6 ft-lb)

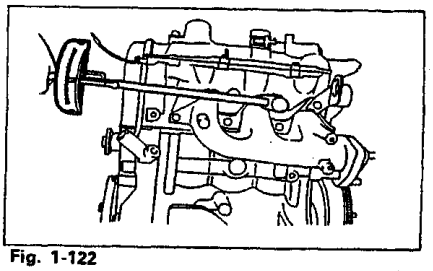


Fig. 1-122

15. Install the insulator.

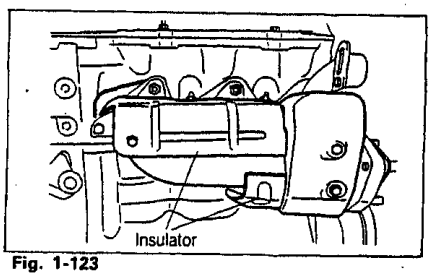


Fig. 1-123

16. Install the oil cooler & oil filter.

Install the parts in numerical order shown in the figure below.

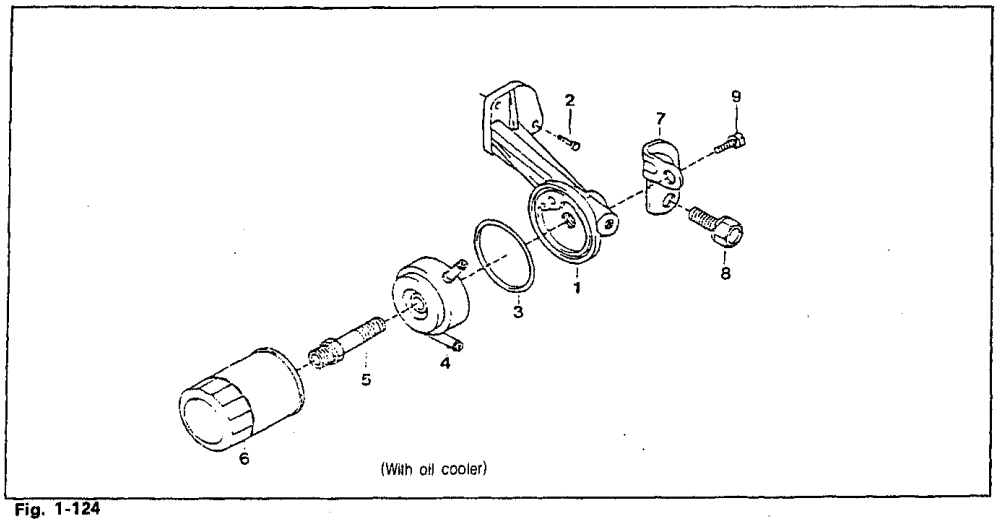


Fig. 1-124

1. Oil filter bracket
2. Bolt
3. "O" ring
4. Oil cooler Ay
5. Oil cooler set bolt
6. Oil filter element S/A
7. Stay oil filter bracket
8. Bolt
9. Bolt

17. Install the intake manifold with the carburetor mounted on it.

Tightening torque:
1.0 to 1.6 kg-m(7.2 to 11.6 ft-lb)

Attach the fuel pipe(only for 2WD) and water hose.

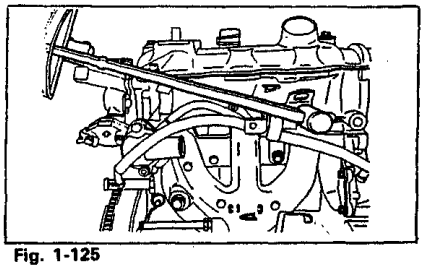


Fig. 1-125

18. Install the alternator and "V" belt

Specified deflection: 5 to 7mm(0.20 to 0.28 inch)
[with a force of 10kg (22.0lb) applied]

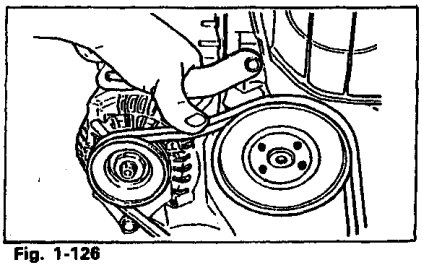


Fig. 1-126

19. Attach the rear end plate.

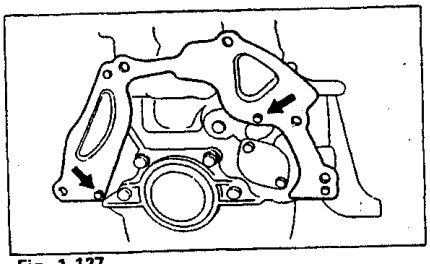


Fig. 1-127

20. Install the flywheel.
    Tightening torque:
    4.0 to 5.0 kg-m (28.9 to 36.2 ft-lb)
    SST: Flywheel guide holder
    09210-87701-000

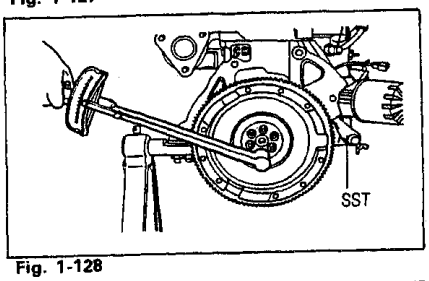


Fig. 1-128

21. Install the clutch disc and clutch cover.
    ⓐ SST: Clutch guide tool
    09301-87701-000
    ⓑ SST: Flywheel holder
    09210-87710-000
    Tightening torque:
    0.7 to 1.0 kg-m (5.1 to 7.2 ft-lb)

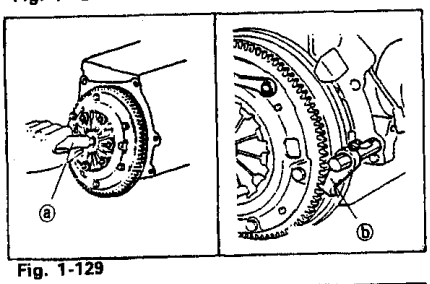


Fig. 1-129

22. Install the distributor.
    1) Set the No. 1 piston at the top dead center at the end of the compression stroke.
    2) Align the stamped marks as shown in the right figure.

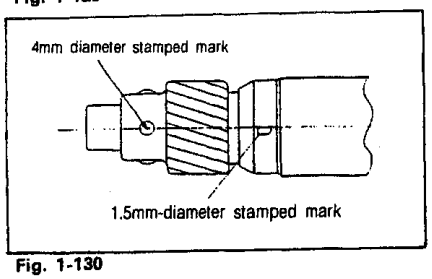


Fig. 1-130

    3) Fill about 30cc of engine oil in the distributor housing.

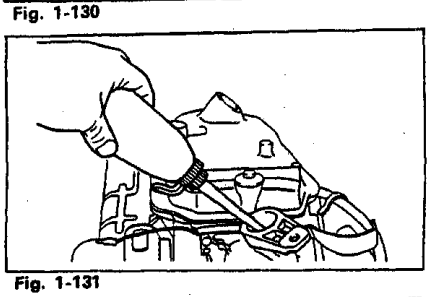


Fig. 1-131

4) Insert the distributor so that the housing bolt hole is at the center of the elongated hole of the distributor flange.

NOTE
The rotor must be facing toward around the top position.

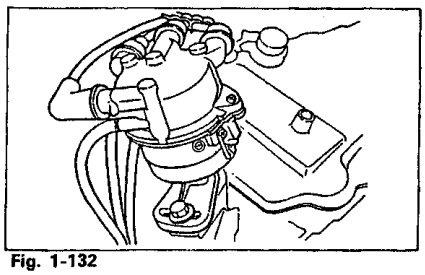


Fig. 1-132

4) Insert the distributor so that the housing bolt hole is at the center of the elongated hole of the distributor flange.

NOTE
The rotor must be facing toward around the top position.

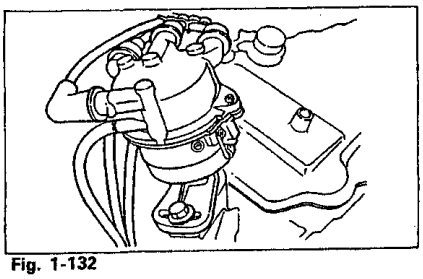


Fig. 1-132

◆ EXHAUST MANIFOLD

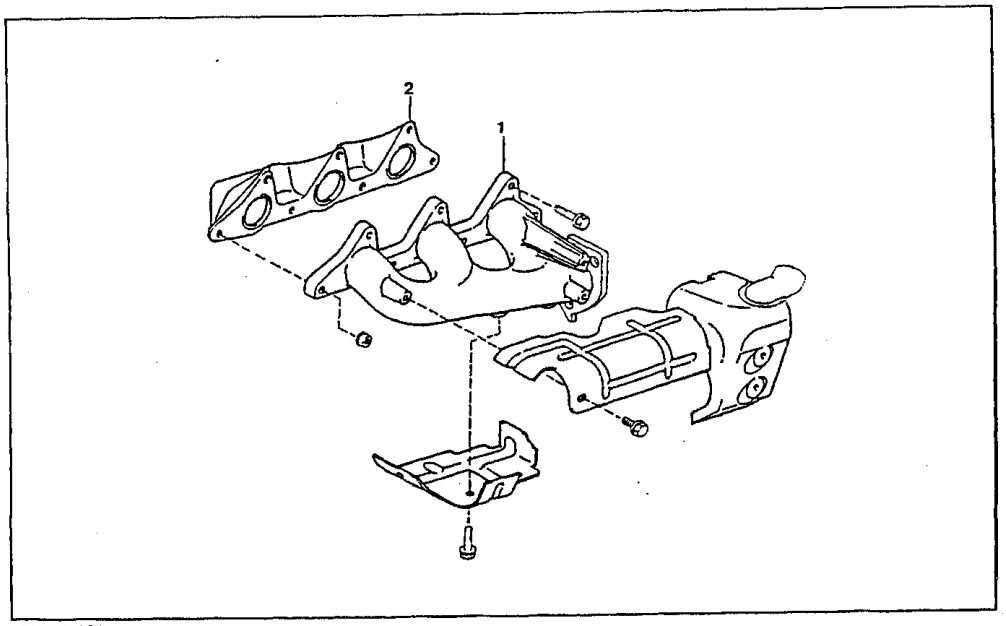


Fig. 1-136

1. Exhaust manifold
2. Exhaust manifold to head gasket

Inspection

1. Inspect the cylinder head attaching surface of the exhaust manifold for distortion.
   Distortion limit: 0.1mm(0.0039 inch)

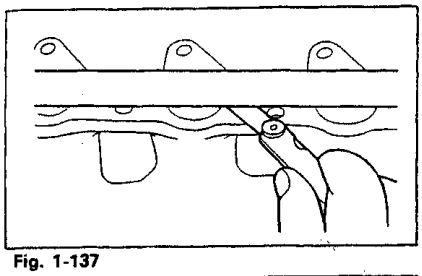


Fig. 1-137

Installation

Tightening torque:
1.0 to 1.6kg-m(7.2 to 11.6 ft-lb)

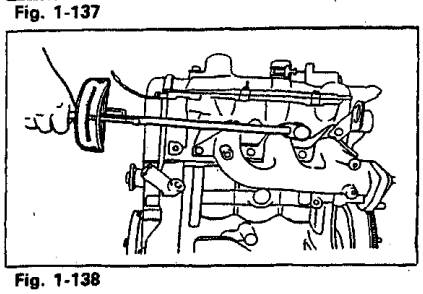


Fig. 1-138

IN-VEHICLE SERVICE

CAMSHAFT OIL SEAL

Previous to starting to replace the camshaft oil seal, first set No. 1 piston at the top dead center at the end of the compression stroke.

Removal

1. Make a hole on the oil seal by SST.
   SST: Oil seal remover & replacer set
   09223-87702-002

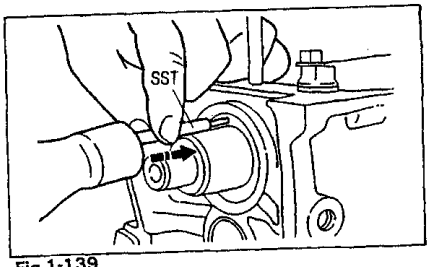


Fig.1-139

2. Screw the SST into the hole.
   SST: Oil seal remover & replacer set
   09223-87702-040

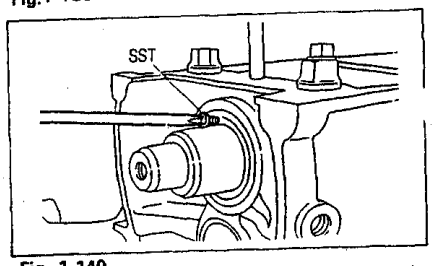


Fig. 1-140

3. Pry the oil seal out with a screw driver or the like.

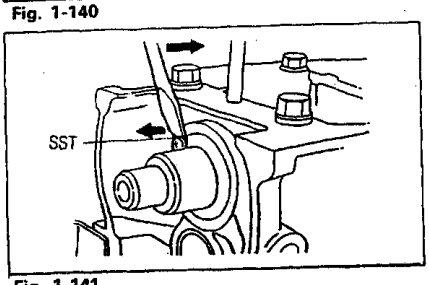


Fig. 1-141

Installation

Place the SST against the oil seal. Then the oil seal is press-fitted into position.

SST: Front hub & drive pinion bearing tool set
09608-12010-000

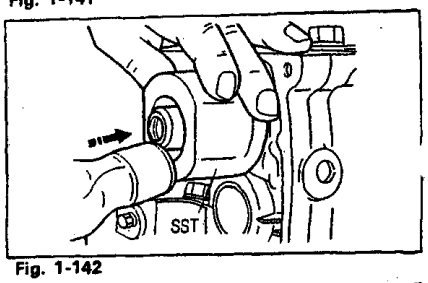


Fig. 1-142

◆ CRANKSHAFT FRONT OIL SEAL

Removal

SST: Oil seal remover & replacer set
09223-87702-000

1) Apply engine oil to the lip section of the oil seal.
2) Place the oil seal remover & replacer ① against the oil seal.
3) Place the crankshaft attaching bolt ② against the remover & replacer ①. Then, proceed to install the oil seal into position by turning the crankshaft attaching bolt ②.

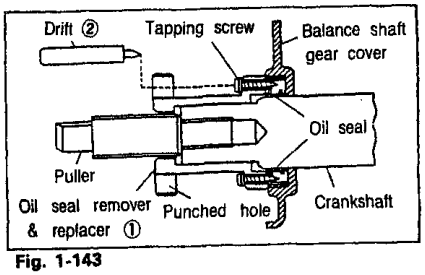


Fig. 1-143

Installation

SST: Oil seal remover & replacer set
09223-87702-000

1) With the oil seal remover & replacer ① placed against the oil seal, drive a drift into the seal soas to make a hole.
2) Thread a tapping screw into the hole in the oil seal.
3) Screw the puller ④ so as to remove the oil seal.

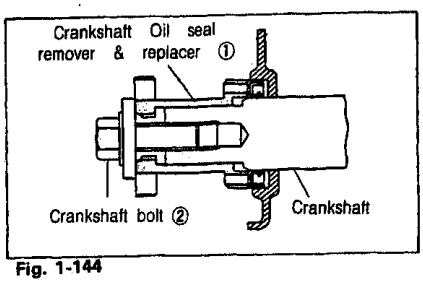


Fig. 1-144

STRUCTURAL VIEW OF AIR CLEANER AND AIR CLEANER HOSE

TRUCK

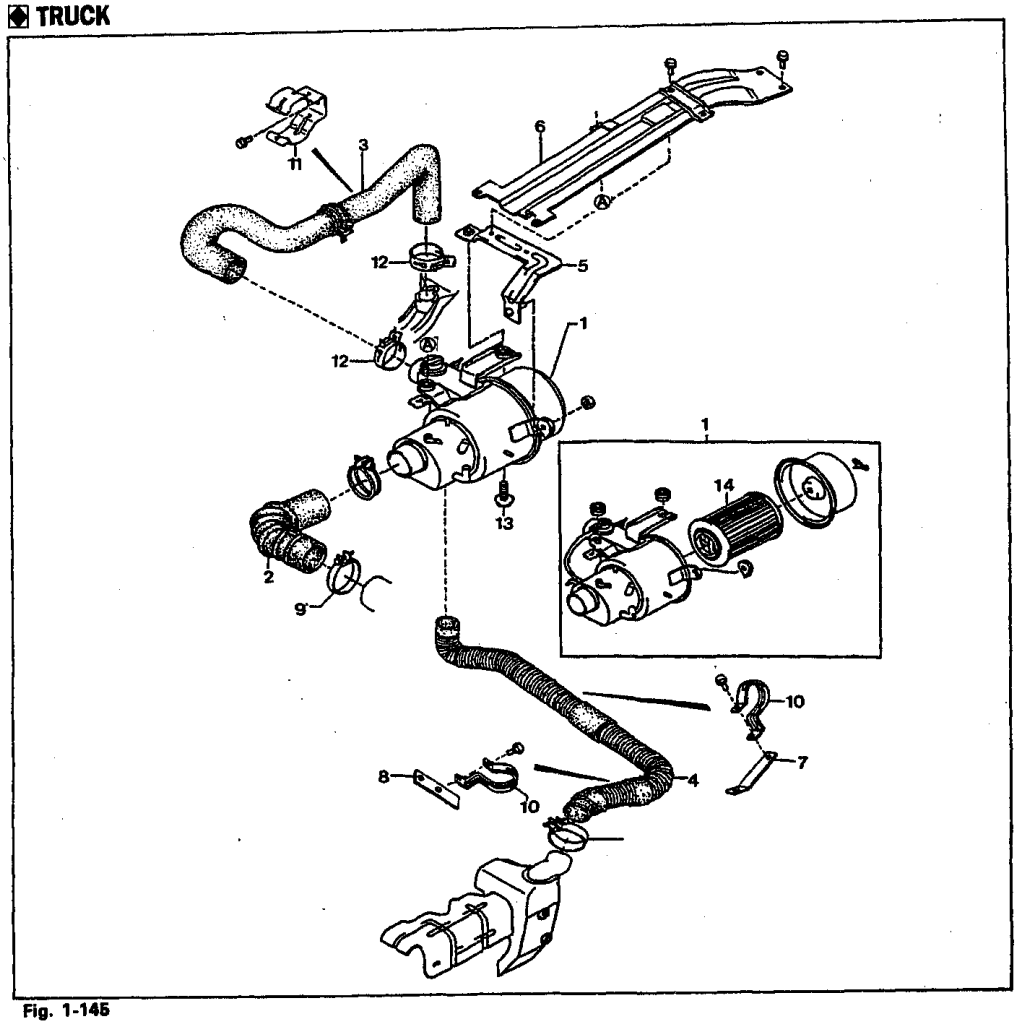


Fig. 1-145

1. Air cleaner Ay
2. Air cleaner hose
3. Cool air intake hose
4. Hot air hose
5. Air cleaner bracket
6. Air cleaner bracket
7. Air hose bracket
8. Air hose bracket
9. Hose clamp
10. Hose clamp
11. Hose clamp
12. Hose clamp
13. Bolt
14. Air cleaner element

◆ VAN · COACH

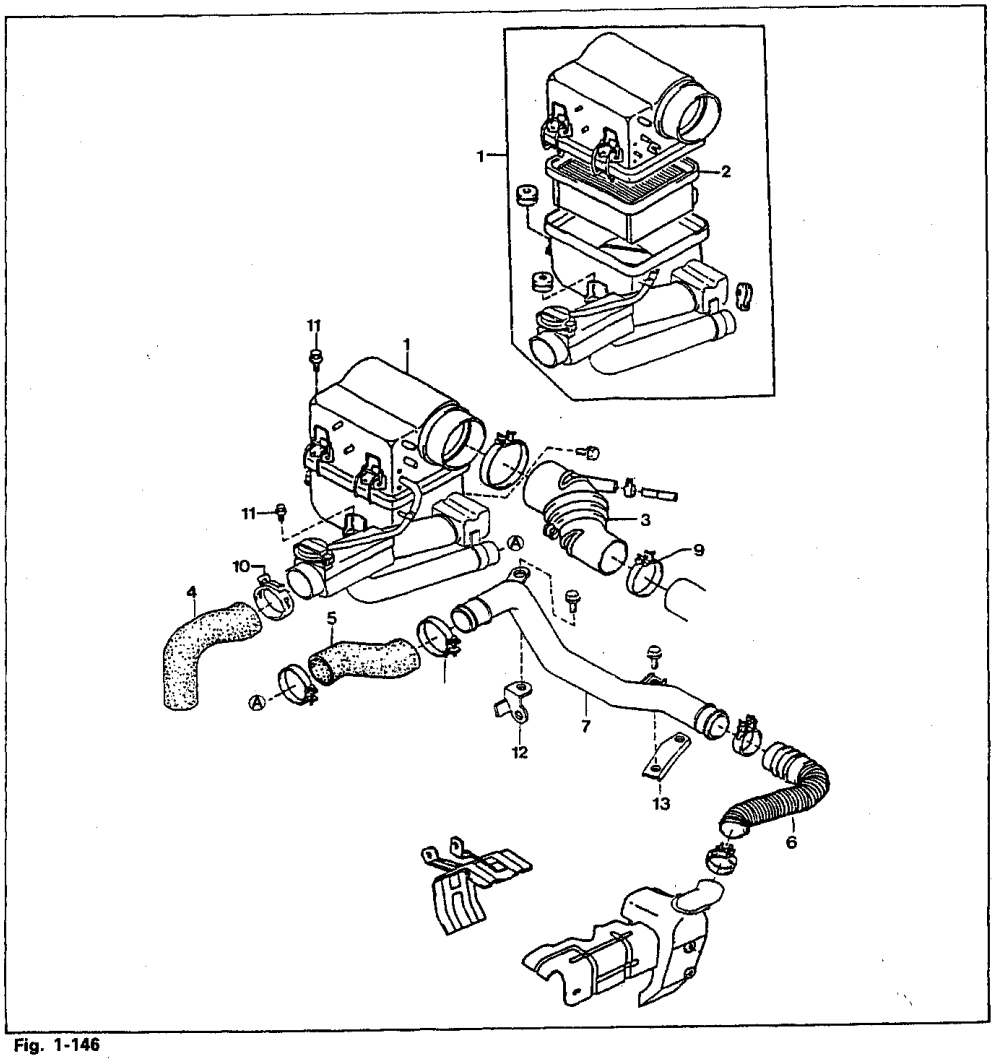


Fig. 1-146

1. Air cleaner Ay
2. Air cleaner element
3. Air cleaner hose
4. Air intake hose
5. Hot air hose No. 2
6. Hot air hose No. 1
7. Hot air intake pipe
8. Ventilation tube
9. Hose clamp
10. Hose clamp
11. Bolt
12. Air pipe bracket
13. Air pipe bracket

LUBRICATION SYSTEM 2

CHANGING OF ENGIN OIL AND OIL FILTER

1. Stop the engine after warming it up.
   Then remove the oil filler cap.

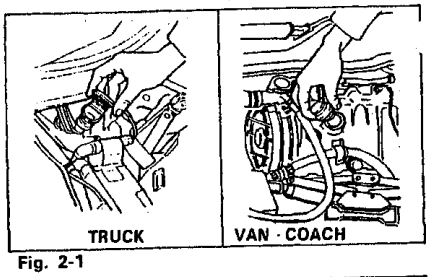


Fig. 2-1

2. Place a drain pan under the drain plug.
   Remove the drain plug with a wrench and drain the oil fully.

   Be careful not to burn yourself as the oil may be hot.

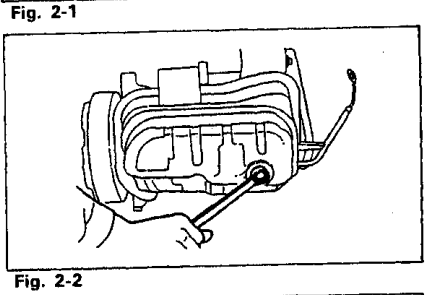


Fig. 2-2

3. Loosen the oil filter with an oil filter wrench and remove it by hand.
   Apply a small amount of engine oil to the rubber gasket of the new oil filter. Screw the new filter into place and tighten it until the gasket contacts the seat.
   Then, tighten the filter 3/4 turn additionally so as to seat it completely.
   Reinstall the drain plug and gasket.
   Tighten the drain plug with a wrench. Be very careful not to strip the threads by overtightening the drain plug.

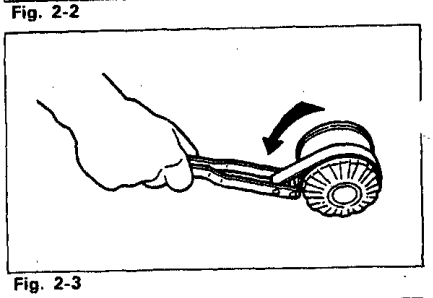


Fig. 2-3

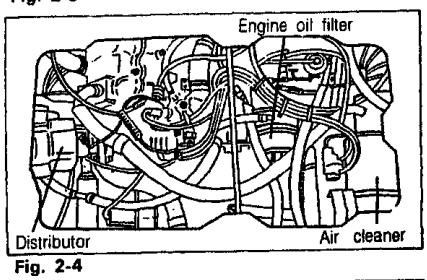


Fig. 2-4

NOTE

Special attention must be paid as to the piping of the fuel hose during the removal/installation of the oil filter. Hence, after completion of the oil filter replacement, make sure that the fuel pipes are routed properly.

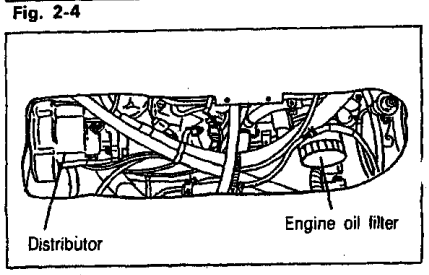


Fig. 2-5

4. Replenish engine oil and install the filler cap. Start the engine carefully and check for leaks at the oil filter or drain plug.
   Stop the engine and wait a few minutes.
   Check the oil level again and replenish engine oil if necessary.
   Finally install the radiator grille

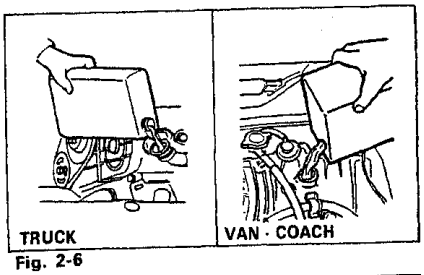


Fig. 2-6

5. Care must be exercised to ensure that no oil gets to the ignition coil, which is located near the oil filling port. If the oil should get to the IG coil, wipe it off by cloth or the like.
   - **Be sure to install the oil filler securely.**
   - **Be sure to install the oil filler cap in such a way that the blow-by gas ventilation hose comes into line with the nipple of oil filler cap. If the oil filler cap is installed in a wrong direction, it leads to excessive oil consumption.**

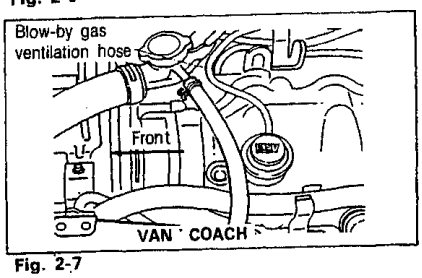


Fig. 2-7

OIL PUMP

STRUCTURAL VIEW

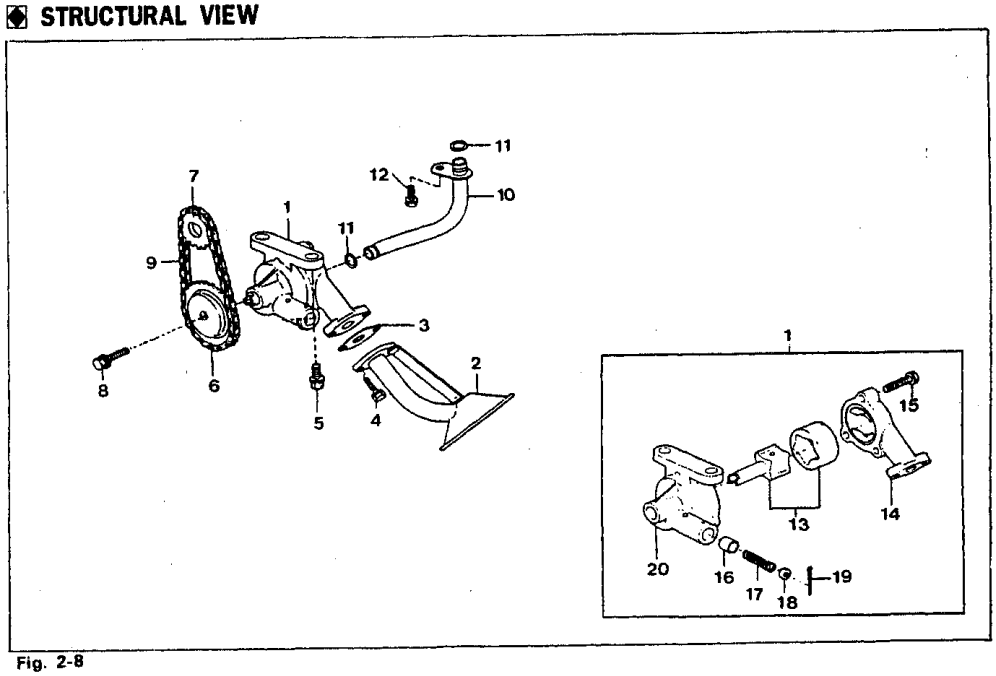


Fig. 2-8

1. Oil pump assembly less strainer
2. Oil pump strainer Ay
3. Oil strainer flange gasket
4, 5, 8, 12, 15. Bolt with washer
6. Oil pump drive shaft sprocket
7. Oil pump drive sprocket
9. Oil pump drive chain assembly
10. Oil pump outlet pipe S/A
11. "O" ring
13. Oil pump rotor set
14. Oil pump cover
16. Oil pump relief valve
17. Compression spring
18. Oil pump relief valve spring retainer
19. Cotter pin
20. Oil pump body

REMOVAL

1. Check the deflection of oil pump chain.
   Measure the deflection when the center of the chain between the sprockets is pushed.
   Deflection limit: 7.0 mm (0.275 inch)

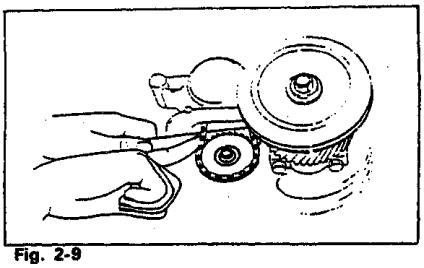


Fig. 2-9

◆ DISASSEMBLY

Disassemble the parts in numerical order shown in the right figure.

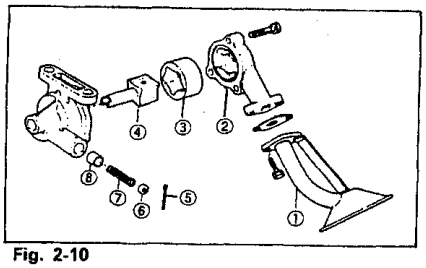


Fig. 2-10

◆ INSPECTION

1. Check for cracks, damage of oil pump drive shaft sprocket.

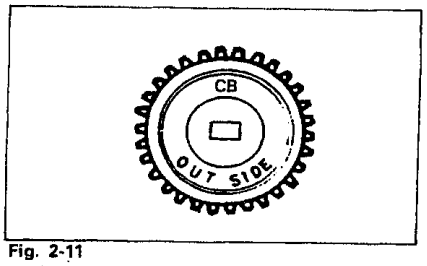


Fig. 2-11

2. Check for damage of oil pump chain.

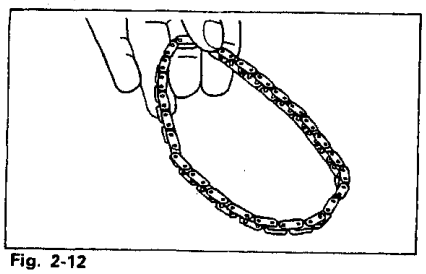


Fig. 2-12

3. Measure the shaft clearance.
   Specified clearance:
   0.045 to 0.085mm(0.0018 to 0.0033 inch)
   Limit: 0.10mm(0.0039 inch)

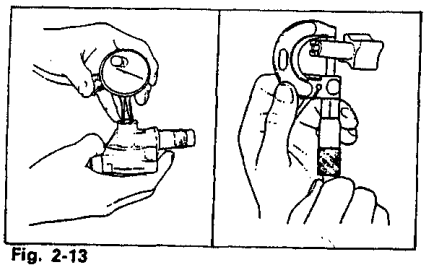


Fig. 2-13

4. Measure the tip clearance.
   Specified clearance: 0.15mm(0.0059 inch) or less
   Limit: 0.25mm(0.098 inch)

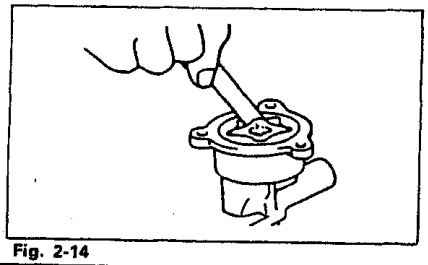


Fig. 2-14

5. Side clearance
   Specified clearance:
   0.03 to 0.09mm(0.0012 to 0.0035 inch)
   Limit: 0.20mm(0.0079 inch)

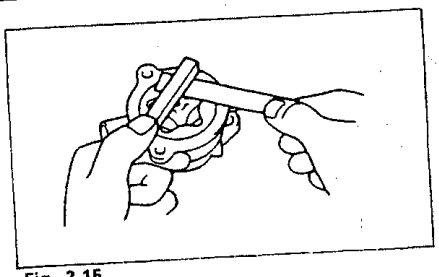


Fig. 2-15

6. Body clearance
   Specified clearance:
   0.10 to 0.16mm (0.0039 to 0.0063 inch)
   Limit: 0.30mm(0.0118 inch)

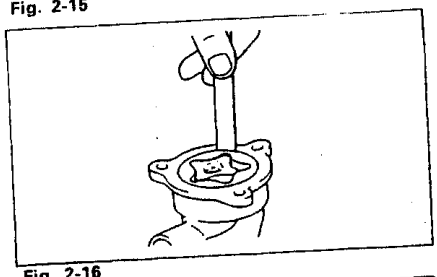


Fig. 2-16

7. Relief valve
   Check the oil passage and sliding surface for damage.

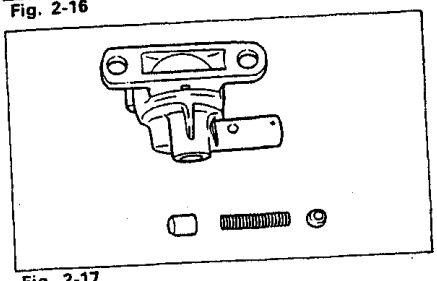


Fig. 2-17

◆ ASSEMBLY

NOTE: Coat each sliding part with engine oil.

1. Assemble the relief valve in numerical order shown in the right figure.

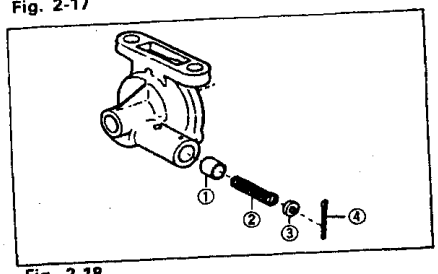


Fig. 2-18

2. Oil pump rotor set
   Assemble the rotors so that the punched marks are facing the same direction(facing toward you).

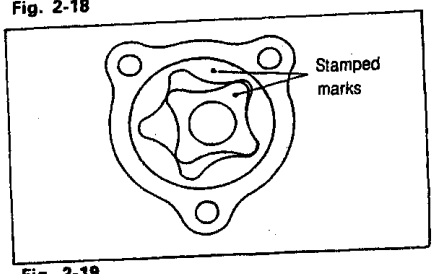


Fig. 2-19

3. Oil pump cover and body
   Tightening torque:
   0.4 to 0.7 kg-m(2.9 to 5.1 ft-lb)

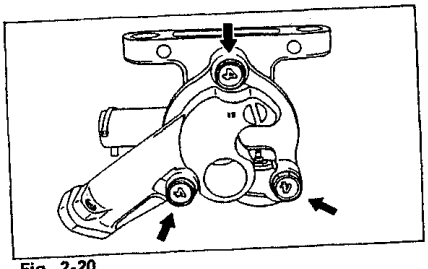


Fig. 2-20

4. Strainer
   NOTE: Replace the gasket with new one.
   Tightening torque:
   0.4 to 0.7 kg-m (2.9 to 5.1 ft-lb)

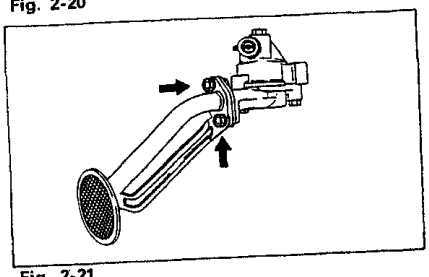


Fig. 2-21

◆ CHECK THE OPERATION OF OIL PUMP

1. After assembling, immerse the oil pump strainer into clean engine oil, and turn the sprocket counter clockwise.
   Oil should be discharged from the oil pump outlet pipe.

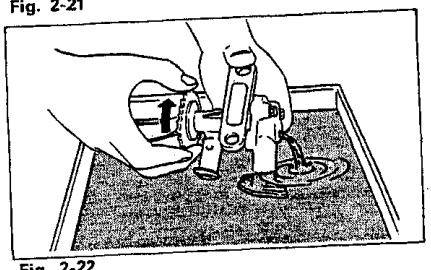


Fig. 2-22

2. Block the outlet port with your finger and perform the same test and confirm that the oil pump shaft becomes harder to turn until it cannot be turned no more.

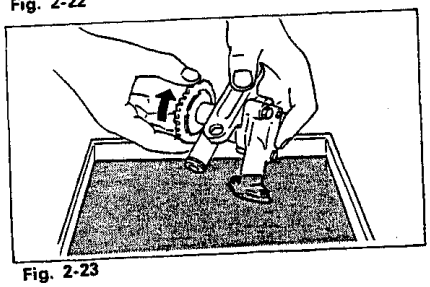


Fig. 2-23

COOLING SYSTEM 3

STRUCTURAL VIEW OF COOLING SYSTEM

TRUCK

Remove the parts in numerical order shown in the figure below.

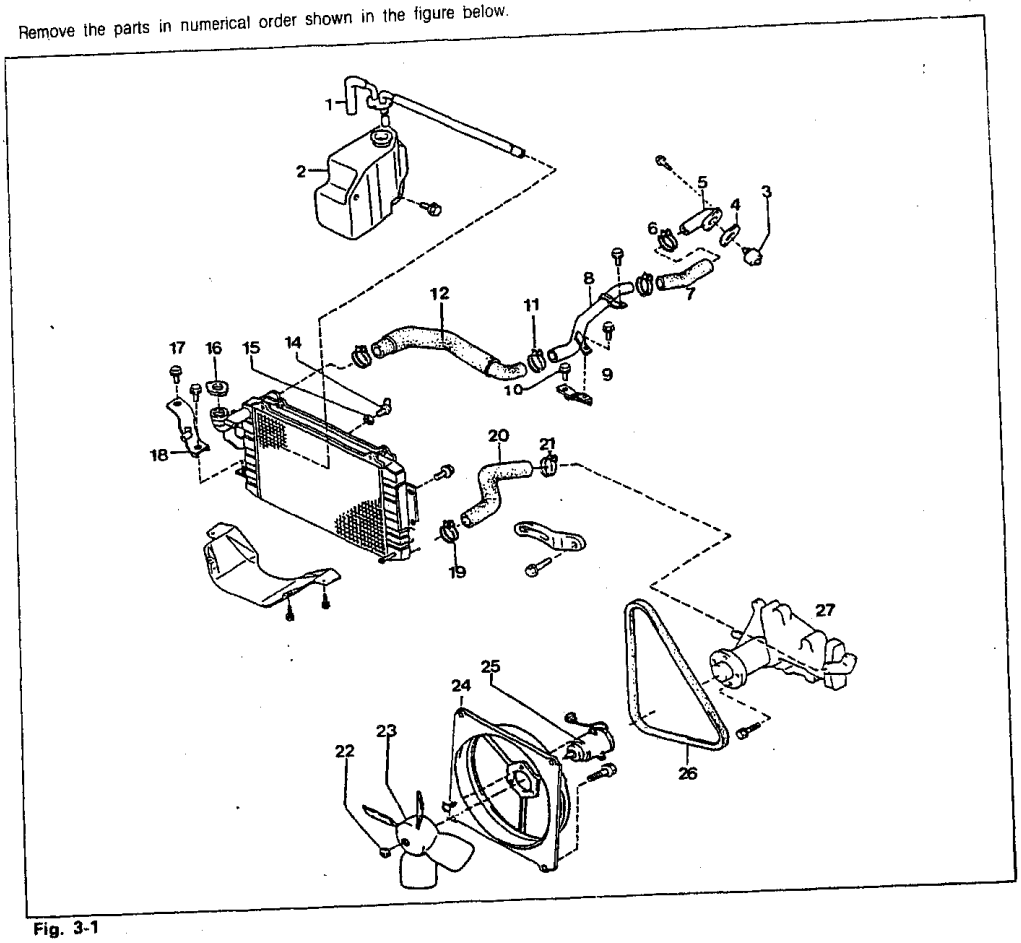


Fig. 3-1

1. Reserve tank cap
2. Reserve tank Ay
3. Thermostat Ay
4. Water outlet gasket
5. Water outlet
6. Clip
7. Water upper hose
8. Water pipe
9. Water pipe braket
10. Bolt
11. Clip
12. Water upper hose
13. Clip
14. Drain plug
15. "O" ring
16. Pressure cap
17. Bolt
18. Radiator braket
19. Clip
20. Water lower hose
21. Clip
22. Nut
23. Cooling fan
24. Radiator cowling Ay.
25. Fan motor
26. "V" belt
27. Water pump

◆ VAN · COACH

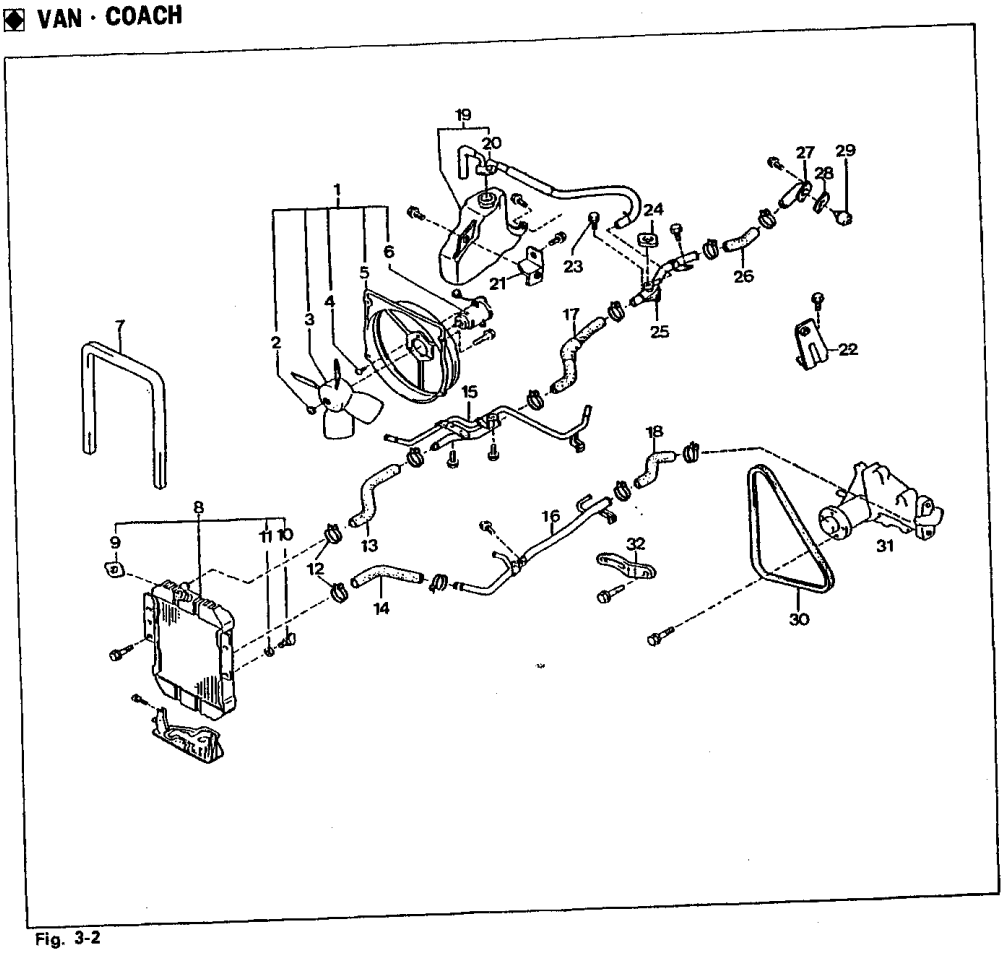


Fig. 3-2

1. Electric fan complete
2. Nut
3. Cooling fan
4. Washer & screw
5. Radiator cowling Ay
6. Cooling fan motor
7. Radiator upper seal Ay
8. Radiator
9. Radiator cap
10. Drain plug
11. "O" ring
12. Clip
13. Water upper hose
14. Water lower hose
15. Water upper hose
16. Water lower pipe
17. Water upper hose
18. Water lower hose
19. Reserve tank Ay
20. Reserve tank cap Ay
21. Reserve tank bracket
22. Reserve tank bracket
23. Washer & bolt
24. Radiator cap
25. Water upper pipe
26. Water upper hose
27. Water outlet
28. Water outlet gasket
29. Thermostat Ay
30. "V" belt
31. Water pump
32. Alternator strap

COOLANT

REPLACEMENT

The sealing type radiator uses a long life coolant. It is necessary to change the coolant at regular intervals.

Coolant change intervals: Every two years

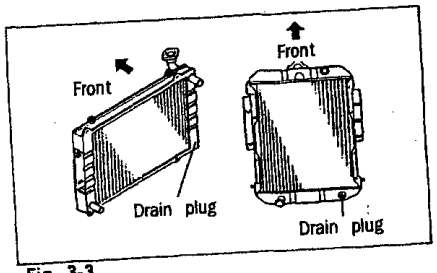


Fig. 3-3

1. Open the water valve of the heater(Set the heater control lever to the "WARM" position).
2. Remove the radiator cap
   (In the case of Van & Coach, remove the front panel. Then, remove the cap at the radiator side only)
   1) The front panel is retained by means of two(orange color) knobs. Turn the knob to the left and remove it toward the vehicle interior.
   2) Slightly pull the front panel lower section toward you. Then, raise the panel and remove it.

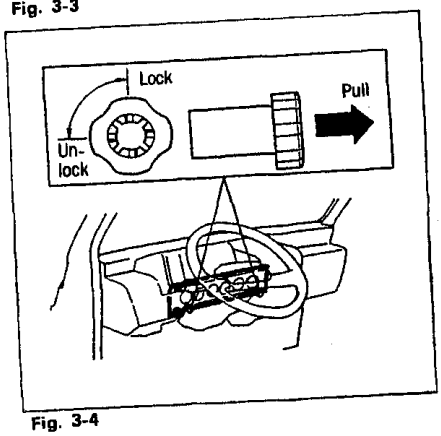


Fig. 3-4

3. Loosen the radiator drain plug and drain the cooling water.
4. Insert a hose into the water filling port of the radiator. While the engine is idling, keep tap water flowing into the radiator, and clean the radiator.
   (This operation must be continued until the water from the drain plug becomes clean)
5. Stop filling up tap water and drain the water about a half. Then, close the drain plug.
   (This operation must be performed with the engine stopped.)

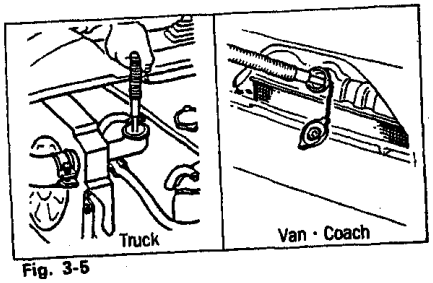


Fig. 3-5

6. Remove the plug for heater air bleeding(Van · Coach).
7. Remove the cap for the pressure valve in the engine compartment(Van · Coach).
8. Put the coolant to the radiator and fill it with clean water (Van · Coach).
   Tighten the cap in the engine compartment before the cooling water overflows, thereby fill up the radiator with water.
9. Install the plug for heater air bleeding(Van · Coach).

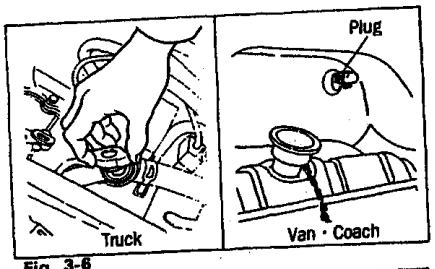


Fig. 3-6

10. Clean the inside of the reserve tank. Put the coolant and fill the tank with clean water.
11. Fully close the radiator cap. Start the engine and run it at about 3000 rpm, until cooling water temperature rises above 80℃ (176°F).
12. Make sure that no water leaks from the drain plug.
13. After the cooling water gets cool, open the radiator cap. Ensure that the radiator is filled with water.
14. Make sure that the water level of the reserve tank reaches the FULL line.
15. Install the front panel(Van · Coach)

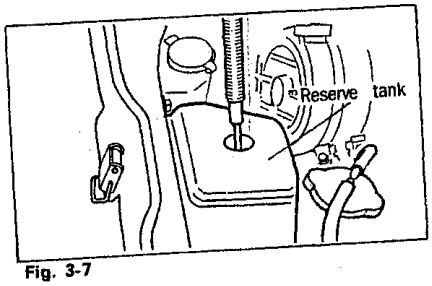


Fig. 3-7

◆ CHECKING OF COOLING SYSTEM

Check the cooling system, follow the procedure given below. Retighten or replace any part which exhibits defects.

1. Detach the radiator cap and fill the cooling system with cooling water. Install a cap tester.
2. Apply a pressure of 1.2kg/㎠(17 psi) to the cooling system by means of the cap tester. Proceed to check the following items listed below.
   1) Radiator Cap
   2) Water pump leakage
   3) Leakage at hose connections
   4) Excessive hose bulge

NOTE

Care must be exercised to ensure that the neck filter section of the radiator is not distorted while the cap tester is removed or installed or the tester is operated.

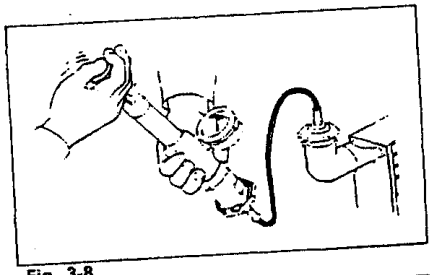


Fig. 3-8

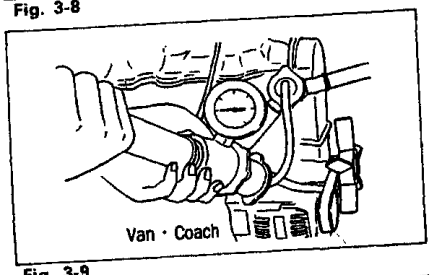


Fig. 3-9

◆ RADIATOR CAP

Inspection

1. Check the following parts. Replace any part which exhibits defects.
   1) Cracked or distorted seal packing
   2) Distorted or dented valve or valve seat
   3) Water scale accumulation between valve and valve seat.

NOTE

Remove any water scale accumulation which is found between the valve and the valve seat.

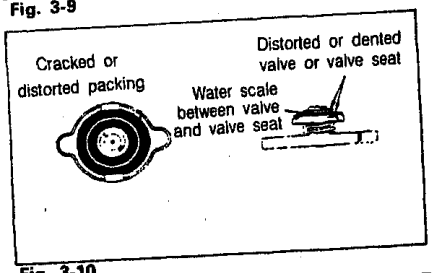


Fig. 3-10

4) Checking of Valve opening pressure

Specified value:

0.75 to 1.05 kg/cm²(10.7 to 14.9 psi)

Allowable limit: 0.7kg/cm² (10.0 psi)

NOTE

1. **Make sure that no foreign matter, such as water scale, is accumulated between the valve and the valve seat.**
2. **When installing the cap tester, be sure to adjust the seal assembly to a proper length. If this adjustment is not made properly, it will cause a poor sealing.**

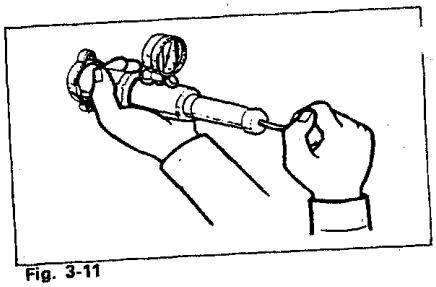


Fig. 3-11

5) Checking of negative pressure valve

Ensure that the valve opens when it is pulled by fingers. Also, ensure that the valve closes when the fingers are released.

6) Checking of neck filler section(water filling port).

1) Distorted or dented seal surface

2) Distorted edge section

NOTE

If the neck filler section is distorted, the radiator cap can not seat on the neck filler section closely, resulting in the decrease in water level.

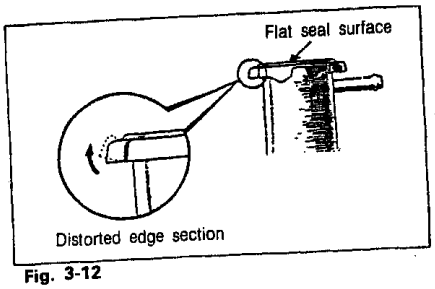


Fig. 3-12

Coolant capacity(including reserve tank and heater)

Truck: 4.2 ℓ

Van: 5.0 ℓ

Coach: 5.5 ℓ

WATER PUMP

DISASSEMBLY

Disassemble the parts in numerical order shown in the figure below.

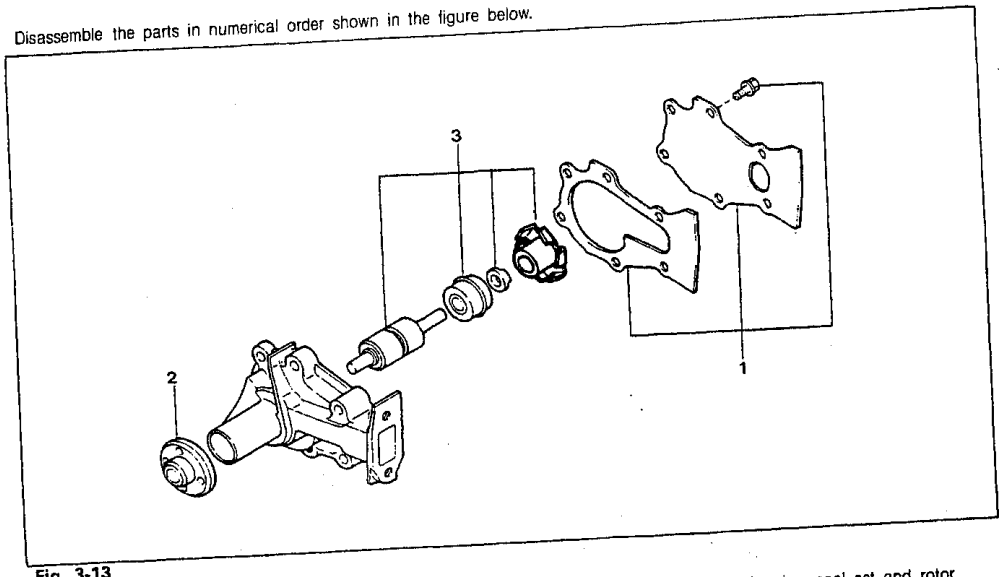


Fig. 3-13

1. Water pump cover and gasket
2. Water pump pulley seat
3. Water pump bearing, seal set and rotor

1. Press off the water pump pulley.

   ⓐ **SST: Water pump bearing anvil**
   09253-87201-000

   ⓑ **SST: Water pump bearing remover & replacer**
   09238-87201-000

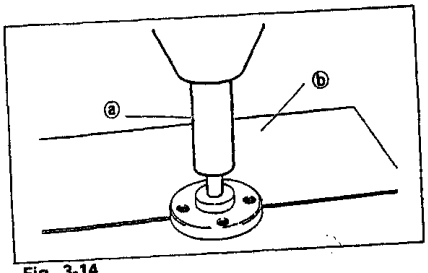


Fig. 3-14

2. Remove the water pump bearing.

   SST: Water pump seal set remover & replacer
   09237-87201-000

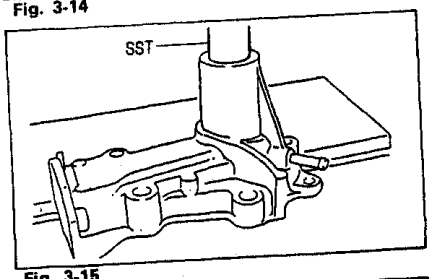


Fig. 3-15

3. Remove the rotor and seal set from the water pump bearing.

SST: Water pump bearing remover & replacer
09238-87201-000

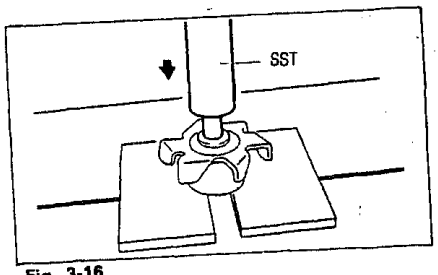


Fig. 3-16

ASSEMBLY

1. Press the bearing into the pump rotor.

SST: Water pump seal set remover & replacer
09237-87201-000

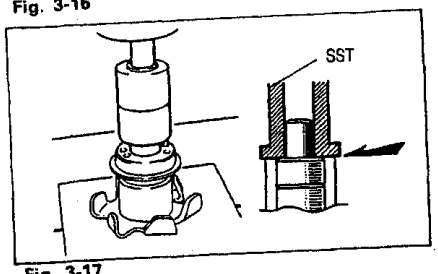


Fig. 3-17

2. Press the water pump seal set with rotor into position.

ⓐ **SST: Water pump bearing remover & replacer**
09238-87201-000

ⓑ **SST: Water pump rotor pulley**
09238-87201-000

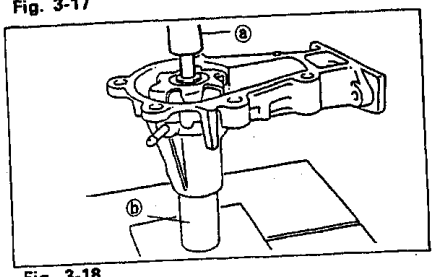


Fig. 3-18

3. Press the water pump rotor into position.

SST: Water pump bearing remover & replacer
09238-87201-000

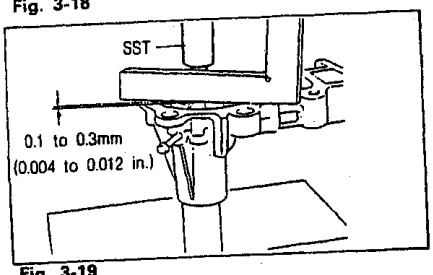


Fig. 3-19

4. Press the water pump bearing set into water pump pulley seat.

ⓐ **SST: Water pump bearing remover & replacer**
09238-87201-000

ⓑ **SST: Water pump bearing receiver**
09254-87201-000

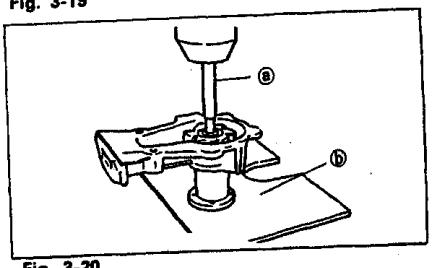


Fig. 3-20

5. After assembling, make sure the rotor rotates smoothly with the water pump seat in the installed condition.

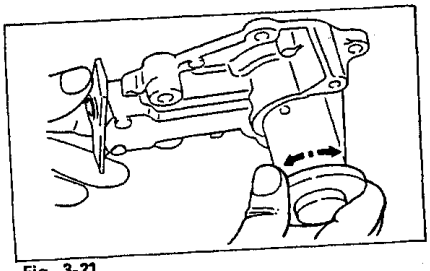


Fig. 3-21

THERMOSTAT

INSPECTION

1. Immerse the trermostat in water, and check the valve opening temperature by heating the water gradually.

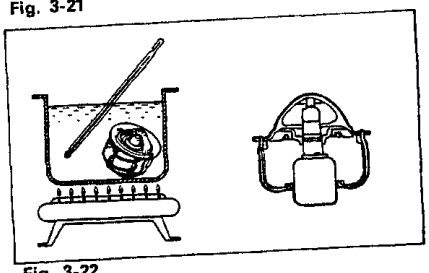


Fig. 3-22

2. Replace the thermostat if the valve remains open at normal tempeature or is not very tight when fully closed.
   Valve starts to open at 82℃ (180.4°F)
   Valve opens by more than 8mm(0.31 in.)at 95℃ (203.0°F)

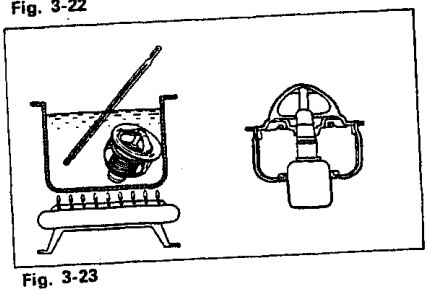


Fig. 3-23

COOLING FAN MOTOR

CIRCUIT DIAGRAM

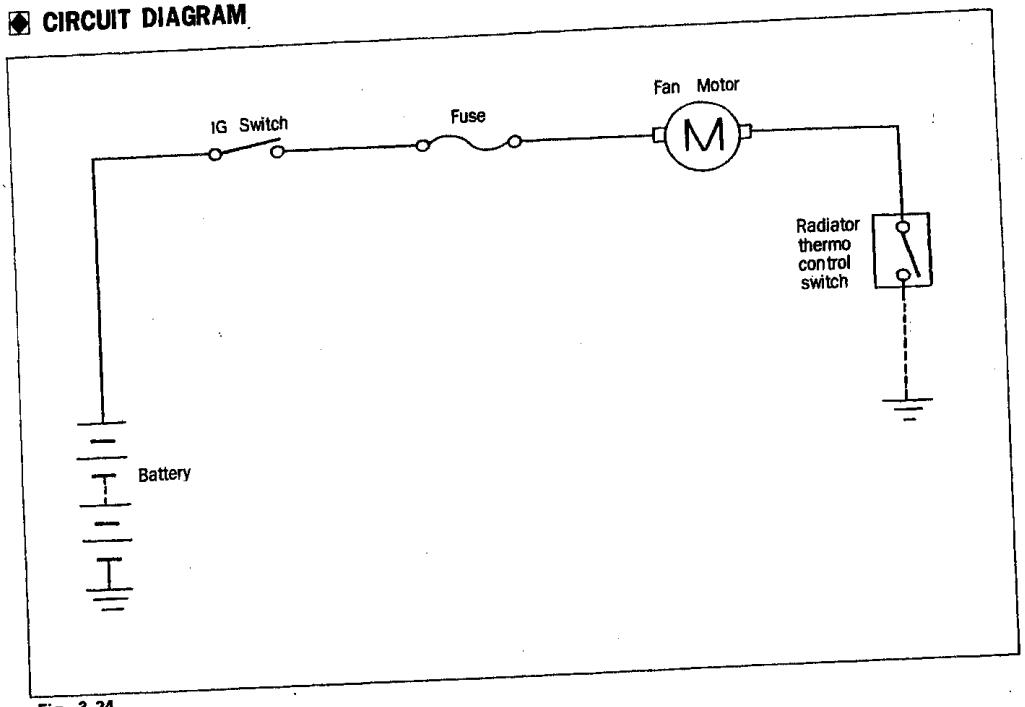


Fig. 3-24

IN-VEHICLE INSPECTION

1. Turn the ignition switch on.
2. Disconnect the radiator thermo control switch terminal and ground it directly to the body.
   Confirm that the fan motor can turn.

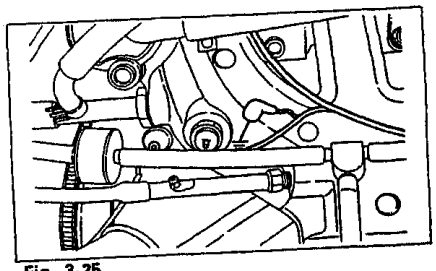


Fig. 3-25

CHECKING OF RADIATOR THERMO CONTROL SWITCH

1. Connect a circuit tester to the radiator thermo control switch.
2. Under this setting, change the water temperature. And observe the behavior of the circuit tester's behaves as follows, it represents that the radiator thermo control switch is functioning normally.

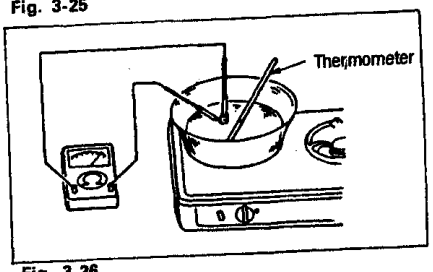


Fig. 3-26

Water temperature	Low	Raise temperature	85℃	Lower temperature	78℃
Tester pointer	Pointer won't swing		Pointer will swing		Pointer won't swing

NOTE: Before the radiator thermo switch is installed, be sure to apply the bond sealer to the switch.

◆ INSPECTION OF FAN MOTOR

Connect the fan motor to the battery.
[Connect the positive ⊕ terminal of motor to the positive ⊕ terminal of battery.]
[Connect the negative ⊖ terminal of motor to the negative ⊖ terminal of battery.]

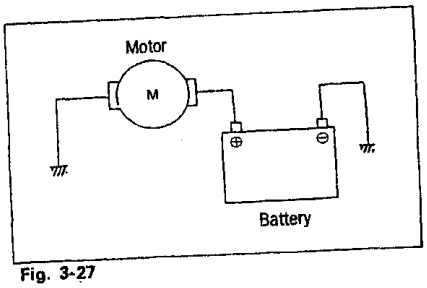


Fig. 3-27

FUEL SYSTEM 4

CARBURETOR

STRUCTURAL VIEW

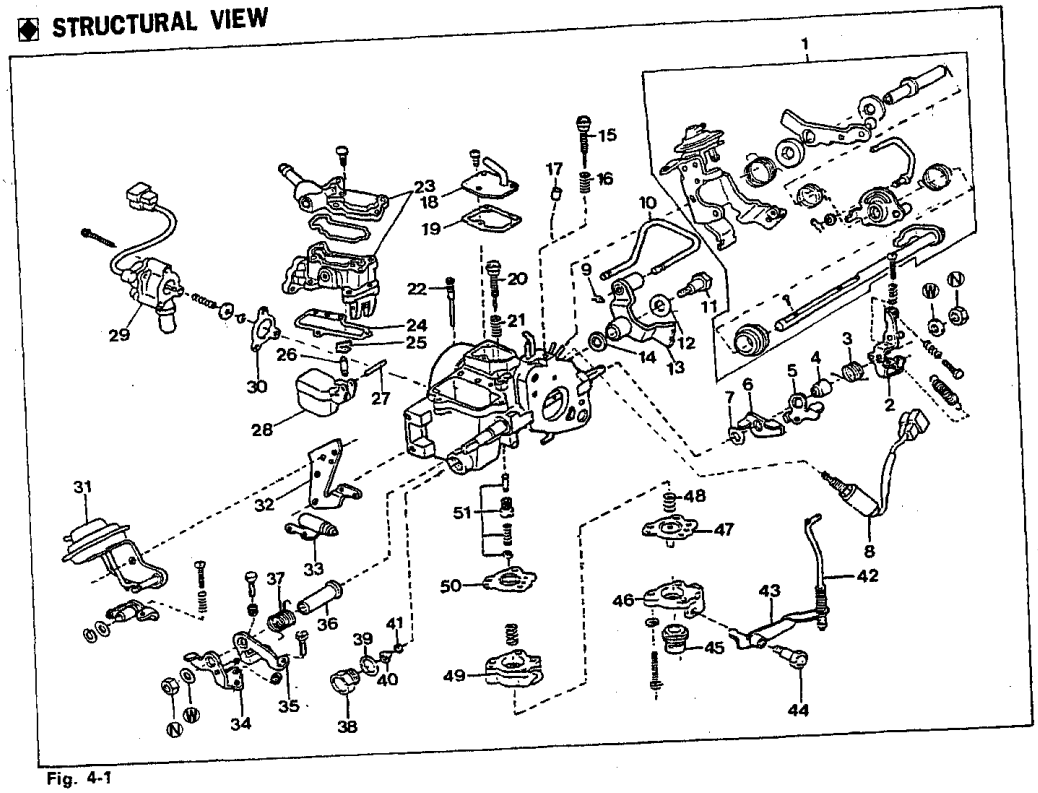


Fig. 4-1

1. Choke valve Ay
2. Throttle lever Ay
3. Return spring
4. Lever collar
5. First idle lever S/A
6. Throttle adjusting lever S/A
7. Washer
8. Solenoid valve
9. Snap ring
10. Link
11. First cam S/A
12. Washer
13. Set screw
14. Washer
15. Idle adjusting screw
16. Idle adjusting spring
17. Plug
18. Cover
19. Case gasket
20. Throttle adjusting screw
21. Throttle adjusting screw
22. Slow jet
23. Float bowl S/A
24. Air horn gasket
25. Needle valve holding pin
26. Neddle valve
27. Float lever pin
28. Float S/A
29. Out vent S/A
30. Gasket
31. Actuator S/A
32. Actuator bracket
33. Idle switch
34. Arm
35. Lever S/A
36. Spacer
37. Throttle return spring
38. Main passage plug
39. Main passage gasket
40. First main jet
41. Main jet gasket
42. Connecting link
43. Pump lever
44. Pump arm set screw
45. Boot
46. Bowl cover S/A
47. Diaphragm S/A
48. Power valve spring
49. Diaphragm S/A
50. Bowl cover S/A
51. Power valve

REMOVAL · INSTALLATION

Remove the parts in numerical order shown in the figure below.
Installation is in the reverse order of removal

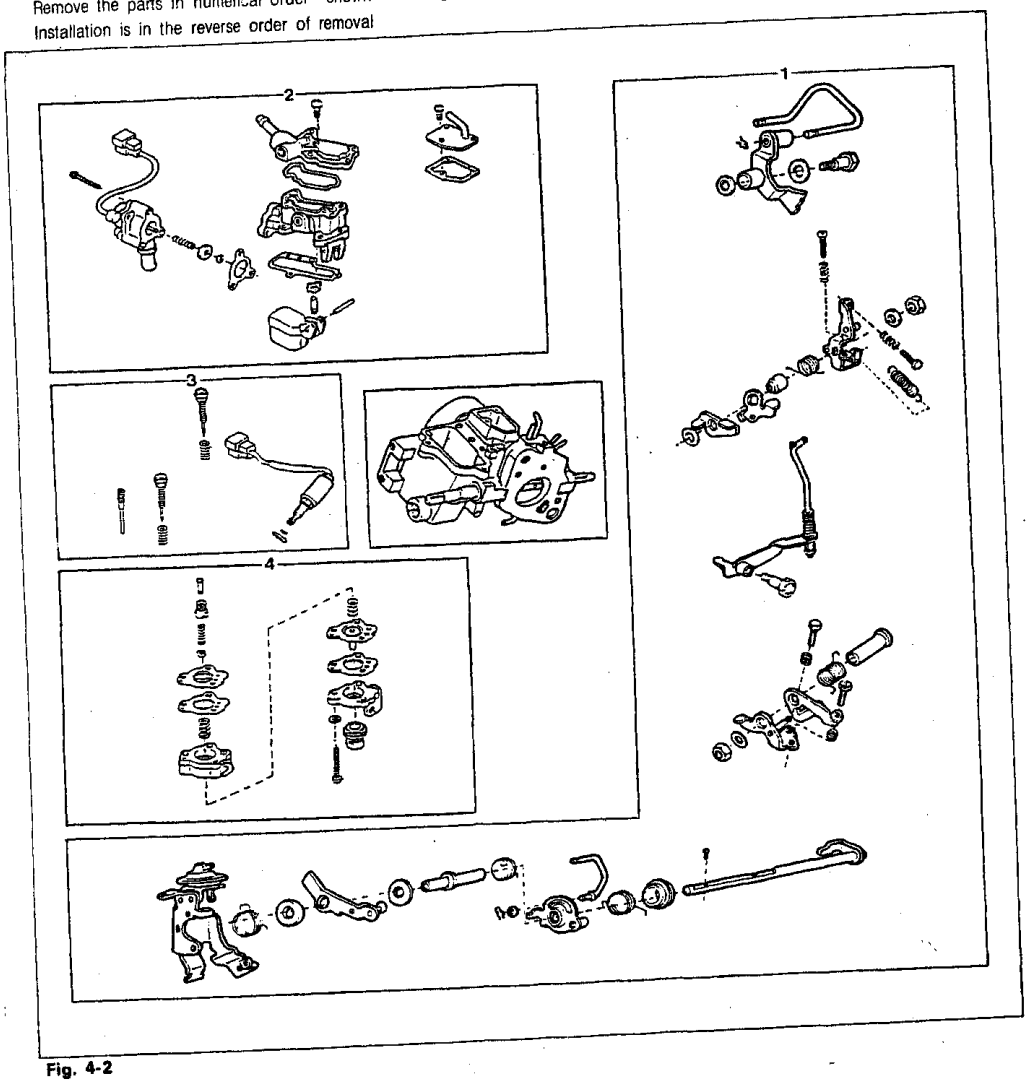


Fig. 4-2

1. Link mechanism
2. Float and related parts
3. Jets
4. Parts related to acceleration pump

INSPECTION

NOTE

1. **Before inspecting the parts, wash them thoroughly in gasoline.**
   Using compressed air, blow all dirt and other foreign matters from the jets and similar parts, and from the fuel passages and apertures in the body.
2. **Never clean the jets or orifices with wire or drill. This could enlarge the openings and result in excessive fuel comsumption.**

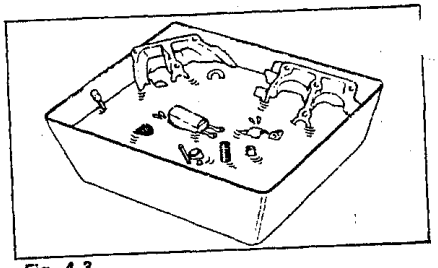


Fig. 4-3

Body cover section

1. Body cover:
   Inspect cracks, scored mounting surface and distortion.

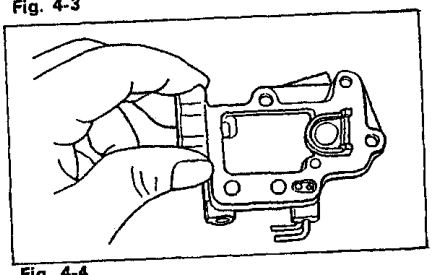


Fig. 4-4

2. Float:
   Check to see whether gasoline enters inside, worn lever pin hole.

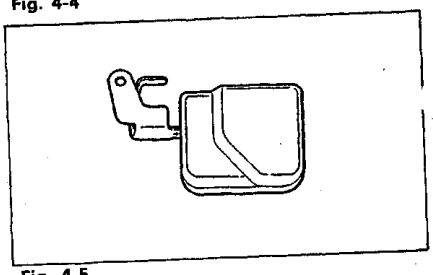


Fig. 4-5

3. Needle valve and seat:
   Check for contact surfaces.
4. Strainer:
   Check for rupture and cracks.

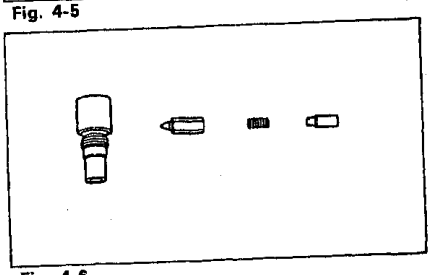


Fig. 4-6

Body section

1. Body:
   Check for cracks, scored mounting surface, damaged thread or clogging.

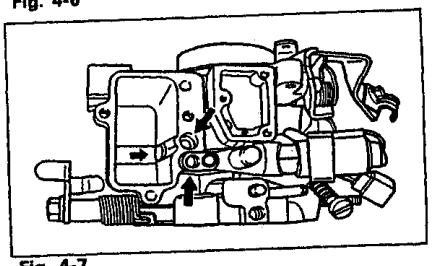


Fig. 4-7

2. Jets:
   Check holes, threads and screw driver grooves for signs of damage.

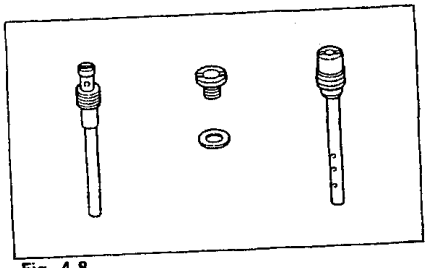


Fig. 4-8

3. Idle adjusting screw:
   Damage tapered section or threads.

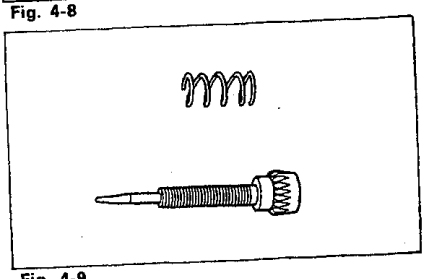


Fig. 4-9

4. Power valve:
   Ensure that no leak is seen when your breath is blown through lower part.
   Check for smooth operation.

5. Check valve:
   Check for damage and rust.

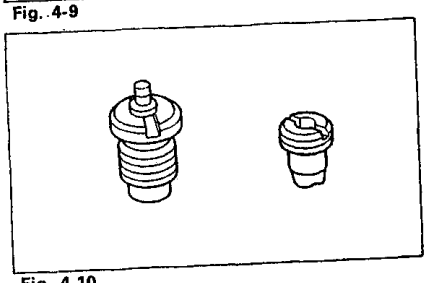


Fig. 4-10

6. Diaphragm pump section:
   Check for rupture or separation, diaphragm spring for rust.

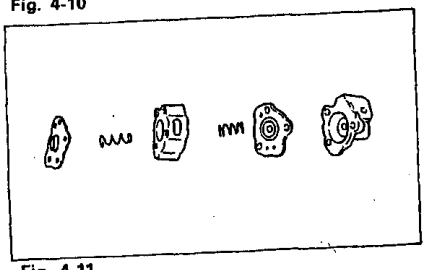


Fig. 4-11

7. Solenoid valve:
   Check for the operation of solenoid valve connecting wiring to the battery positive terminal and ground the body. The needle valve should be pulled in.

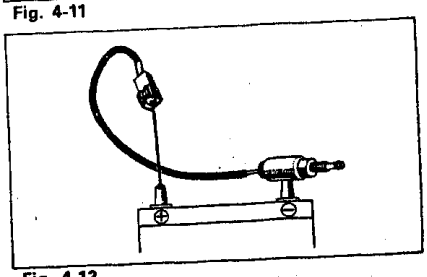


Fig. 4-12

8. Throttle positioner:
   Connect a hose to the diaphragm and suck it.
   The diaphragm should move. If not, replace it.

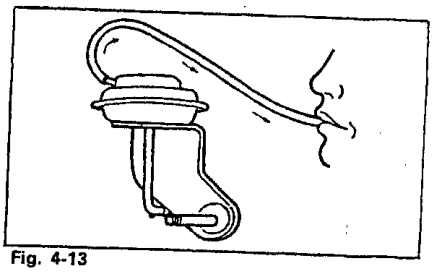


Fig. 4-13

Adjust the float lever

1. Ascent position:
   Invert the carburetor body cover and allow the float to hang down by its own weight.
   Bend the arrow-head section in order that the distance between the float upper-most part and the air horn may be the specified dimension.

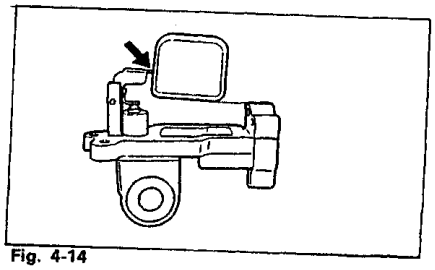


Fig. 4-14

2. Descent position:
   Invert the carburetor body cover:
   And lightly push the float upward by one's finger so that the arrow-headed part may contact to each other lightly.
   Bend the arrow-headed section in order that the distance between the needle valve and the lip may be the specified dimension.

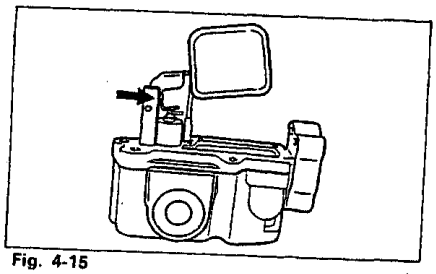


Fig. 4-15

Carburetor adjustment

1. Idle adjusting screw
   Back off the idle adjusting screw 4 turns from the fully closed position.

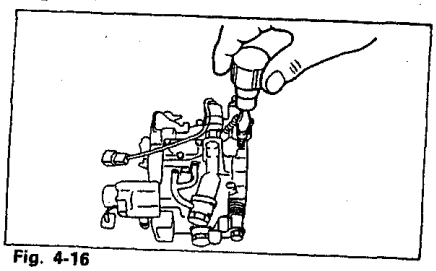


Fig. 4-16

2. Fast idling
   1) Push out the choke lever over the whole stroke.
      And ensure that the fast idle cam Ⓑ assumes the position as indicated in Fig. 4-17.
   2) If the mating marks are not lined up with each other, perform the adjustment by turning the fast idle adjusting screw Ⓐ.

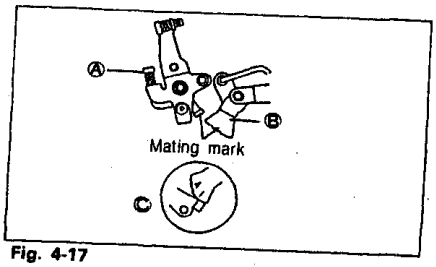


Fig. 4-17

FUEL PUMP

SPECIFICATIONS

Fuel pump	Testing fuel	Gasoline			
	Delivery performance	Voltage(V)	Squarting pressure(kg/cm²)	Output amount(1 /hr)	Ampere(A)
		12±0.1	0.7±0.02(69±2)	Above 17	Below 2
		13.5±0.1	0.3±0.02(69±2)	Above 115	—
Fuel pump relay	Specified voltage	12V, DC			
	Normal load ampere capacity	Max. 5A			
	Voltage range	10V to 16V			
	Engine speed detecting operation	100 ± 50 rpm(2.5 ± 1.25 Hz)			
IG Coil	Coil constant (at 20℃)	Primary : R_1 = 1.5Ω±10% L_1 = 6.6 mH±15% Secondary: R_2 = 12.1KΩ±15% L_2 = 330H±20%			

CIRCUIT DIAGRAM (FUEL PUMP ONLY)

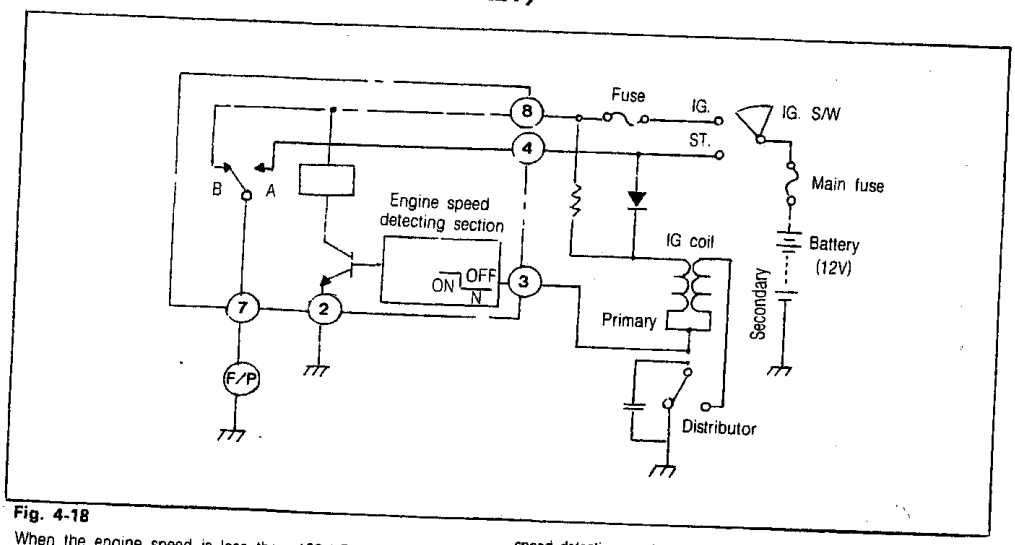


Fig. 4-18

When the engine speed is less than 100±50 rpm, the engine speed detecting section becomes ON.

When the engine speed is more than 100±50 rpm, the engine speed detecting section becomes OFF.

*** When the engine is started**

The engine switch is at "ST" position.

The engine speed detecting section and Tr become ON.

The current flows to the coil and the point is switched to A.

As a result, the fuel pump becomes ON.

*** After the engine is started**

When the engine speed is more than 100±50 rpm, the engine speed detecting section and Tr will become OFF.

Consequently, the current does not flow to the coil and the point returns to B.

Thereby forming the following circuit: B→point B→⑦.

Hence, the fuel pump becomes ON.

Afterwards, when the engine speed is less than 100±50 rpm, the engine speed detecting section becomes ON and then Tr becomes ON.

Consequently, the current flows to the coil and the point switches to A.

Since the engine switch is at IG position, the current does not flow to terminal ④.

Hence, the fuel pump becomes OFF.

4 FUEL PUMP

◆ STRUCTURAL VIEW

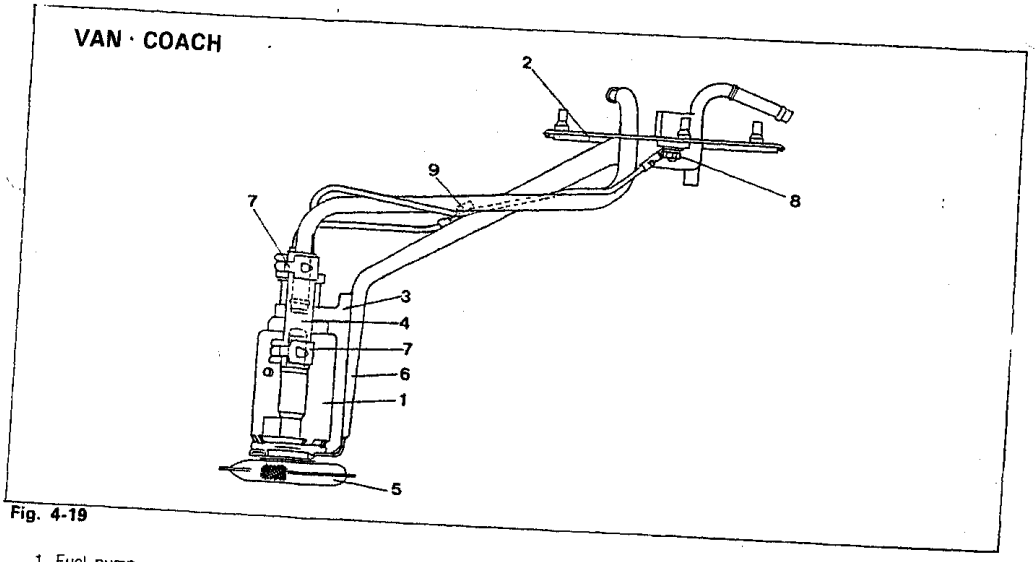


Fig. 4-19

1. Fuel pump
2. Gasket
3. Lever cushion
4. Lever hose
5. Filter S/A
6. Bracket S/A
7. Clip
8. Hexagon nut
9. Screw with washer

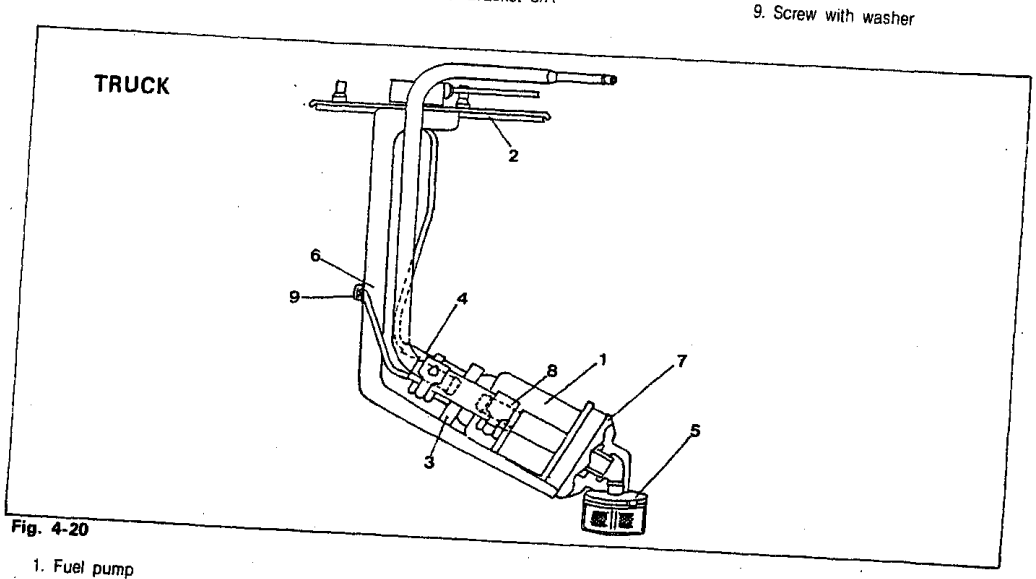


Fig. 4-20

1. Fuel pump
2. Gasket
3. Lever cushion
4. Lever hose
5. Filter S/A
6. Bracket S/A
7. Cover
8. Clip
9. Screw with washer

SCHEMATIC DIAGRAM OF EXHAUST GAS CONTROL SYSTEM

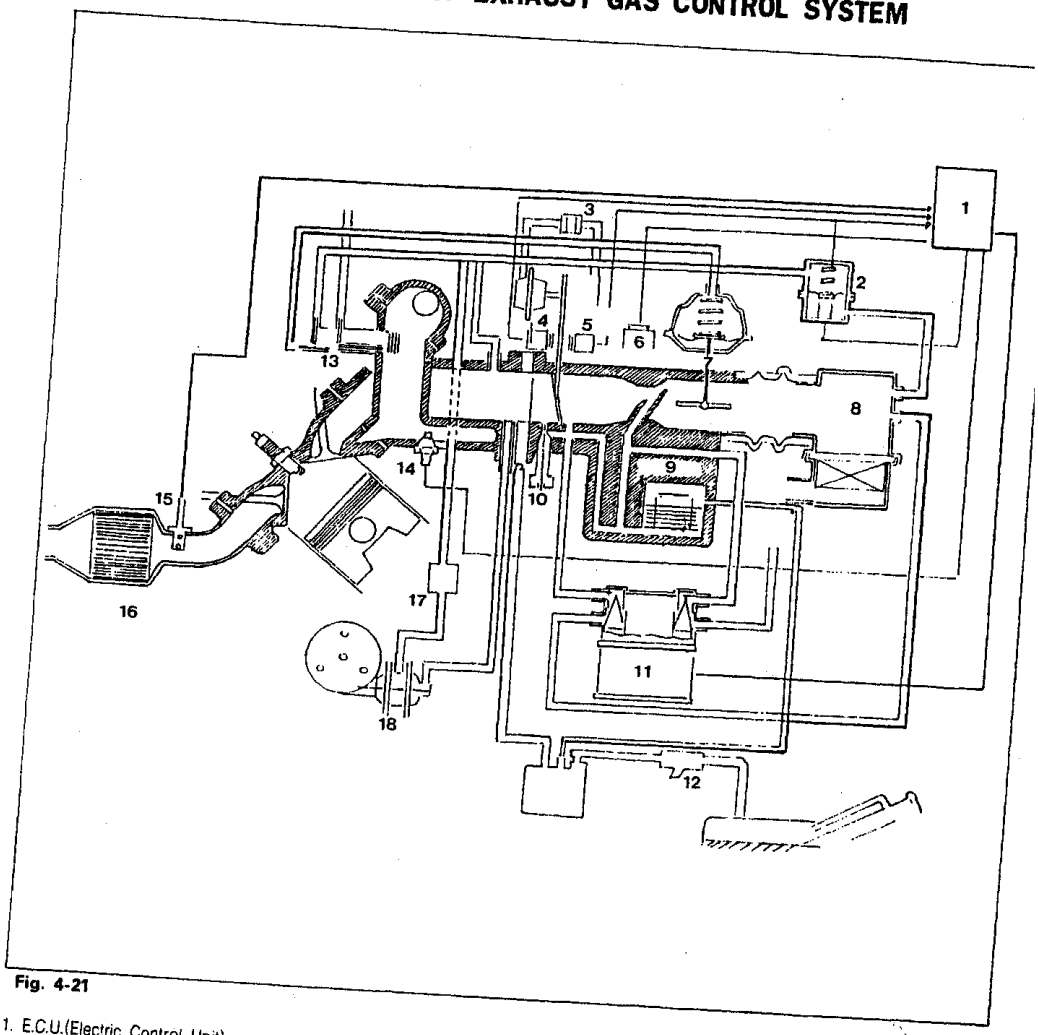


Fig. 4-21

1. E.C.U.(Electric Control Unit)
2. Vacuum switch
3. V.T.V.(Vacuum Transmitting Valve)
4. T.P.(Throttle Positioner)
5. Idle switch
6. Fuel cut valve
7. Choke opener
8. Air cleaner
9. Carburetor
10. M.A.S.(Mixture Adjuster Screw)
11. Air bleeder valve
12. Fuel vapour & purge control valve
13. B.V.S.V.(Bimetal Vacuum Switch Valve)
14. Water thermometer
15. Oxygen detecting sensor
16. Catalyst
17. Gas filter
18. Distributor

BLOW-BY GAS RECIRCULATION SYSTEM

SCHEMATIC DIAGRAM

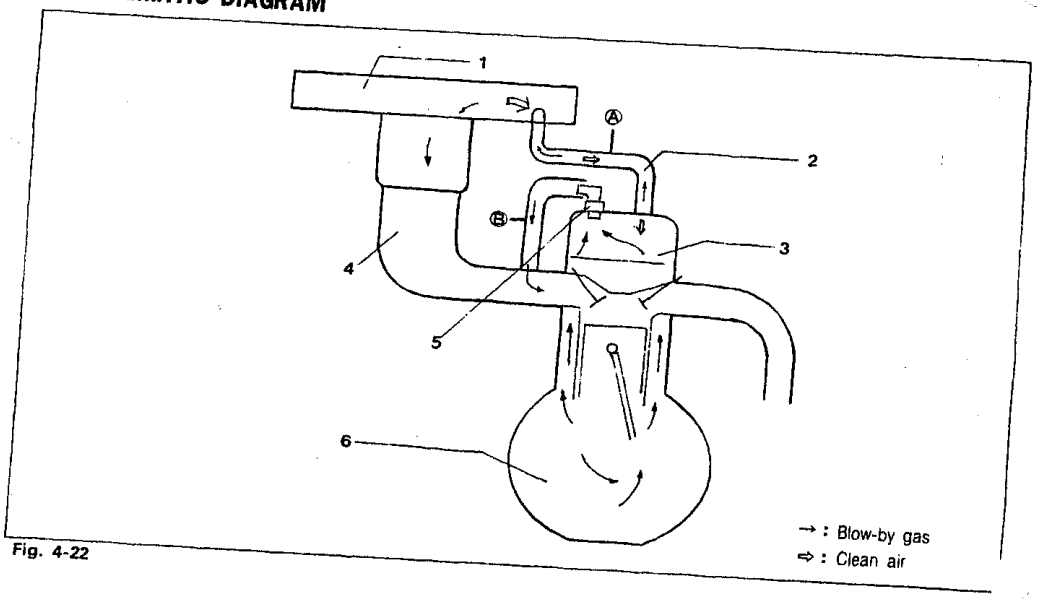


Fig. 4-22

1. Air cleaner
2. Ventilation hose
3. Head cover
4. Intake manifold
5. Oil separator
6. Crank case

INSPECTION

Inspection of the ventilation hose(1)

1. Inspect weather the ventilation hoses exhibit cracks, damage, or restriction.
2. Ensure that the baffle plate of the cylinder head cover exhibits no restriction.
3. Remove the oil filler cap. Lightly blow into the inside through the ventilation hose. If there is a vent continuity, it represents a normal operation.

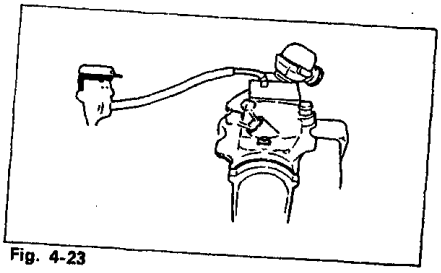


Fig. 4-23

Inspection of the ventilation hose(2)

1. Disconnect the ventilation hose from the carburetor's insulator.
2. Ensure that the hose exhibits no cracks, damage or restriction.
3. Remove the oil filter cap.
4. Strongly blow from the carburetor side.
   If air passes through, it represents a normal operation.

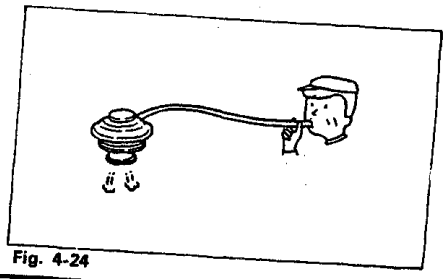


Fig. 4-24

FUEL EVAPORATIVE EMISSION CONTROL SYSTEM (WITH UNLEADED ENGINE)

SCHEMATIC DIAGRAM

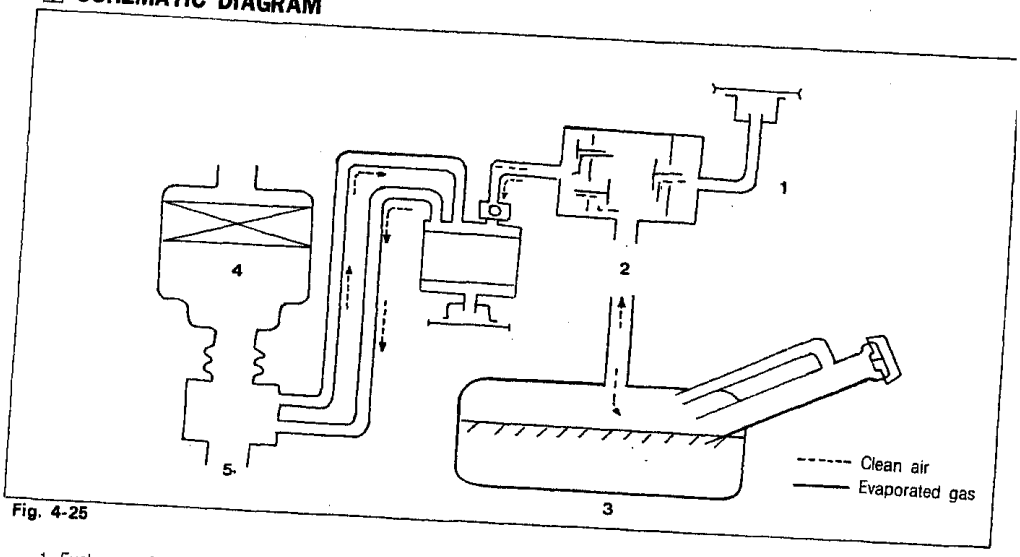


Fig. 4-25

1. Fuel vapor & purge control valve
2. Charcoal canister
3. Fuel tank
4. Air cleaner
5. Carburetor

CHARCOAL CANISTER

CAUTION

1. Handle the charcoal canister with care, for it has likely absorbed gasoline.
2. Never try to disassemble the charcoal canister. The charcoal canister has been so constructed that it is intergral with the check valve.

INSPECTION

Check the charcoal canister for continuity between ports, as follows.

1. Blow air from port (B) and make sure the air comes out of port (A), port (B) and port (C).
2. Blow air from port (C) and make sure the air comes out of port (B) and port (D).
3. Blow air from port (D) and make sure the air hardly comes out of port (B) and port (C).
4. Blow air from port (A) and make sure the air does not flow freely.

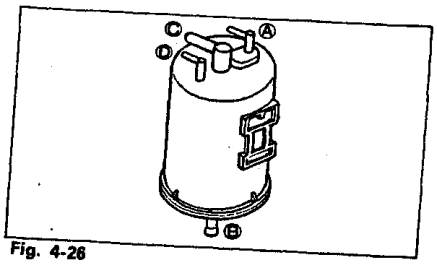


Fig. 4-26

⊠ CATALYSTIC CONVERTER (WITH UNLEADED ENGINE)

It is called three way catalyzer. Platium, rhodium and palladium are the main components of it. The main function of catalystic converter is the CO, HC, NO_x of exhaust fumes. It is installed in exhaust pipe as a monolis type.

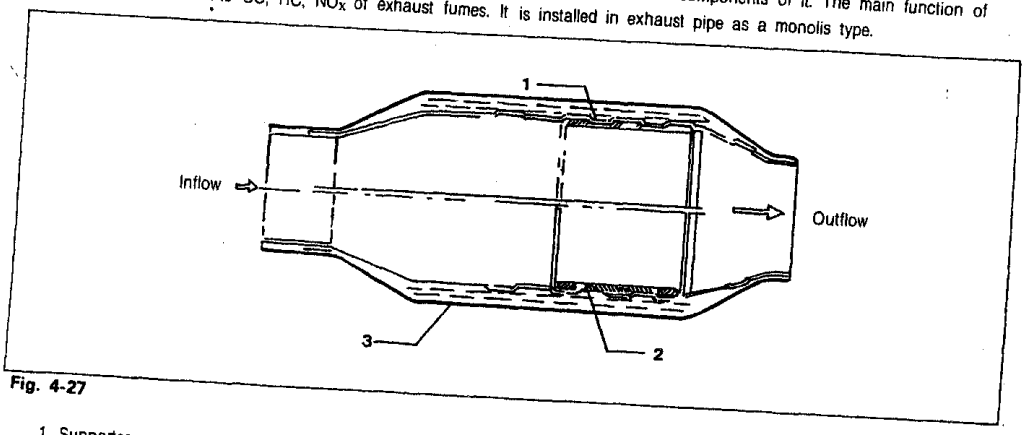


Fig. 4-27

1. Supporter
2. Interam mat
3. Case

DASHPORT SYSTEM

ADJUSTING THE SPECIFIED ENGINE SPEEDS

1. Remove the vacuum hose(1) from pipe(2) of the diaphragm.
2. Open the throttle and detach the adjusting screw(4) from the shaft(3). (Increase the engine speed up to 3,000 rpm).
3. Make sure that the diaphragm shaft comes out by pulling it.
4. Make sure that the diaphragm shaft touches the adjusting screw(4).
5. Ensure that the engine speed grows stable at the specified rpm by the adjusting screw(4).
6. Increase the engine speed up to 3,000 rpm and make sure that the engine speeds within the specified rpm by turning the adjusting screw(4).
7. Connect the vacuum hose(1) to the diaphragm(2).
8. Decrease slowly the engine speed and make sure that the engine speed is within the specified range.
9. If not within specified range, loosen the adjusting screw and adjust by turning the adjusting screw(4).

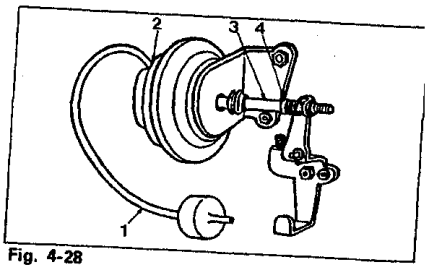


Fig. 4-28

INSPECTION

System check

Disconnect the dashport hose.

Adjust the engine speed to the dashport touch revolution speed, i.e. 1,400±100 rpm. Flap the accelerator pedal several times. Ensure that the engine speed stabilizes at 1,400±100 rpm.

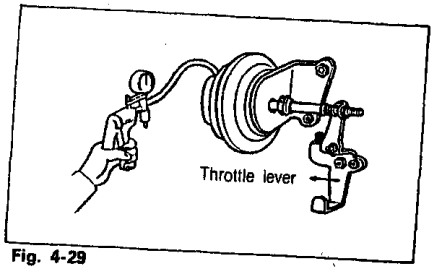


Fig. 4-29

Unit check

1. Dashport

With a Mityvac connected, apply a vacuum of 220mmHg to the dashport. If the shaft is pulled out, it represents a normal function. Next, release the vacuum. If the shaft is returned quickly, it represents a normal function.

CONTROL SYSTEM FOR IGNITED ANGLE

SCHEMATIC DIAGRAM

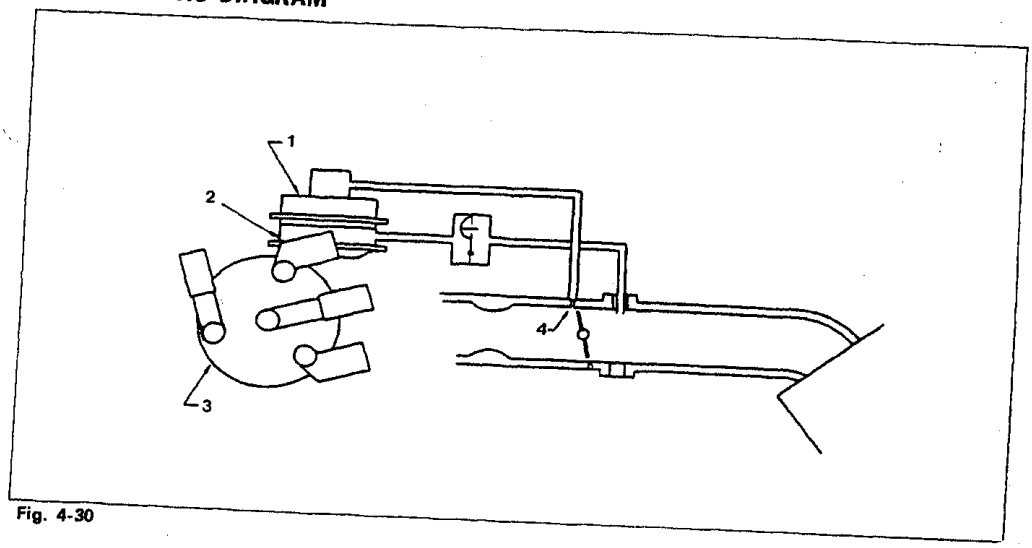


Fig. 4-30

1. Main diaphragm
2. Sub diaphragm
3. Distributor
4. Advance port

SYSTEM CHECK

Checking of ignition advance

1. Stop the function of the vacuum advancer.
   And accelerate the engine repeatedly. Using a timing light, check to see whether the governor ignition advance is taking place.

   NOTE

   Prior to starting this test, disconnect the main and auxiliary vacuum hoses. And make sure to plug the disconnected hoses.
2. Apply a negative pressure to the main and auxiliary vacuum advancers, respectively by means of a Mityvac or by sucking the hose. Ensure that the breaker plate moves in the ignition advance direction.

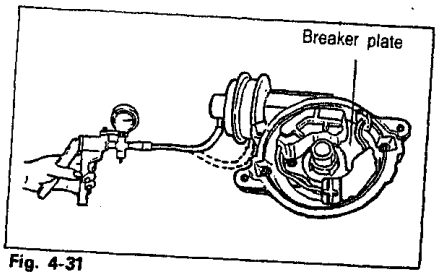


Fig. 4-31

ENGINE ELECTRICAL SYSTEM 5

ALTERNATOR

SPECIFICATIONS

ITEM	MANDO MACHINERY CORP.	DAEWOO AUTO COMPONENTS. Ltd.
Nominal output	12V (Truck : 40A. Van·Coach : 50A)	
Speeds in use	1.000 ~ 15.000 rpm	
Revolutionary direction	Clockwise(viewed from pully)	
Presetting voltage	14.5±0.3V(Ambient temp : 25℃. 5.000rpm. Max. 10A load)	
Cut-in speed	Max. 1.200rpm (13.5 V Hot)	
Stator outer diameter	ϕ 107	ϕ 105
Operating temp. range	−40℃ to 105℃	−40℃ to 100℃
Ground	Negative ground	
Regulator type	I.C.-Regulator built-in	

DISASSEMBLY AND ASSEMBLY

Remove the parts in numerical order shown in the figure below.
Installation is in the reverse order of removal.

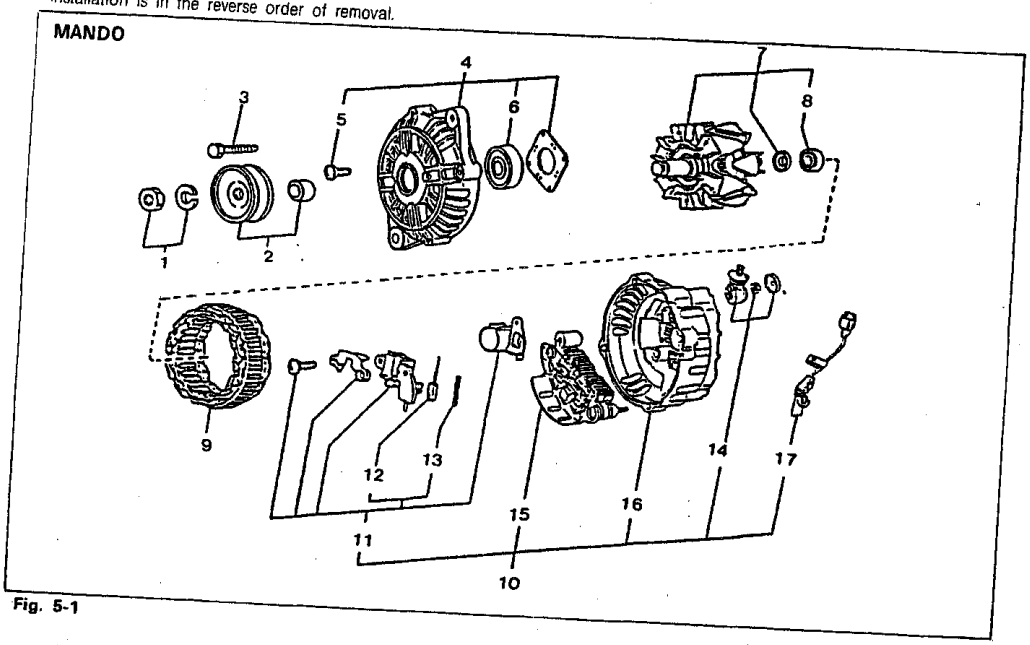


Fig. 5-1

1. Hexagon nut & washer
2. Pulley
3. Through bolt
4. Front bracket Ay
5. Flange screw
6. Bearing
7. Rotor Ay
8. Bearing
9. Stator Ay
10. Rear bracket Ay
11. Regulator Ay
12. Brush
13. Brush spring
14. Connector Ay
15. Rectifier Ay
16. Rear bracket
17. Lead wire Ay

Remove the parts in numerical order shown in the figure below.
Installation is in reverse order of removal.

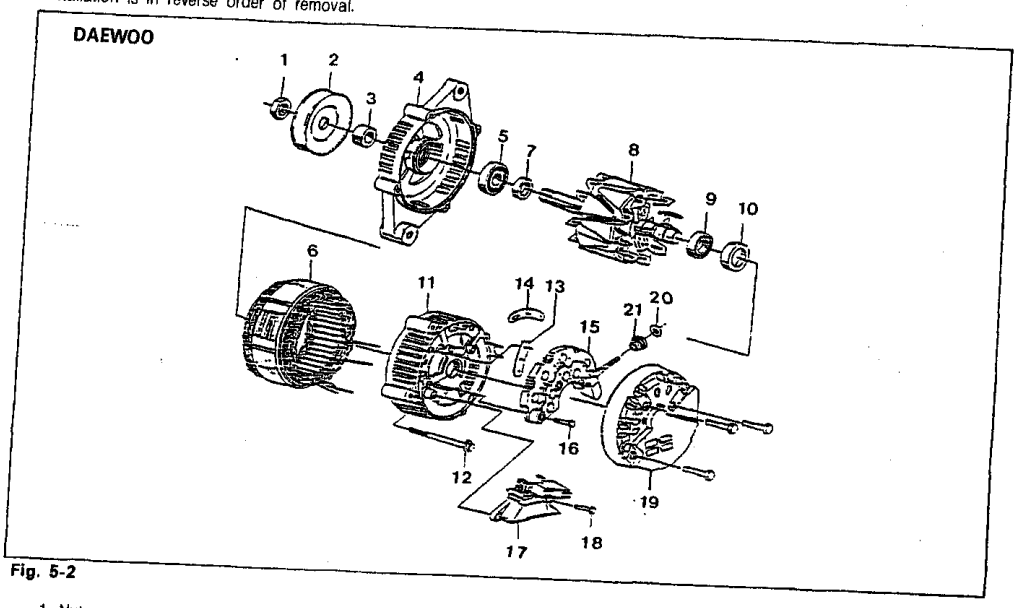


Fig. 5-2

1. Nut
2. Pulley
3. Collar
4. Frame
5. Ball bearing Ay
6. Stator Ay
7. Collar
8. Rotor Ay
9. Bearing Ay
10. Retainer
11. Frame
12. Through bolt
13. Insulator
14. Insulator
15. Rectifier Ay
16. Screw
17. Brush & regular Ay
18. Screw & lock washer
19. Cover
20. Nut
21. Insulator

CIRCUIT DIAGRAM OF CHARGE

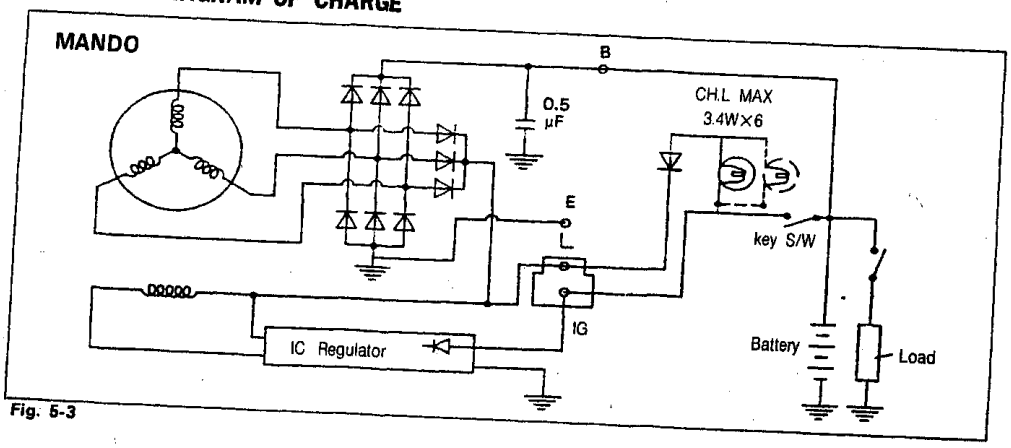


Fig. 5-3

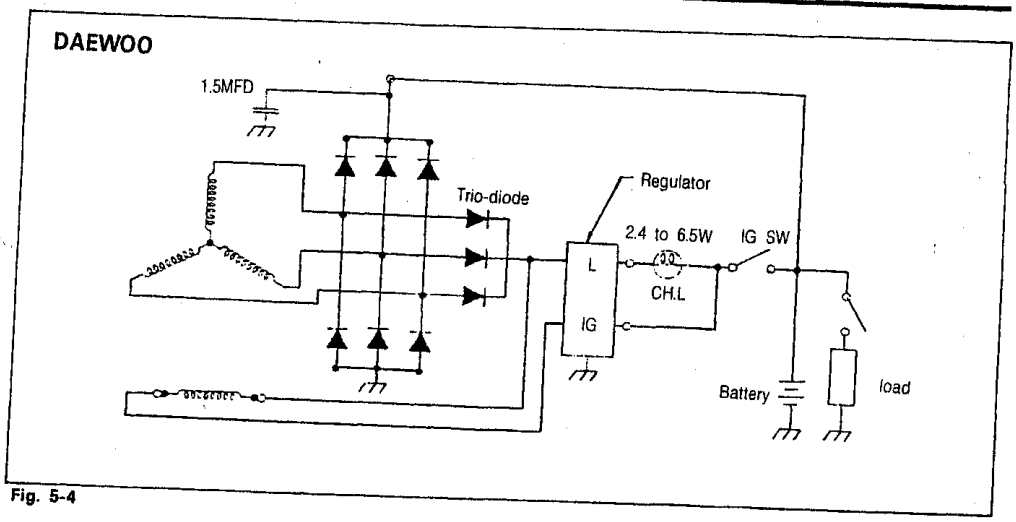


Fig. 5-4

INSPECTION

Rotor

1. Wiring damage
   1) Measure the resistance between the slip rings by using a circuit tester.
   2) If it is not within standard resistence, replace the rotor.
   Standard resistance: 2.9±0.15Ω

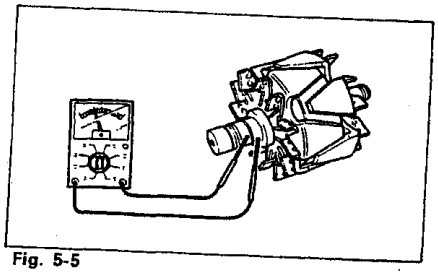


Fig. 5-5

2. Ground of the rotor coil
   1) Check for continuity between the slip ring and the core by using a circuit tester.
   2) Replace the rotor if there is continuity.
3. Slip ring surface
   If the slip ring is rough, use a lathe or fine sandpaper to repair it.

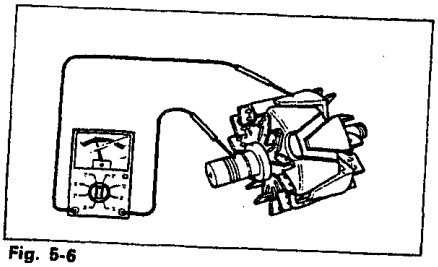


Fig. 5-6

Stator

1. Wiring damage
   1) Check for continuity between the stator coil leads by using a circuit tester.
   2) Replace the stator if there is no continuity.

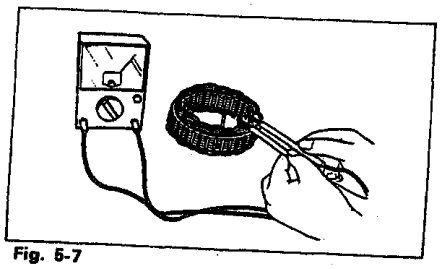


Fig. 5-7

2. Ground of the stator coil
   1) Check for continuity between the stator coil leads and the core by using a circuit tester.
   2) Replace the stator if there is continuity.

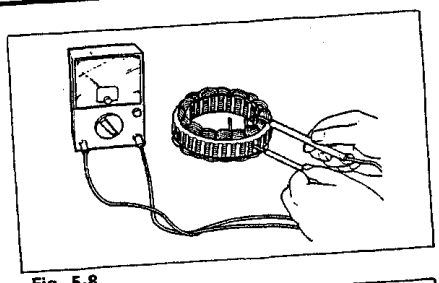


Fig. 5-8

Brush

If the brush is worn almost to or beyond the limit, replace it.

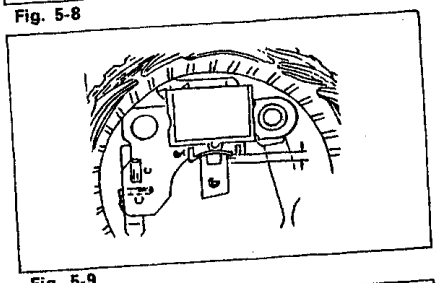


Fig. 5-9

Brush Spring

1. Measure the force of the spring by using a spring pressure gauge.
2. Replace the spring if necessary.

   Standard force: 210±60g

NOTE

Read the spring pressure gauge at the brush tip project is 2mm(0.079 inch)

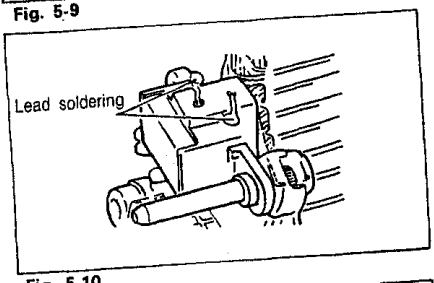


Fig. 5-10

Bearing

1. Check for abnormal noise, looseness, insufficient lubrication, etc.
2. Replace the bearing if there is any abnormality.

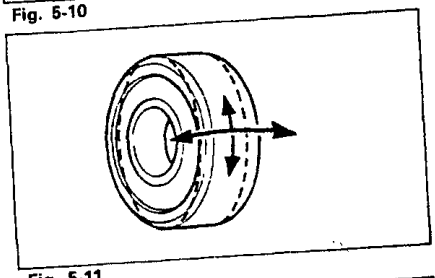


Fig. 5-11

Rectifier

1. Positive diode

   Check for continuity between the diode lead and the heat sink at the positive side, using an ohmmeter. There should be continuity only in the direction from the diode lead to the heat sink.

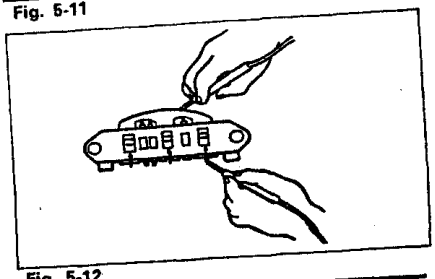


Fig. 5-12

2. Negative diode
   Check for continuity between the diode lead and heat sink at the negative side. There should be continuity only in the direction from the heat sink to the diode.

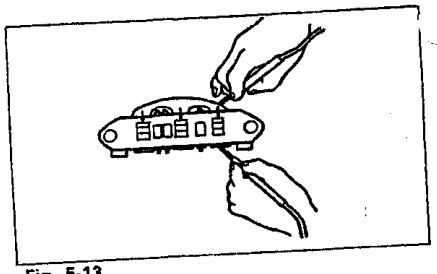


Fig. 5-13

Performance Test

1. Generator performance test
   1) Connect the leads, voltmeter and ammeter.
   2) Turn S1 on and increase the generator speed until voltmeter reading reaches approx. 13.5V.
   3) Then turn S1, S2 on. Regulating load resistence, increase the generator speed keeping volting at 13.5V until ammeter reading reaches full output load.
   Generator speed:
   Less than 5,000 rpm at 13.5V, full output load
2. Voltage regulation test
   1) Connect the leads, voltmeter and ammeter.
   2) Turn S1 on and increase the generator speed until voltmeter reading reaches approx. 13.5V.
   3) Then turn S2 on. Regulate load resistance, increase the generator speed to 5,000 rpm.
   4) Check the voltmeter reading.
   Rotated voltage: 14.5±0.3V

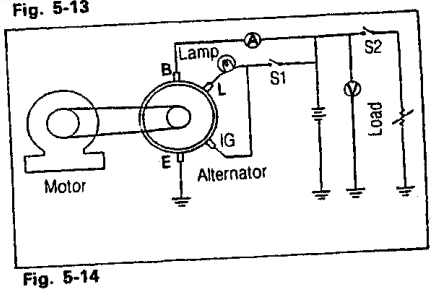


Fig. 5-14

◆ TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy
Starter does not turn at all, or its turning speed is too slow to start the engine.	Battery and related parts	
	Poor contact battery terminals	Clean and tighten
	Poor grounding of negative cable	Clean and repair
	Voltage caused by discharged battery	Recharge
	Insufficient voltage caused by battery malfunction	Replace
	Ignition switch and related parts	
	Poor contact of ignition switch	Replace
	Loose ignition switch wiring or connector	Repair
	Broken wire between ignition switch and magnetic switch	Repair or replace
	Magenetic switch and related parts	
	Loose wiring and/or connectors	Repair
	Burnt magnetic switch contact plate or improper contact	Replace
	Broken wire in magnetic switch puil-in coil	Replace
	Broken wire magnetic switch holding coil	Replace
	Starter and related parts	
	Poor contact of brushes	Adjust contact or replace
	Fatigued brush of field coil	Replace
	Poor grounding of field coil	Replace
	Poor soldering of field coil	Repair
	Commutator malfunction	Repair
	Grounded armature	Replace
	Worn parts	Replace
Starting problem	Insufficient battery capacity	Inspect and/or replace
	Qss system malfunction	
Starter turns but pinion gear does not mesh with ring gear	Tip of overrunning clutch pinion is worn	Replace
	Fatigued overrunning clutch drive spring	Replace
	Overrunning clutch races	Replace
	Improper sliding of spline	Adjust contact and repair
	Worn bushing	Replace
	Worn ring gear	Replace
Starter turns continuously	Sticking contact place of magnetic switch	Replace
	Layer shorting of coil of magnetic switch	Replace
	Ignition switch does not return	Replace
Discharging of battery	Loose drive belt	Adjust
	Grounded or broken stator coil	Replace
	Broken rotor coil	Replace
	Poor conact of brush and slip ring	Clean or replace
	Malfunction of rectifier	Replace
	Malfunction of IC regulator	Replace
	Insufficient of unsuitable battery electrolyte	Adjust
	Malfunction of battery electrode (internal short-circuit)	Replace
	Poor contact of battery terminals	Clean and tighten
	Excessive electric load	Check power consumption
Overcharging of battery	IC regulator malfunction	Replace
	Operating in extremely high temperature	Repair

STARTER

SPECIFICATIONS

ITEM	DAEWOO	MANDO
Nominal output	12V, 0.8KW	←
Engaging type	Electromagnetic push-in-type	←
Rated time	30 seconds	←
Revolutionary direction	Counter clockwise(view from the side of pinion)	←
Operating voltage of electric switch	Pull in voltage 8V Max. Pinion travel restricted at 2㎜	←
Module	2.25	←

DISASSEMBLY AND ASSEMBLY

Remove the parts in numerical order shown in the figure below.
Installation is in the reverse order of removal.

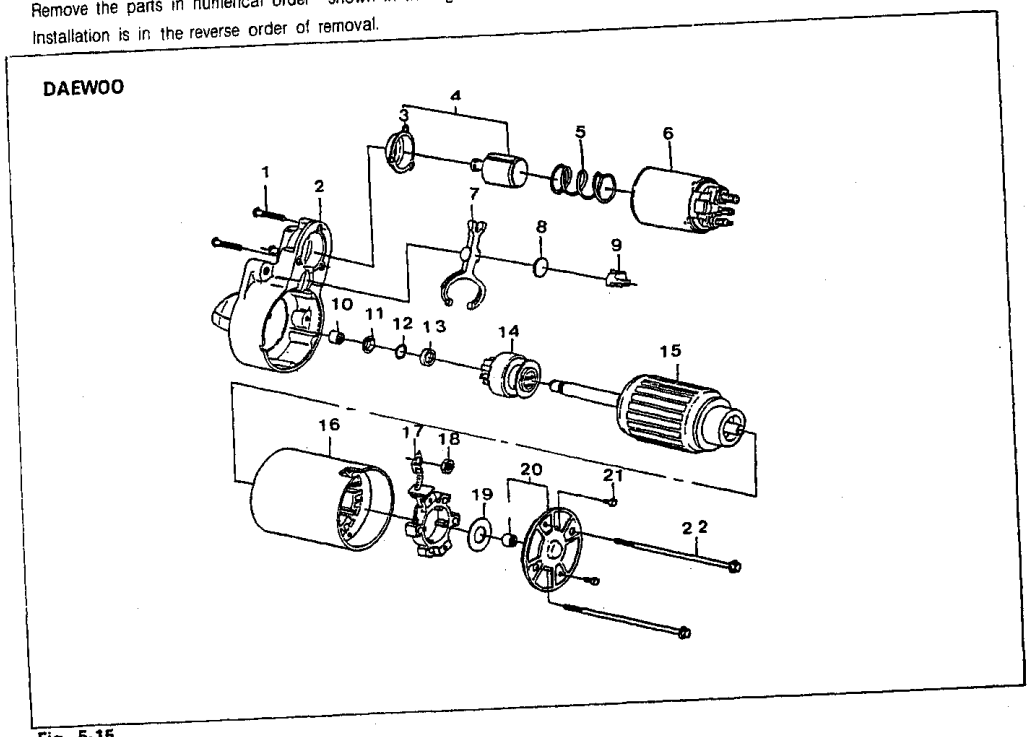


Fig. 5-15

1. Screw
2. Housing
3. Bolt
4. Flange Ay
5. Spring
6. Solenoid Ay
7. Lever
8. Lever plate
9. Plug
10. Bearing
11. Collar
12. Lock ring
13. Stop pinion
14. Drive Ay
15. Armature Ay
16. Yoke Ay
17. Brush holder Ay
18. Nut
19. Washer
20. Bearing
21. Screw
22. Through bolt

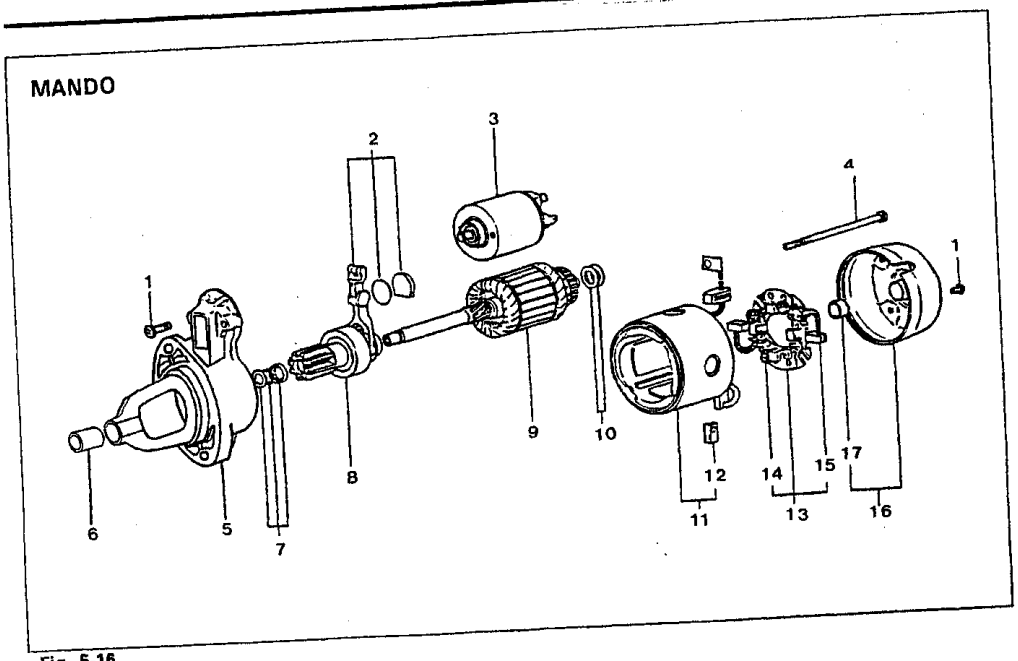


Fig. 5-16

1. Screw
2. Lever
3. Magnetic switch Ay
4. Through bolt
5. Front bracket Ay
6. Sleeve metal
7. Stopper set
8. Overrunning clutch
9. Armature Ay
10. Washer set
11. Yoke Ay
12. Brush (+)
13. Brush holder Ay
14. Brush ring
15. Brush (−)
16. Rear bracket Ay
17. Sleeve metal(right)

INSPECTION

1. Check that commutator is not grounded.
   Using an ohmmeter, check that there is no continuity between the commutator and amature coil core. If there is continuity, replace the amature.

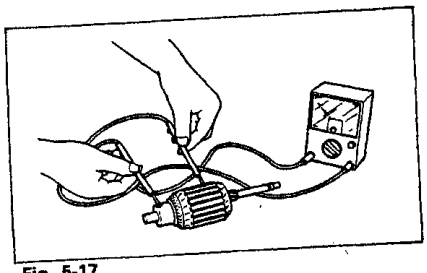


Fig. 5-17

2. Check commutator for open circuit.
   Using an ohmmeter, check for continuity between the segments of the commutator. If there is no continuity between any segment, replace the amature.

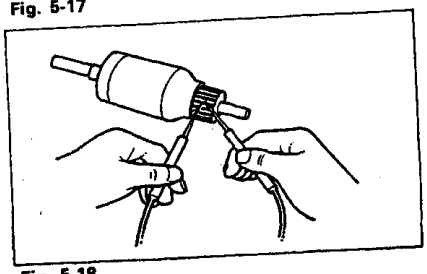


Fig. 5-18

3. Outer diameter of the commutator
   Replace the amature if the outer diameter of the commutator is grind limit or less.
   Standard diameter: 31.9mm (1.256 in.)
   Limit diameter: 29.8mm (1.173 in.)

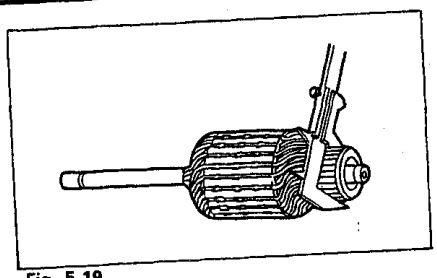


Fig. 5-19

4. Roughness of the commutator surface
   1) If the commutator surface is dirty, wipe it with a cloth.
   2) If it is rough, repair it by using a lathe or fine sandpaper.

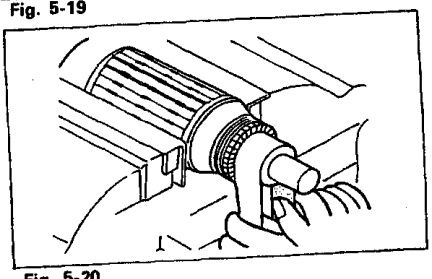


Fig. 5-20

5. Segment groove depth.
   If the depth of the mold between segments is less than the limit depth, undercut the grooves by standard depth.
   Standard depth: 0.5 to 0.8mm(0.020 to 0.031 inch)
   Limit depth: 0.2mm(0.008 inch)

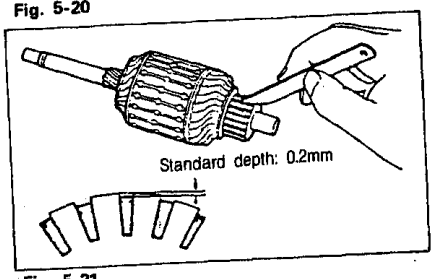


Fig. 5-21

6. Check field coil for open circuit.
   Using an ohmmeter, check for continuity between the lead wire and field coil brush lead.
   If there is no continuity, replace the field coil.

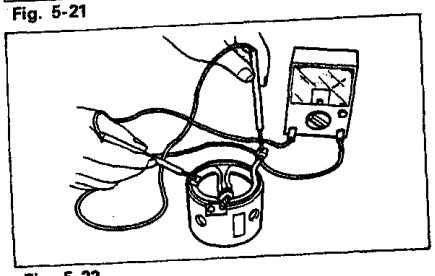


Fig. 5-22

7. Check that field coil is not grounded.
   Using an ohmmeter, check for continuity between the field coil end and field frame.
   If there is continuity, replace the field coil.

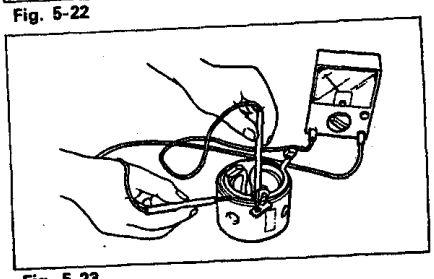


Fig. 5-23

Check insulation of brush holder

Using an ohmmeter, check for continuity between the positive and negative brush holders. If there is continuity, repair or replace the brush holder.

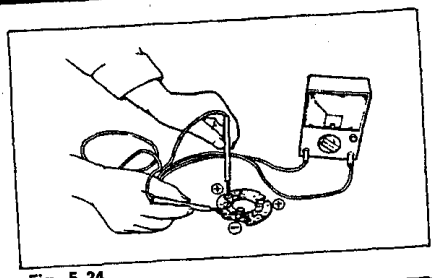


Fig. 5-24

Brush and brush holder

1. Brush

If the brushes are worn beyond the wear limit, or if the wear is near the limit, replace the brushes.

Standard: 17mm(0.669 inch)

Wear limit: 10mm

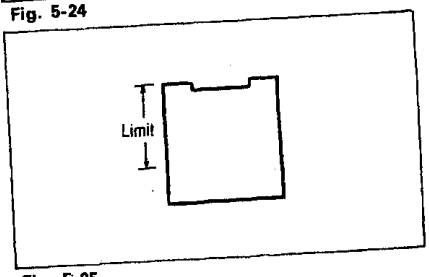


Fig. 5-25

2. Brush spring

1) Measure the force of the brush spring by using a spring balance.

2) Replace the brush spring if the force is limit or less.

Standard force: 1050 to 1350g

Limit force: 600g

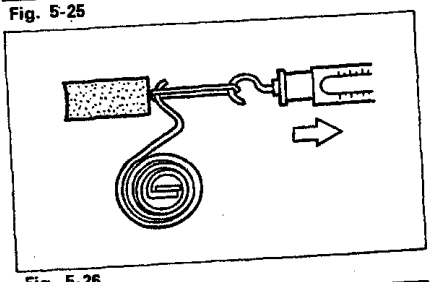


Fig. 5-26

7. Magnetic switch test

Using an ohmmeter, check for continuity between the terminals.

Terminal	Continuity
Ⓑ - Ⓜ(Without pushing plunger)	NO
Ⓑ - Ⓜ(Pushing plunger)	YES
Ⓢ - Body	YES
Ⓢ - Ⓜ	YES

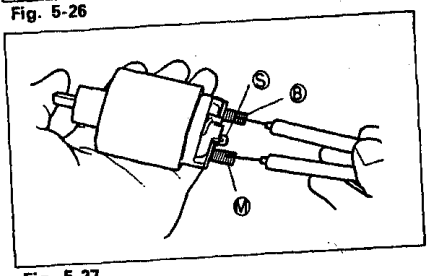


Fig. 5-27

◆ INSPECTION OF PERFORMANCE

Magnetic switch

Disconnect the terminal Ⓜ wire, and make the following tests.

Pull-in test

The switch is normal if the pinion ejects outward when the battery is connected as shown in the right figure.

CAUTION

Do not supply power continuously for more than 10 seconds.

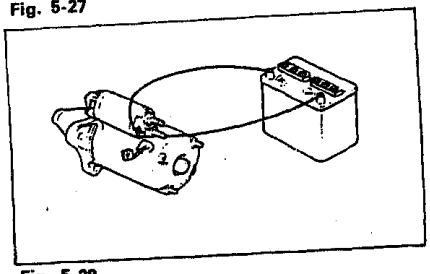


Fig. 5-28

Hold-in test

1. After completing the pull-in test, disconnect the wire from terminal Ⓜ (with the pinion left ejected).
2. The hold-in coil is functioning properly if the pinion does not return.

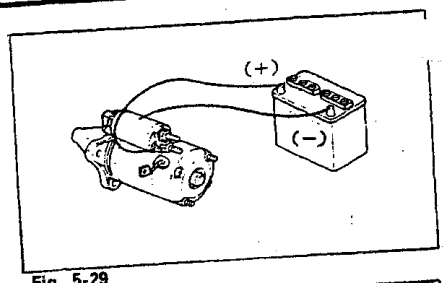


Fig. 5-29

Return test

1. Connect the battery between terminal Ⓜ of the magnetic switch and the body, as shown in the figure.
2. Pull the pinion out manually to the pinion stopper position.
3. The pinion should immediatedly return to its original position when it is released.

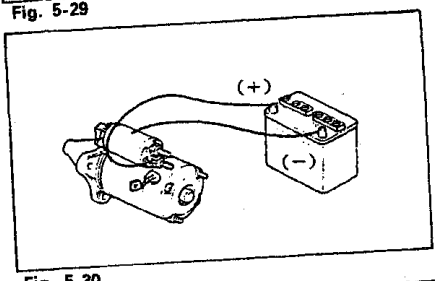


Fig. 5-30

Adjustment of pinion gap

1. Disconnect the wiring from terminal Ⓜ.
2. Apply battery power to the terminal Ⓢ and ground the starter motor body. the pinion will eject outward and then stop.
3. Measure the clearance(pinion gap) between the pinion and the stopper.
   Standard pinion gab: 1.5mm(0.047 in.)
   Limit pinion gap: 0.1 to 2mm(0.004 to 0.079 in.)

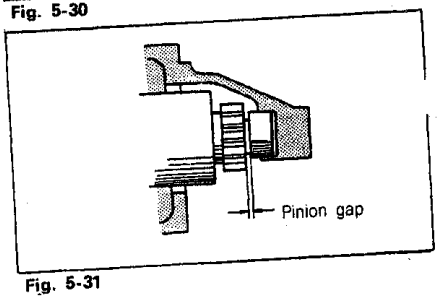


Fig. 5-31

4. If the pinion gap is not within the specified range, make the adjustment by increasing or decreasing the number of washers used between the magnetic switch and the drive housing. The gap will become smaller if the number of washers is increased.

5. Perform no-load performance test.
   1) Connect the battery, ammeter and voltmeter to the starter as shown in Fig. 5-32.
   Specified current: 50A at 11.5V
   Revolution: 6,000 rpm(MANDO)
   5,000 rpm(DAEWOO)

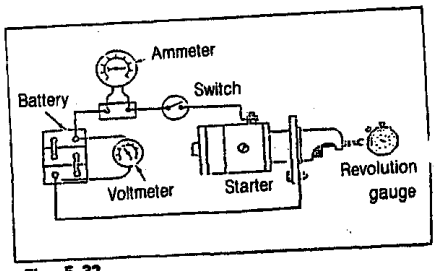


Fig. 5-32

DISTRIBUTOR

STRUCTURAL VIEW

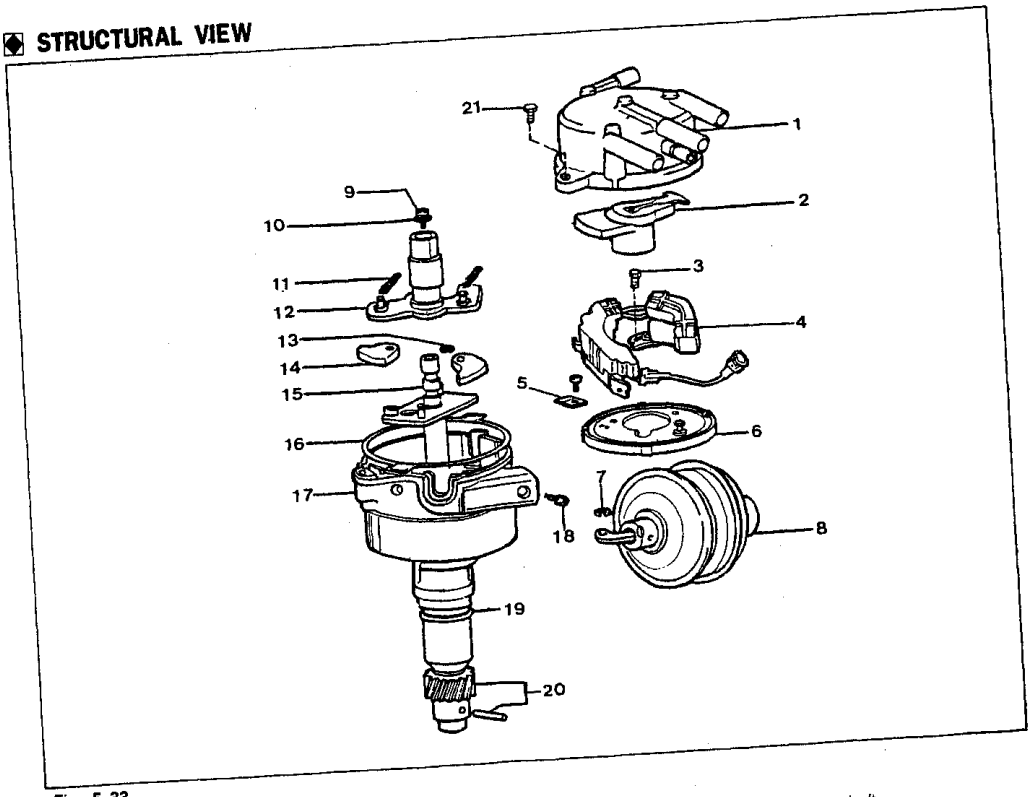


Fig. 5-33

1. Distributor cap
2. Distributor rotor
3. Bolt
4. Pick-up coil & igniter Ay
5. Bolt
6. Breaker plate
7. Snap ring
8. Vacuum control unit
9. Grease stopper
10. Bolt
11. Governor spring
12. Distributor cam S/A
13. Snap ring
14. Ply weight S/A
15. Governor shaft
16. Dust proof packing
17. Distributor housing
18. Bolt
19. "O" ring
20. Distributor gear kit
21. Bolt

DISASSEMBLY

1. Remove the distributor cap.
2. Remove the rotor, cover and packing.
3. Remove the screw and pick-up coil lead wire.

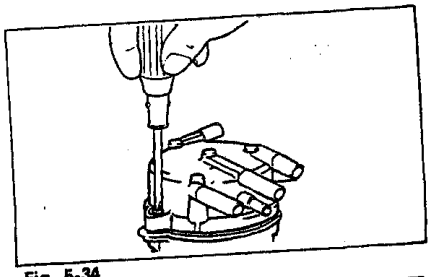


Fig. 5-34

4. Pick-up coil and igniter
   1) Remove the 4 screws.
   2) Remove the pick-up coil and igniter.

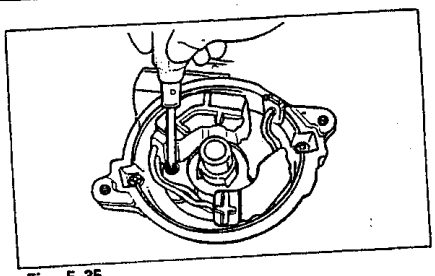


Fig. 5-35

5. Remove the vacuum control unit.
   1) Remove the "E" ring and screws.
   2) Remove the vacuum control unit.

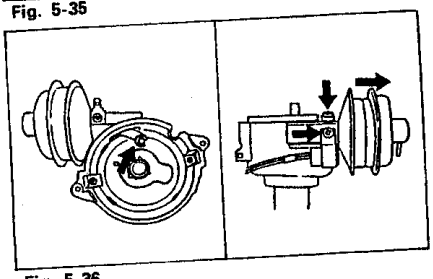


Fig. 5-36

6. Remove the breaker plate.
   1) Remove the 2 screws.
   2) Pull out the breaker plate.

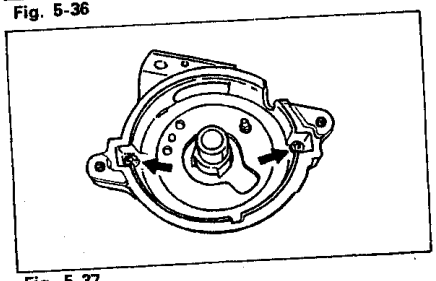


Fig. 5-37

7. Remove the cam.
   1) Remove the governor springs.
   2) Pull out the greese stopper.
   3) Remove the screw at the top of the governor shaft.
   4) Pull out the cam & governor weights.

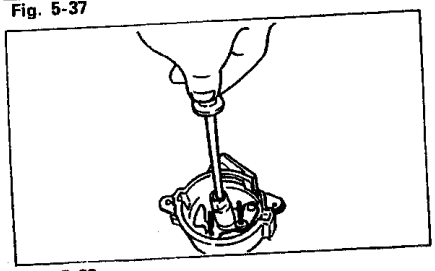


Fig. 5-38

◆ INSPECTION

1. Cap
   Check for cracks, rust, dirt or corroded terminal and check the center contact for wear.

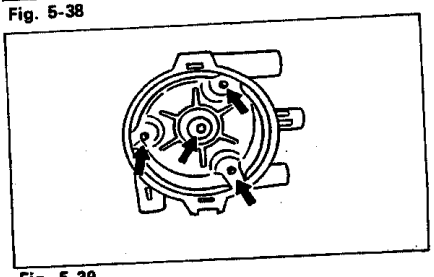


Fig. 5-39

2. Roter
Check for cracks, burnt or dirt or corrosion.

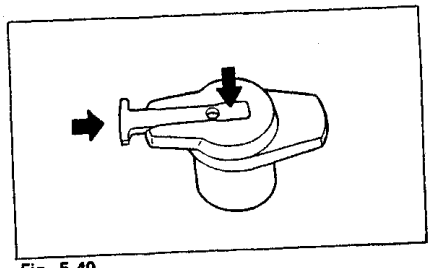


Fig. 5-40

3. Breaker plate
Turn the breaker plate and check that it has a slight drag.
If strong resistance or sticking is left, replace the breaker plate.

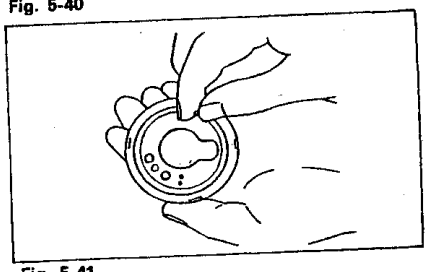


Fig. 5-41

4. Governor
Temporarily install cam with governor to the governor shaft and check that they fit correctly.
If necessary, replace the cam with governor or housing kit.

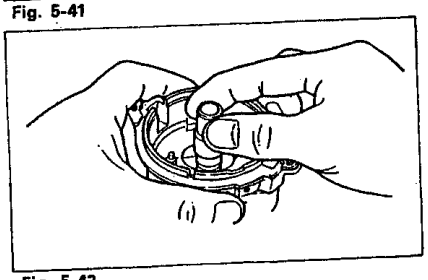


Fig. 5-42

5. Governor shaft and housing
Check for wear, sticking or demage. If necessary, replace the housing kit.

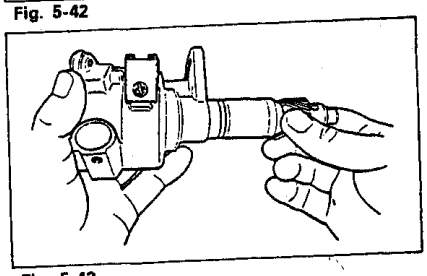


Fig. 5-43

◆ ASSEMBLY

1. Install the cam with governor weights.
   1) Install the screw.
   2) Pack the high-temperature grease into the shaft.
   3) Push on the grease stopper with your finger.
   4) Install the governor springs.

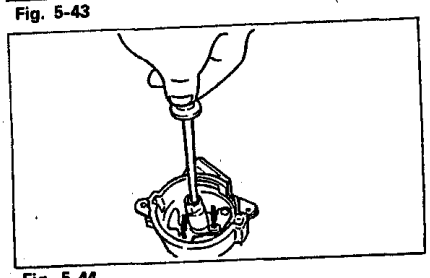


Fig. 5-44

2. Install the breaker plate.
   1) Fit the four clips on the governor. plate into the housing slots.
   2) Tighten the 2 screws.

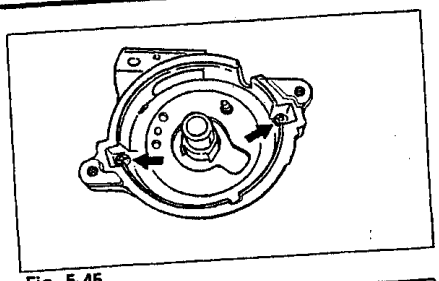


Fig. 5-45

3. Install the vacuum advancer.
   1) Insert the advancer into the distributor and position the level hole over the plate pin.
   2) Install the E-ring on the pin.

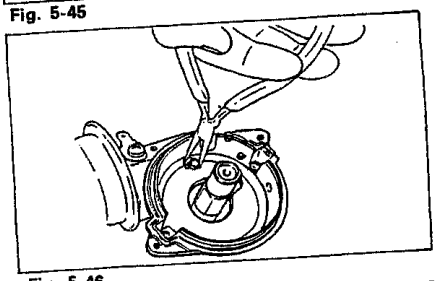


Fig. 5-46

4. Install the pick-up coil and igniter.
   1) Install the pick-up coil and igniter.
   2) Tighten the 4 screws.

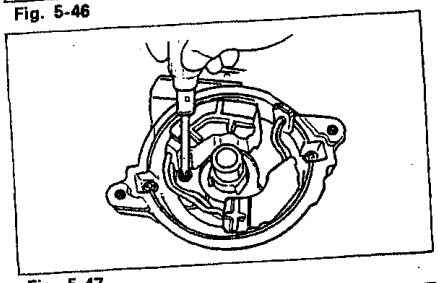


Fig. 5-47

5. Install the screw, pick-up coil lead wire and insulators.
6. Install the rotor and packing.
7. Install the distributor cap.

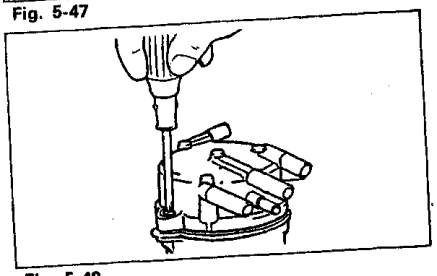


Fig. 5-48

◆ INSTALLATION

1. Turn the crankshaft until the No. 1 cylinder is coming up on compression stroke.
2. Apply the engine oil(about 30cc) to the inside gear housing.
3. Align the distributor matching marks(ㅂ).

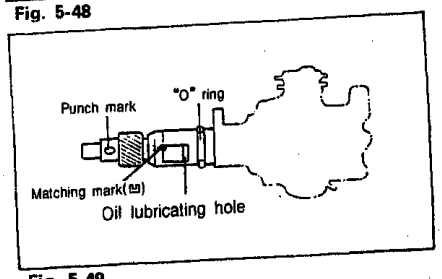


Fig. 5-49

4. Install the distributor, as indicated in the right figure.
5. Adjust the ignition timing after installation.
6. Tighten the bolt.
   Tightening torque: 150 to 220 kg-m

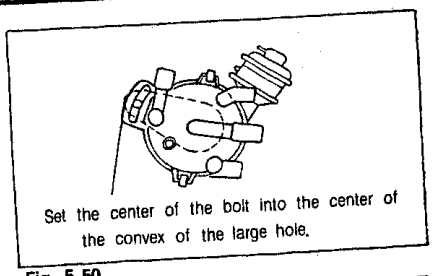


Fig. 5-50

NOTE

1. **Be sure not to turn the crankshaft and distributor during the installation.**
2. **Apply the engine oil to the "O" ring.**
3. **Cover the hose and cord with distributor cover and tighten the button ("A").**

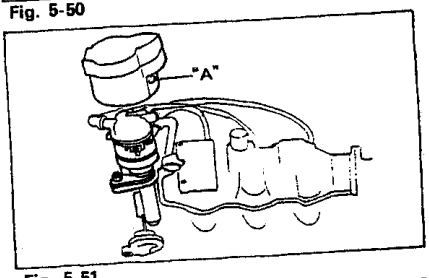


Fig. 5-51

SPARK PLUG

REMOVAL

1. High tension cord check
   1) Carefully remove the high tension cord by rubber boot.
   NOTE: Pulling on or bending the cords may damage the conductor inside.
   2) Remove the spark plug, using the plug wrench.

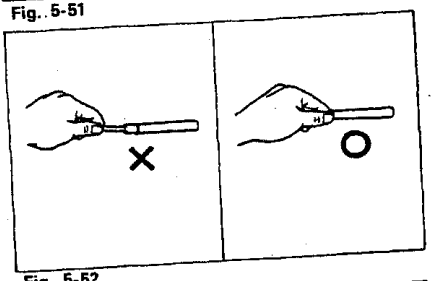


Fig. 5-52

INSPECTION

1. Check the following points. If a problem is found, replace the spark plug.
   1) Damaged insulation
   2) Worn electrodes
   3) Carbon deposits
   3) If cleaning is necessary, use a plug cleaner or a wire brush. Clean the upper insulator also.
   4) Damaged gasket
   5) Burnt condition of spark insulator
   6) If it is black with carbon deposits, either misfiring due to improper proportions of gas and air or overheating of the plug may have occured.
2. Adjust the elctrode gap.
   Carefully bend the outer electrode to obtain the correct electrode gap.
   Standard electrode gap: 0.9mm (0.035 inch)

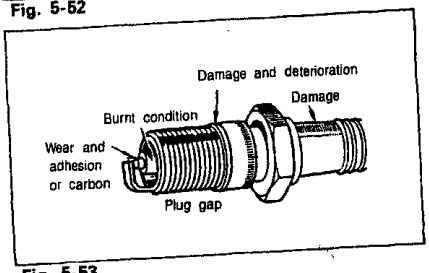


Fig. 5-53

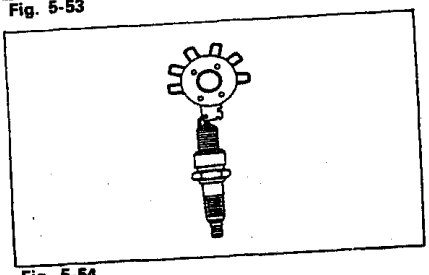


Fig. 5-54

INSTALLATION

1. Install the spark plug, using the plug.

IGNITION COIL

INSPECTION

1. Measure the primary coil resistance between positive ⊕ terminal and negative ⊖ terminal.
   Resistance: 1.5±0.015 Ω

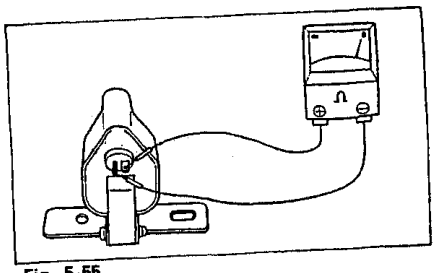


Fig. 5-55

2. Measure the secondary coil resistance between positive ⊕ terminal and high tension terminal.
   Resistance: 12±1.8 Ω

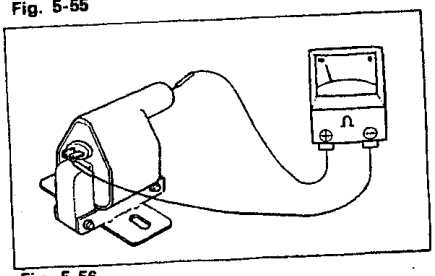


Fig. 5-56

3. Measure the insulation coil resistance between positive ⊕ terminal and coil case.
   Resistance: above 10MΩ

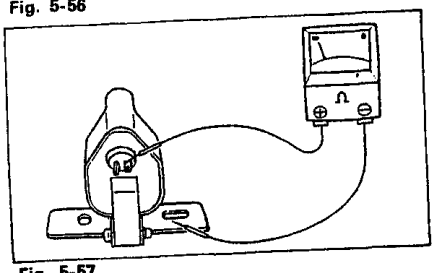


Fig. 5-57

HIGH-TENSION CORD

INSPECTION

Measure resistance by using the ohmmeter.

(kΩ)

Cord	Value of Resistance(kΩ)
1st	5 ~ 11
2nd	3.5 ~ 7.7
3rd	3.1 ~ 6.82
Center	3 ~ 6.6(Van Coach)
	4.25 ~ 9.35(Truck)

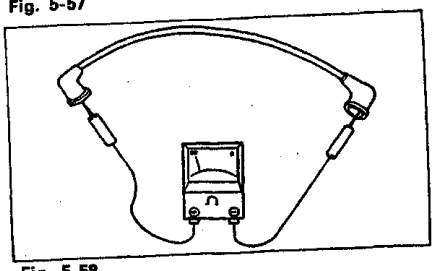


Fig. 5-58

CLUTCH 6

CLUTCH UNIT

REMOVAL

Remove the parts in numerical order shown in the figure below.

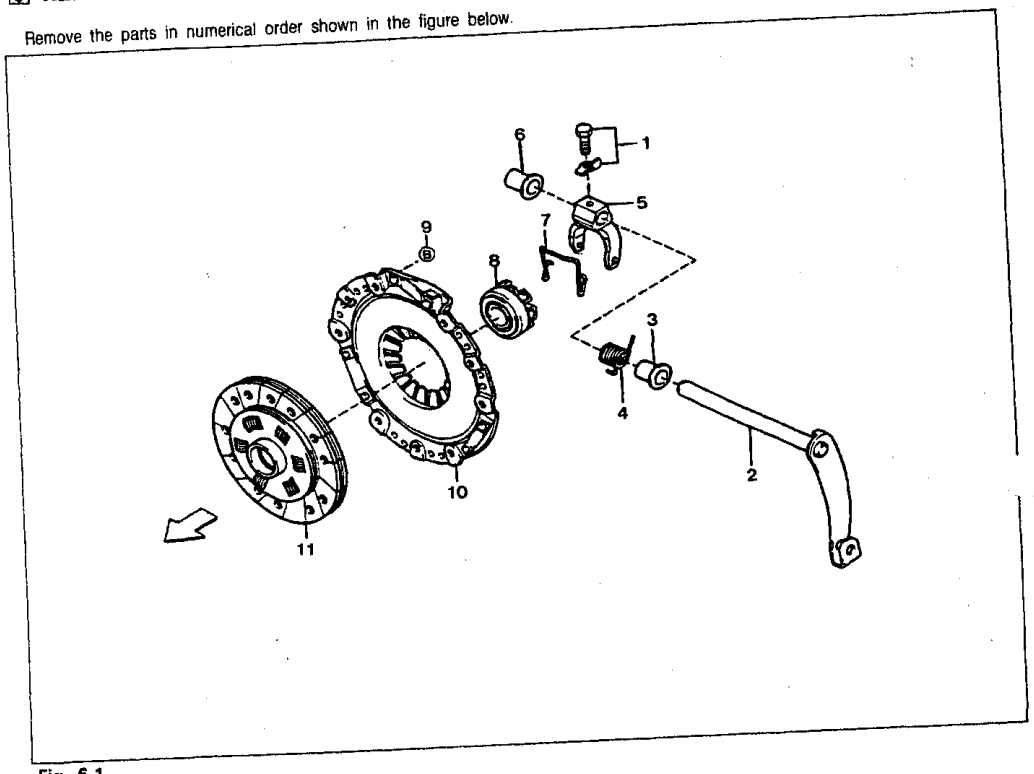


Fig. 6-1

1. Lock plate & holder
2. Clutch release lever S/A
3. Bush
4. Torsion spring
5. Clutuch release lever yoke
6. Bush
7. Release bearing hub clip
8. Clutch release bearing hub
9. bolt
10. Clutch cover Ay
11. Clutch disc Ay

INSPECTION AND REPAIRS

Clutch cover and diaphragm spring

Inspect the following parts. Replace any parts which exhibit defects.

1. Check the clutch pressure plate and the clutch disc contacting surface of the flywheel for evidence of wear or burns.
2. Check the diaphragm spring lever for wear, corrosion or damage.

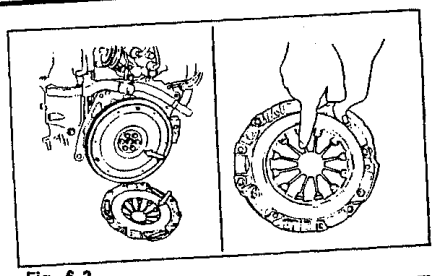


Fig. 6-2

Clutch disc

1. Check the clutch disc for wear.
   Rivet depth limit: 0.3mm(0.0118 inch)

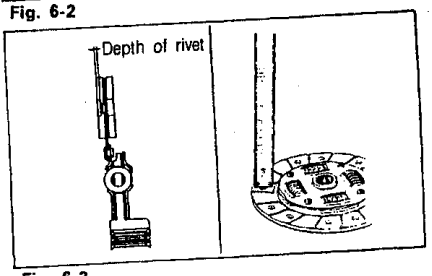


Fig. 6-3

2. Check the clutch disc for runout.
   Runout limit: 1.0mm(0.039 inch)

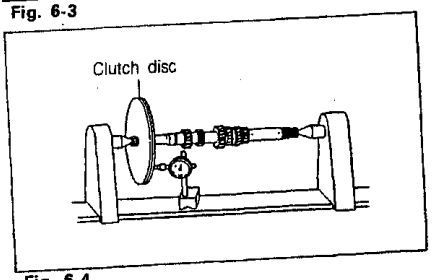


Fig. 6-4

Release bearing

1. Check for release bearing for smooth turning. Turn the release bearing while applying a force to the bearing by your hand in the thrust direction. Ensure that you feel no abnormal stiffness or binding.
2. Check the release bearing hub for damage or wear. Also, check to see if any damage or wear is present at the clip contact surface and the housing sliding section.

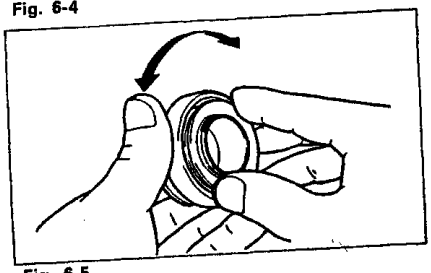


Fig. 6-5

Release bearing hub clip

1. Check for wear or damage.

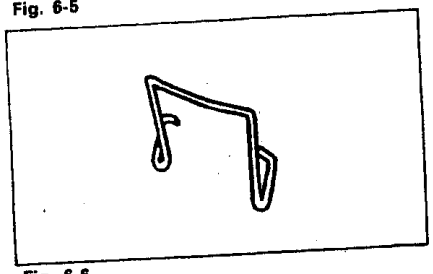


Fig. 6-6

Input shaft front bush replacement

1. Using a screw extractor, remove the bush.
2. Remove the rear end felt of the crankshaft.

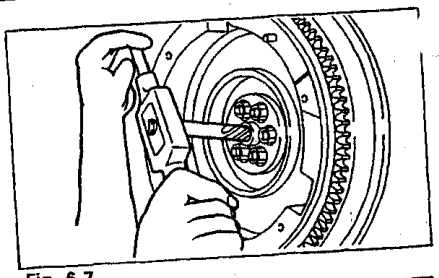


Fig. 6-7

3. Install the bush, using the following SST given below.
   SST: Water pump bearing remover
   09238-87201-000

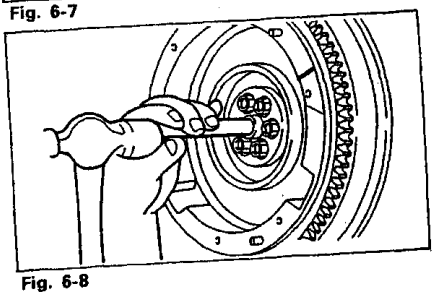


Fig. 6-8

INSTALLATION

Install the parts in numerical order shown in the figure below.

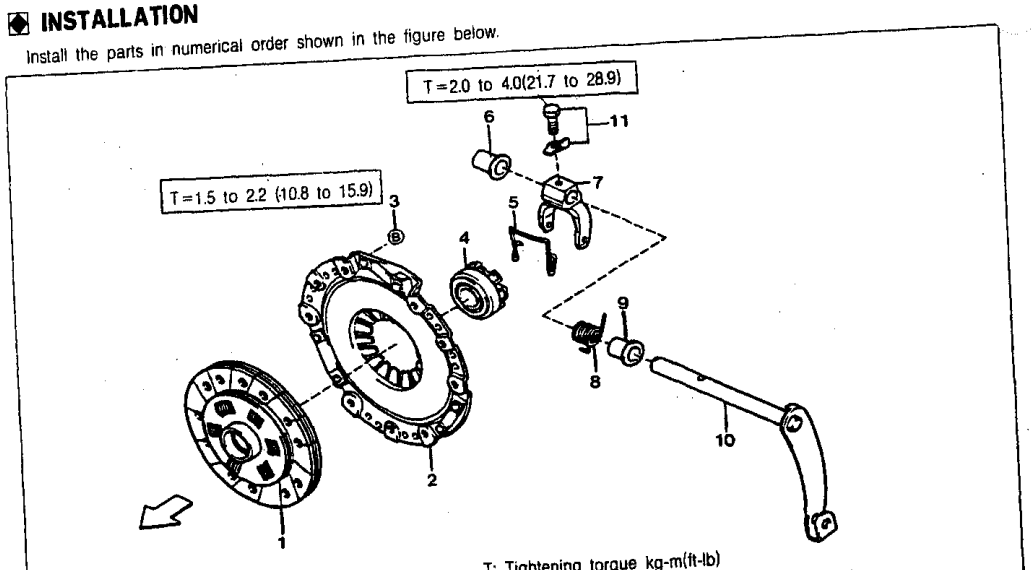


Fig. 6-9

1. Clutch disc Ay
2. Clutch cover Ay
3. Bolt
4. Clutch release bearing hub
5. Clutch release bearing clip
6. Bush
7. Clutch release lever yoke
8. Torsion spring
9. Bush
10. Clutch release lever S/A
11. Lock plate & bolt

Install the clutch disc and clutch cover, using the following SST given below.

SST: Clutch guide tool
09301-87701-000

NOTE

1. **Be certain to tighten the bolts evenly, starting with those bolts provided near the locating pin.**
2. **Apply a long life chassis grease to the clutch disc splined section.**

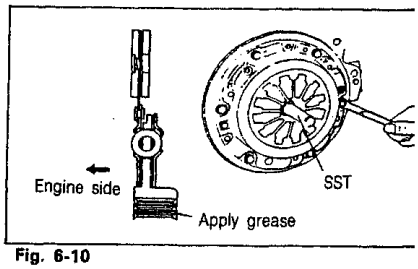


Fig. 6-10

Check the diaphragm spring tips for deviation in height with a thickness gauge and the following SST given below.

SST: Clutch diaphragm spring aligner tool set
09301-00012-000

Deviation in height:
Limit: 0.7mm(0.028 inch)

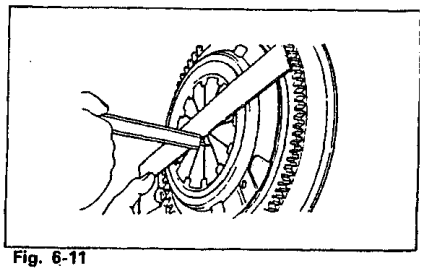


Fig. 6-11

If the deviation in height exceeds the specified limits, adjust the diaphragm spring tips with the following SST given below.

SST: Clutch diaphragm spring aligner tool set
09301-00012-000

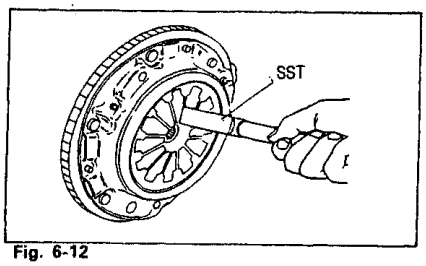


Fig. 6-12

Install the release lever yoke

NOTE

1. **Apply the MP grease to the release bearing hub and yoke contact surface.**
2. **Apply the MP grease to the release bearing and housing case contact surface.**

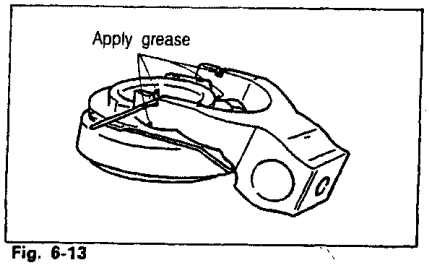


Fig. 6-13

CLUTCH PEDAL AND CLUTCH CABLE

REMOVAL

Remove the parts in numerical order shown in the figure below.

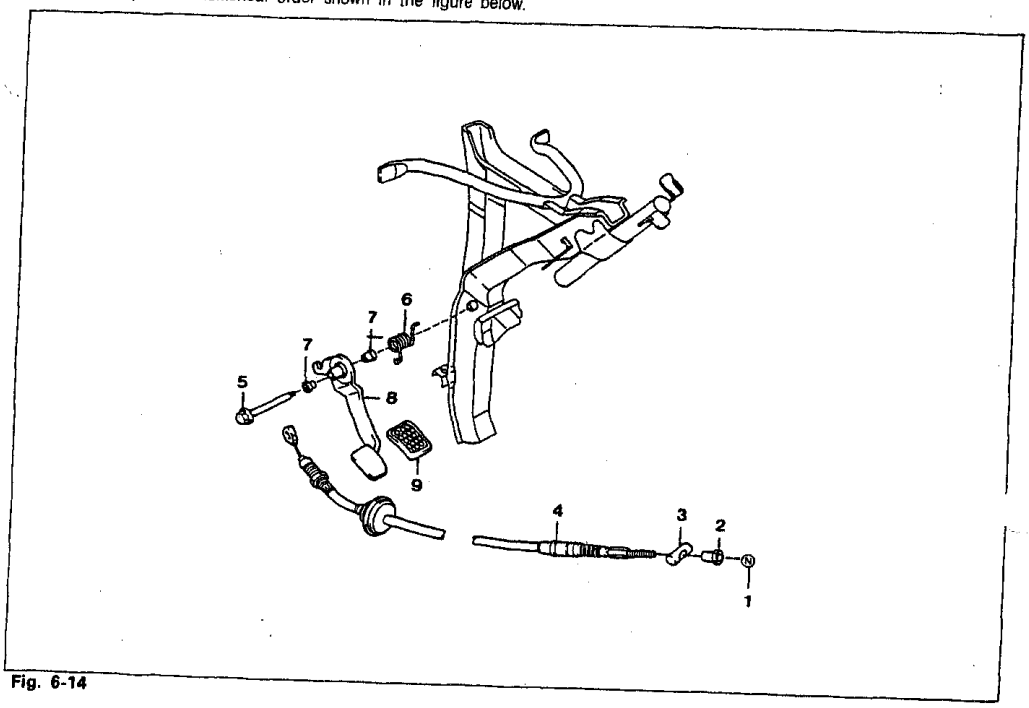


Fig. 6-14

1. Nut
2. Clutch cable adjusting nut
3. Clutch cable end hanger
4. Clutch release cable S/A
5. Clutch pedal shaft
6. Clutch pedal S/A with torsion spring
7. Bush
8. Clutch pedal S/A
9. Clutch pedal pad

◆ INSPECTION

Inspect the following parts. Replace any parts which exhibits defects.

Clutch pedal

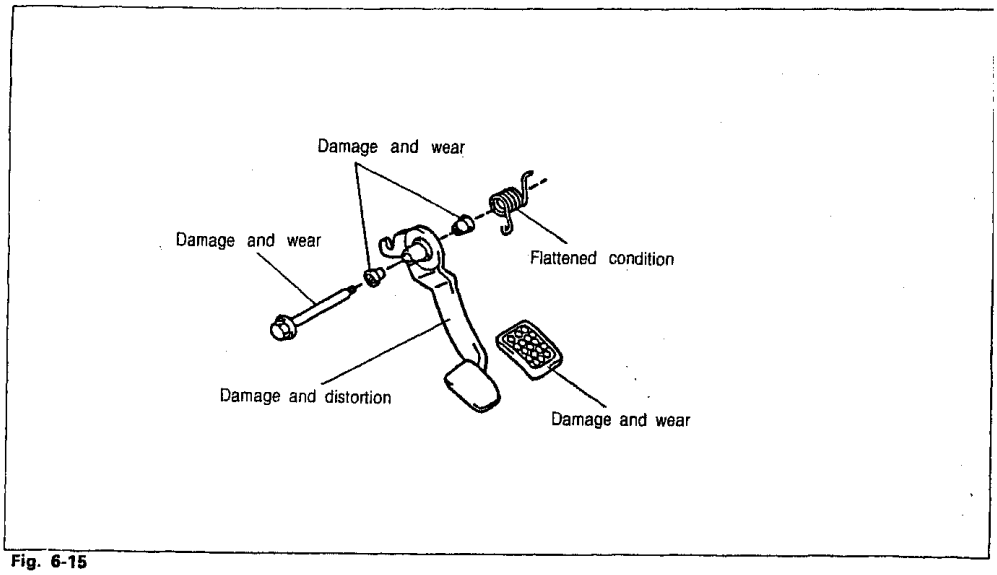


Fig. 6-15

Clutch cable

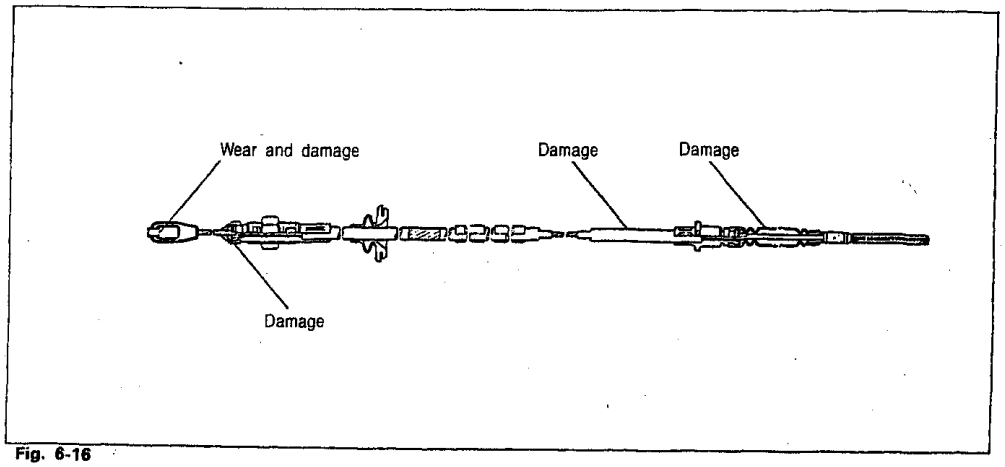


Fig. 6-16

◆ INSTALLATION

Install the parts in numerical order shown in the figure below.

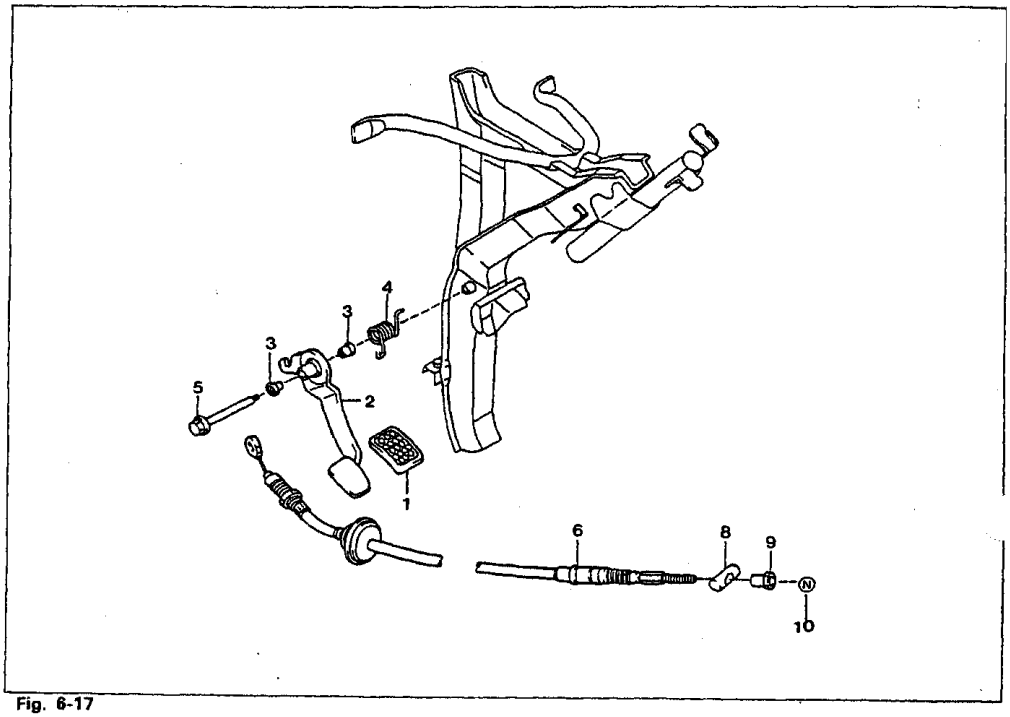


Fig. 6-17

1. Clutch pedal pad
2. Clutch pedal S/A
3. Bush
4. Clutch pedal S/A with torsion spring
5. Clutch pedal shaft
6. Clutch release cable S/A
7. Clamp
8. Clutch cable end hanger
9. Clutch cable adjusting nut
10. Nut

Clutch pedal adjustment

1. Pedal installation height
   Adjust the distance between the floor and the pedal pad upper surface's center to the specified value by means of the pedal support bolt.
   Pedal installation height: 125 to 135mm (4.921 to 5.315 inch)

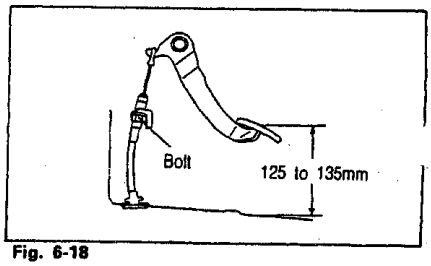


Fig. 6-18

2. Pedal free travel
   Pull the outer downward. Then, turn the adjusting nut until the pedal free travel complies with the specifications.
   Approximate free travel:
   15 to 25mm(0.591 to 0.984 inch)

NOTE

If the adjusting nut exceeds the range indicated in the right figure during the pedal free travel adjustment, perform the adjustment by means of the inner cable at the release lever side.

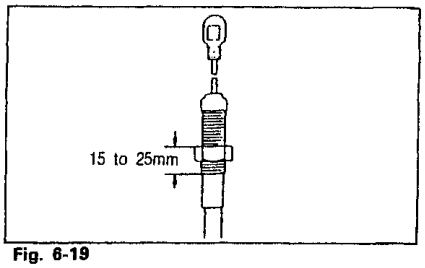


Fig. 6-19

3. Push the tip-end of the release lever forward by your hand. Turn the inner cable adjusting nut so that the amount of the release lever movement complies with the specifications.
   Play at release lever tip-end:
   2.0 to 3.0mm(0.079 to 0.018 in)

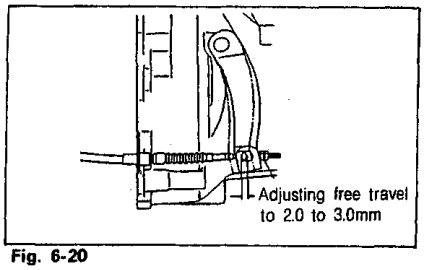


Fig. 6-20

Pedal free travel: 25 to 35mm(0.984 to 1.378 inch)
Pedal reverse travel: not less than 70mm(2.756 inch)
[Distance between the point where clutch is disengaged and vertical line of stopper]

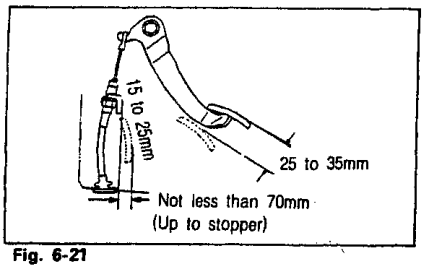


Fig. 6-21

TRANSMISSION 7

TRANSMISSION TOP COVER

STRUCTURAL VIEW

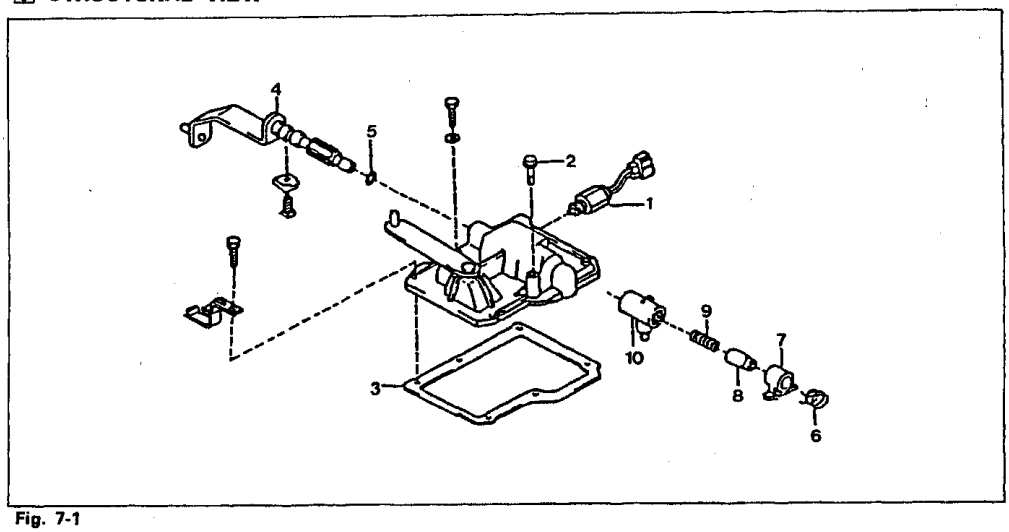


Fig. 7-1

1. Back-up lamp switch Ay
2. Bolt
3. Transmission case cover gasket
4. Shift lever shaft S/A
5. "O" ring
6. Compression spring
7. Reverse gate
8. Shift lever stopper
9. Compression spring
10. Inner shift lever

DISASSEMBLY

1. Remove the back-up lamp switch Ay.
2. Remove the gasket.

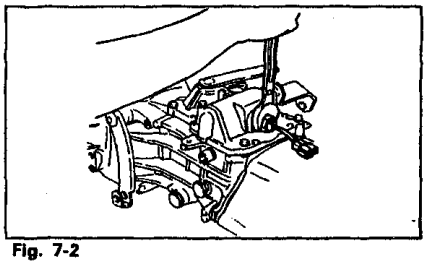


Fig. 7-2

3. Remove the bolt with washer.

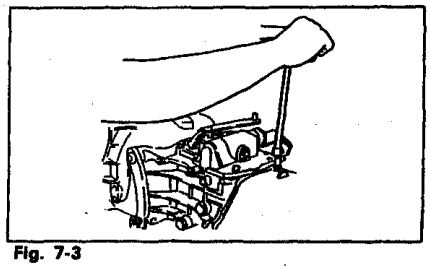


Fig. 7-3

4. Remove the bolt(One reamer bolt of 25mm(0.984 in.)). (25×1/reamer bolt)
5. Remove the washer ring and harness clamp.
6. Remove the transmission cover gasket.

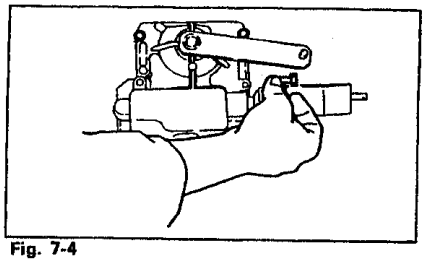


Fig. 7-4

7. Set bolt (For shift lever shaft S/A)
   Remove the key of the lock washer with ⊖ screwdriver and then loosen the set bolt, using a spanner.
8. Remove the lock washer.

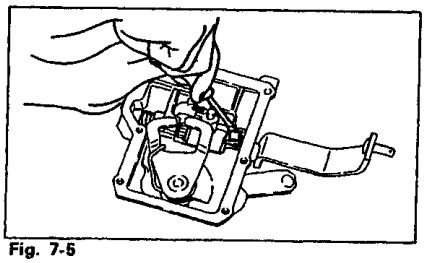


Fig. 7-5

9. Remove the shift lever shaft S/A by turning left and right.
10. Remove the "O" ring.

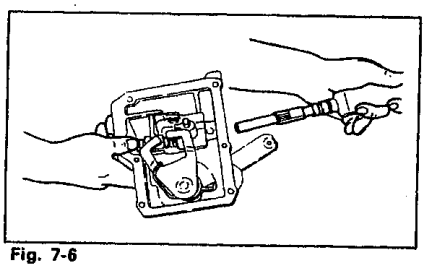


Fig. 7-6

Fix the select lever arm and case cover by a piece of wire to work easily.

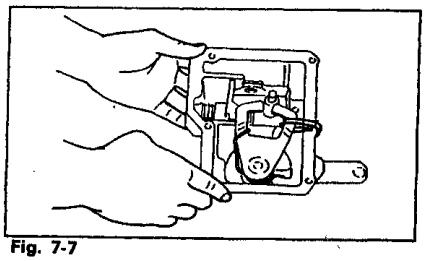


Fig. 7-7

11. Remove the compression spring.
    Remove the reverse gate.

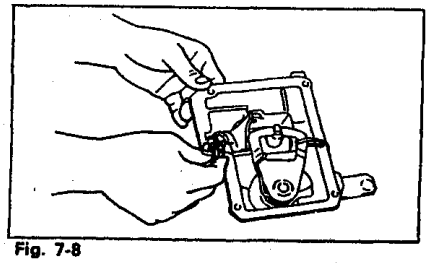


Fig. 7-8

12. Remove the reverse gate with control shift lever stopper.

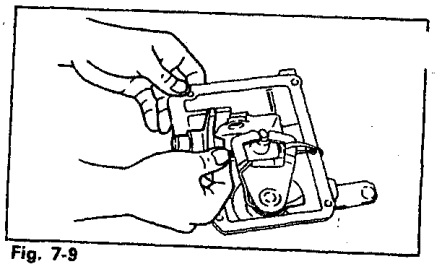


Fig. 7-9

13. Remove the control shift lever stopper from the reverse gate.

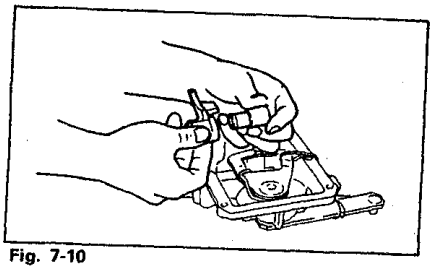


Fig. 7-10

14. Remove the compression spring.

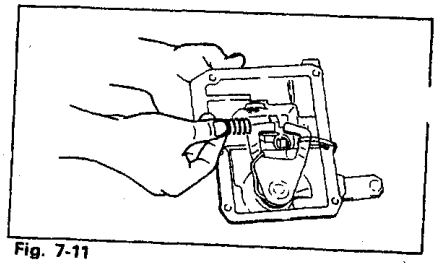


Fig. 7-11

15. Remove the inner shift lever.
16. Remove the transmission case cover S/A.

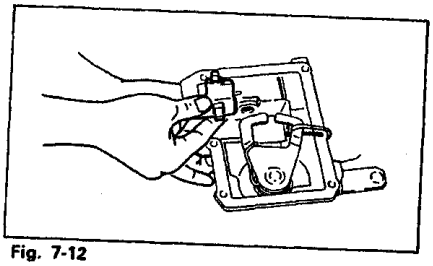


Fig. 7-12

◆ INSPECTION

Check each parts for abnormal wear and damage.
Replace any parts which exhibit defects.

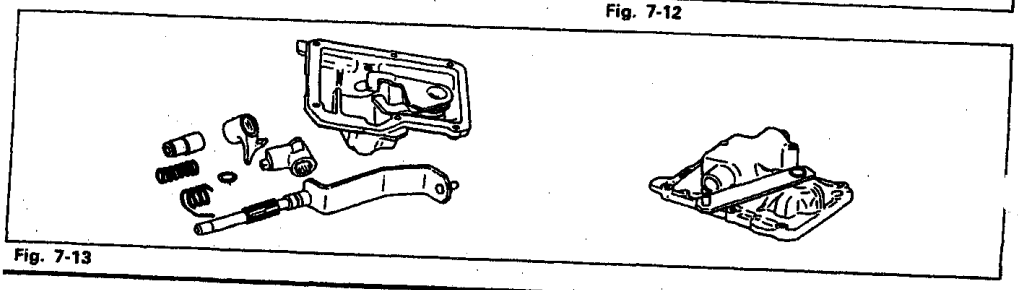


Fig. 7-13

◆ ASSEMBLY

1. Assemble the transmission top cover Ay according to the following order.
2. Assemble the inner shift lever.
3. Assemble the compression spring.
4. Assemble the control shift lever stopper.
5. Assemble the reverse gate.
   Assemble each parts numbered ② to ⑤ in the top cover by the numbered order and fix them loosely not to seperate each parts inserting a bar, etc.

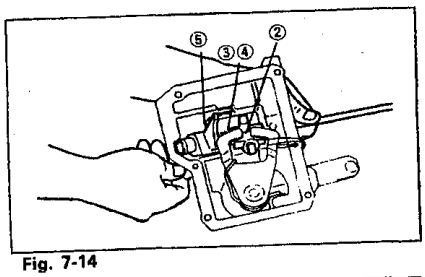


Fig. 7-14

6. Insert a spring like the way shown in the figure and fix it with a driver.

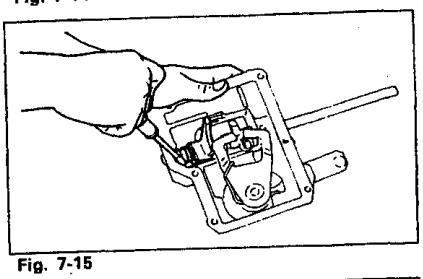


Fig. 7-15

7. Install the "O" ring.
   Use new "O" ring.

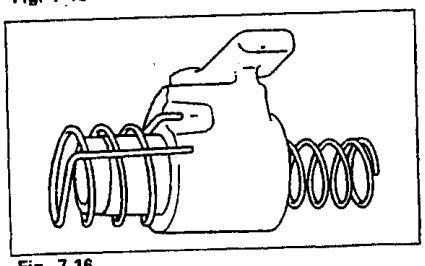


Fig. 7-16

8. Assemble the shift lever shaft S/A.
   Pull out the inserted bar in the above (5) and install the shaft slowly.

NOTE

Assemble the cutted part of the shaft, with facing toward the lower part of the case cover. (saperate the wire fixing the arm of shift lever after assembling the shaft.)

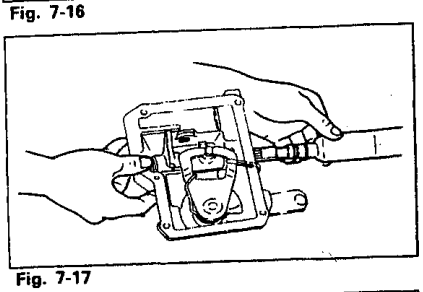


Fig. 7-17

9. Install the lock washer.
   Assemble a new lock washer.
10. Tighten the set bolt.
    With turned one fourth, tighten the lock washer after tightening a bolt to shift lever shaft.

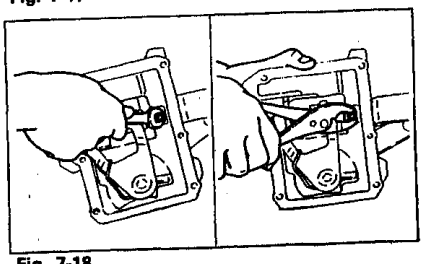


Fig. 7-18

11. Assemble the new gasket of transmission top cover.
12. Install the washer ring and harness clamp.
13. Tighten the hexagon bolt to the specified torque (25×1/reamer bolt).
    Tightening torque: 0.7 to 1.0kg-m

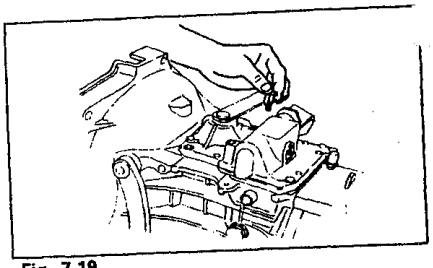


Fig. 7-19

14. Tighten the bolt with washer to the specified torque.
    Tightening torque: 0.7 to 1.0kg-m

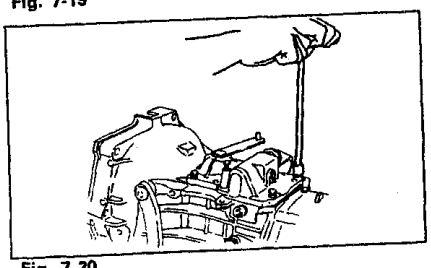


Fig. 7-20

15. Assemble the gasket.
    NOTE: Do not reuse the old gasket.
16. Install the back-up lamp switch.
    Clean the thread section of switch and apply the bond.
    Tightening torque: 3.0 to 5.0kg-m

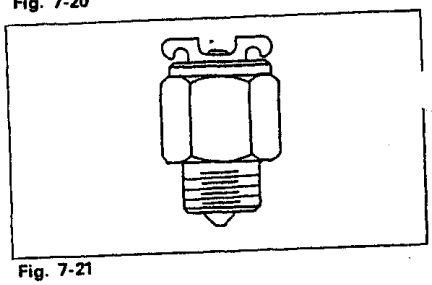


Fig. 7-21

TRANSMISSION FRONT COVER

STRUCTURAL VIEW

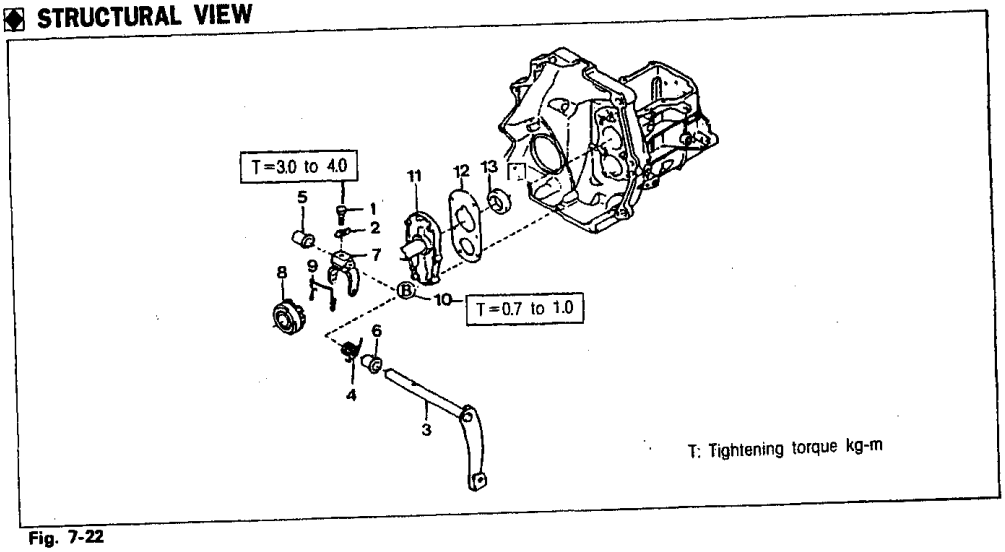


Fig. 7-22

1. Bolt
2. Lock washer
3. Clutch release lever S/A
4. Torsion spring
5. Bush
6. Bush
7. Clutch release lever yoke
8. Clutch release bearing hub S/A
9. Release bearing hub clip
10. Bolt with washer
11. Front cover
12. Front cover gasket
13. Oil seal of S type

DISASSEMBLY

1. Remove the bolt.
   Unfasten the key of lock washer with a ⊖ screwdriver and then loosen the bolt.
2. Remove the lock washer.

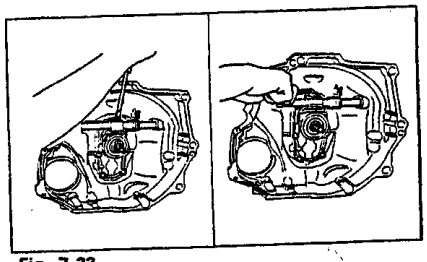


Fig. 7-23

3. Remove the clutch release lever S/A.
   Remove the torsion spring carefully not to be free.

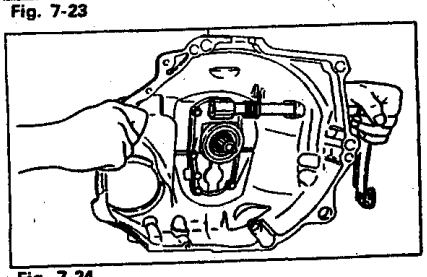


Fig. 7-24

4. Remove the torsion spring.

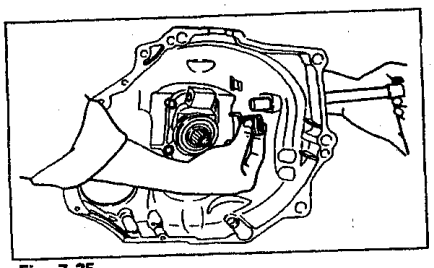


Fig. 7-25

5, 6. Remove the bushing.

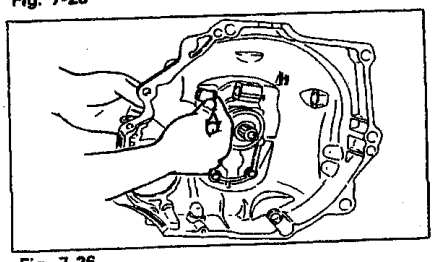


Fig. 7-26

7. Remove the clutch release lever yoke.
   Remove the clutch release bearing hub S/A with release bearing clip.
8. Remove the clutch bearing hub S/A.

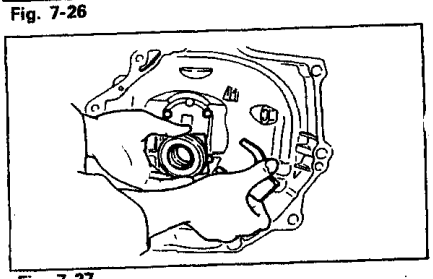


Fig. 7-27

9. Remove the release bearing hub clip spring.
   Remove the release bearing from the hub after confirming the direction of assembly.
10. Remove the bolt with washer.

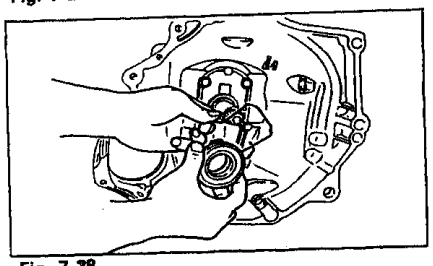


Fig. 7-28

11. Remove the front cover.
    Remove the front cover by lightly tapping with a hammer.
12. Remove the front cover gasket.
13. Remove the oil seal of S-type.
    Remove the oil seal, turning lightly it with a ⊖ screwdriver.

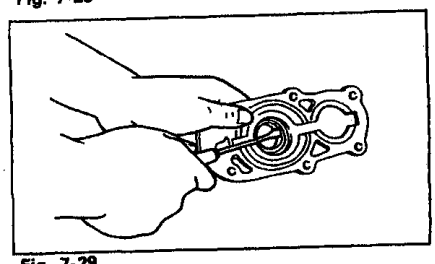


Fig. 7-29

INSPECTION

Check the lip section of the oil seal and the sliding section of the clutch release hub for wear and damage.

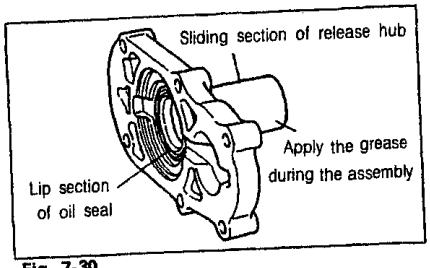


Fig. 7-30

ASSEMBLY

1. Install a new oil seal of S-type, using the SST.
   SST: Rear axle bearing outer replacer 09515-87201-000

   NOTE: Apply the gear oil to the lip section.
2. Assemble the front cover gasket.
3. Assemble the front cover.
4. Assemble the bolt with washer. Use a new bolt.
   Tightening torque: 0.7 to 1.0kg-m

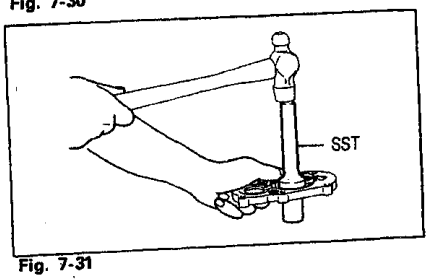


Fig. 7-31

5. Assemble the release bearing hub clip and spring.
6. Apply the grease to the inside around of the clutch release bearing and hole as well.
7. Install the clutch release yoke.
   Apply the grease to the sliding section of the yoke.
   Assemble the (5)~(7) of the above ready-made things.

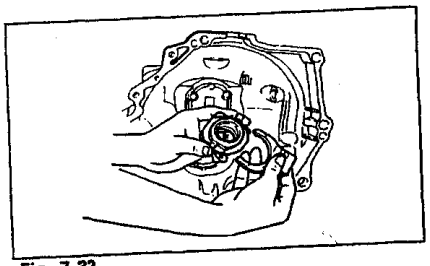


Fig. 7-32

8, 9. Assemble the bushing.
   Apply the grease to the inside of the bushing.
10. Assemble the torsion spring.

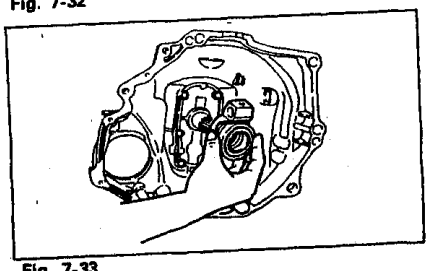


Fig. 7-33

11. Assemble the clutch release fork lever S/A.
12. Assemble the lock washer.
    Tighten confirmly it after attaching the lock washer.
13. Tighten the bolt with the specified torque.
    Tightening torque: 3.0 to 4.0kg-m

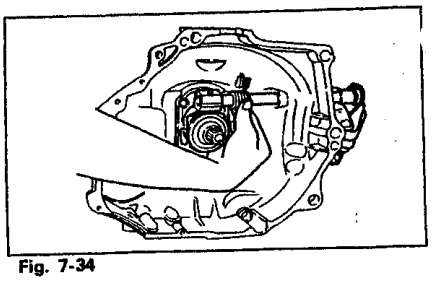


Fig. 7-34

SHIFT MECHANISM

STRUCTURAL VIEW

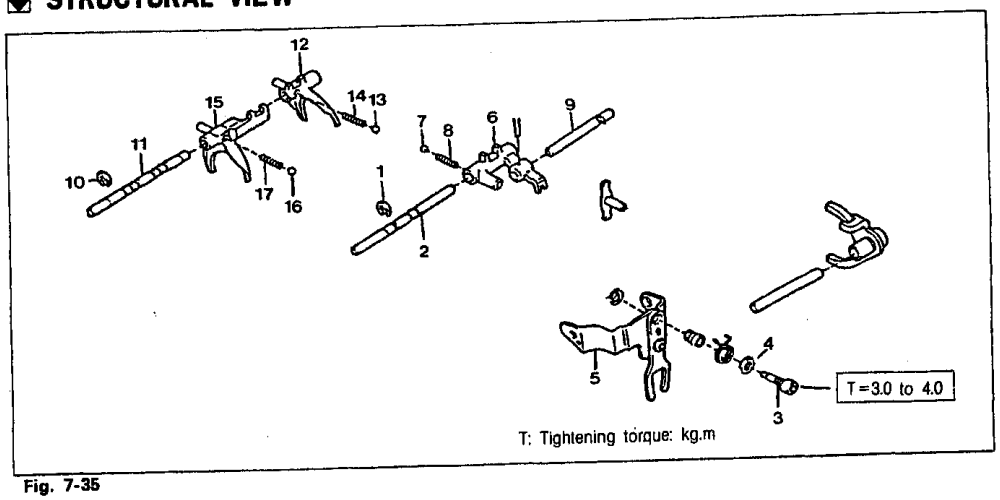


Fig. 7-35

1. ⑮. "E" ring
2. ⑭. 5th & reverse shift fork shaft
3. ⑰. Shift arm pivot
4. ⑯. Washer
5. ⑬. Reverse shift plate S/A
6. ⑩. Reverse shift yoke
7. ⑫. Ball
8. ⑪. Compression spring
9. ⑨. Gear shift lever shaft
10. ⑧ "E" ring
11. ⑦. 1st to 4th shift fork shaft
12. ⑥. 1st & 2nd shift fork
13. ⑤. Ball
14. ④. Compression spring
15. ③. 3rd & 4th shift fork
16. ②. Ball
17. ①. Compression spring

NOTE

No. 1 to 17 are reference number at disassembly. No. ① to ⑰ are reference number at assembly.

DISASSEMBLY

1. Remove the "E" ring with a nose plier.

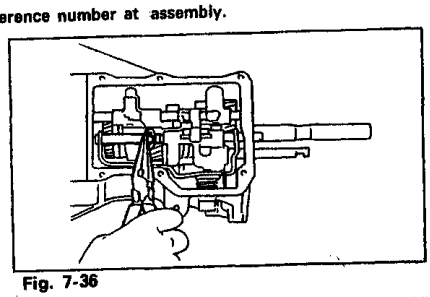


Fig. 7-36

2. Remove the 5th & reverse shift fork shaft.
   Lightly tap the shaft from the front, using a brass bar.

NOTE
Be careful not to lose the ball and the compression spring from the reverse shift fork.

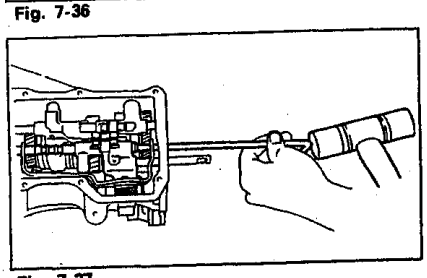


Fig. 7-37

3. Remove the shift arm pivot, using a torque wrench for size of 10mm.
4. Remove the gasket.

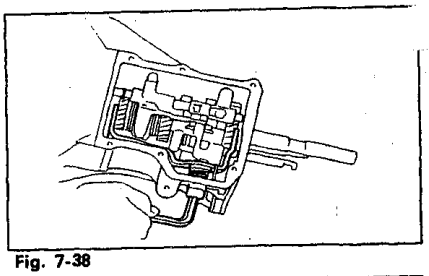


Fig. 7-38

5. Remove the reverse shift plate S/A with the reverse shift fork S/A from the case.

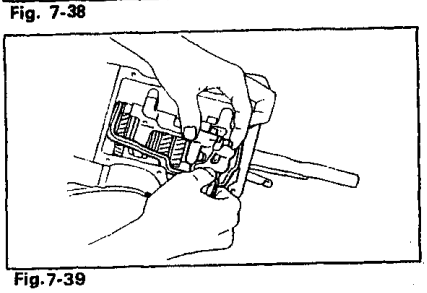


Fig. 7-39

6. Remove the reverse shift tank.
   Remove the shift fork which is drawn out from the case.

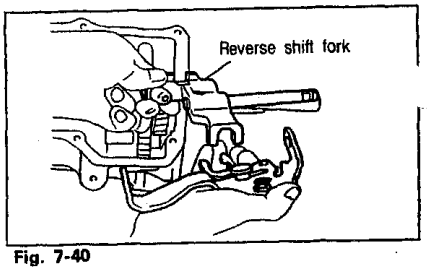


Fig. 7-40

7. Remove the ball.
8. Remove the compression spring.

   Remove the No. 7 and 8 Fig. 7-35 from the reverse shift fork at the same time.

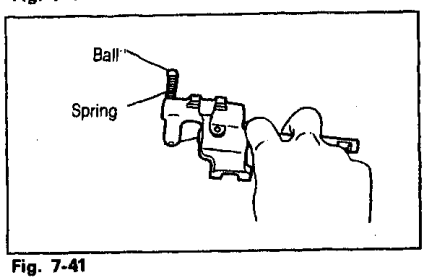


Fig. 7-41

9. Remove the gear shift lever shaft.

   Fix the gear shift lever shaft to a vice and remove the spring pin from the reverse shift fork, using the punch.

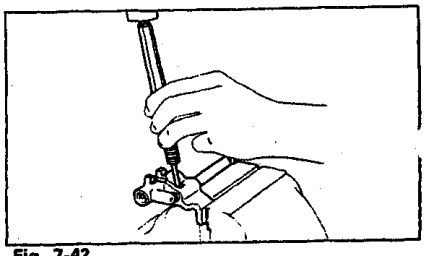


Fig. 7-42

Remove the gear shift lever shaft after pulling out the spring pin.

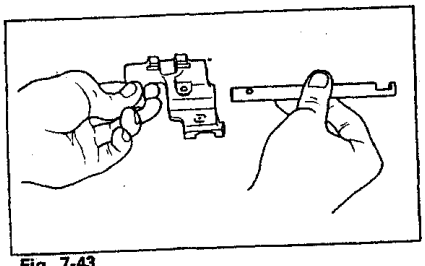


Fig. 7-43

10. Remove the "E" ring, using a nose plier.

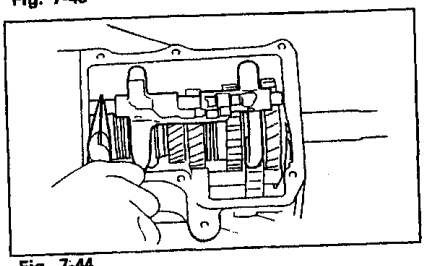


Fig. 7-44

11. Remove 1st from 4th shift fork shaft.
    Lightly tap the shaft from the front, using a brass bar.

NOTE

Be careful not to lose the ball and the compression spring from the 1st and 2nd/3rd and 4th shift fork.

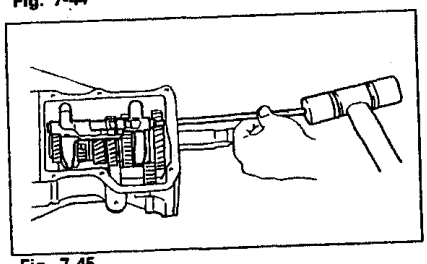


Fig. 7-45

12. Remove the 1st and 2nd shift fork.
13. Remove the ball.
    Remove the compression spring.
14. Remove the No. 13 and 14 in Fig. 7-35 from the 1st and 2nd shift fork at the same time.

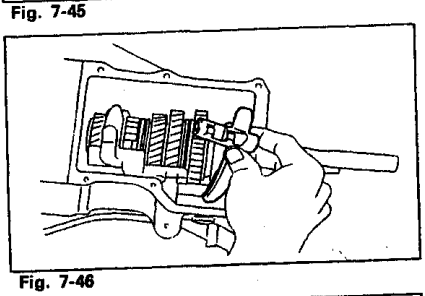


Fig. 7-46

15. Remove the 3rd and 4th shift fork.
16. Remove the ball.
17. Remove the compression spring.
    Remove the No. 16 and 17 in Fig. 7-35 from the 3rd and 4th shift fork at the same time.

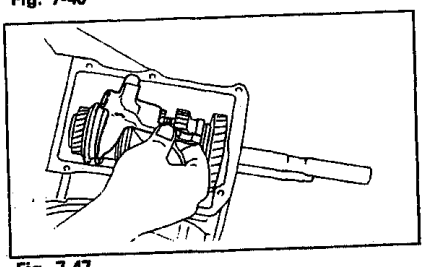


Fig. 7-47

INSPECTION

Check each part for abnormal wear and damage. Replace any parts which exhibit defects.

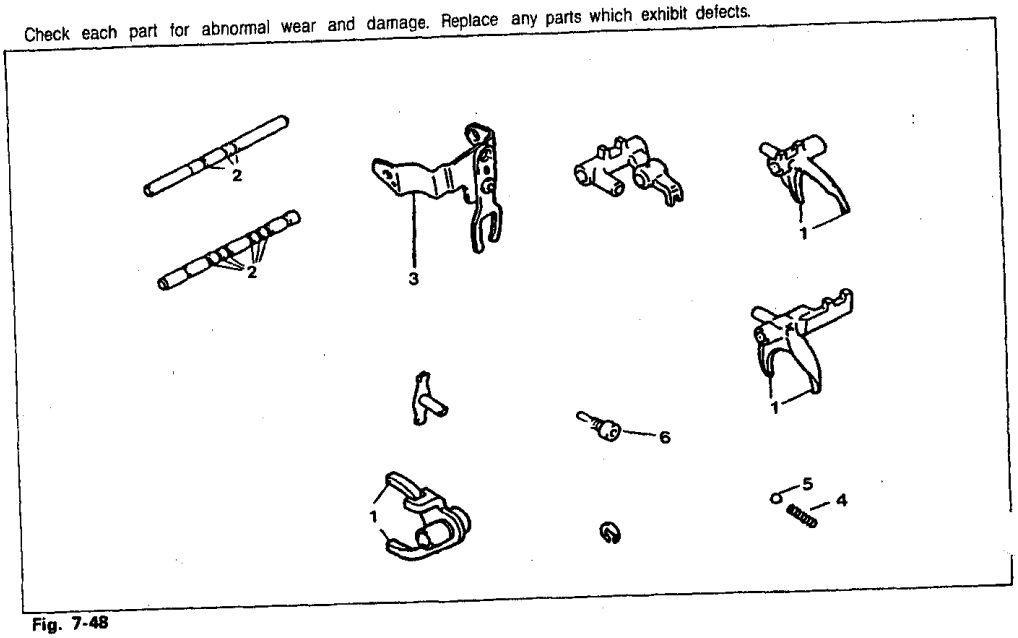


Fig. 7-48

1. Sliding contact surface
2. Shaft with ball groves
3. Reverse shift arm
4. Spring
5. Ball
6. Pivot

ASSEMBLY

1. Assemble the compression spring.
2. Assemble the ball.
3. Assemble the 3rd and 4th shift fork.
   Insert and assemble the ① and ② in Fig. 7-35 to the shift fork, using the SST(Special Service Tool).

   SST: Shift fork shaft guide
   09339-87501-000

   1) Align the hole of the SST proper with the ball hole of the shift fork. Then, insert the spring and ball into position.
   2) Push the ball by means of a pushing rod (a fine screwdriver or the like). While the SST proper is being turned, pull out the pushing rod so as to settle the ball in place.
   3) Next, insert the piece of the SST into position. Hold the ball in such a way that the SST proper may be pushed out. Then, take out the SST proper.

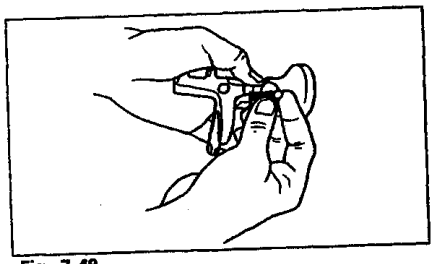


Fig. 7-49

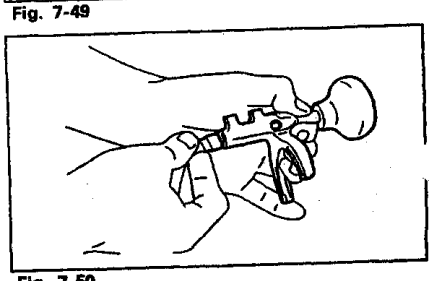


Fig. 7-50

14. Tap and insert the brass bar into the back of the reverse shift fork shaft and 5th fork shaft and assemble it with the same way of the above No. 7.

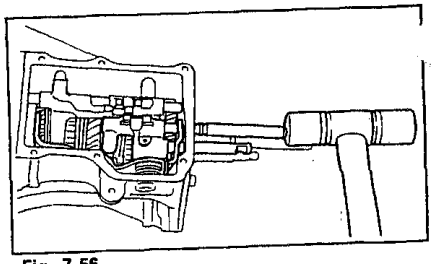


Fig. 7-56

15. Assemble the "E" ring.
NOTE: Do not use the old "E" ring.

16. Assemble the gasket.
NOTE: Do not use the old "E" ring.

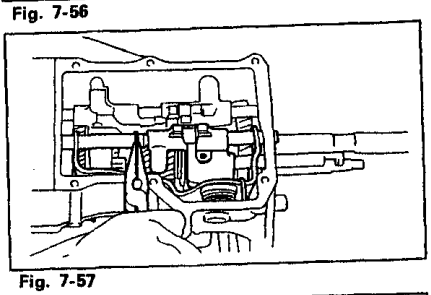


Fig. 7-57

17. Assemble the shift arm pivot.
Tighten it to specified torque with torque wrench for size of 10mm.

Tightening torque: 3.0 to 4.0kg-m

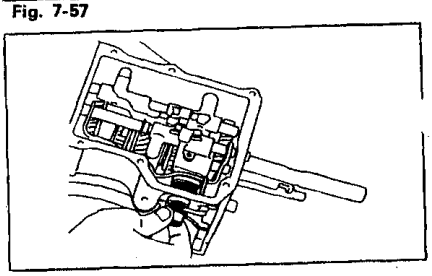


Fig. 7-58

14. Tap and insert the brass bar into the back of the reverse shift fork shaft and 5th fork shaft and assemble it with the same way of the above No. 7.

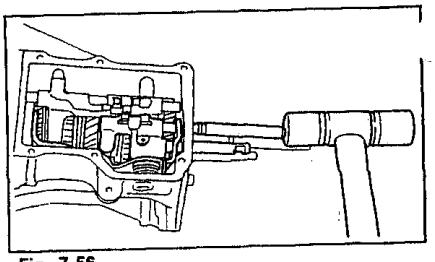


Fig. 7-56

15. Assemble the "E" ring.
NOTE: Do not use the old "E" ring.

16. Assemble the gasket.
NOTE: Do not use the old "E" ring.

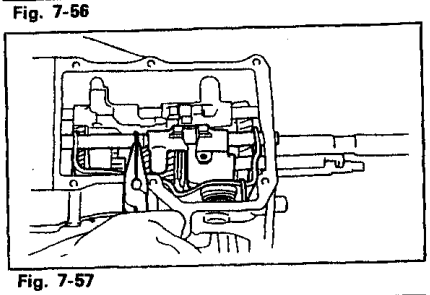


Fig. 7-57

17. Assemble the shift arm pivot.
Tighten it to specified torque with torque wrench for size of 10mm.

Tightening torque: 3.0 to 4.0kg-m

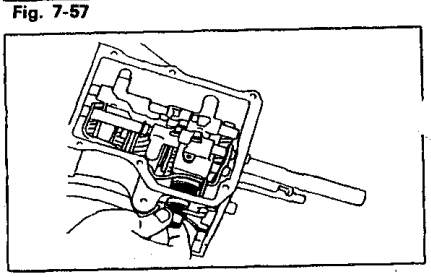


Fig. 7-58

TRANSMISSION GEAR

STRUCTURAL VIEW

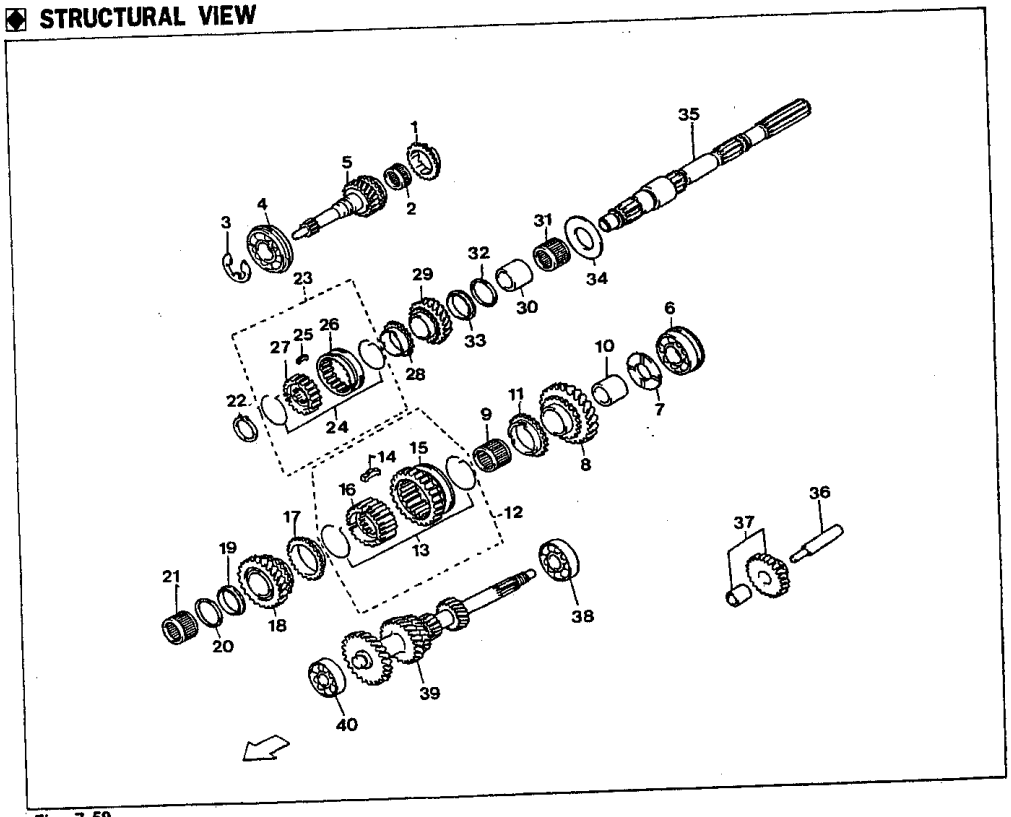


Fig. 7-59

1. ㊵. Synchronizer ring
2. ㊴. Needle roller bearing
3. ㊳. "E" ring
4. ㊲. Bearing
5. ㊱. Input shaft
6. ㊺. Radial ball bearing
7. ㉞. Thrust washer
8. ㉝. 1st gear
9. ㉜. Needle roller bearing
10. ㉛. 1st gear bearing inner race
11. ㉚. Synchronizer ring
12. ㉙. 13 ㉘~16 ㉕ Ay
13. ㉖. Synchromesh shifting key spring
14. ㉗. Synchromesh key No. 1
15. ㉖. Reverse gear
16. ㉕. Transmission clutch hub, No. 1
17. ㉔. Synchronizer ring
18. ㉓. 2nd gear
19. ⑦. Friction damper(For 2nd gear)
20. ⑧. Plain washer
21. ⑨. Needle roller bearing
22. ㉒. Snap ring
23. ㉑. 24 ⑳~27 ⑰ Ay
24. ⑳. Synchromesh shift key spring
25. ⑲. Synchromesh shift key, No.2
26. ⑱. Transmission hub sleeve
27. ⑰. Transmission clutch hub, No. 2
28. ⑯. Synchronizer ring
29. ⑮. 3rd gear
30. ⑪. 3rd gear bearing inner race
31. ⑭. Needle roller bearing
32. ⑬. Plain washer
33. ⑫. Friction damper(For 3rd gear)
34. ⑩. Thrust washer
35. ⑥. Output shaft
36. ⑤. Reverse idler shaft
37. ④. Reverse idler gear gear S/A
38. ③. Radial ball bearing
39. ②. Counter shaft S/A
40. ①. Radial ball bearing

NOTE

No. 1 to 40 are reference number at disassembly. No. ① to ㊵ are reference number at assembly.

◆ DISASSEMBLY

Remove the input shaft S/A(No. 3 to 5 in Fig.7-59), using the following SST, given below.

SST: Main drive gear puller attachment
09912-87501-000
SST: Puller slide hammer
09913-87501-000

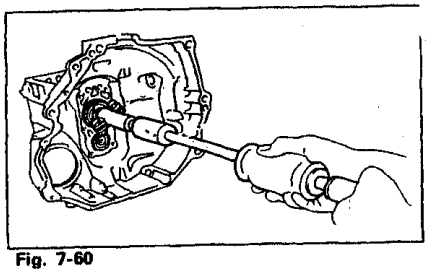


Fig. 7-60

1. After removing the No. 3 to 5 in Fig. 7-59, remove the synchronizer ring from the case.
2. Remove the needle roller bearing from the input shaft.

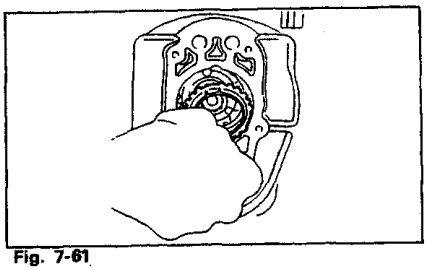


Fig. 7-61

3. Remove the "E" ring with a ⊖ screwdriver.

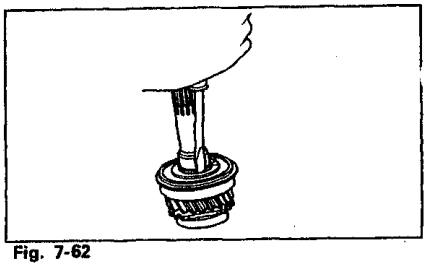


Fig. 7-62

4. Remove the radial ball bearing, using the counter gear bearing puller.
   SST: Counter gear bearing puller
   09602-87301-000
5. Remove the input shaft.

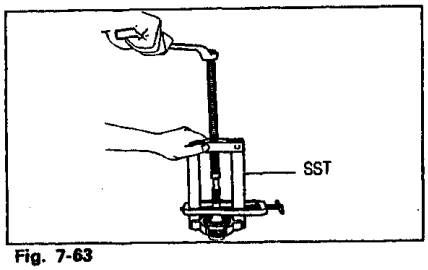


Fig. 7-63

6. Remove the radial ball bearing, using the following SST given below.

   SST: 09602-87301-000
   Counter gear bearing puller

   Lightly tap the output shaft from thr rear as well as from the front, using a wooden hammer. Thus slightly float the bearing ring from the case.
   When the SST is employed, insert a screwdriver or the like between the front of the output shaft and the case. In this way, prevent the output shaft from moving forward.

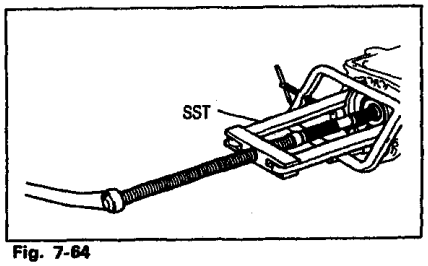


Fig. 7-64

7. Remove the thrust washer.

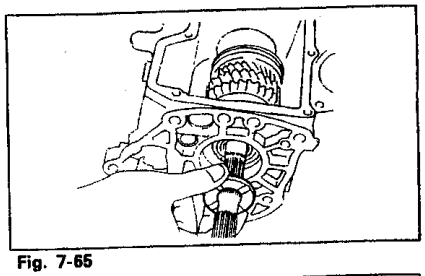


Fig. 7-65

Take out the output shaft and gears installed in output shaft from the transmission case.

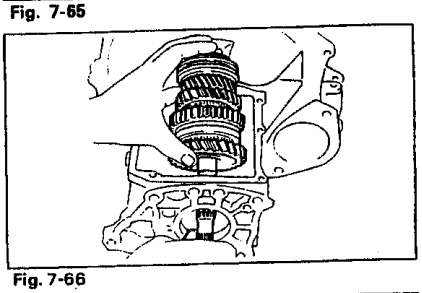


Fig. 7-66

8. Remove the 1st gear.
9. Remove the needle roller bearing.

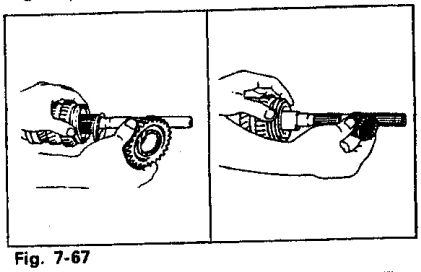


Fig. 7-67

10. Remove the 1st gear bearing inner race.
11. Remove the synchronizer ring.

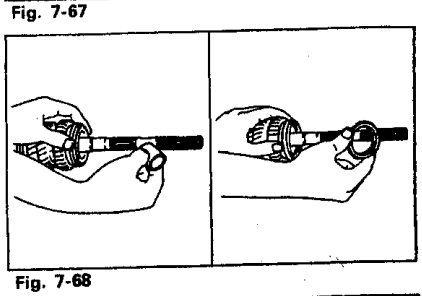


Fig. 7-68

12. Remove the No. 13 to 16 in Fig. 7-59 as a set.

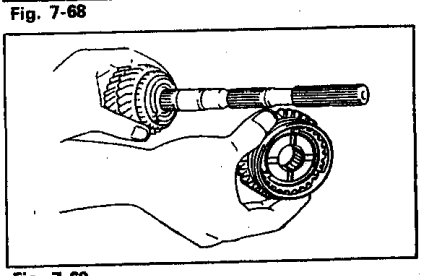


Fig. 7-69

13. Remove the synchromesh shift key spring.
14. Remove the synchromesh shift key.
15. Remove the reverse gear.
16. Remove the transmission clutch hub.

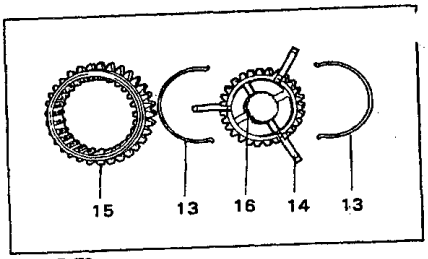


Fig. 7-70

17. Remove the synchronizer ring.
18. Remove the 2nd gear.

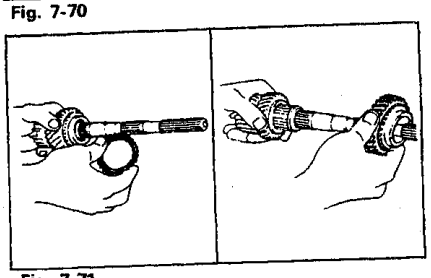


Fig. 7-71

19. Remove the friction damper for 2nd gear.
    Fix the shaft to a vice, tap lightly and remove with a ⊖ screwdriver.

NOTE
- **Do not reuse the friction damper.**
- **Be careful not to take place a scratch in shaft.**

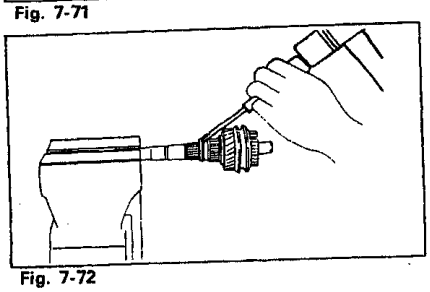


Fig. 7-72

20. Remove the plain washer.
21. Remove the needle roller bearing.

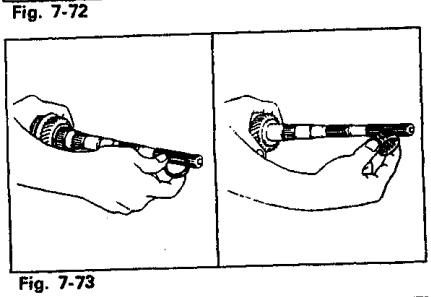


Fig. 7-73

22. Remove the shaft snap ring.

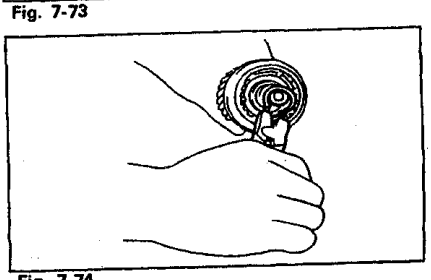


Fig. 7-74

23. Remove the No. 24 to 27 in Fig. 7-59 as a set.

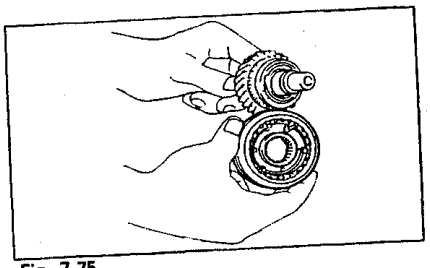


Fig. 7-75

24. Remove the synchromesh shift key spring.
25. Remove the synchromesh shift key.
26. Remove the transmission hub sleeve.
27. Remove the transmission clutch hub.

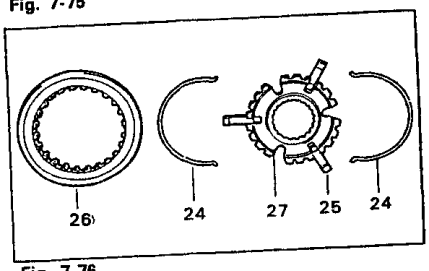


Fig. 7-76

28. Remove the synchronizer ring.
29. Remove the 3rd gear.

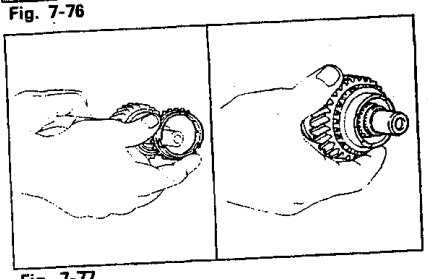


Fig. 7-77

30. Remove the 3rd gear bearing inner race and remove the No. 31 to 33 in Fig. 7-59 as a set.
31. Remove the needle roller bearing.

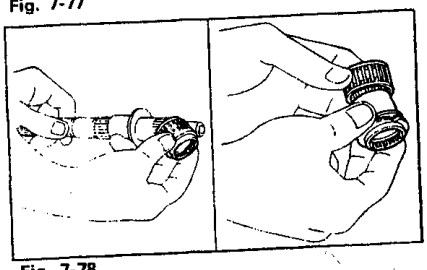


Fig. 7-78

32. Remove the plain washer.

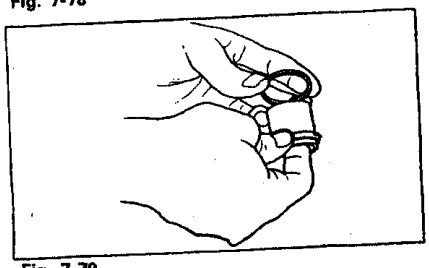


Fig. 7-79

33. Remove the friction damper for 3rd gear.
    Push the inner race with a friction damper into the shaft reversely, and then tap lightly and disassemble the friction damper with a ⊖ screwdriver after fixing the shaft to a vice.

NOTE
- **Be careful not to take place a scratch in inner race.**
- **Do not reuse the friction damper.**

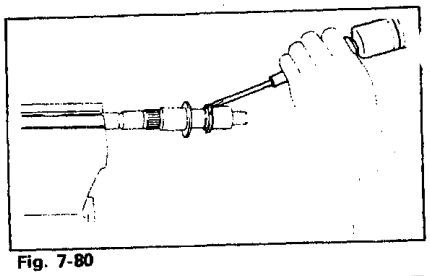


Fig. 7-80

34. Remove the thrust washer.
35. Remove the output shaft.

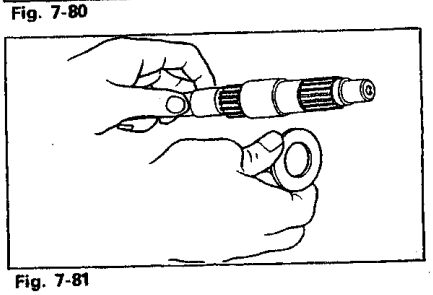


Fig. 7-81

36. Remove the reverse idler shaft.
37. Remove the reverse idler gear.

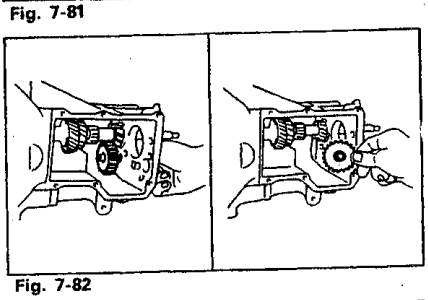


Fig. 7-82

38. Remove the radial ball bearing.
    Tap lightly the counter shaft S/A at the front and then remove the bearing with a special service tool after lifting slightly the bearing from the case.

    SST: Universal pulley
    09950-20014-000

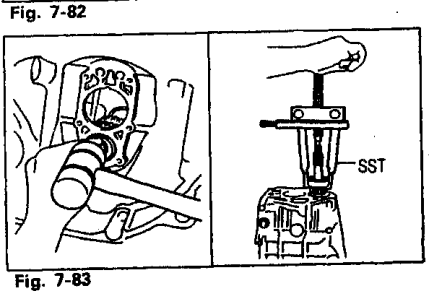


Fig. 7-83

39. Remove the counter shaft from the case.

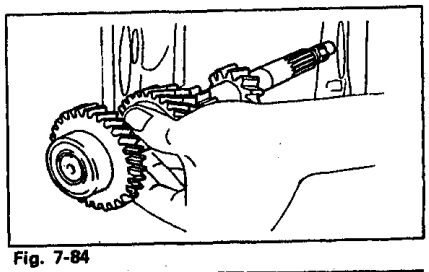


Fig. 7-84

40. Remove the radial ball bearing.
Remove it with a special service tool after fixing the shaft to a vice.

SST: Counter gear bearing puller
09334-87201-000

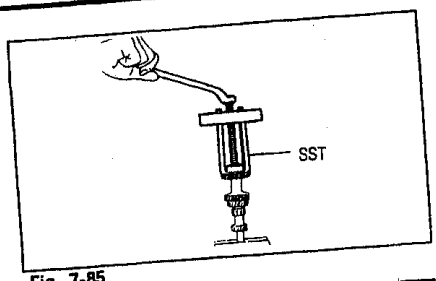


Fig. 7-85

◆ INSPECTION

Check each section for wear and damage.
Replace any parts which exhibit defects.

1. Shaft-related parts
1) Spline ①
2) Bearing inner race fitting section ②
3) Gear ③
4) Hub sleeve engaging section ④
5) Tapered section ⑤
6) Roller bearing race section ⑥

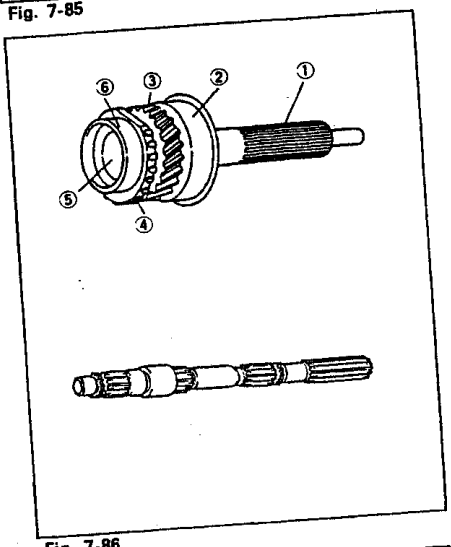


Fig. 7-86

7) Bend
Limit: 0.02mm(0.0008 inch)

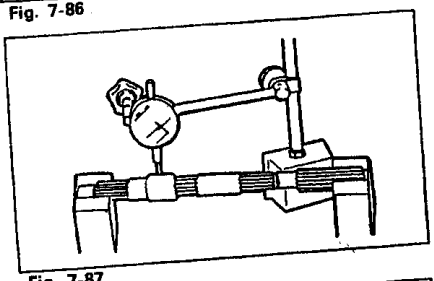


Fig. 7-87

2. Gear, bush & roller bearing
1) Tapered section ①
2) Spigot section ② fitting into hub sleeve
3) Gear teeth ③
4) Gear end surface ④
5) Gear inner surface ⑤
6) Inner race ⑥
7) Roller bearing ⑦

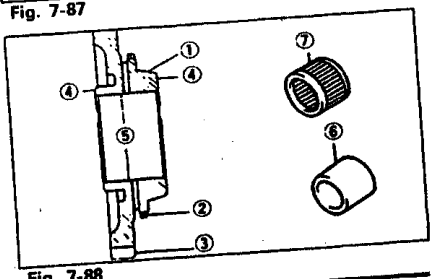


Fig. 7-88

3. Synchronizer ring

1) Hub sleeve contact section ①
2) Inner tapered section ②
3) Clearance ③ between synchronizer ring and gear closely fitted to each other

Each gear:

Specified clearance: 0.85 to 1.45mm (0.0334 to 0.057 inch)

Allowable limit of clearance: 0.5mm(0.0199 inch)

4) Braking action with gear.
Apply the gear oil to the gear tapered section. Turn the synchronizer ring which is firmly pressed against the gear by your hand. Ensure that no slipping takes place between the ring and the tapered section.

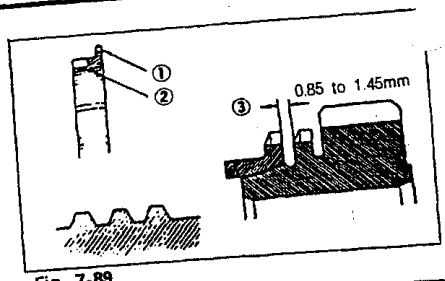


Fig. 7-89

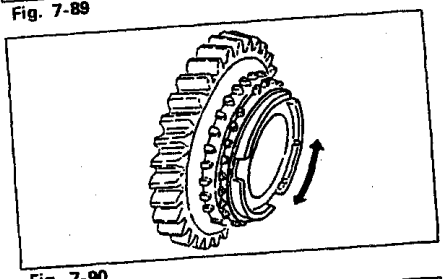


Fig. 7-90

4. Clutch hub & clutch hub sleeve and Reverse gear

1) Engaging section ① with gear
2) Spline section ②
3) Shifting key inserting groove ③
4) Shift fork contact section ④
5) Checking of sliding condition between hub and hub sleeve and sliding condition of reverse gear.

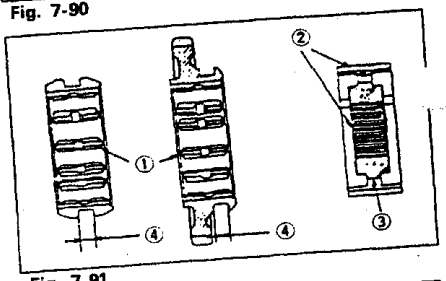


Fig. 7-91

5. Synchromesh shifting key & key spring.

1) Key projected portion ①
2) Key spring-to-key contact area
3) Checking key for wear ②

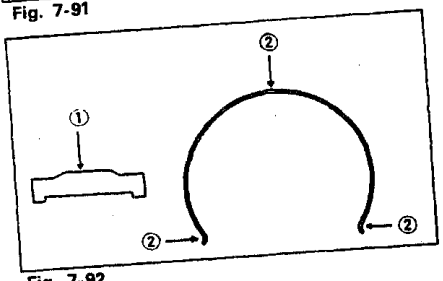


Fig. 7-92

6. Counter gear

1) Gear teeth ①
2) Spigot section fitting into bearing ②

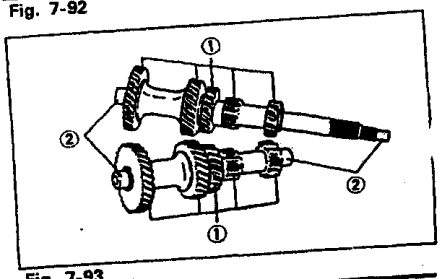


Fig. 7-93

7. Reverse idler gear and shaft

1) Gear teeth ①
2) Bush ②
3) Gear to reverse arm contact section ③
4) Shaft ④

8. Radial ball bearing

1) When pressing and rotating the ball of bearing by hand, it rotates smoothly and doesn't has any play.

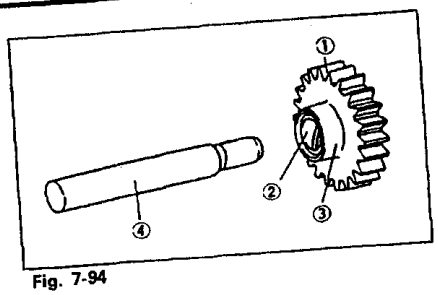


Fig. 7-94

9. Transmission case-related parts

1) Transmission case ①
2) Extension housing attaching section ②
3) Bearing inserting section ③
4) Shift fork shaft inserting hole ④

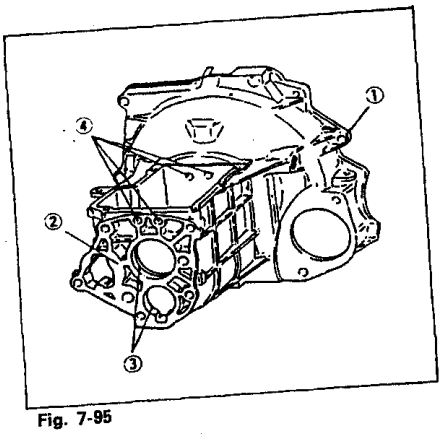


Fig. 7-95

◆ ASSEMBLY

1. Assemble the radial ball bearing to the counter shaft, using the following SST given below.
   SST: Counter shaft front bearing replacer
   09310-87301-000
2. Assemble the counter shaft S/A.

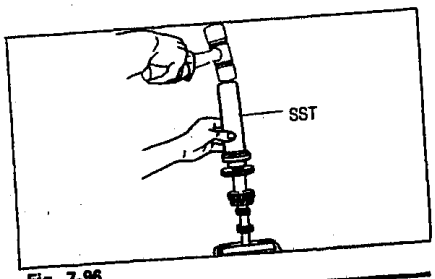


Fig. 7-96

3. Assemble the radial ball bearing.
   Assemble the counter shaft to case and assemble the bearing with a special service tool.
4. Assemble the reverse idler gear.

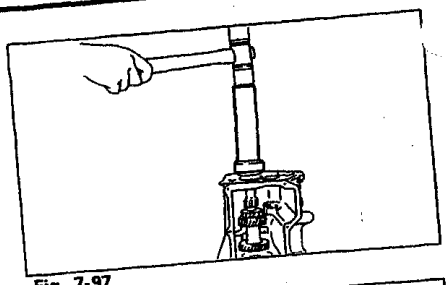


Fig. 7-97

5. Install the reverse idler shaft.
   Assemble the shaft after assembling the idler gear in the case.
6. Assemble the output shaft.

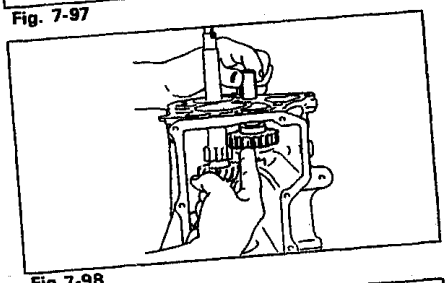


Fig.7-98

7. Assemble the friction damper for 2nd gear.
   Assemble the friction damper to the shaft by hand and then apply pressure with a press slowly, using the special service tool.

   SST: Friction damper replacer
   09309-87503-000

NOTE
Use a new friction damper, and be careful not to mistake a pressing direction.

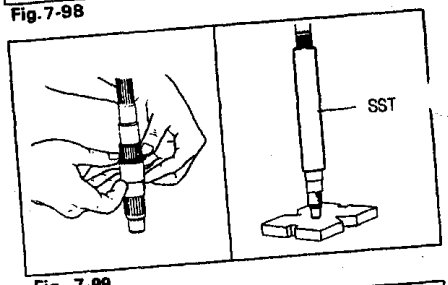


Fig. 7-99

How to assemble the friction damper

1) How to press
   The tilting angle of the friction damper will be within 30° to the upright axle angle.
2) How to apply the grease

Application position:
Apply the inner lip by secting by 5
Amount of application:
5 positions of ϕ 11×10mm(about 0.2g)
Kind of oil: MP grease

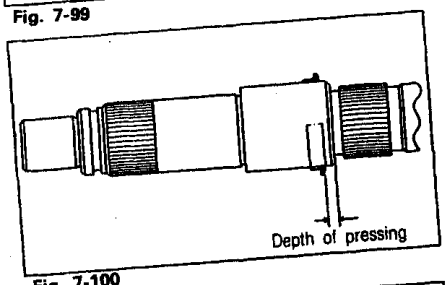


Fig. 7-100

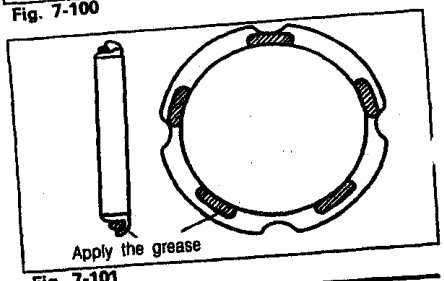


Fig. 7-101

8. Assemble the plain washer.
9. Assemble the needle roller bearing.

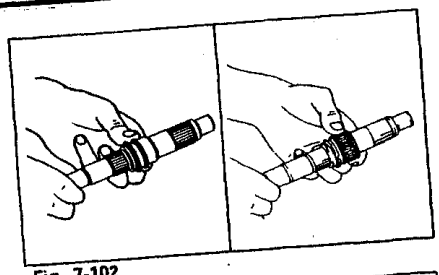


Fig. 7-102

10. Assemble the thrust washer.

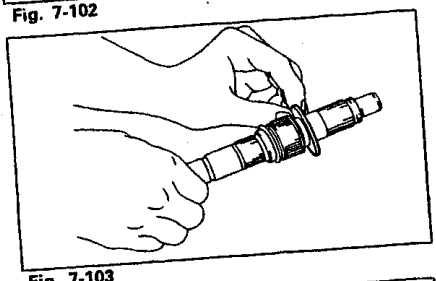


Fig. 7-103

11. Assemble the 3rd gear bearing inner race.
12. Assemble the friction damper for 3rd gear.
    Assemble the friction damper to the inner race by hand, and then apply pressure with a press slowly, using the special service tool.

    SST: Friction damper replacer
    09309-87501-000

NOTE
Use a new friction damper, and be careful not to mistake a pressing direction.

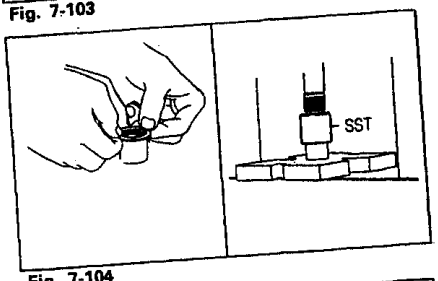


Fig. 7-104

How to assemble the friction damper.

1) How to press the tilting angle of the friction damper will be within 30° to the upright axle angle.
2) How to apply the grease.
   Application position:
   Apply the inner lip by secting by 5
   Amount of application:
   5 positions of ϕ 11×10mm(about 2g)
   Kind of oil: MP grease

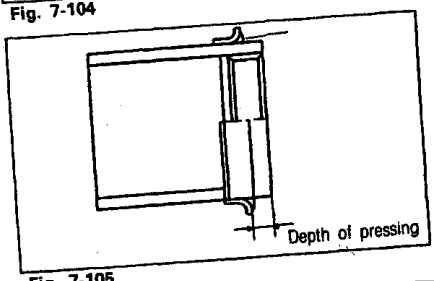


Fig. 7-105

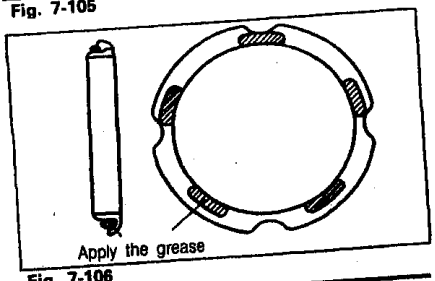


Fig. 7-106

13. Assemble the plain washer.
14. Assemble the needle roller bearing.
    Assemble the 3rd gear bearing inner race, friction damper for 3rd gear, plain washer, and needle roller bearing to the output shaft as a set.

NOTE

Be careful not to mistake a assembly direction.

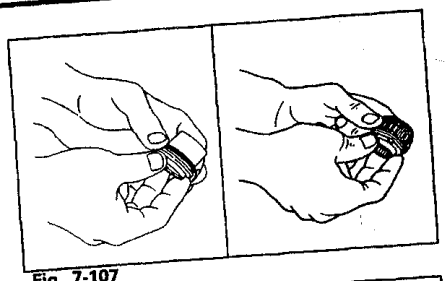


Fig. 7-107

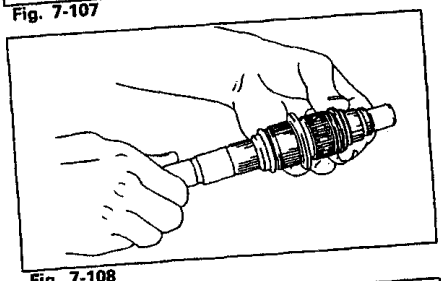


Fig. 7-108

15. Assemble the 3rd gear.
16. Assemble the synchronizer ring.

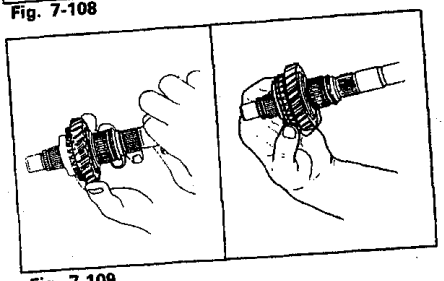


Fig. 7-109

17. Assemble the transmission hub clutch (No. 2).
18. Assemble the transmission hub sleeve.
19. Assemble the synchromesh shift key (No. 2).
20. Assemble the synchromesh shift key spring.

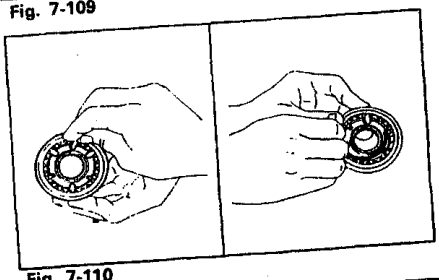


Fig. 7-110

21. Assemble the synchronizer ring, 2nd gear, friction damper for 2nd gear and plain washer to the output shaft as a set.

NOTE

Be careful not to mistake a assembly direction.

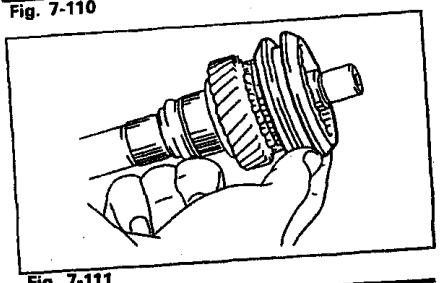


Fig. 7-111

22. Assemble the shaft snap ring.

NOTE • **Use a new snap ring.**
• **Make sure that the snap ring is assembled to the key groove firmly.**

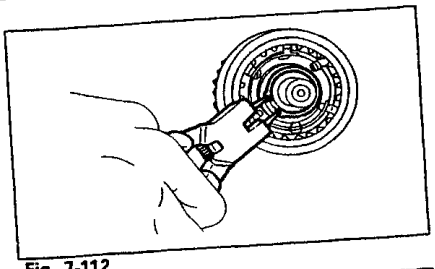


Fig. 7-112

Shaft snap ring

Select and install a snap ring from among those snap rings shown in the table below so that the thrust clearance between the hub end surface and the snap ring may become the following value.

Part number	Thickness (mm)
AA100 17 228	1.2
AA100 17 225	1.3
AA100 17 226	1.4
AA100 17 227	1.5

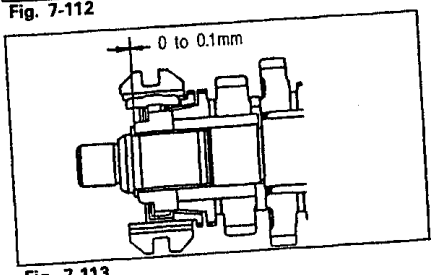


Fig. 7-113

23. Assemble the 2nd gear.
24. Assemble the synchronizer ring(No. 2).

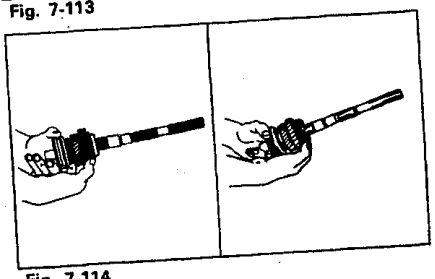


Fig. 7-114

25. Assemble the transmission clutch hub(No. 1).
26. Assemble the reverse gear.
27. Assemble the synchromesh shift key(No. 1).
28. Assemble the synchromesh shift key spring.

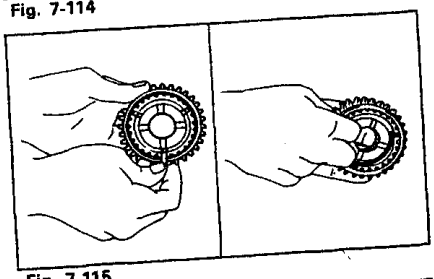


Fig. 7-115

29. Assemble the No. ㉕ to ㉘ in Fig. 7-59 to the output shaft as a set.

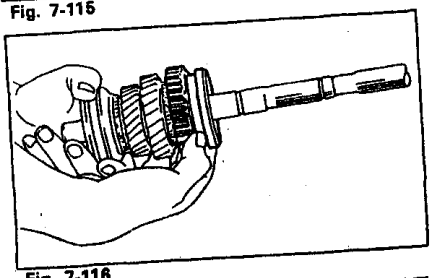


Fig. 7-116

Selection of clutch hub No. 1

Select a hub in such a way that the difference between the reverse gear and the large diameter of the clutch hub may become 0.03 to 0.19mm(0.0012 to 0.0075 inch).

Part number	Diameter of hub	Discernment
AA100 17 261	58 − 0.160 / 0.220	Colorlessness
AA100 17 262	58 − 0.260 / 0.320	Yellow
AA100 17 263	58 − 0.360 / 0.420	White

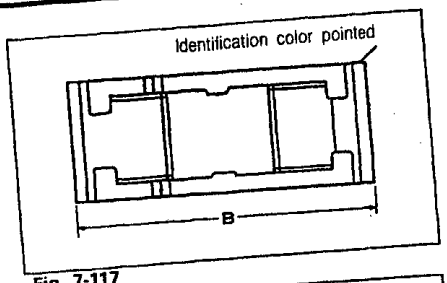


Fig. 7-117

30. Assemble the synchronizer ring(No. 3).
31. Assemble the 1st gear bearing inner race.

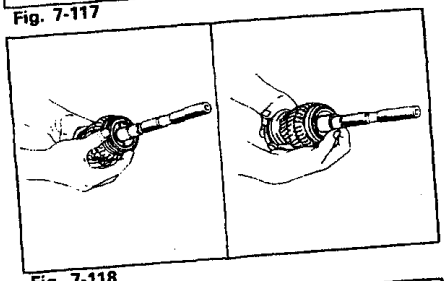


Fig. 7-118

32. Assemble the needle roller bearing.

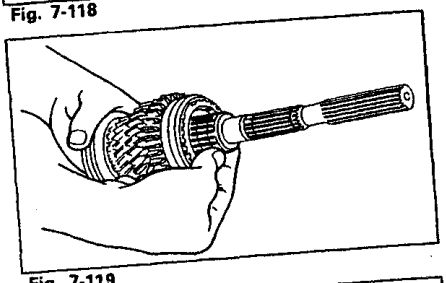


Fig. 7-119

33. Assemble the 1st gear.
34. Assemble the thrust washer.

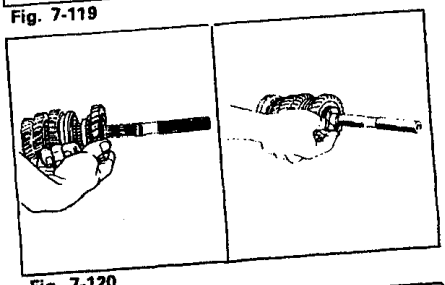


Fig. 7-120

Install the No. ⑥ to ㉝ in Fig. 7-59 to the case as a set, using the following SST given below.

SST: Output shaft holder
09336-87502-000

NOTE
Don't tighten the attaching bolt with full force when the special service tool set.

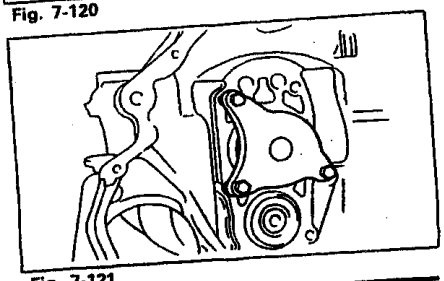


Fig. 7-121

35. Install the radial ball bearing.
Tap lightly and assembly the radial ball bearing at the rear of the case with a special service tool.

SST: Transmission bearing replacer
09310-87301-000

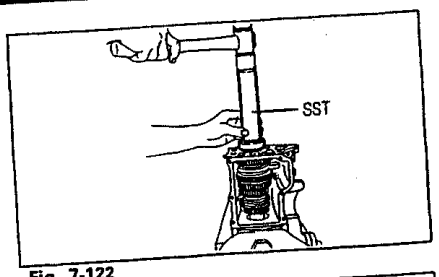


Fig. 7-122

36. Assemble the input shaft.
37. Assemble the radial ball bearing.
Tap lightly and assemble the bearing with a special service tool.

SST: Transmission bearing replacer
09310-87301-000

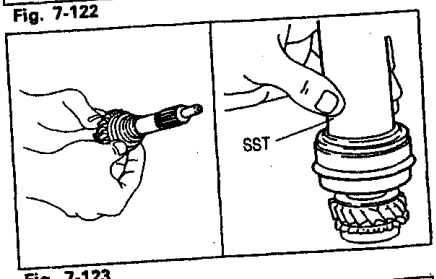


Fig. 7-123

38. Assemble the "E" ring

NOTE: Use a new "E" ring.

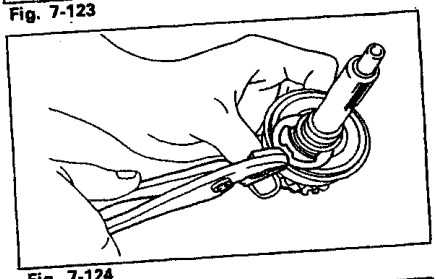


Fig. 7-124

39. Assemble the needle roller bearing.
Press the bearing into the input shaft on the side of the case.

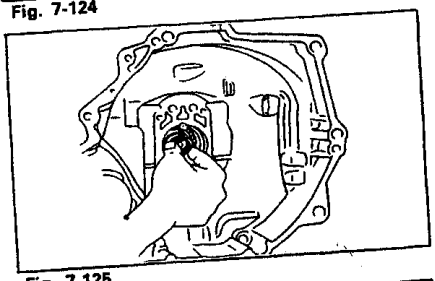


Fig. 7-125

40. Assemble the synchronizer ring.
Press the synchronizer ring into the input shaft on the side of the case.

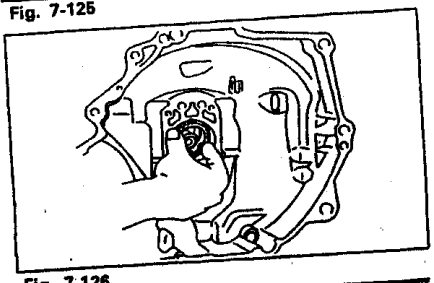


Fig. 7-126

3. Assemble the 5th gear bearing inner race.
4. Assemble the needle roller bearing.

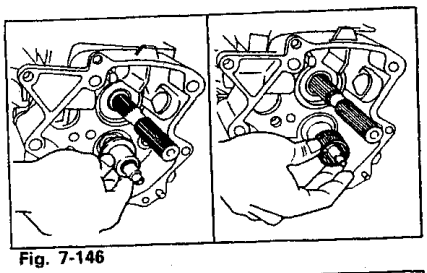


Fig. 7-146

5. Assemble the 5th counter gear.
   Assemble it after applying the gear oil to inside of the gear.
6. Assemble the 5th shift arm.

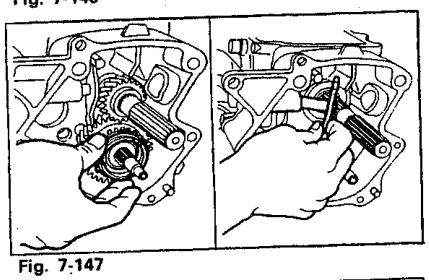


Fig. 7-147

7. Assemble the 5th gear.
   Assemble it after applying the gear oil to the inside of the gear.

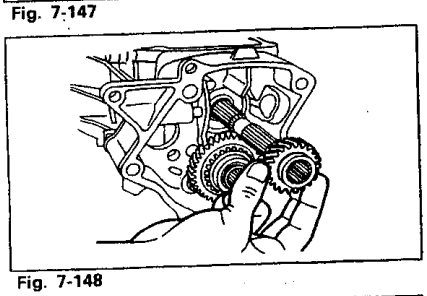


Fig. 7-148

8. Assemble the synchronizer ring(No. 3).

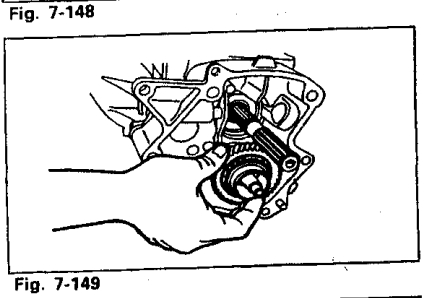


Fig. 7-149

9. Assemble the transmission clutch hub(No. 3).
10. Assemble the synchromesh shift key.
11. Assemble the transmission hub sleeve.
12. Assemble the synchromesh shift key spring.

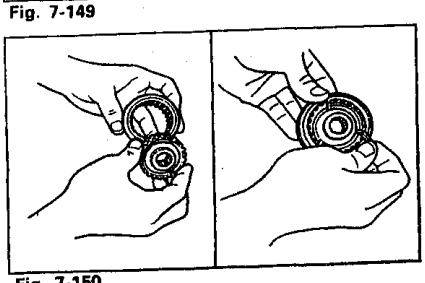


Fig. 7-150

13. Assemble the No. 9 to 12 in the above to the shaft as a set.

NOTE: The hub is to be assembled in order for a long side of the boss to be placed in the rear side of the mission.

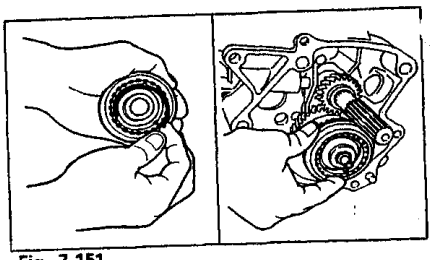


Fig. 7-151

14. Assemble the 5th shift fork.
15. Assemble the 5th shift fork shaft.

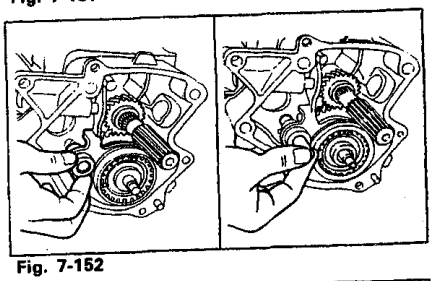


Fig. 7-152

16. Assemble the shift key retainer.

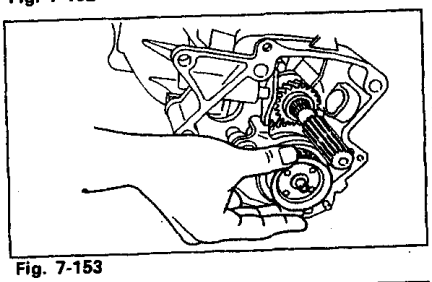


Fig. 7-153

17. Tighten the lock nut.
    Caulk the lock nut with a chisel after tightening a new lock nut to the specified torque.

NOTE
When tightening the lock nut, engage the shaft with the clutch hub, not to rotate the shaft like the way of disassembly.

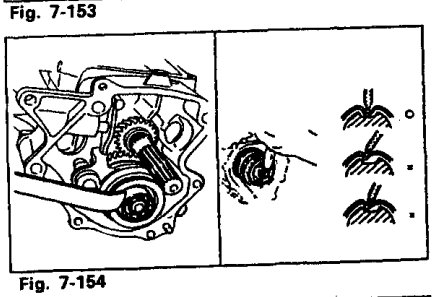


Fig. 7-154

18. Assemble the speedometer drive gear.
19. Assemble the shaft snap ring.
    Use a new snap ring.
    Put the snap ring in a hole firmly.

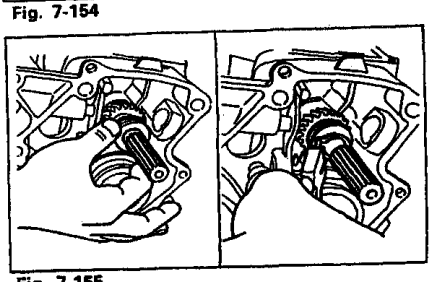


Fig. 7-155

10. Remove the lock nut.
    Remove the lock nut after loosening the key of the nut with a ⊖ screwdriver.

NOTE

When you loosen a nut, first separate the sub Ass'y of the case cover and fix the gear not to rotate the shift which is applied a double lock. This is the state that 1st and 4th gear go in gear with.

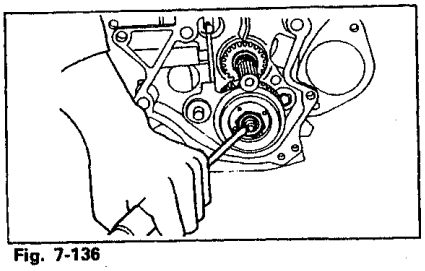


Fig. 7-136

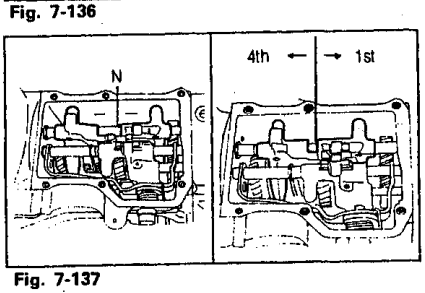


Fig. 7-137

11. Remove the shift key retainer.
12. Remove the 5th shift fork shaft.
13. Remove the 5th shift fork.

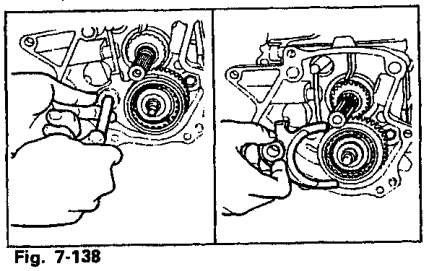


Fig. 7-138

14. Remove the No. 14 to 17 in Fig. 7-131 as a set.
15. Remove the synchromesh shift key spring.
16. Remove the transmission hub sleeve.
17. Remove the synchromesh shift key.
18. Remove the transmission clutch hub(No. 3).

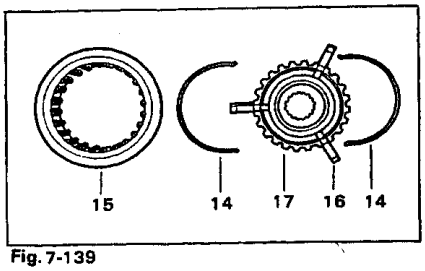


Fig. 7-139

19. Remove the synchronizer ring(No. 3).

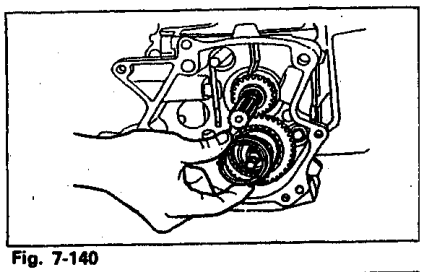


Fig. 7-140

20. Remove the 5th gear.
21. Remove the 5th shift arm.

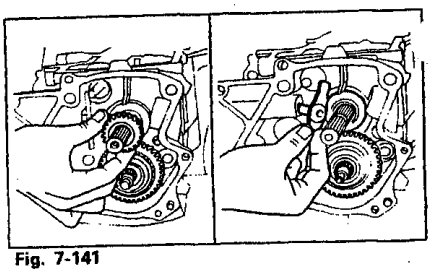


Fig. 7-141

22. Remove the 5th counter gear.
23. Remove the needle roller bearing.

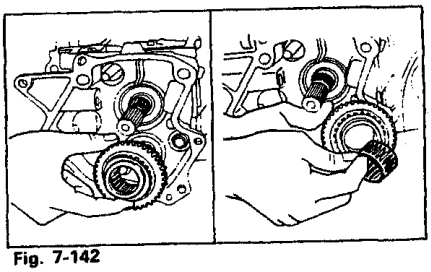


Fig. 7-142

24. Remove the 5th gear bearing inner race.

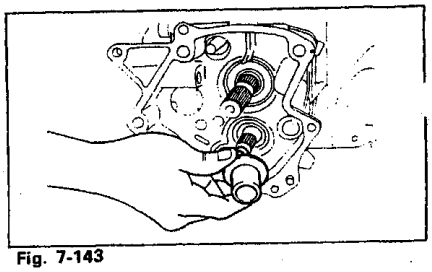


Fig. 7-143

25. Remove the center housing.
26. Remove the extention housing gasket.

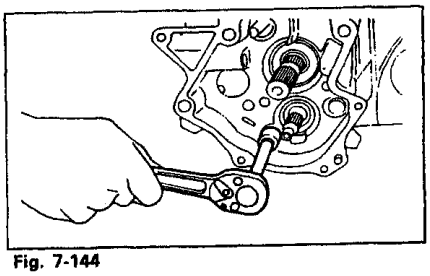


Fig. 7-144

◆ ASSEMBLY

1. Assemble the extention housing gasket.
   NOTE: Use a new gasket.
2. Assemble the center housing and tighten the bolt to the *specified torque.*
   Tightening torque: 3.0 to 4.5kg-m

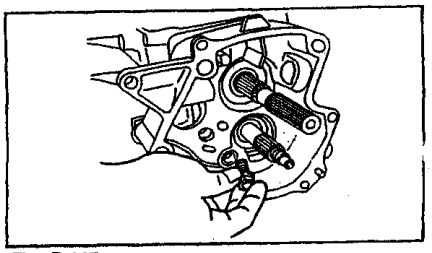


Fig. 7-145

5TH TRANSMISSION

STRUCTURAL VIEW

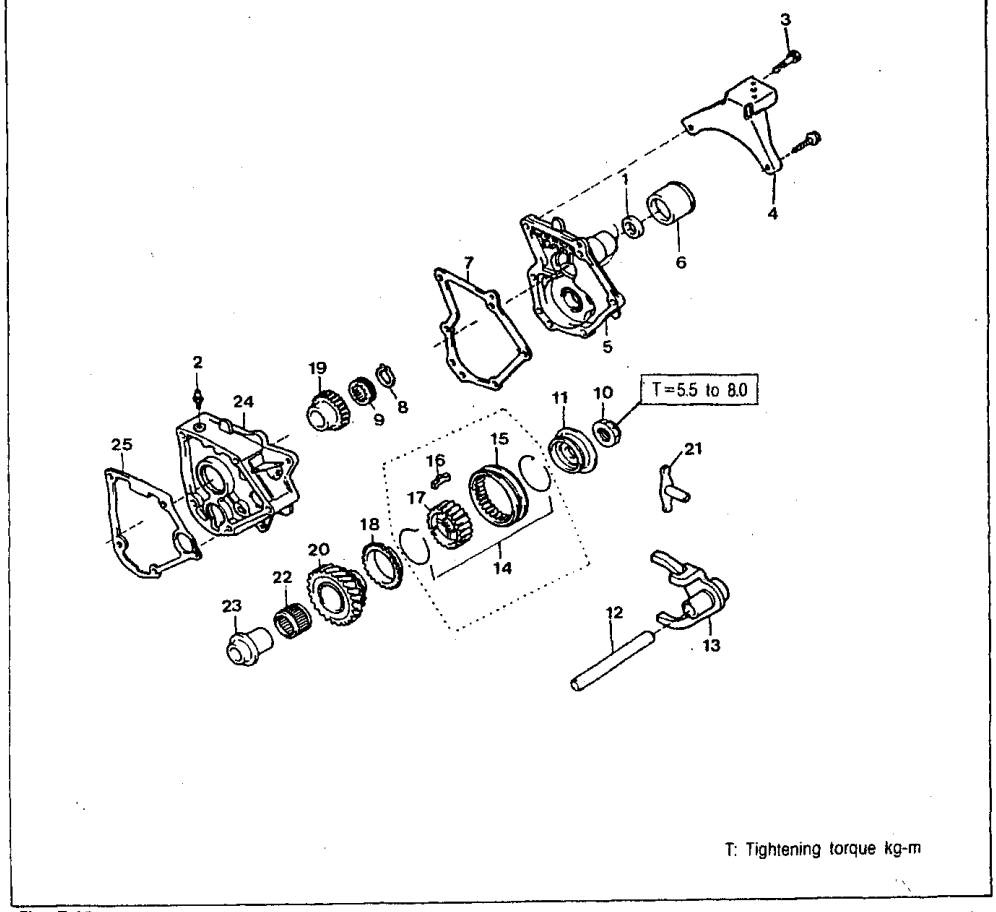


Fig. 7-131

1. Oil seal of T-type
2. Bleeder Ay
3. Bolt with washer
4. Transmission mounting bracket
5. Rear cover Ay
6. Sealing cap
7. Extention housing gasket, No. 2
8. Snap ring
9. Speedometer drive gear
10. Lock nut
11. Shift key retainer
12. 5th shift fork shaft
13. 5th shift fork
14. Synchromesh shift key spring
15. Transmission nub sleeve
16. Synchromesh shift key
17. Transmission clutch hub, No. 3
18. Synchronizer ring, No. 3
19. 5th gear
20. 5th counter gear
21. 5th shift arm
22. Needle roller bearing
23. 5th gear bearing inner race
24. Center housing
25. Extention housing gasket

◆ DISASSEMBLY

1. Remove the oil seal of T-type, using the following SST given below.
   SST: Oil seal puller
   09308-10010-000
2. Remove the bleeder plug.

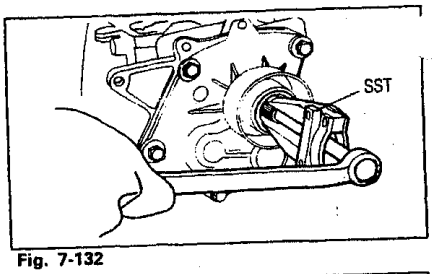


Fig. 7-132

3. Remove the bolt with washer.

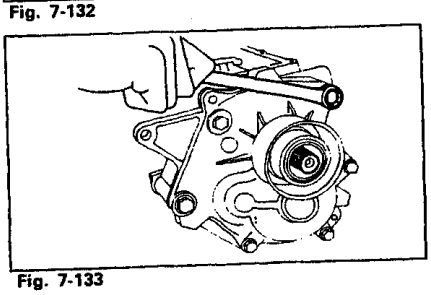


Fig. 7-133

4. Remove the transmission mounting bracket.
5. Remove the rear cover Ay.

6. Remove the sealing cap, using the following SST given below.
   SST: Universal puller
   09950-20014-000
7. Remove the extention housing gasket(No. 2).

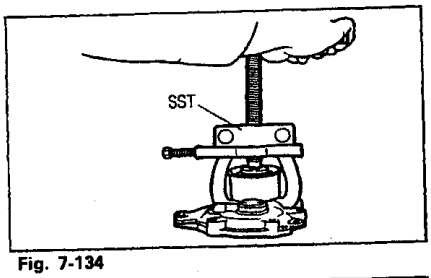


Fig. 7-134

8. Remove the shaft snap ring.
9. Remove the speedometer drive gear.

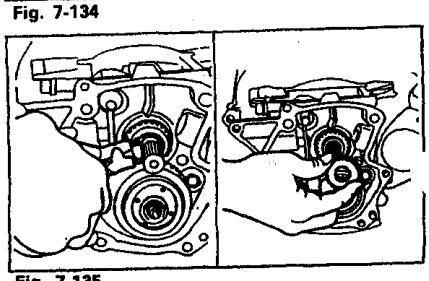


Fig. 7-135

35. Install the radial ball bearing.
    Tap lightly and assembly the radial ball bearing at the rear of the case with a special service tool.
    SST: Transmission bearing replacer
    09310-87301-000

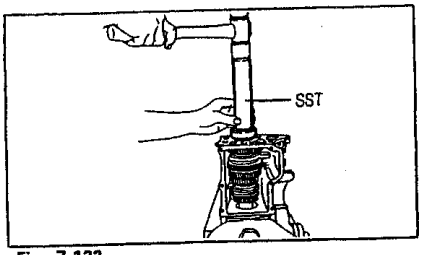


Fig. 7-122

36. Assemble the input shaft.
37. Assemble the radial ball bearing.
    Tap lightly and assemble the bearing with a special service tool.
    SST: Transmission bearing replacer
    09310-87301-000

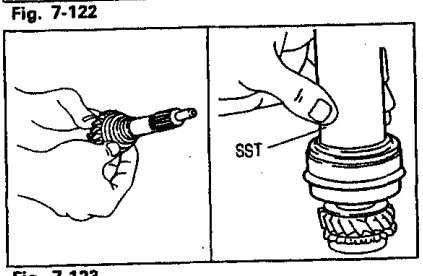


Fig. 7-123

38. Assemble the "E" ring
    NOTE: Use a new "E" ring.

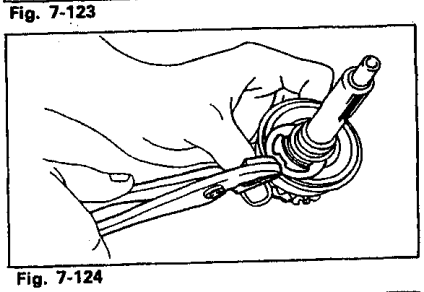


Fig. 7-124

39. Assemble the needle roller bearing.
    Press the bearing into the input shaft on the side of the case.

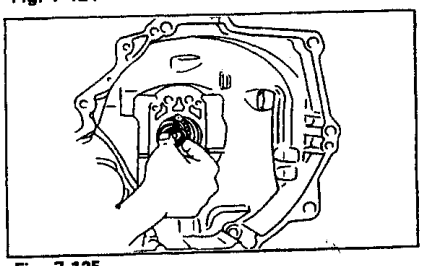


Fig. 7-125

40. Assemble the synchronizer ring.
    Press the synchronizer ring into the input shaft on the side of the case.

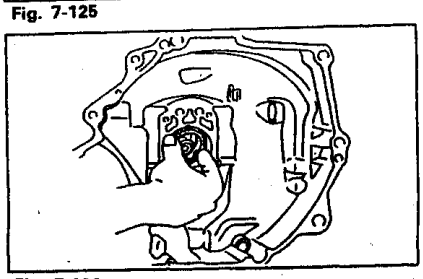


Fig. 7-126

Snap ring

Select and install a snap ring from among those snap rings shown in the table on the right so that the clearance between the speedometer drive gear surface and snap ring may become below 0.1mm.

Part number	Thickness (mm)
AA100 17 342	1.2
AA100 17 343	1.3
AA100 17 344	1.4
AA100 17 345	1.5
AA100 17 346	1.6
AA100 17 347	1.7

Fig. 7-156

20. Assemble the extention housing gasket(No. 2).
    Use a new gasket.
21. Assemble the sealing cap.

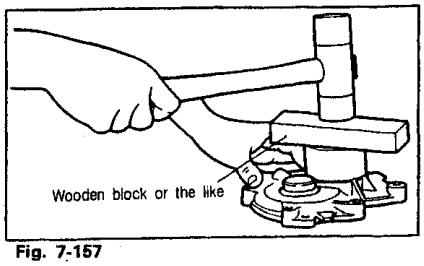


Fig. 7-157

22. Assemble the rear cover Ay.
23. Assemble the transmission mounting bracket.

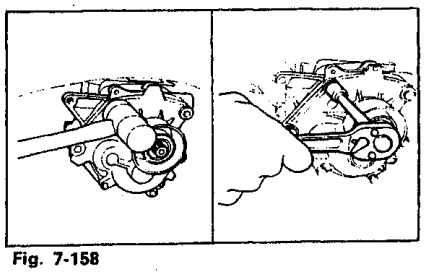


Fig. 7-158

24. Tightening the bolt with washer to the specified torque.

Tightening torque

40mm×3 : 1.5 to 2.2 kg-m

25mm×1, 95mm×2, 95mm×1 : 3.0 to 4.5 kg-m

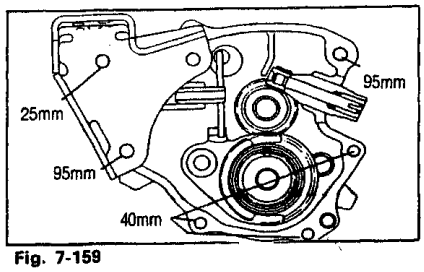


Fig. 7-159

25. Assemble the bleeder plug.

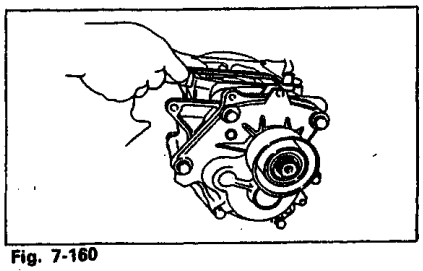


Fig. 7-160

26. Assemble the oil seal of T-type.
    Assemble a new oil seal with a special service tool.

    SST: Input shaft bearing replacer
    09304-87101-000

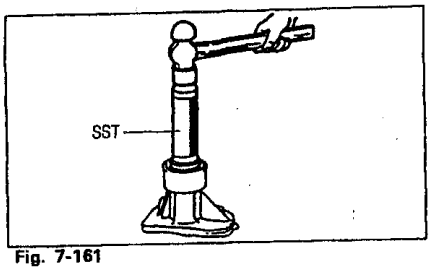


Fig. 7-161

CONTROL CABLE

REMOVAL · INSTALLATION

Remove the parts in numerical order shown in the figure below.
Install the parts in the reverse order of removal.

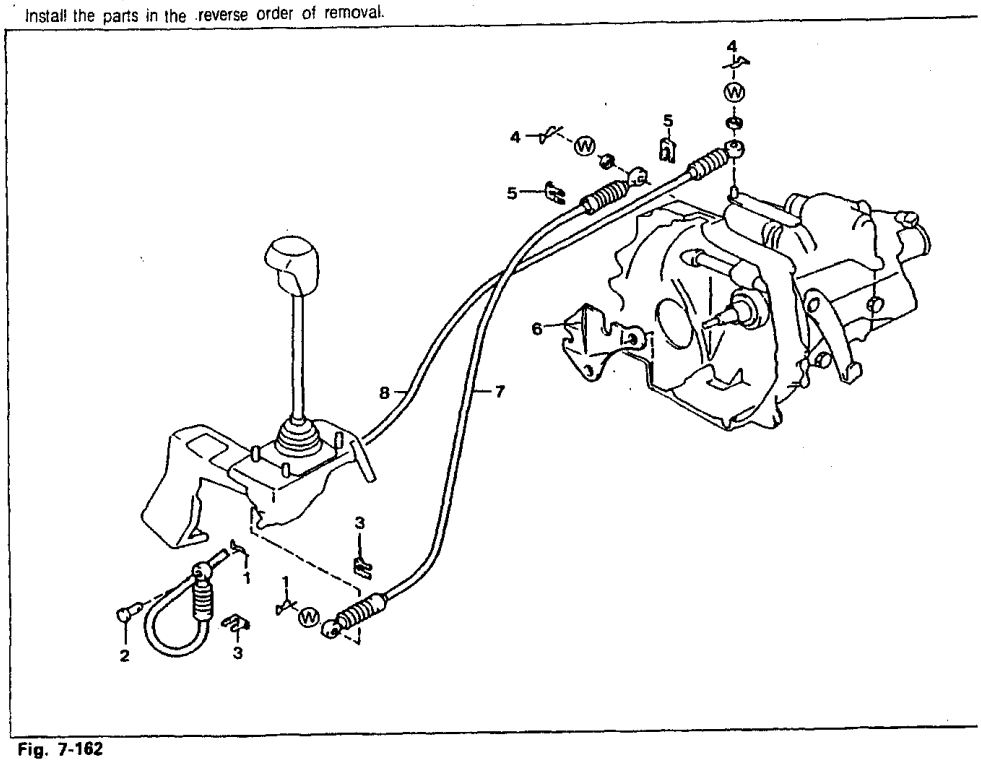


Fig. 7-162

1. Clip
2. Pin
3. Clip
4. Clip
5. Clip
6. Bracket
7. Transmission control shift cable
8. Transmission control select cable

PROPELLER SHAFT 8

STRUCTURAL VIEW

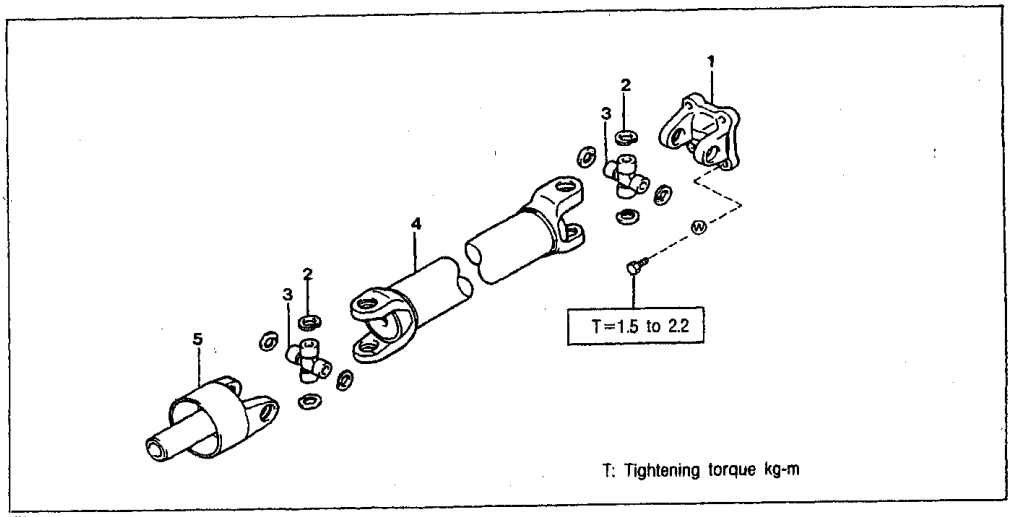


Fig. 8-1

1. Universal joint with flange yoke
2. Hole snap ring
3. Universal joint spider
4. Propeller shaft assembly
5. Universal joint sleeve yoke S/A

DISASSEMBLY

1. Jack-up the vehicle and support it with rigid racks.
2. Remove the propeller shaft Ay.

NOTE

Put mate marks on the flange yoke and companion flange, respectively. Also, be sure to install the oil stopper No. 2 so that no gear oil may flow out.

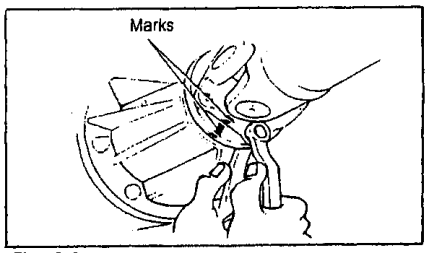


Fig. 8-2

INSPECTION

1. Check the propeller shaft for evidence of damage or bend.
   Limit of bend: 0.5mm

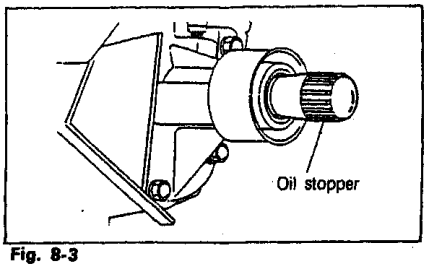


Fig. 8-3

2. Check the spider bearing cup-fitting section, sliding shaft section and boot for damage.

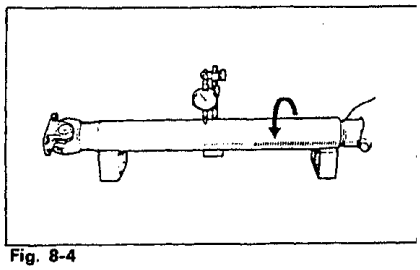


Fig. 8-4

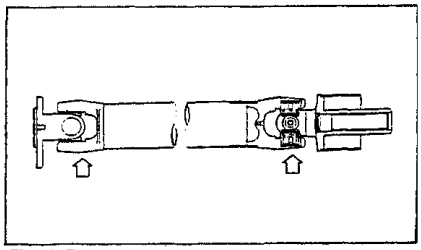


Fig. 8-5

3. Check the flange yoke and sleeve yoke.
   1) Inspect to see whether any damage is present at the differential drive pinion companion flange-contact section ①.
   2) Check the oil seal sliding section ② for damage or wear.
   3) Check the spline ③ for damage or wear.
   4) Fit the sleeve yoke onto the sliding spline of the transmission output shaft.
      Ensure that the spline exhibits no looseness in the rotation direction and the sleeve can slide freely in the axial direction on the spline.

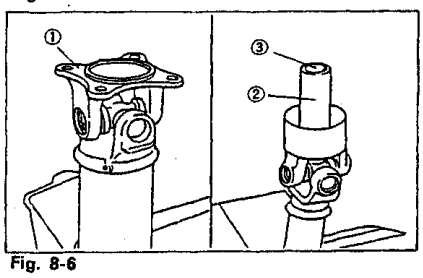


Fig. 8-6

4. Check the universal joint for looseness as follows.
   1) Check the spider for looseness in the axial direction
   2) Check the spider for looseness in the right angled direction.
   3) Check the spider for smooth rotation.

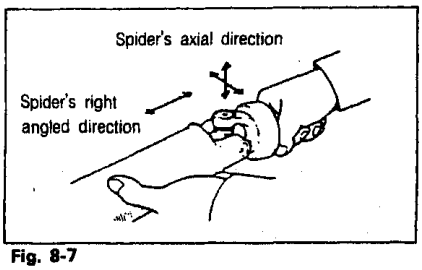


Fig. 8-7

UNIVERSAL JOINT SPIDER

REPLACEMENT

1. Put mate marks on the flange yoke(sleeve yoke) and propeller shaft, respectively.

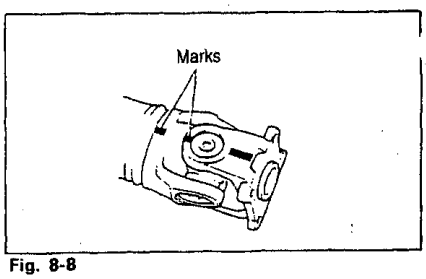


Fig. 8-8

2. Detach the snap ring.

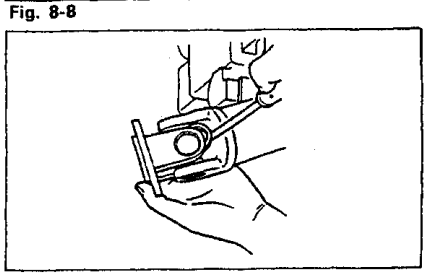


Fig. 8-9

3. Press the spider bearing cap off, using socket wrenches (12mm and 26mm) in conjunction with a press or a vise.

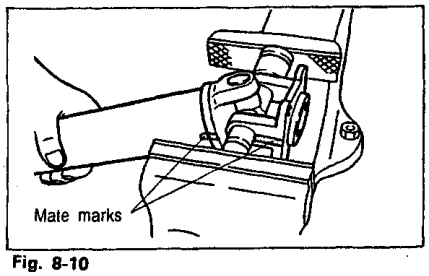


Fig. 8-10

4. Using a hammer, lightly tap the joint yoke so that the spider bearing cup that has been pressed off may be removed from the joint yoke.

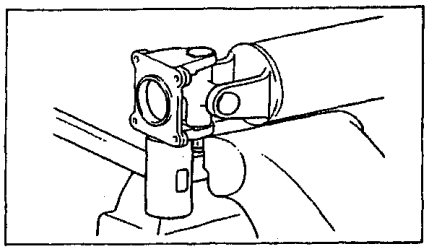


Fig. 8-11

5. Remove the bearing cup at the opposite side by repeating the operations described in the steps 3 and 4 above.
6. Separate the flange yoke(sleeve yoke) from the propeller shaft.
7. Remove the remaining bearing cups through the operations described in the steps 1 through 6 above

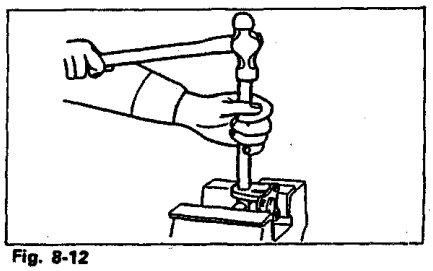


Fig. 8-12

8. Inspect the disassembled parts. Repair or replace any parts which exhibit defects.

   1) Spider journal sections ①
   2) Seal ②
   3) Roller ③
   4) Bearing cup ④
   5) Hole of spider bearing fitting section
   6) Each yoke groove for snap ring

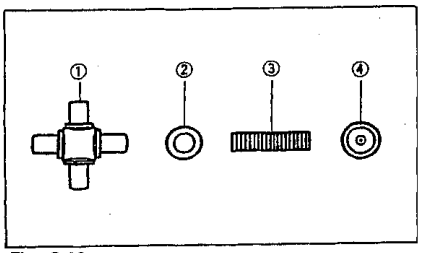


Fig. 8-13

9. Assemble the spider on the propeller shaft

   1) Apply the MP grease to the spider bearing rollers and cup inner surface.

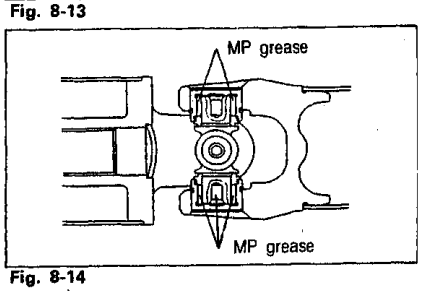


Fig. 8-14

   2) Fit the spider and bearing cap in the propeller shaft yoke.
   3) Using a socket wrench(12㎜), press the bearing cap to the sufficient depth.
   4) Install the bearing cap in the other hole of the propeller shaft, following the same procedure described in the step (3) above.

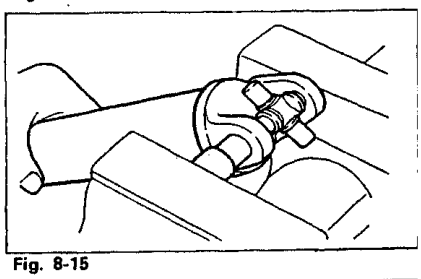


Fig. 8-15

10. Attach the flange yoke(sleeve yoke) to the propeller shaft, following the same procedure described in the step (3) above.

    NOTE
    Make sure that the mate marks scribed during the disassembly are lined up to each other.

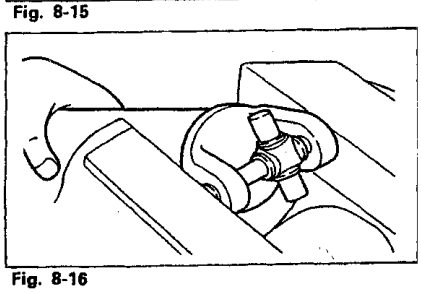


Fig. 8-16

11. Select and install a suitable snap ring so as to obtain a proper play in the axial direction as follows:
    1) Hook a spring scale at the bolt hole of the flange yoke as well as at the sleeve yoke end.
    2) Gently pull the spring scale to measure the starting torque.
    Starting torque: 3 to 150 kg-m

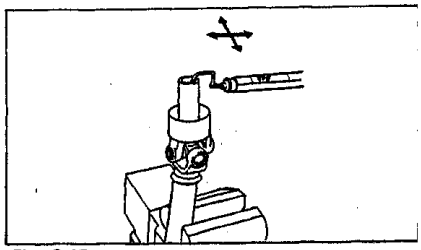


Fig. 8-17

NOTE

1. **Make sure not to reuse the removed snap rings.**
2. **Be sure that snap ring of same thickness are employed at both sides.**

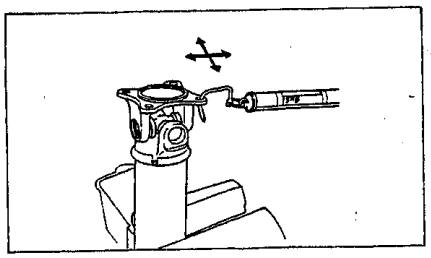


Fig. 8-18

◆ MAIN POINTS OF ASSEMBLY

1. Apply gear oil to the spline section of the sleeve yoke and its outer periphery. Insert the shaft in the bearing retainer of the transmission(transfer).
2. Perform the assembly, making sure that the mate marks are lined up to each other.
3. Ensure that the propeller shaft rotates without emitting any abnormal noise. Also, ensure that the shaft rotates smoothly without any binding.
4. Ensure that the transmission or the transfer exhibits no oil leakage.

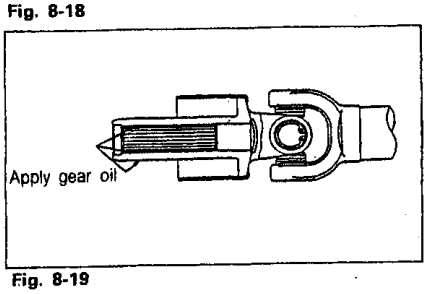


Fig. 8-19

FRONT AXLE 9

STRUCTURAL VIEW

Remove the parts in numerical order shown in the figure below.
Installation is in the reverse order of removal.

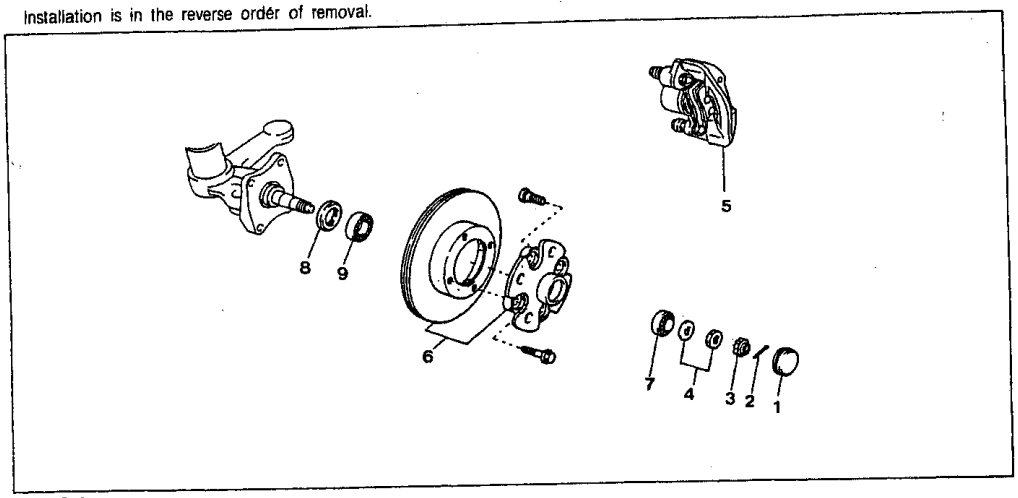


Fig. 9-1

1. Front hub grease cap
2. Cotter pin
3. Front wheel adjusting lock cap
4. Plate washer & nut
5. Disc brake caliper Ay
6. Front axle hub & front disc Ay
7. Tapered roller outer bearing
8. Type "T" oil seal
9. Tapered roller inner bearing

OPERATION PRIOR TO REMOVAL

1. Jack up the vehicle and support it with rigid racks.
2. Remove the disc wheel.
3. In the case of the disc-equipped vehicle, disconnect the brake hose from the caliper.

MAIN POINTS OF REMOVAL

Type "T" oil seal
SST: Oil seal puller
09308-00010-000

Tapered roller bearing outer race (Outer)

Drive off the bearing outer race by using a brass rod, as indicated in the right figure.

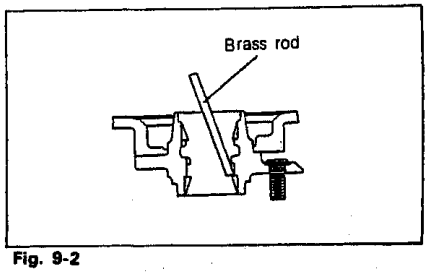


Fig. 9-2

Tapered roller bearing outer race (Inner)
Drive off the bearing outer race.
SST: Axle hub & drive pinion bearing tool set
09608-87501-000

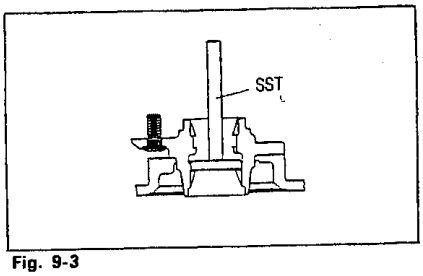


Fig. 9-3

INSPECTION

Inspect the following parts. Replace any parts which exhibit defects.

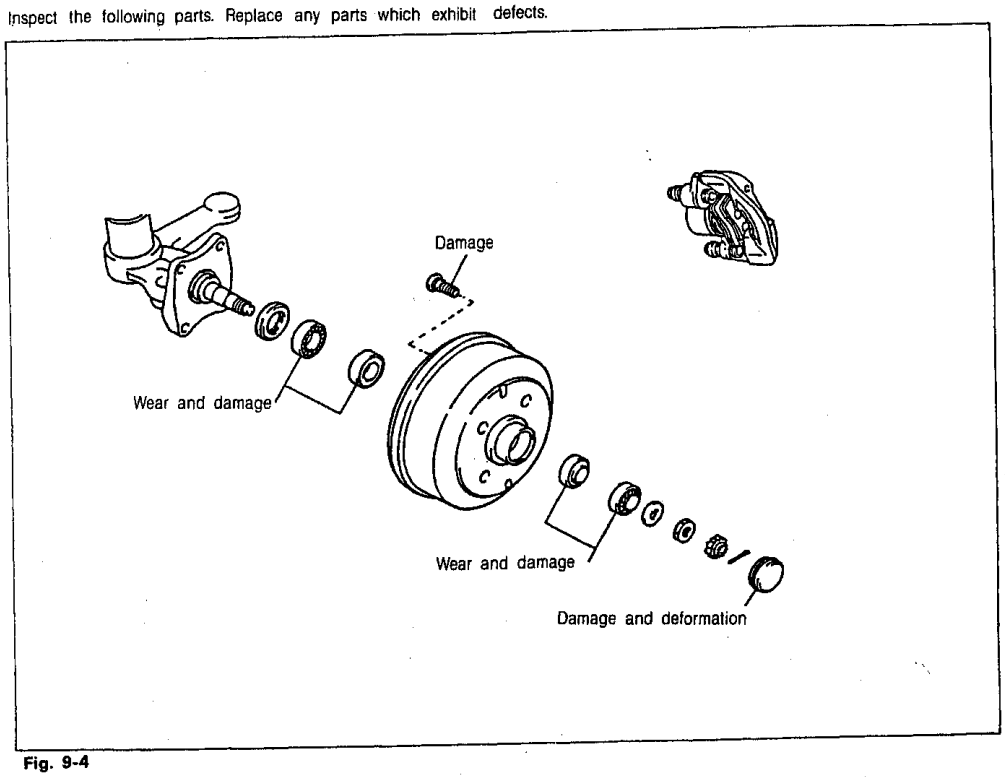


Fig. 9-4

Grease applying points

Apply the MP grease to those points specified in the right figure.

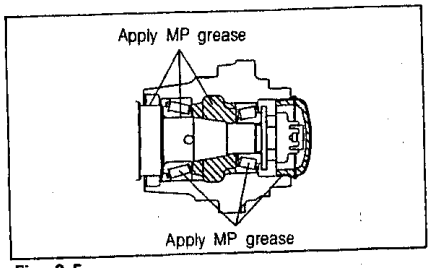


Fig. 9-5

⊠ MAIN POINTS OF INSTALLATION

Tapered roller bearing outer race (Inner bearing)

SST: Rear axle bearing inner replacer
09515-87202-000

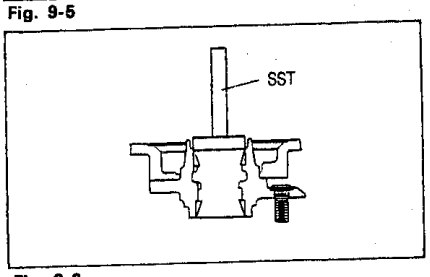


Fig. 9-6

Tapered roller bearing outer race (Outer bearing)

SST: Rear axle bearing outer replacer
09515-87201-000

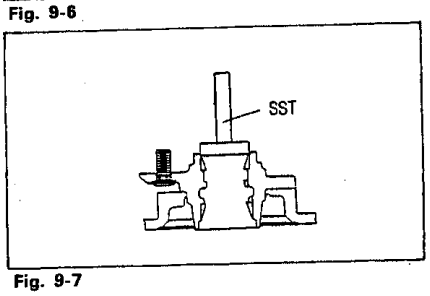


Fig. 9-7

Operation after installation

1. Install the brake hose.

REAR AXLE 10

REAR AXLE SHAFT

STRUCTURAL VIEW

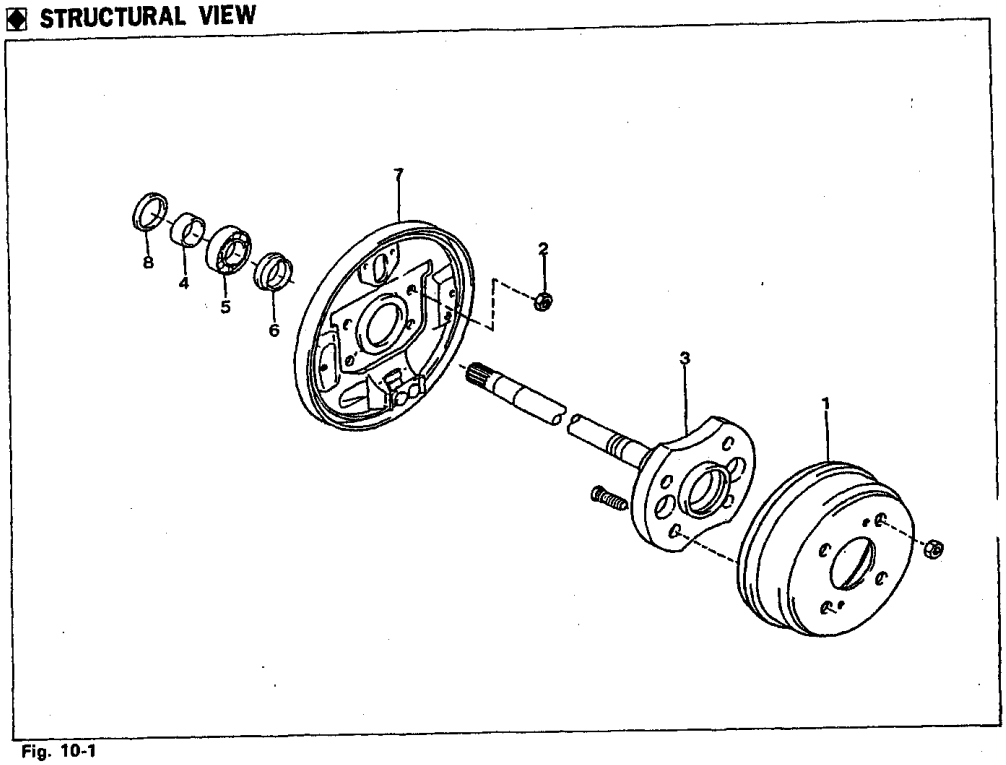


Fig. 10-1

1. Brake drum
2. Nut
3. Rear axle shaft
4. Rear axle bearing inner retainer
5. Bearing
6. Spacer
7. Braking plate
8. Oil seal

OPERATION PRIOR TO REMOVAL

1. Jack up the vehicle and support it with rigid racks.
2. Drain the differential oil.
3. Remove the following parts.
   1) Rear wheel
   2) Parking cable adjusting nut
   3) Parking cable end
   4) Brake tube union nut

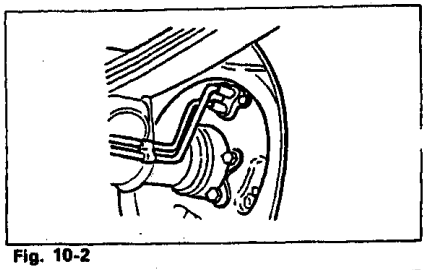


Fig. 10-2

◆ MAIN POINTS OF REMOVAL

Rear axle shaft

Remove the rear axle shaft together with the backing plate, using the following SST given below.

SST: Rear axle shaft puller
09520-00031-000

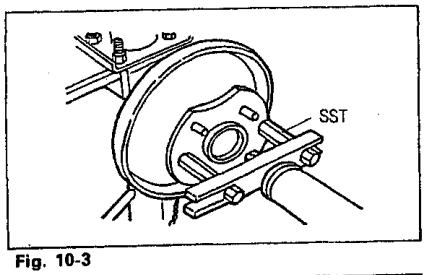


Fig. 10-3

Rear axle bearing inner retainer

1. Grind off the bearing inner retainer with a grinder.

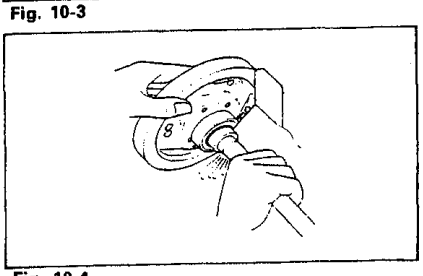


Fig. 10-4

2. Cut off the retainer with a chisel and remove it from the shaft.

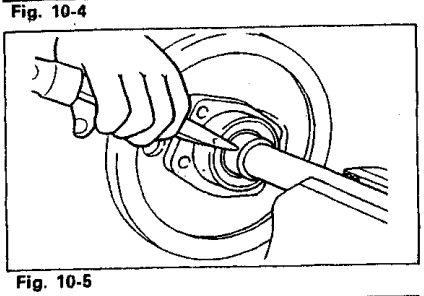


Fig. 10-5

Bearing

Remove the bearing, using the following SSTs given below.

ⓐ **SST: Rear wheel bearing puller**
09521-87301-000

ⓑ **SST: Rear wheel bearing puller**
09521-87502-000

ⓒ **SST: Bearing remover**
09238-87202-000

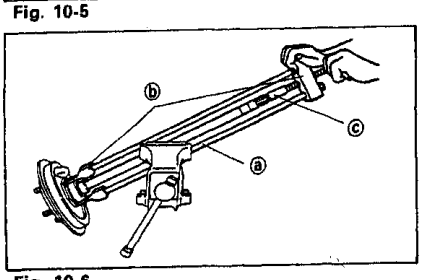


Fig. 10-6

Oil seal

Remove the oil seal, using the following SST given below.

SST: Oil seal puller
09308-00010-000

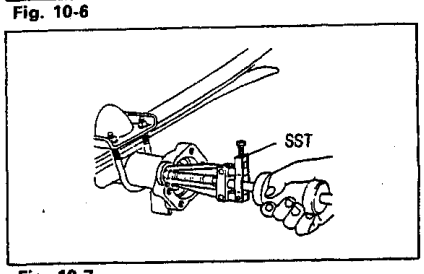


Fig. 10-7

◆ INSPECTON

Inspect the following parts. Replace any parts which exhibit defects.

1. Rear axle shaft.
   1) Check the shaft for wear, damage or runout.
      Runout allowable limit:
      Flange: 0.05mm(0.002 in.)
      Shaft: 0.80mm(0.031 in.)
   2) Oil seal contact section
   3) Serrated section
2. Bearing
3. Oil seal

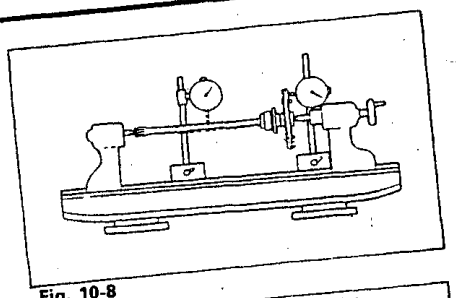


Fig. 10-8

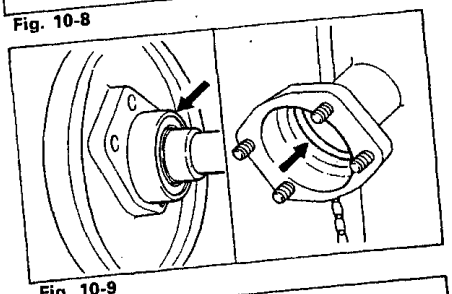


Fig. 10-9

◆ MAIN POINTS OF INSTALLATION

Oil seal

Install the oil seal, using the following SST given below.

SST: Rear axle bearing outer replacer
09515-87201-000

NOTE

Apply the MP grease to the lip section of the oil seal.

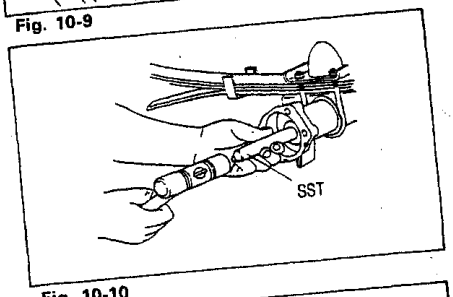


Fig. 10-10

Bearing

Install the bearing, using the following SST given below.

SST: Rear axle bearing outer replacer
09515-87501-000

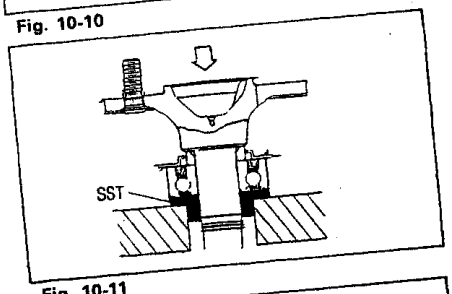


Fig. 10-11

Rear axle bearing inner retainer

1. Heat the bearing inner retainer in an oil bath, until the temperature reaches about 150℃.

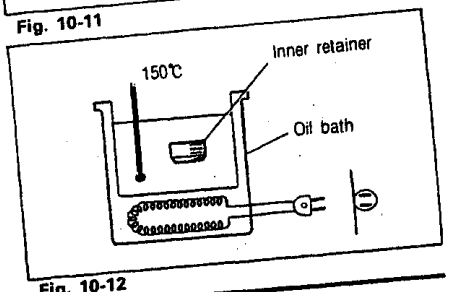


Fig. 10-12

2. Install the bearing inner retainer quickly on the shaft, using a press in conjunction with the following SST given below.

SST: Rear axle bearing outer replacer
09515-87501-000

NOTE
Make sure that there is no oil or grease on the rear axle shaft nor on the retainer.

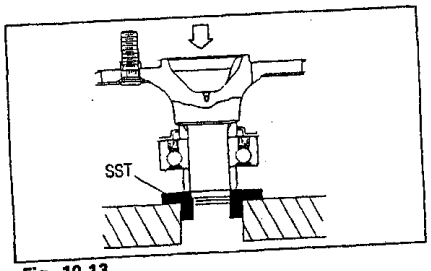


Fig. 10-13

Rear axle shaft

1. Remove the trace of sealer and grease from the section where the rear axle housing end section is attached on the backing plate as well as from the adjacent areas. Proceed to degrease the areas.

NOTE
As for the remaining sealer, etc. on the attaching section, remove it by means of a cloth wetted by thinner, a plastic spatula or the like in order that no scratch may be made on the attaching surface.

2. Apply the silicon bond 1212 to the rear axle housing end section. This application of the sealer must be made liberally without forming any missing spots, as indicated in the right figure, so that the sealer may be oozed out liberally from the mating surfaces when the rear axle shaft is attached in place. (Furthermore, the cross-section of the applied sealer should be a cylindrical shape.)

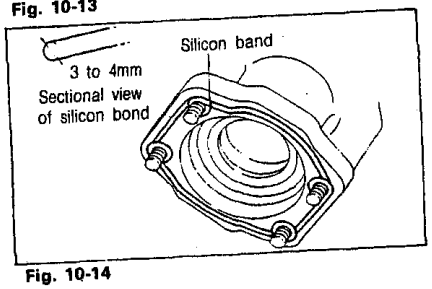


Fig. 10-14

NOTE
After the bond has been applied, be sure to immediately perform the operation.

3. Install the rear axle shaft together with the backing plate, using the following SST given below.

SST: Rear axle shaft puller
09520-00031-000
Tightening torque: 4.5 to 5.5kg-m

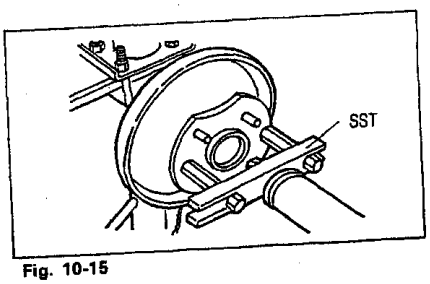


Fig. 10-15

Operation after installation

1. Install the following parts given below.
   1) Brake tube union nut
      Tightening torque: 1.3 to 1.8kg-m
   2) Parking brake cable adjusting nut.
2. Carry out the air bleeding operation for the brakes.
3. Check the differential oil level.
   Capacity: 1.2 liters
4. Adjust the brake shoe clearances.
   (Vehicle equipped with automatic adjusting mechanism)
   Parking brake adjustment
   Parking brake lever working travel:
   6 to 10 notches
   [When operated by force of 20kg]
5. Install the wheel.
   Tightening torque: 9.0 to 12.0kg-m

DIFFERENTIAL

DIFFERENTIAL CARRIER OIL SEAL REPLACEMENT

Main points of disassembly.

1. Separate the propeller shaft.

NOTE

If the white paint mark is hard to recognize, put mate marks on the flange yoke and companion flange, respectively.

2. Remove the following parts given below.
   1) Lock nut

      SST: Drive pinion flange holding tool
      09330-87301-000

NOTE

Prior to the removal, be sure to release the locking of the lock washer.

   2) Companion flange
   3) Oil seal

      SST: Drive pinion flange holding tool
      09308-10010-000

Main points of assembly

1. Assemble the following parts given below.
   1) Oil seal

      SST: Oil seal puller
      09309-87201-000

NOTE

Prior to the assembly, be sure to apply gear oil to the lip section of the oil seal.

   2) Companion flange

      Assemble the companion flange with its mate mark aligned with the one on the flange yoke.
   3) Washer plate
   4) Lock washer
   5) Lock nut

      SST: Drive pinion flange holding tool
      09330-87301-000

      Tightening torques: 10.0 to 14.0kg-m

   6) Propeller shaft

      Tightening torque: 1.5 to 2.2kg-m

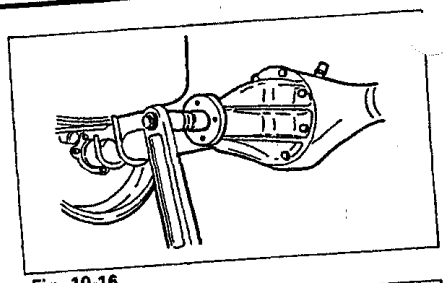


Fig. 10-16

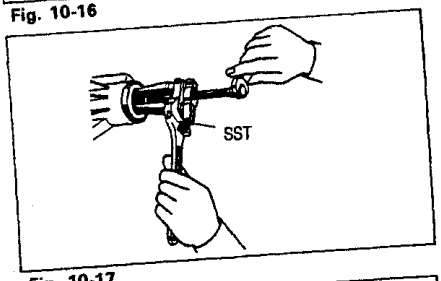


Fig. 10-17

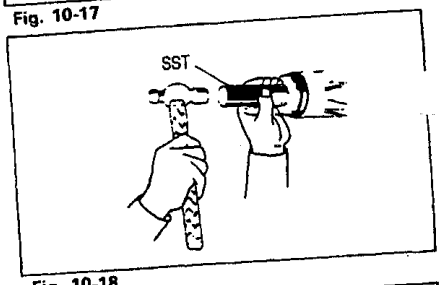


Fig. 10-18

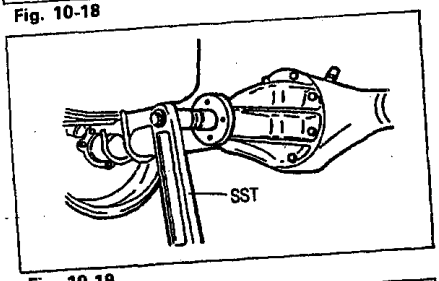


Fig. 10-19

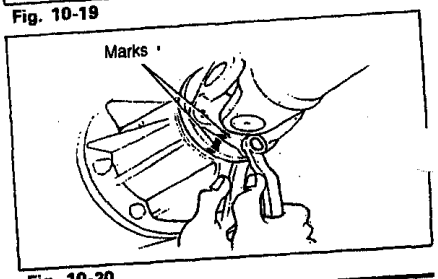


Fig. 10-20

DIFFERENTIAL CARRIER

DISASSEMBLY

Disassemble parts in numerical order shown in the figure below and assemble them in the reverse order of the disassembly.

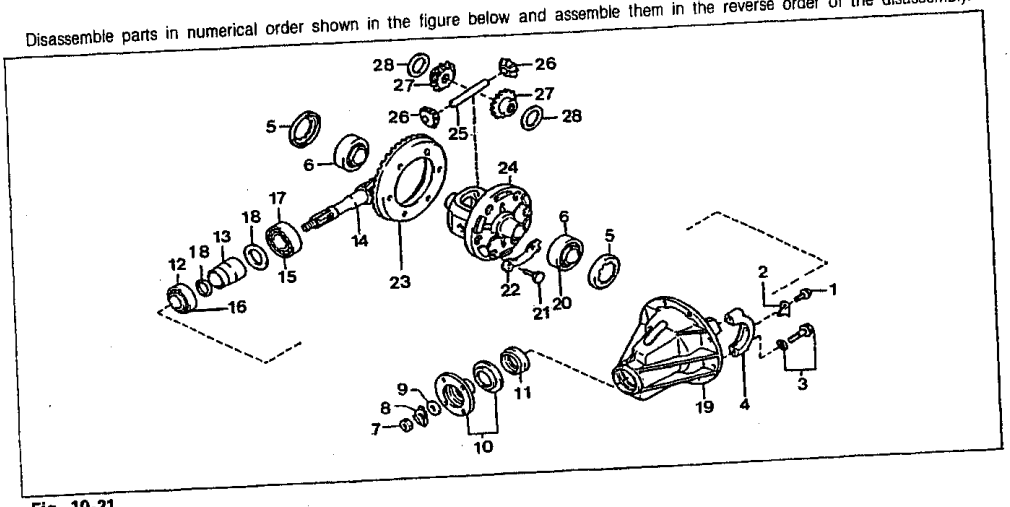


Fig. 10-21

1. Bolt W/washer
2. Differential bearing adjusting lock
3. Bolt W/washer
4. Differential cap
5. Differential bearing adjusting nut
6. Tapered roller bearing(outer race)
7. Hexagon nut
8. Lock washer
9. Plate washer
10. Drive pinion companion flange S/A
11. Type "T" oil seal
12. Tapered roller bearing
13. Differential drive pinion bearing spacer
14. Differential drive pinion
15. Tapered roller bearing
16. Tapered roller bearing(outer race)
17. Tapered roller bearing(outer race)
18. Shim
19. Differential carrier
20. Tapered roller bearing
21. Bolt
22. Ring gear set bolt lock plate
23. Differential ring gear
24. Differential case
25. Pinion shaft
26. Pinion
27. Pinion
28. Thrust washer

OPERATION PRIOR TO DISASSEMBLY

Place the differential carrier removed from the vehicle on the disassembly stand.

SST: Engine overhaul stand
09219-87202-000

SST: Differential overhaul attachment
09548-87201-000

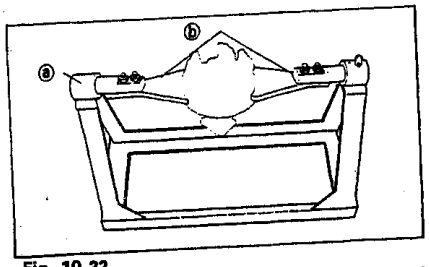


Fig. 10-22

Put mate marks on the differential bearing cap and carrier at the right and left sides, respectively.

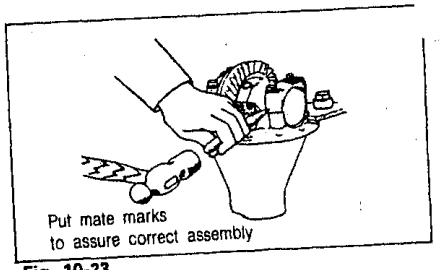


Fig. 10-23

◆ INSPECTION BEFORE DISASSEMBLY

1. Backlash of ring gear
   Specified values: 0.08 to 0.15mm(0.003 to 0.006in.)

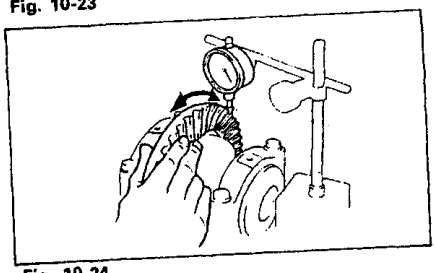


Fig. 10-24

2. Runout of ring gear
   Allowable limit: 0.1mm(0.004 in.)

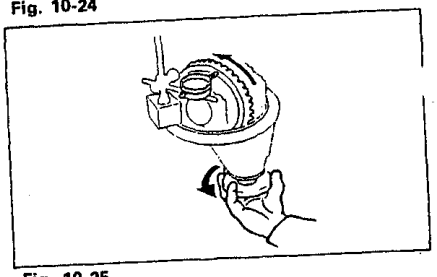


Fig. 10-25

3. Preload of drive pinion bearing
   Specified value: 8.0 to 12.0 kg-m

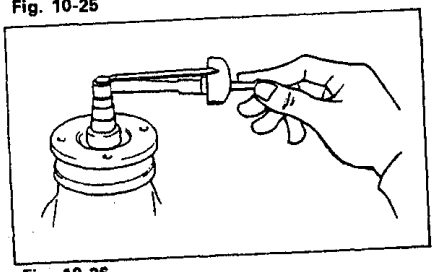


Fig. 10-26

◆ MAIN POINTS OF DISASSEMBLY

Hexagen nut

1. Remove the hexagen nut, using the following SST given below.
   SST: Drive pinion holding tool
   09330-87310-000

NOTE

Before the nut is slackened, be sure to release the locking of the lock washer.

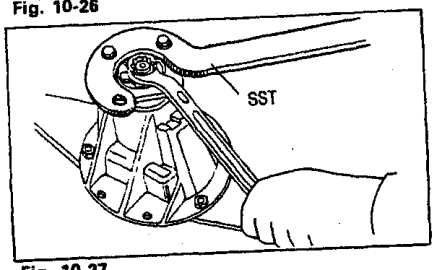


Fig. 10-27

2. Oil seal
   Remove the oil seal, using the following SST given below.
   SST: Oil seal puller
   09308-00010-000
3. Drive pinion front bearing (Inner race)
   Drive out the drive pinion, using a plastic hammer or the like.

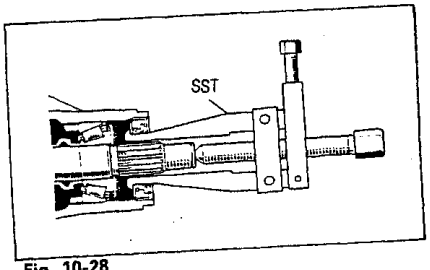


Fig. 10-28

4. Drive pinion rear bearing
   Remove the bearing, using the following SST given below.
   ⓐ SST: Universal puller
   09950-20014-000
   ⓑ SST: Tightening piece
   09956-00010-000

   NOTE
   Special caution must be exercised as to the drive pinion which may jump out due to the repulsive force at the mount when the drive pinion is detached from the bearing.

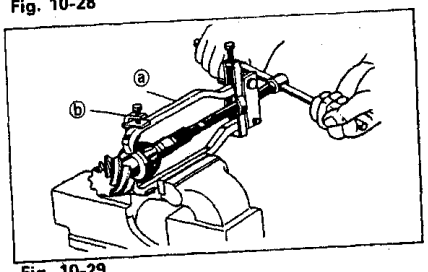


Fig. 10-29

5. Front and rear bearing outer races
   Remove the outer races, using the following SST given below.
   SST: Axle hub & drive pinion bearing tool set
   09608-87501-000

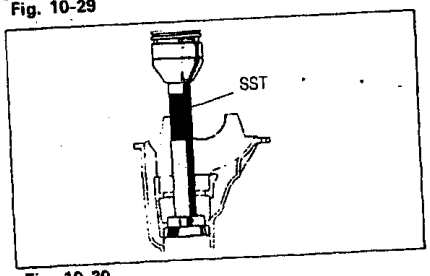


Fig. 10-30

6. Differential case side bearing
   Remove the bearing, using the following SST given below.
   SST: Differential side bearing puller
   09502-10012-000

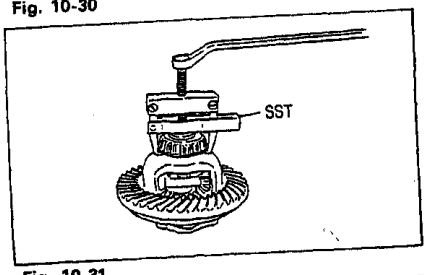


Fig. 10-31

7. Differential ring gear
   Before the ring gear-related parts are removed, put mate marks on the ring gear and case.

   NOTE
   In the case of the non-slip type differential, be sure to put a mate mark on the case cover, too.

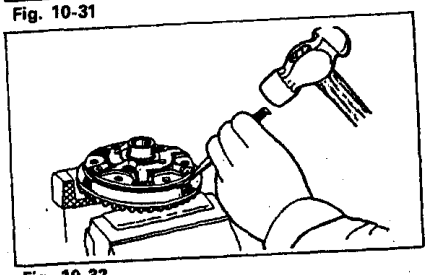


Fig. 10-32

◆ INSPECTION

Inspect each section of the following parts for any sign of damage, wear or excessive looseness. Replace any parts which exhibit defects.

1. Drive pinion & ring gear

1) Gear teeth ①
2) Spline portion ② of drive pinion
3) Bearing fitting section ③

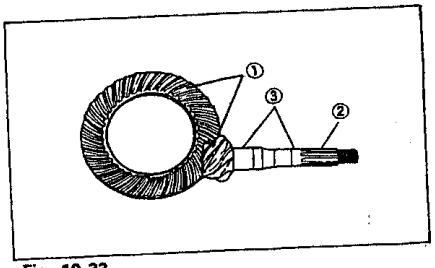


Fig. 10-33

2. Side gear & pinion

1) Gear teeth ①
2) Side gear boss section ②
3) Side gear serrated section ③
4) Pinion shaft fitting hole ④
5) Differential case contact section ⑤
6) Pinion shaft ⑥

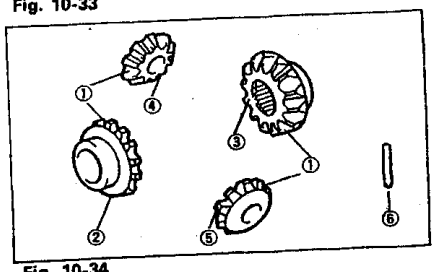


Fig. 10-34

3. Differential case

1) Side gear boss contact sections ①
2) Pinion contact section ②
3) Ring gear attaching section ③
4) Side bearing press-fitting section ④
5) The differential case proper ⑤

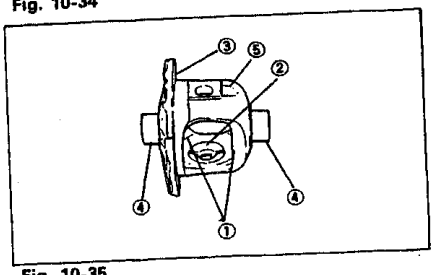


Fig. 10-35

4. Bearings

1) Front bearing ①
2) Rear bearing ②
3) Side bearings ③

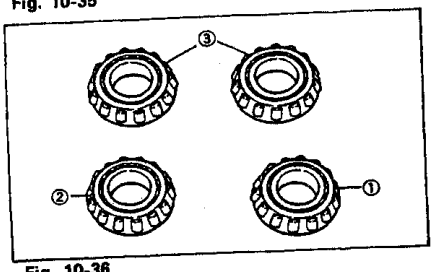


Fig. 10-36

5. Companion flange

1) Oil seal contact section ①
2) Spline section ②

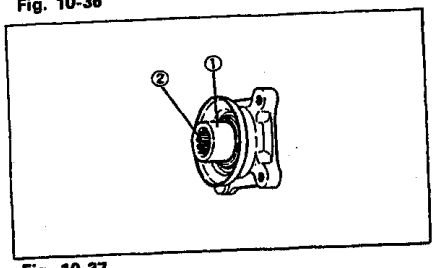


Fig. 10-37

6. Differential carrier

1) Side bearing fitting section ①
2) Front & rear bearing outer race fitting section ②
3) Oil seal inserting section ③
4) Axle housing mating surface ④
5) The differential case proper ⑤

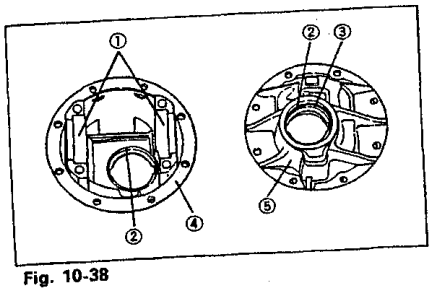


Fig. 10-38

◆ ADJUSTMENTS

1. Adjustment of projecting amount of drive pinion
↓
2. Measurement of bearing preload of drive pinion as a unit ..... **Specified value: 8.0 to 12.0 kg-m**
Condition in which oil seal is not installed
↓
3. Assembly of differential case
↓
4. Adjustment of backlash of ring gear and adjustment of play of differential case in axial direction ..... **Specified value: 0.08 to 0.15mm (0.0031 to 0.0059 inch)**
↓
5. Check and adjustment of tooth contact between ring gear and drive pinion
↓
6. Assembly of oil seal
↓
7. Check of operations described in step 4 and 5
↓
8. Assembly of companion flange

1. Adjustment of drive pinion projecting amount

1. Install the following parts, using the SST given below.
   1) Front & rear bearing outer races

SST: Axle hub & drive pinion bearing tool set 09608-87501-000

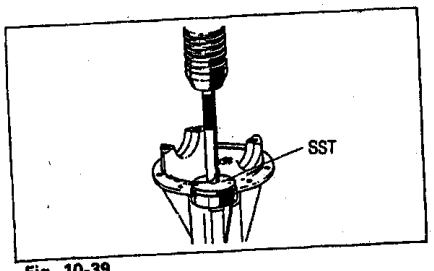


Fig. 10-39

2) Rear bearing ①
3) Base rod ②
SST: Differential drive pinion adjust gauge 09530-87501-000

4) Spacer ③
5) Front bearing ④
6) Companion flange ⑤
7) Washer plate ⑥
8) Nut ⑦
Tightening torque: 10.0 to 12.0 kg-m

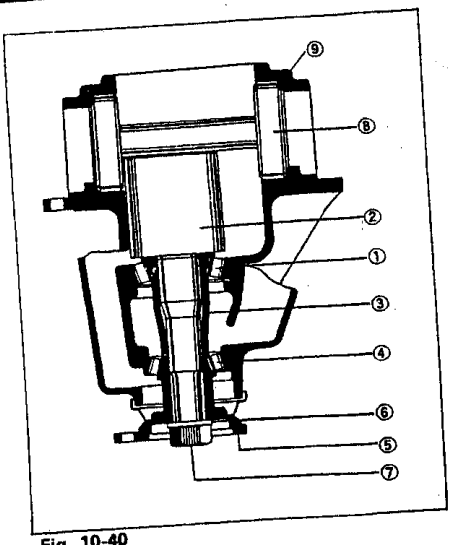


Fig. 10-40

9) Master gauge ⑧
SST: Differential drive pinion adjust gauge 09530-87501-000

10) Bearing cap ⑨
Tightening torque: 3.0 to 5.0 kg-m

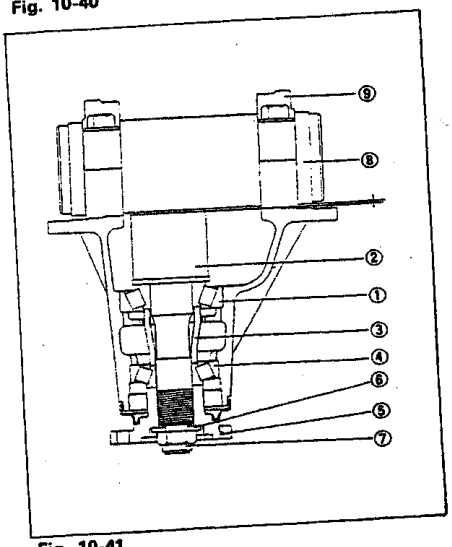


Fig. 10-41

2. Measure the clearance between the master gauge and the base rod, using a thickness gauge.

NOTE
Select a shim with such a thickness that the clearance between the master gauge and the base rod becomes 2mm.

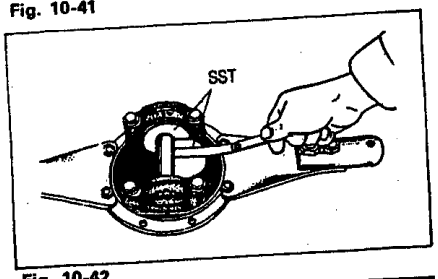


Fig. 10-42

Washer availability

Part Number	Thickness mm
AA100 - 27 -405	0.075
AA100 - 27 - 401	0.15
AA100 - 27 - 402	0.20
AA100 - 27 - 403	0.25
AA100 - 27 - 404	0.50

4. Place the shim on the drive pinion. Press the rear bearing into position, using a press in combination with the following SST given below.

SST: Lower arm bushing replacer
09726-87201-000

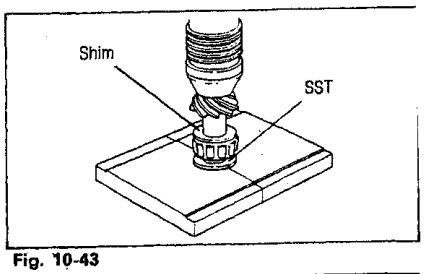


Fig. 10-43

2. Measurement of bearing preload of drive pinion as a unit

1. Assemble a new spacer and shims on the drive pinion.
2. Assemble the drive pinion on the carrier.
3. Install the front bearing, companion flange and washer plate.

NOTE: At this stage, be sure not to install the oil seal.

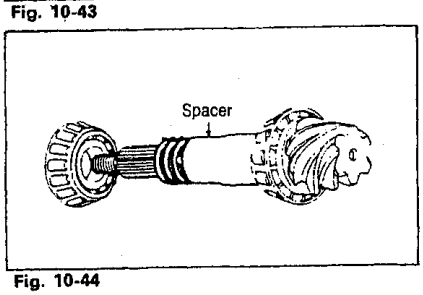


Fig. 10-44

4. Tighten the lock nut, using the following SST given below.

SST: Drive pinion flange holding tool
09330-87301-000

Tightening torque: 10.0 to 14.0 kg-m

NOTE

1. Apply oil to the nut and the threaded portion of the drive pinion.
2. After completion of the assembly, be certain to turn the drive pinion several turns both in the normal direction and in the reverse direction in order that the bearings may be beded in.

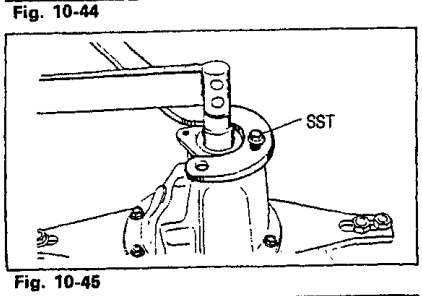


Fig. 10-45

5. Measure the preload.

Specified preload: 8.0 to 12.0 kg-m

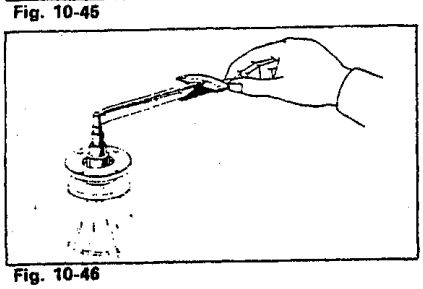


Fig. 10-46

6. When the preload does not confirm to the specification. When the preload is excessive, replace the spacer with a new one. Perform the operations described in the steps (1) through (5). When the preload is insufficient, progressively increase the tightening torque within 14kg-m

NOTE

The preload will sharply increase once a preload starts to apply to the bearing. Hence, carry out this preload adjustment by measuring the preload each time the drive pinion nut is tightened 5 to 10 degrees.

3. Assembly of differential case

Assemble the differential case, following the procedure given below.

1) Thrust washer & side gear ①
2) Pinion ②
3) Pinion shaft ③
4) Slotted spring pin ④

Shim availability

Part Number	Thickness ■
AA100 - 27 -155	0.25
AA100 - 27 - 156	0.30
AA100 - 27 - 157	0.40
AA100 - 27 - 158	0.50

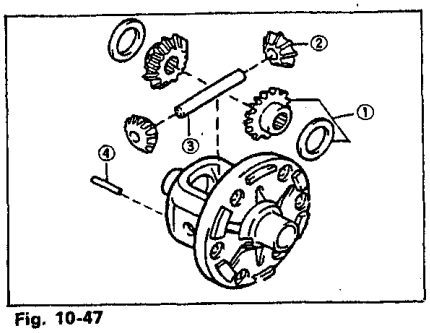


Fig. 10-47

After the differential case has been assembled, proceed to assemble the following parts given below.

1) Ring gear

NOTE

Clean the mate surfaces of the ring gear and case. Be sure that the mate marks which were made during the removal are lined up with each other.

2) Lock plate(S-84 only) and set bolt

Tightening torque:

6.0 to 7.0 kg-m (43.9 to 50.6 ft-lb)

NOTE: Be sure to use a new lock plate.

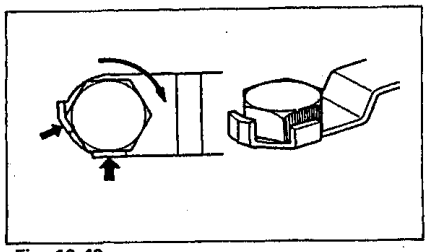


Fig. 10-48

3) Bend the tang of the lock plate so as to prevent the turning.

NOTE

As for the lock plate's tang in contact with the width-across-two flats of the bolt, be sure to bend it until it is pressed closely against the width-section-across-two flats of the bolt.

4) Side spring

SST: Transmission bearing replacer
09309-87201-000

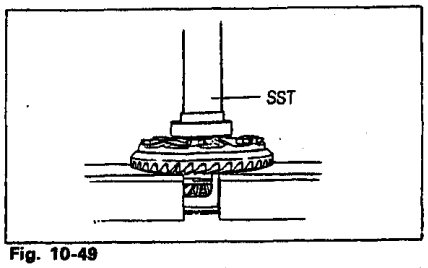


Fig. 10-49

4. Adjustment of backlash of ring gear and adjustment of play of differential case in axial direction.

1. Install the differential case in the carrier.

NOTE

Care must be exercised not to install the right and left bearing outer races in wrong places.

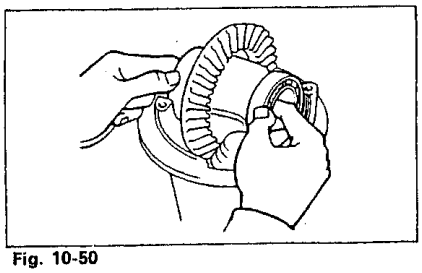


Fig. 10-50

2. Assemble the adjusting nuts in their respective places in the carrier with the threads fitted exactly with each other. Make sure that the backlash exists between the ring gear and the drive pinion.

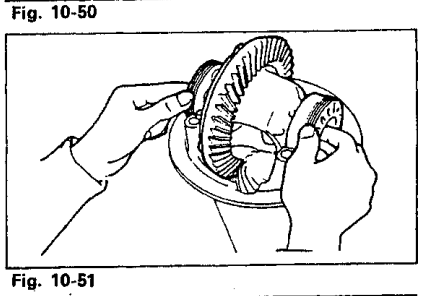


Fig. 10-51

3. Make sure that the mate marks on the bearing caps are aligned with the mate marks on the carrier. Screw in the two bearing cap bolts two or three turns and press down the bearing cap by hands.

NOTE

If the bearing cap does not fit tightly on the carrier, it indicates that the adjusting nut threads are not fitted properly.

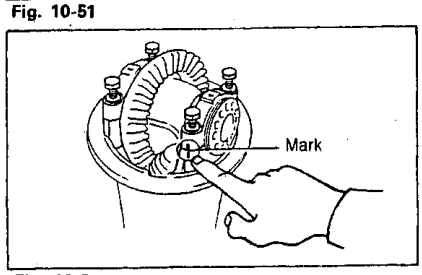


Fig. 10-52

4. Adjust the side bearing preload as follows:
   1) Tighten the bearing cap bolts, until the spring washer are slightly compressed.
   2) Tighten the adjusting nut on the ring gear side by means of the following SST, until the ring gear has a backlash of about 0.08 to 0.15mm.

      SST: Differential side bearing adjust nut wrench 09504-00010-000

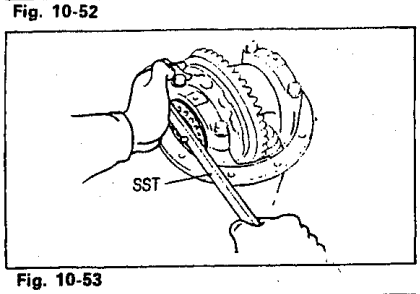


Fig. 10-53

   3) Using the SST, firmly tighten the adjusting nut on the drive pinion side in order that the bearing may be fitted snugly in the carrier.
   4) Check to see if the tightening of the adjusting nut has provided the ring gear backlash.

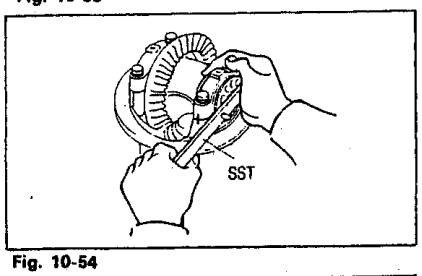


Fig. 10-54

5) Using the SST, sufficiently loosen the side bearing adjusting nut on the drive pinion side.

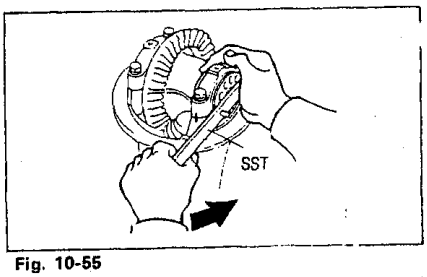


Fig. 10-55

6) Set the adjusting nut to the zero preload position for the side bearing as follows:
- Place a dial gauge on the top of the bearing outer race.
- Tighten the other adjusting nut, until the dial gauge pointer begins to move.

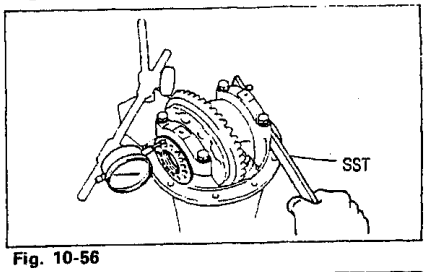


Fig. 10-56

7) Tighten the adjusting nut 1 to 5 notches from the zero preload position.

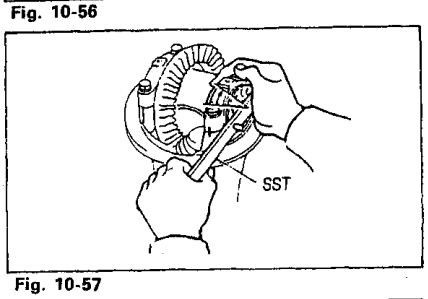


Fig. 10-57

8) Backlash adjustment
- Adjust the backlash to the specified value using the SST. Alternately turn the right and left adjusting nuts the same amount, (i.e. loose the adjusting nut at the left side one notch and tighten the adjusting nut at the right side on notch).

  Specified backlash: 0.08 to 0.15mm(0.003 to 0.006 inch)
- Tighten the bearing cap bolts to the specified torque.

  Tightening torque: 1.5 to 2.2kg-m

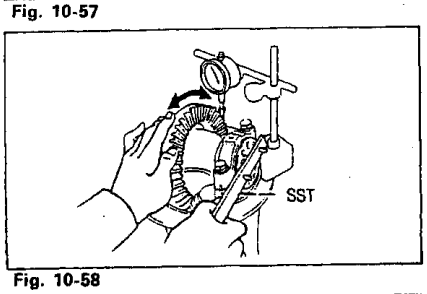


Fig. 10-58

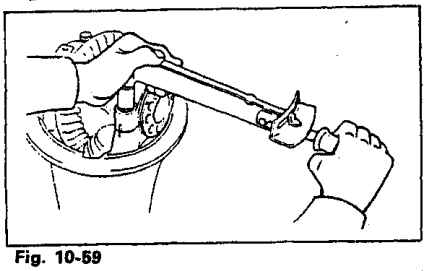


Fig. 10-59

- Recheck the ring gear backlash.

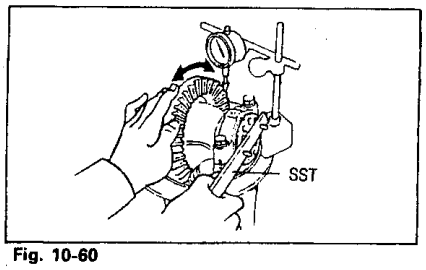


Fig. 10-60

5. Measure the total preload.
   Total preload(starting): 8.0 to 12.0kg-cm

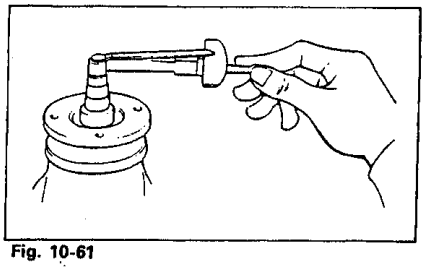


Fig. 10-61

5. Check and adjustment of tooth contact between ring gear and drive pinion.

1. Apply red lead to both sides of the gear teeth. Turn the flange to check the tooth contact between the ring gear and the drive pinion.

NOTE
Be sure to turn the flange in both the forward and backward directions and check the tooth contact patterns at several points.

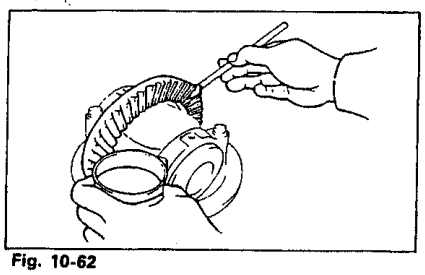


Fig. 10-62

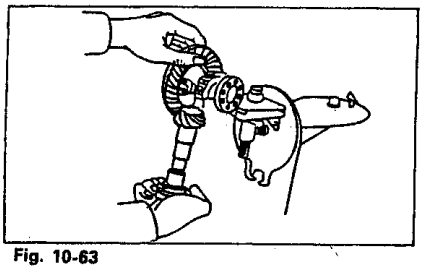


Fig. 10-63

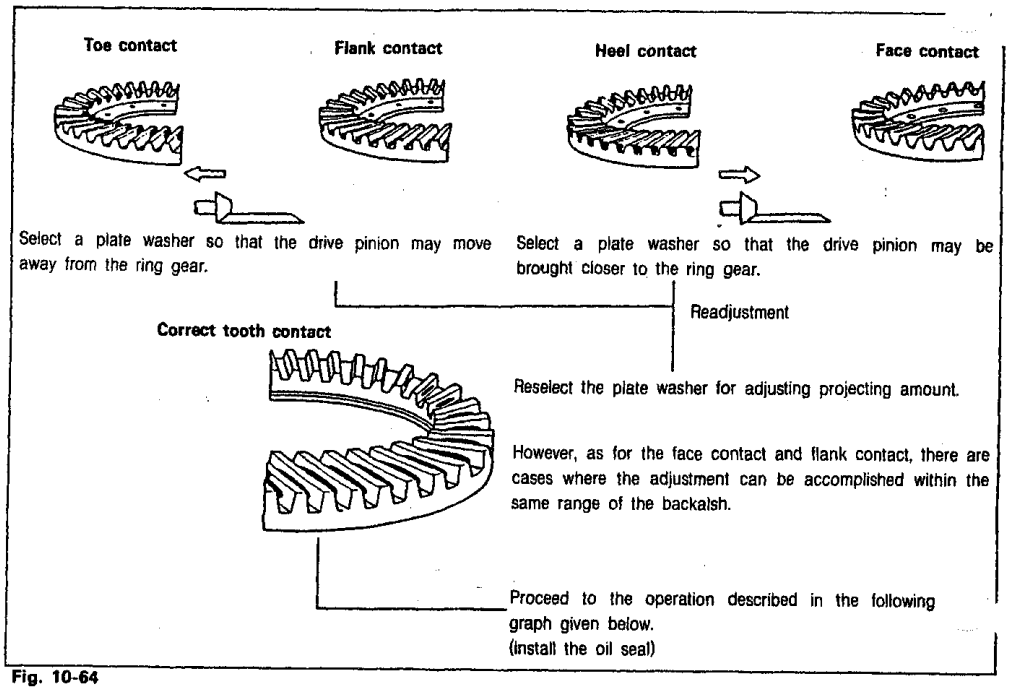


Fig. 10-64

6. Assembly of oil seal

SST: Lower ball joint dust cover replacer
09635-20010-000

NOTE

1. **Be sure to apply gear oil to the lip section of the oil seal.**
2. **Make certain to drive the oil seal into position so that it becomes flush with the edge surface of the housing.**

7. Check operations described in steps 4 and 5. If they are satisfactory, proceed to operation described in step 8.

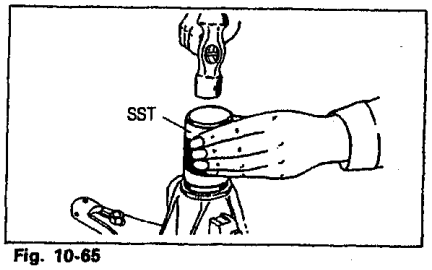


Fig. 10-65

8. Assembly of companion flange

SST: Drive pinion flange holding tool
09330-87301-000
Tightening torque(S-84): 10.0 to 14.0kg-m

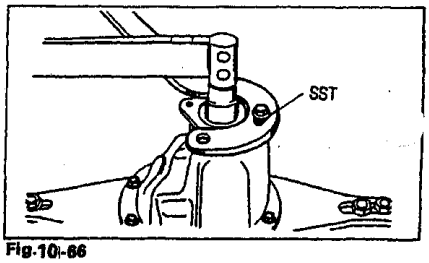


Fig.10-66

AS for the lock nut washer, be sure to positively bend it at two points in the direction in which the nut is further tightened.

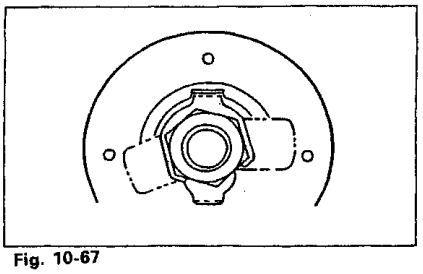


Fig. 10-67

Install the lock on each bearing cap

Tightening torque: 0.4 to 0.7kg-cm

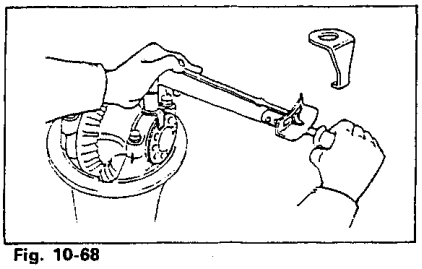


Fig. 10-68

STEERING 11

STEERING WHEEL

REMOVAL · INSTALLATION

Disassemble the parts in numerical order shown in the figure below and assemble them in the reverse order of the assembly.

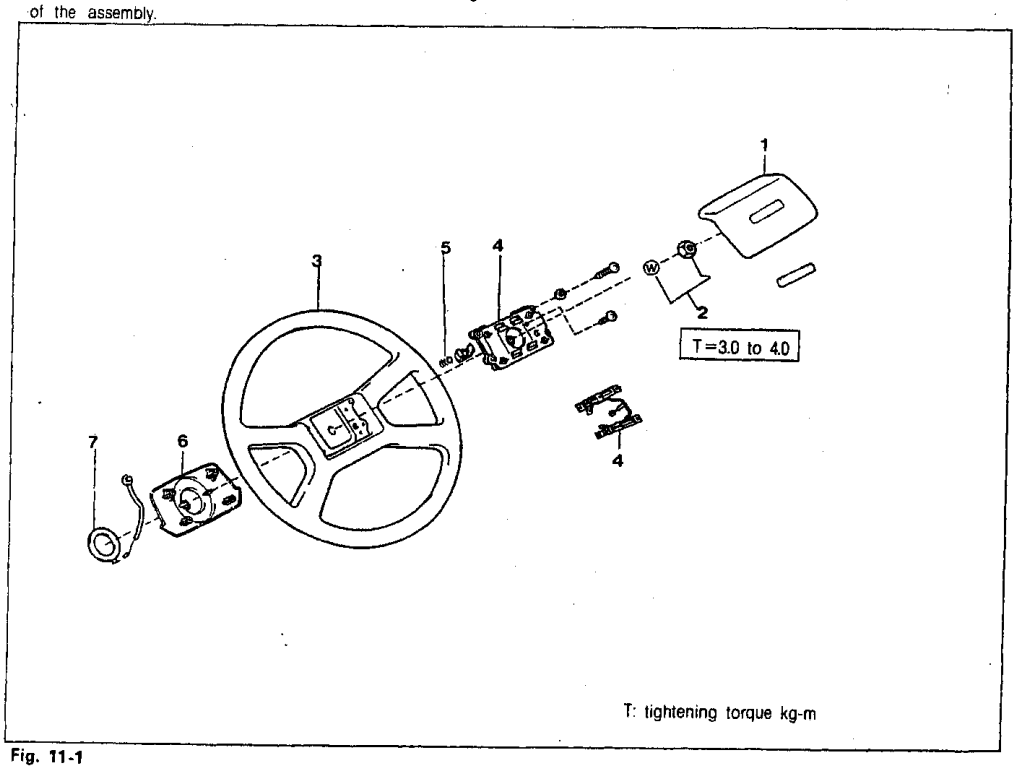


Fig. 11-1

1. Steering wheel pad S/A
2. Hexagon nut & washer
3. Steering wheel Ay
4. Horn button contact plate
5. Horn contact screw
6. Horn lead spring seat
7. Horn ring

NOTE

Prior to the operation, be sure to disconnect the negative ⊖ terminal of the battery.

STEERING MAIN SHAFT

REMOVAL

Remove the parts in numerical order shown in the figure below.

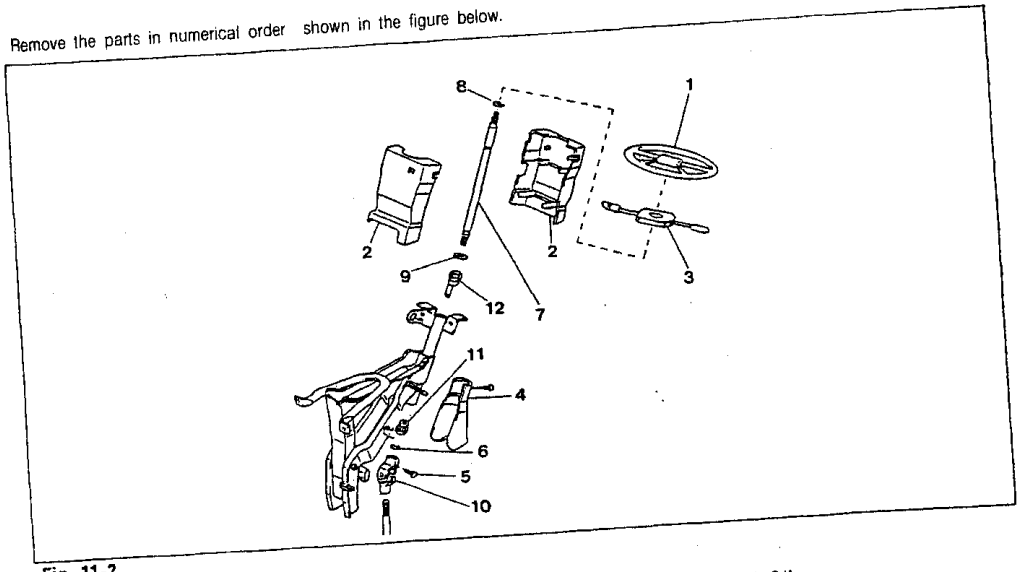


Fig. 11-2

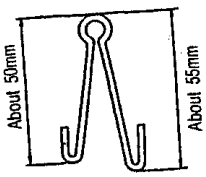
1. Steering wheel Ay
2. Steering column cover
3. Combination switch lever Ay
4. Steering universal joint cover
5. Bolt
6. "E" ring
7. Steering main shaft S/A
8. "E" ring
9. Washer
10. Steering shaft universal joint Ay
11. Bush(rubber)
12. Bush(polyacetal)

MAIN POINTS OF REMOVAL

Bush

Reference
The fabrication of a tool as indicated below will make it easy to remove the polyacetal bush.

1. First, prepare a 4mm dia. cotter pin. Then, bend its legs as indicated in the illustration below.



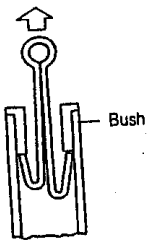


Fig. 11-3

◆ INSTALLATION

Install the parts in numerical order shown in the figure below.

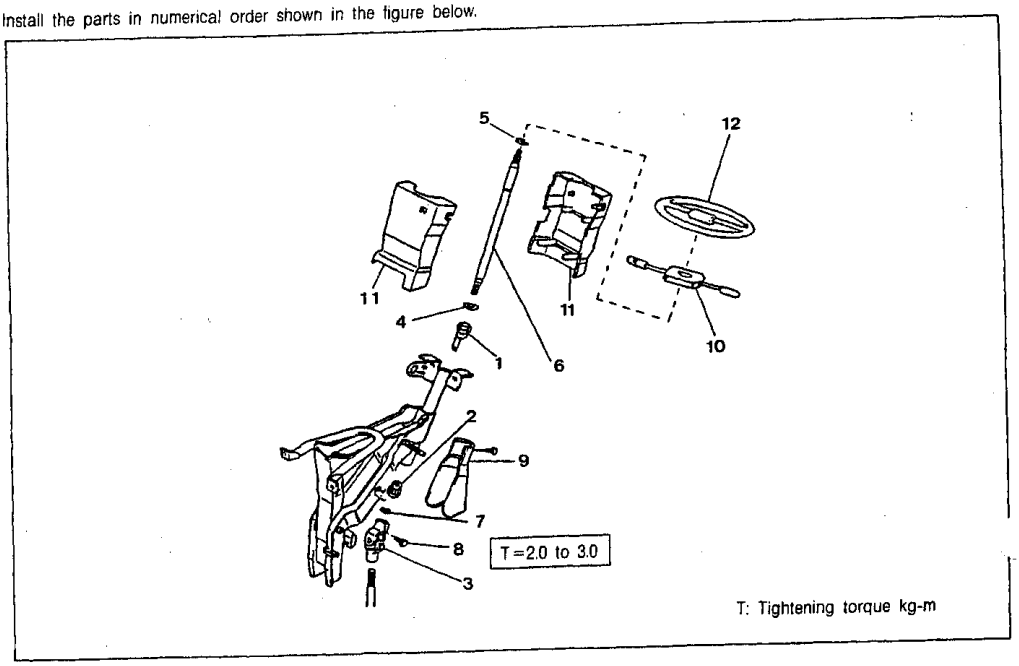


Fig. 11-4

1. Bush(polyacetal)
2. Bush(rubber)
3. Steering shaft universal joint Ay
4. Washer
5. "E" ring
6. Steering main shaft S/A
7. "E" ring
8. Bolt
9. Steering universal joint cover
10. Multi-use lever Ay
11. Steering column cover
12. Steering wheel Ay

◆ MAIN POINTS OF INSTALLATION

Grease applying points

Apply the MP grease to those points specified in the right figure.

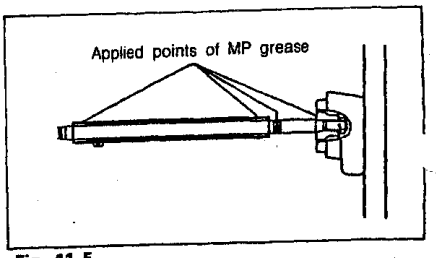


Fig. 11-5

Bush(polyacetal)

Press the bush in such a way that its tang section may point toward the front section of the motor vehicle.

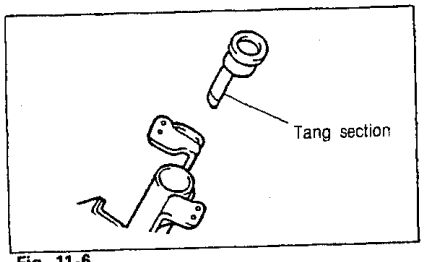


Fig. 11-6

Steering shaft universal joint

Set the front wheels to the straight-ahead condition. Install the universal joint in the positional relationship as indicated in the right figure.

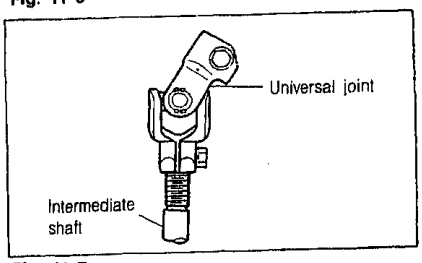


Fig. 11-7

Steering main shaft

Install the steering main shaft in such a way that the cut-out section provided at the spline section of the steering main shaft may be aligned with the tightening bolt hole of the universal joint.

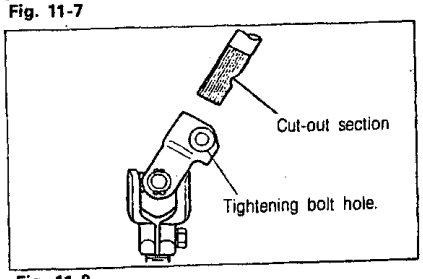


Fig. 11-8

Bolts

1. Temporarily tighten the bolts Ⓐ and Ⓑ as indicated in the right figure. Also, install the steering wheel temporarily.
2. Operate the steering wheel two or three times both to the right and to the left, until it is locked. Then, bring the front wheels to the straight-ahead condition.
3. Tighten the bolts Ⓐ and Ⓑ to the specified torque.
4. Remove the steering wheel that has been mounted temporarily.

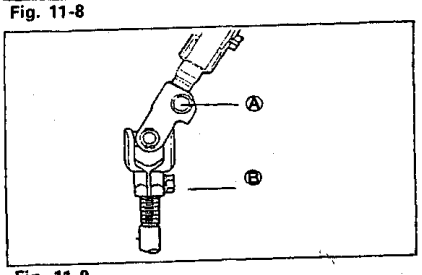


Fig. 11-9

Steering wheel

1. Install the steering wheel in such a way that the recessed section at the back side of the steering wheel may be alinged with the projected section of the self-canceling cam of the turn signal switch.

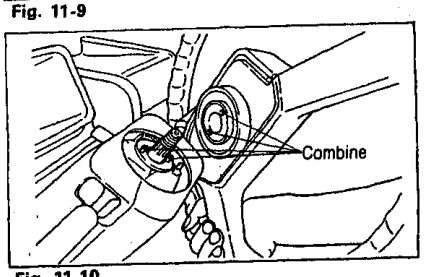


Fig. 11-10

2. Apply rubber grease to the point specified in the right figure.

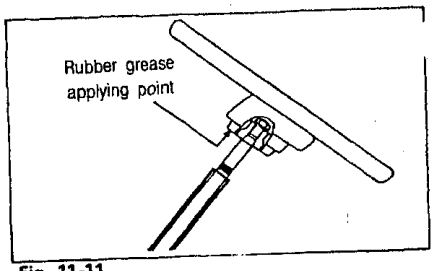


Fig. 11-11

◆ INSPECTION

Inspect the steering wheel for play or looseness as follows.

1. Set the front tires to the straight-ahead condition. Check the steering wheel for play by turning the steering wheel lightly.

Steering wheel play: 5 to 25mm(0.197 to 0.984 in.)
(As measured at wheel periphery)

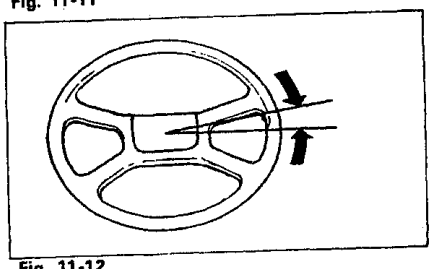


Fig. 11-12

2. Move the steering wheel in the axial direction as well as in the direction normal to the steering shaft. Check to see if the steering wheel exhibits any excessive play or looseness.

NOTE

If the steering wheel exhibits excessive play or looseness , most likely the steering gear or links are worn out or the housing installation bracket is loose.

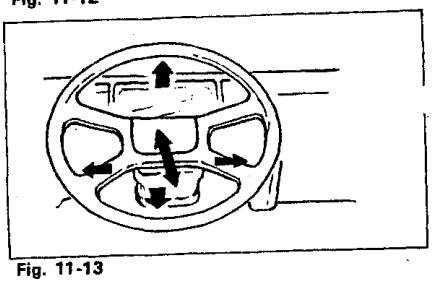


Fig. 11-13

STEERING GEAR ASSY.

REMOVAL

Remove the parts in numerical order shown in the figure below.

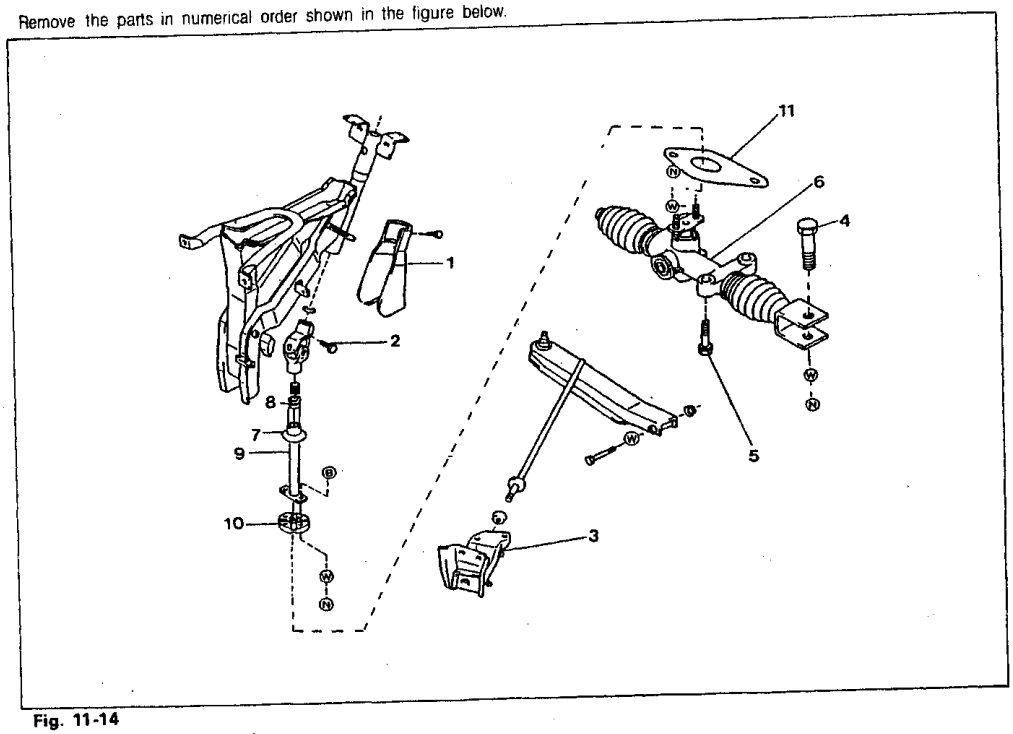


Fig. 11-14

1. Steering universal joint cover
2. Bolt
3. Strut bar bracket S/A
4. Hexagon bolt
5. Bolt
6. Steering gear Ay
7. Dust cover
8. Bush
9. Steering intermediate shaft S/A
10. Flexible coupling Ay
11. Steering gear housing cover

MAIN POINTS OF REMOVAL

Steering gear Ay

Jack up the front section of the vehicle.

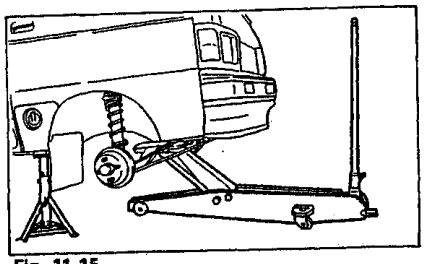


Fig. 11-15

Steering gear housing cover

Remove the steering gear housing cover by aligning the cut-out section of the plate with the pinion flange.

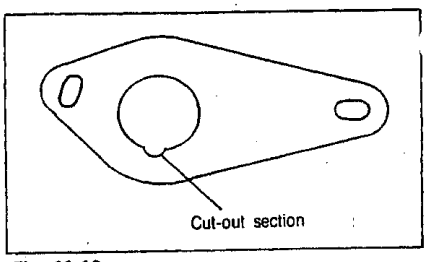


Fig. 11-16

◆ DISASSEMBLY

Disassemble the parts in numerical order shown in the figure below.

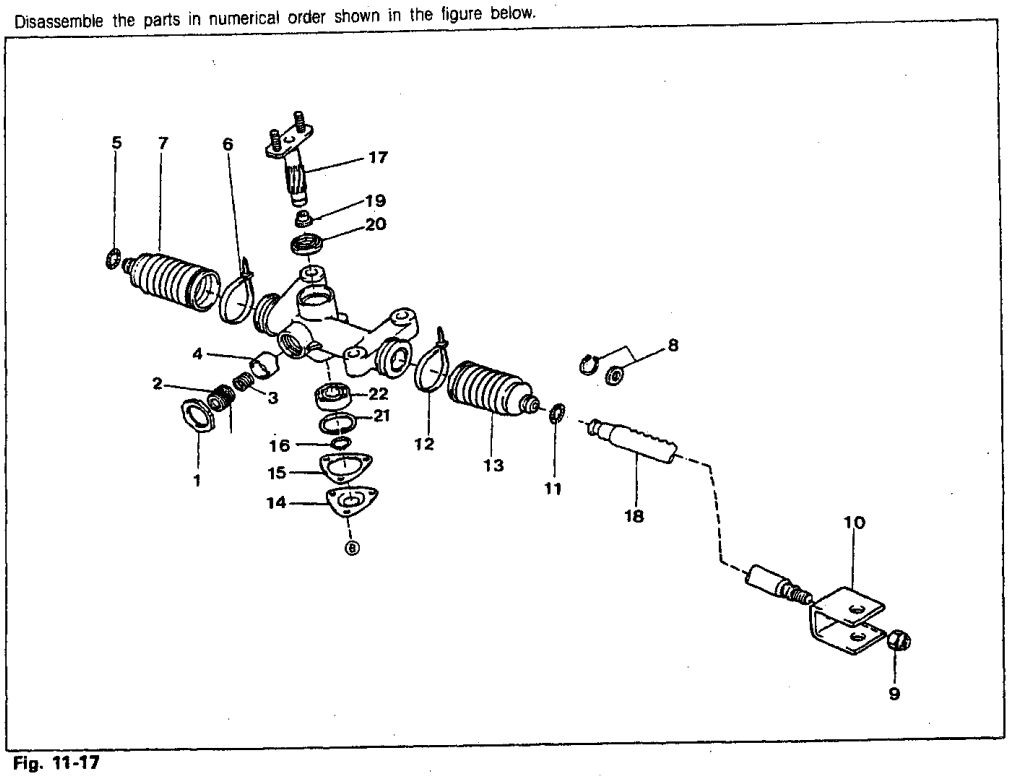


Fig. 11-17

1. Hexagon nut
2. Rack guide spring cap
3. Compression spring
4. Rack guide
5. Steering rack boot No. 1 band
6. Steering rack boot band
7. Steering rack boot
8. Rack stopper & snap ring
9. Lock nut
10. Steering rack No. 1 end S/A
11. Steering rack boot No. 1 band
12. Steering rack boot band
13. Steering rack boot
14. Steering gear housing cover
15. Steering rack housing left packing
16. Shaft snap ring
17. Steering pinion
18. Steering rack
19. Dust cover
20. Type "T" oil seal
21. Bearing snap ring
22. Radial ball bearing

◆ OPERATION PRIOR TO DISASSEMBLY

Clamp the steering gear housing in a vice. This clamping should be made at the mounting section of the steering gear housing with jaw plates of copper or aluminum interposed.

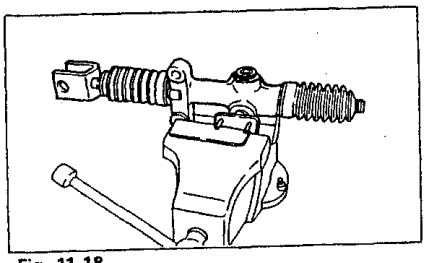


Fig. 11-18

◆ MAIN POINTS OF DISASSEMBLY

Hexagon nut

Remove the hexagon nut, using the SST below.

SST: Worm bearing adjusting screw lock nut
09617-22030-000

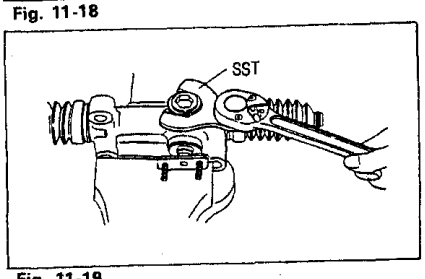


Fig. 11-19

Rack guide spring cap

Remove the rack guide spring cap by means of a simple spinner.

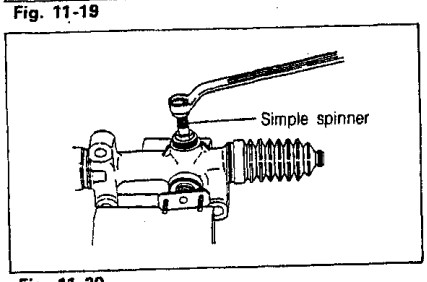


Fig. 11-20

Lock nut

To prevent the tooth surfaces from being damaged, this machined section has been provided at the rack end, as indicated in the right figure.

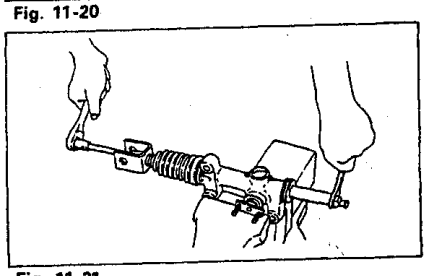


Fig. 11-21

Snap ring

Detach the snap ring, using a snap ring expander.

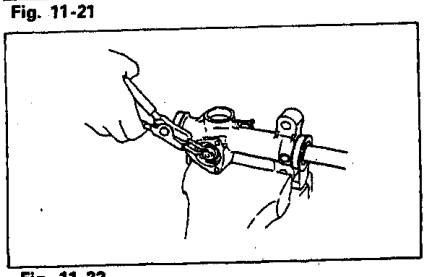


Fig. 11-22

Steering pinion

1. Move the rack by turning the pinión, until the rack teeth may be disengaged from those of the pinion.
2. Drive out the steering pinion, using a round rod, as indicated in the right figure.

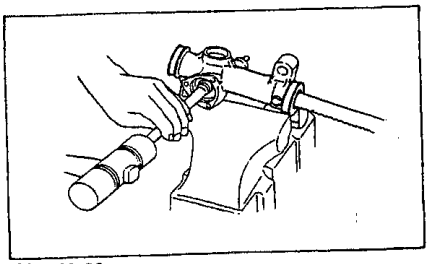


Fig. 11-23

Snap ring

Detach the snap ring by means of a snap ring expander.

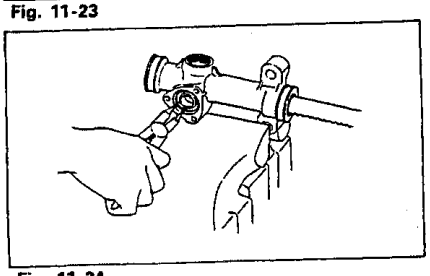


Fig. 11-24

Radial ball bearing

Drive out the bearing lightly using a round rod, as indicated in the right figure.

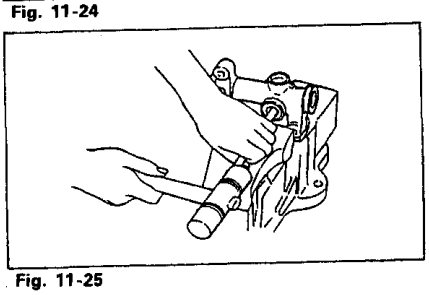


Fig. 11-25

◆ INSPECTION

Inspect the following parts. Replace any parts which exhibit defects.

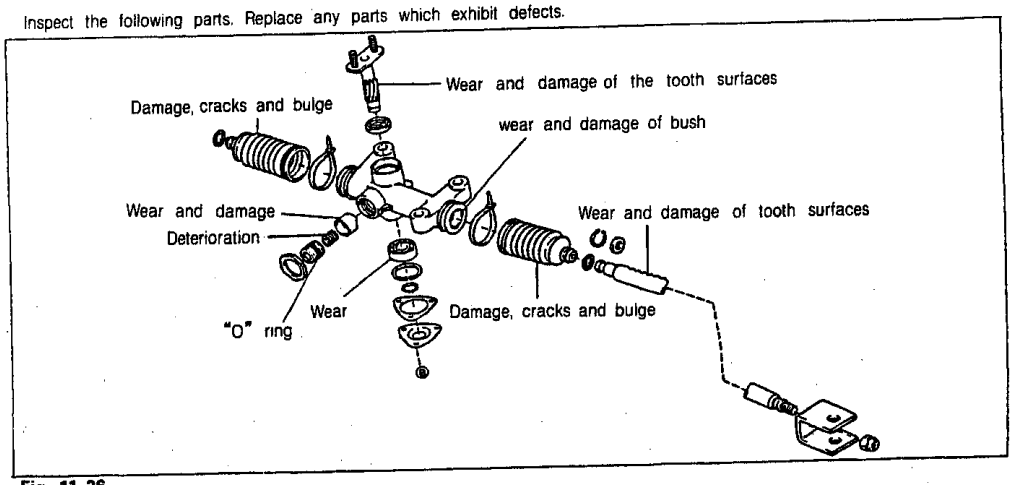


Fig. 11-26

◆ ASSEMBLY

Assemble the parts in numerical order shown in the figure below.

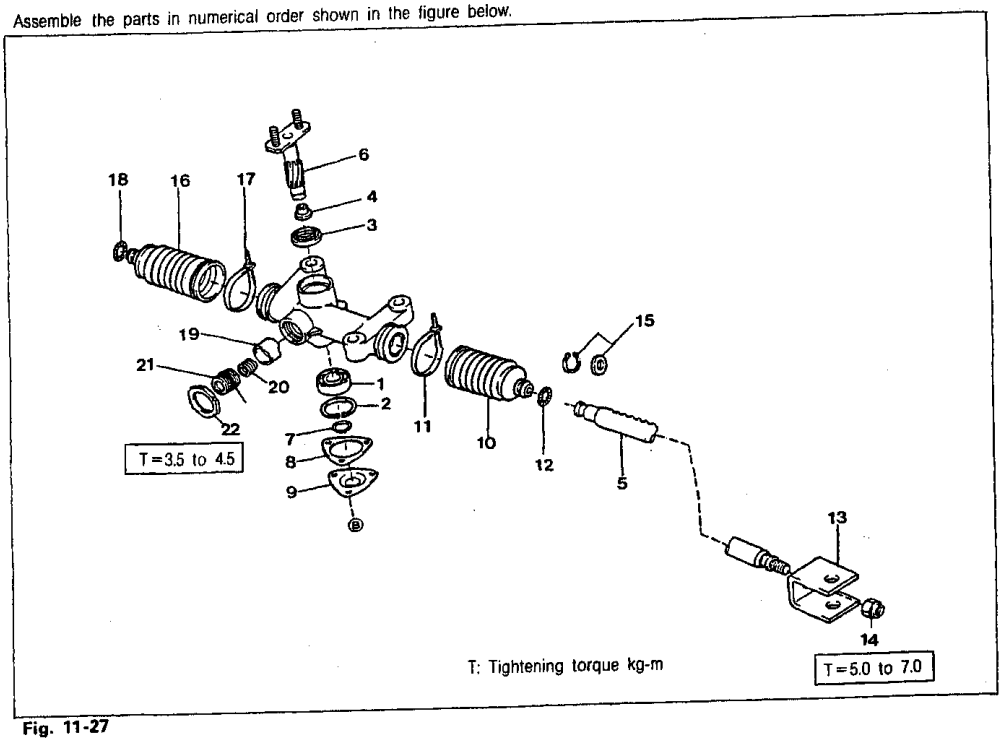


Fig. 11-27

1. Radial ball bearing
2. Bearing snap ring
3. Type "T" oil seal
4. Dust cover
5. Steering rack
6. Steering pinion
7. Steering sanp ring
8. Steering rack housing left packing
9. Steering gear housing cover
10. Steering rack boot
11. Steering rack boot band
12. Steering rack boot No. 1 band
13. Steering rack No.1 end S/A
14. Lock nut
15. Rack stopper & snap ring
16. Steering rack boot
17. Steering rack boot band
18. Steering rack boot No. 1 band
19. Rack guide
20. Compression spring
21. Rack guide spring cap
22. Hexagon nut

◆ MAIN POINTS OF ASSEMBLY

Grease applying points

Apply ultrahigh-pressure grease(EP grease) to those points specified in the right figure.

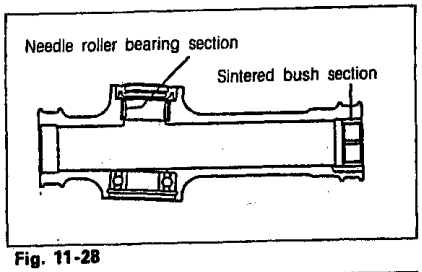


Fig. 11-28

Radial ball bearing

1. Install the radial ball bearing, using the following SST below.
   (Use the SST: Replacer 09254-10010-000 of the replacer set "A" 09250-10011-000)
2. Apply ultrahigh-pressure grease(EP grease) to the radial ball bearing.

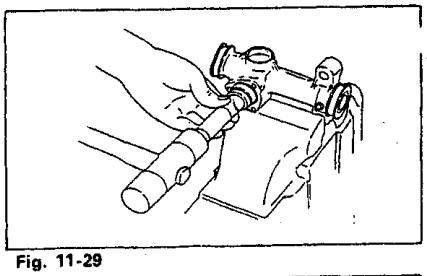


Fig. 11-29

Snap ring

Assemble the snap ring by means of a snap ring expander.

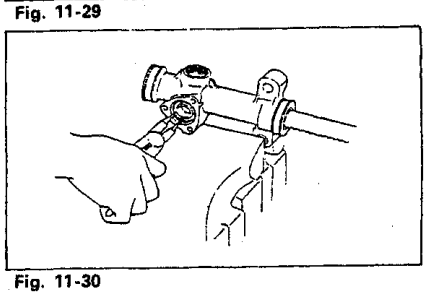


Fig. 11-30

Type "T" oil seal

1. Install the oil seal, using the following SST below.
   SST: Rear axle bearing inner replacer 09515-87202-000
2. When assembling the oil seal, coat the entire lip-section of the oil seal with ultrahigh-pressure grease(EP grease).

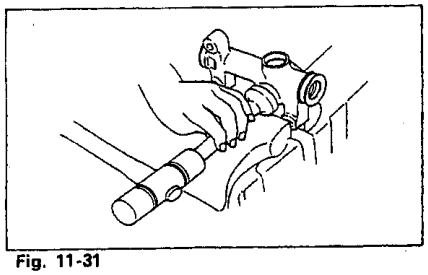


Fig. 11-31

Steering rack

Apply ultrahigh-pressure(EP grease) to the tooth surfaces and the shaft portion of the rack.

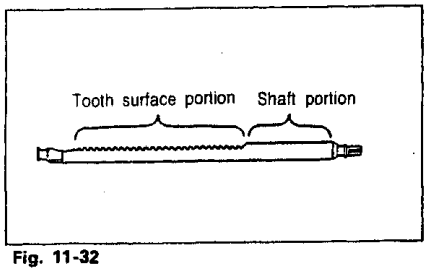


Fig. 11-32

Rack guide

Apply ultrahigh-pressure grease(EP grease) to the rack guide insertion hole.

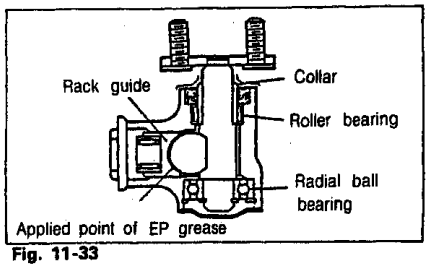


Fig. 11-33

2. Insert the rack into the housing rack may assume the position as indicated in the right figure.

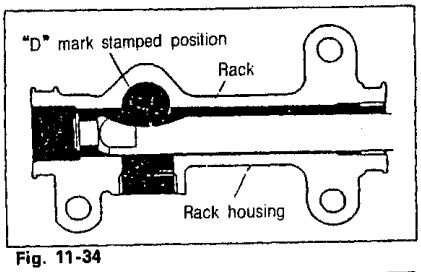


Fig. 11-34

Steering pinion

Drive the pinion into the position, using a round rod.

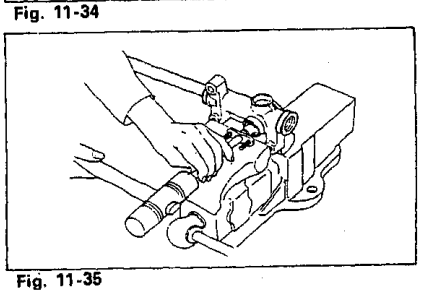


Fig. 11-35

Snap ring

Assemble the snap ring by means of expander.

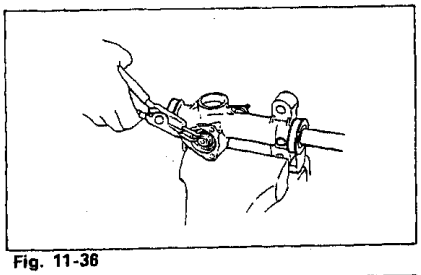


Fig. 11-36

Assembling procedure for steering pinion and rack

1. Push the rack into the position with the pinion flange set to the direction as indicated in the right figure.

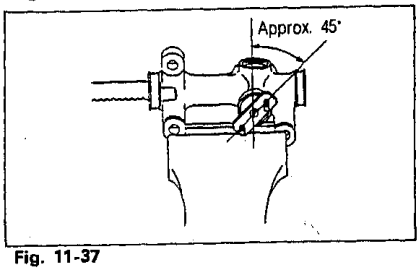


Fig. 11-37

2. After the rack has been meshed with the pinion, make sure that the dimensions of the pinion and rack assume the relationship as indicated in the right figure.

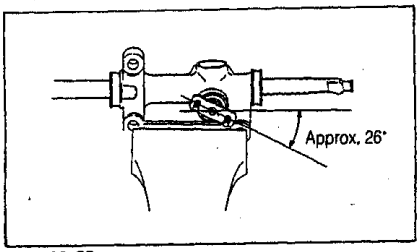


Fig. 11-38

Steering rack boot

Fit a vinyl tube or the like onto the threaded portion of the rack so that no damage may be made to the boot during the assembly.

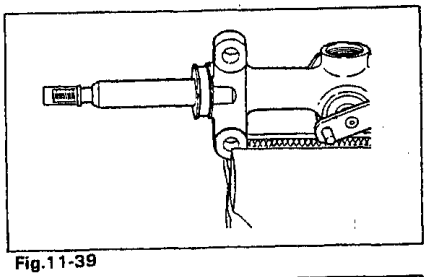


Fig.11-39

Steering rack boot band

Tighten the boot band at the position as specified in the right figure.

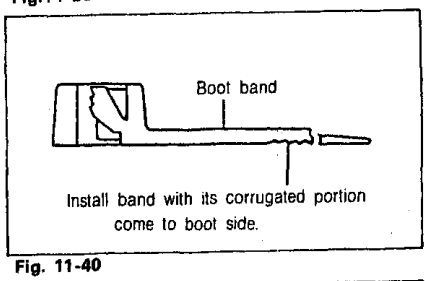


Fig. 11-40

Lock nut

1. Set the steering rack end No. 1 to the angle specified in the right figure.
2. Tighten the lock nut with a wrench.

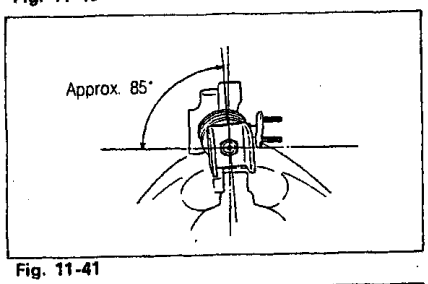


Fig. 11-41

Rack guide spring cap

Torque the spring cap to 0.7kg-m by means of the simple spinner. Then, back off it to an angle of 55°±4°

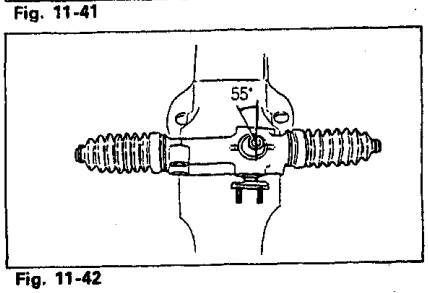


Fig. 11-42

Hexagon nut

Install the hexagon nut, using the following SST below.

SST: Worm bearing adjusting screw lock nut wrench
09617-22030-000

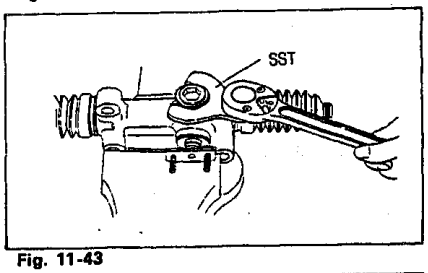


Fig. 11-43

INSTALLATION

Install the parts in numerical order shown in the figure below.

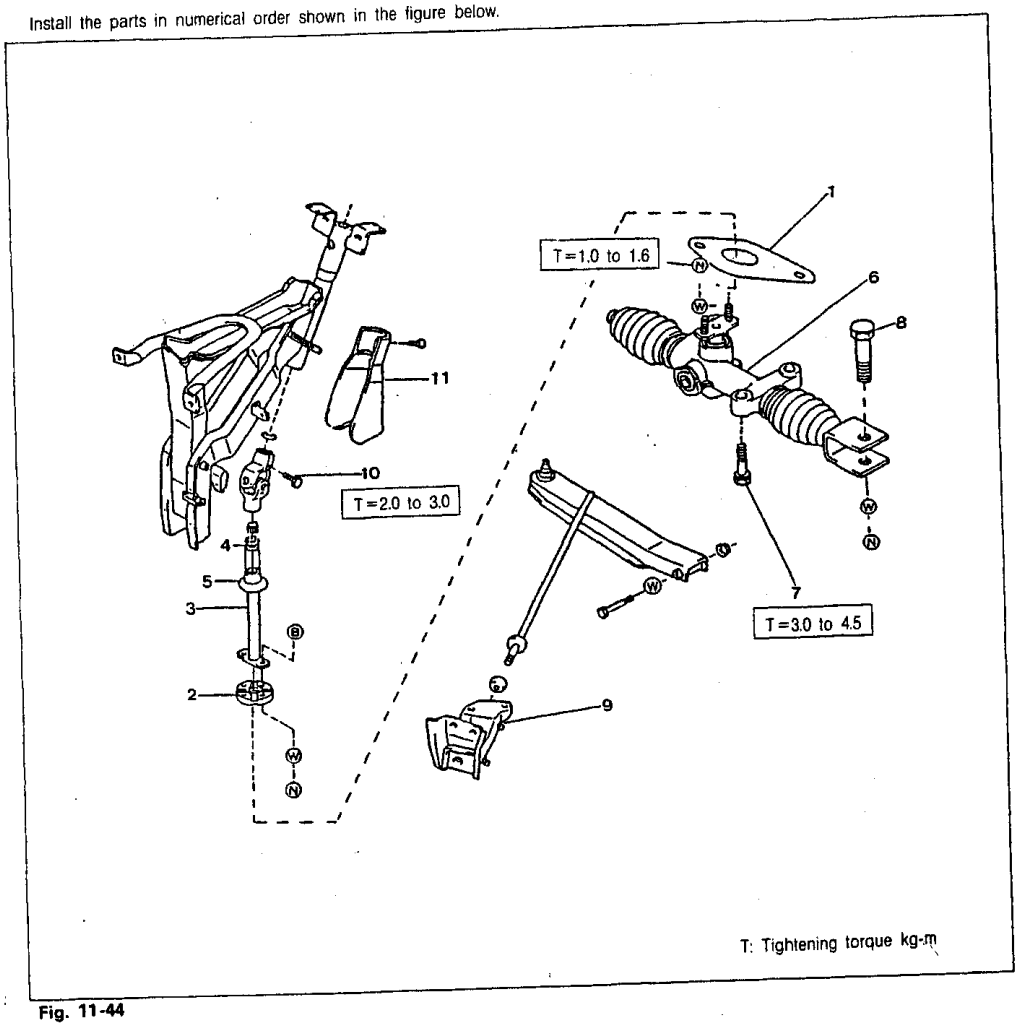


Fig. 11-44

1. Steering gear housing cover
2. Flexible coupling Ay
3. Steering intermediate shaft S/A
4. Bush
5. Dust cover
6. Steering gear Ay
7. Bolt
8. Hexagon bolt
9. Strut bar bracket S/A
10. Bolt
11. Steering universal joint cover

DRAG LINK

REMOVAL

Remove the parts in numerical order shown in the figure below.

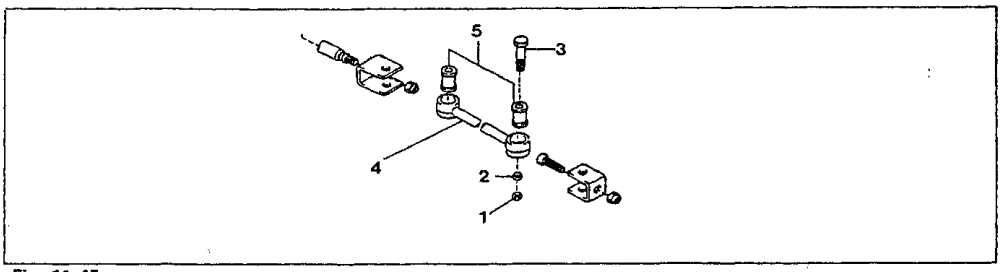


Fig. 11-45

1. Nut
2. Spring washer
3. Bolt
4. Steering drag link
5. Bush

MAIN POINTS OF REMOVAL

Bush

Press the bush off. For this removal operation, use a set of the following SSTs in conjunction with a press, as indicated in the right figure.

ⓐ **SST: Clutch guide tool**
09301-87201-000

ⓑ **SST: Differential drive pinion bearing cone rear replacer**
09506-87301-000

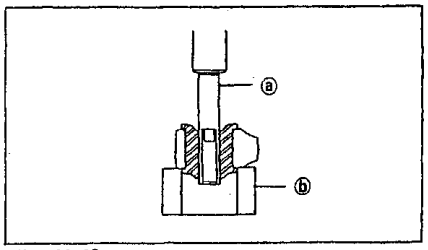


Fig. 11-46

INSTALLATION

Install the parts in numerical order shown in the figure below.

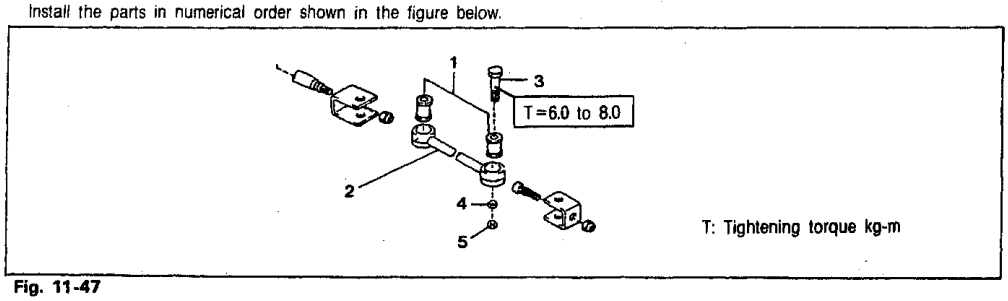


Fig. 11-47

1. Bush
2. Steering drag link
3. Bolt
4. Spring washer
5. Nut

Bush

Press the bush into the position. For this installation, use a set of the following SSTs in conjuction with a press, as indicated in the right figure.

ⓑ SST: Clutch guide tool
09301-87201-000

ⓐ SST: Differential drive pinion bearing cone rear replacer
09506-87301-000

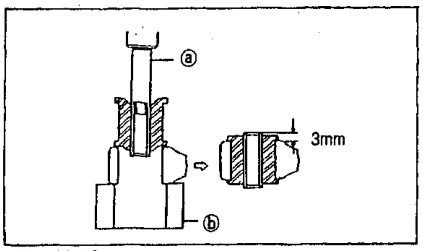


Fig. 11-48

CENTER ARM

REMOVAL

Remove the parts in numerical order shown in the figure below.

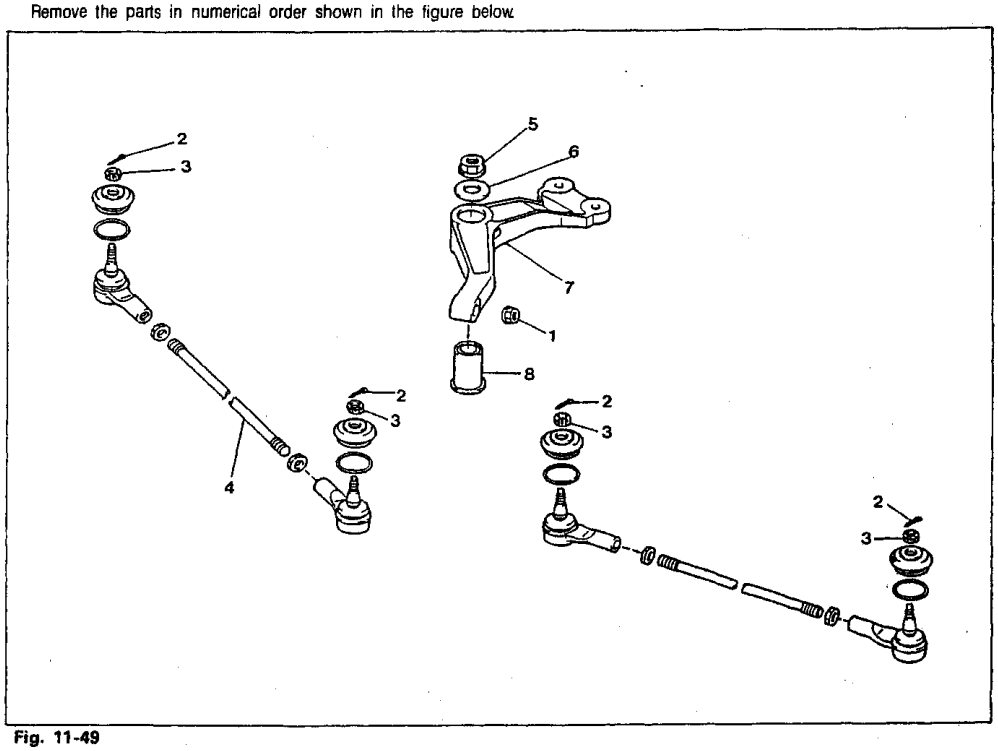


Fig. 11-49

1. Lock nut
2. Cotter pin
3. Castle nut
4. Tie rod Ay
5. Lock nut
6. Plate washer
7. Steering center arm
8. Bush

◆ MAIN POINTS OF REMOVAL

Tie rod ends

Remove the tie rod, using the following SST below.

SST: Tie rod end puller
09611-87701-000

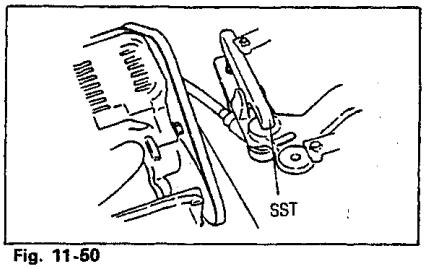


Fig. 11-50

Bush

Press the bush off. For this removal operation, use a set of the following SSTs in conjuction with a press, as indicated in the right figure.

ⓐ **SST: Differential drive pinion bearing cone rear replacer**
09506-87301-000

ⓑ **SST: Transmission gear bearing anvil**
09334-87301-000

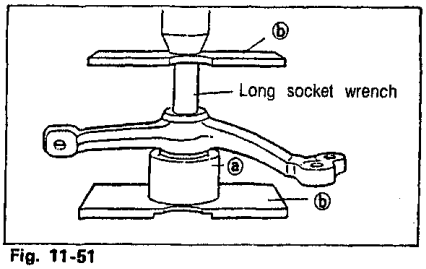


Fig. 11-51

◆ INSPECTION

Inspect the following parts. Replace sny aprts which exhibit defects.

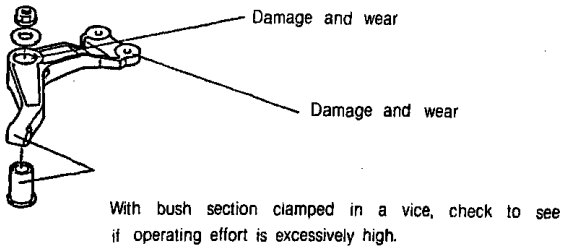


Fig. 11-52

INSTALLATION

Install the parts in numerical order shown in the figure below.

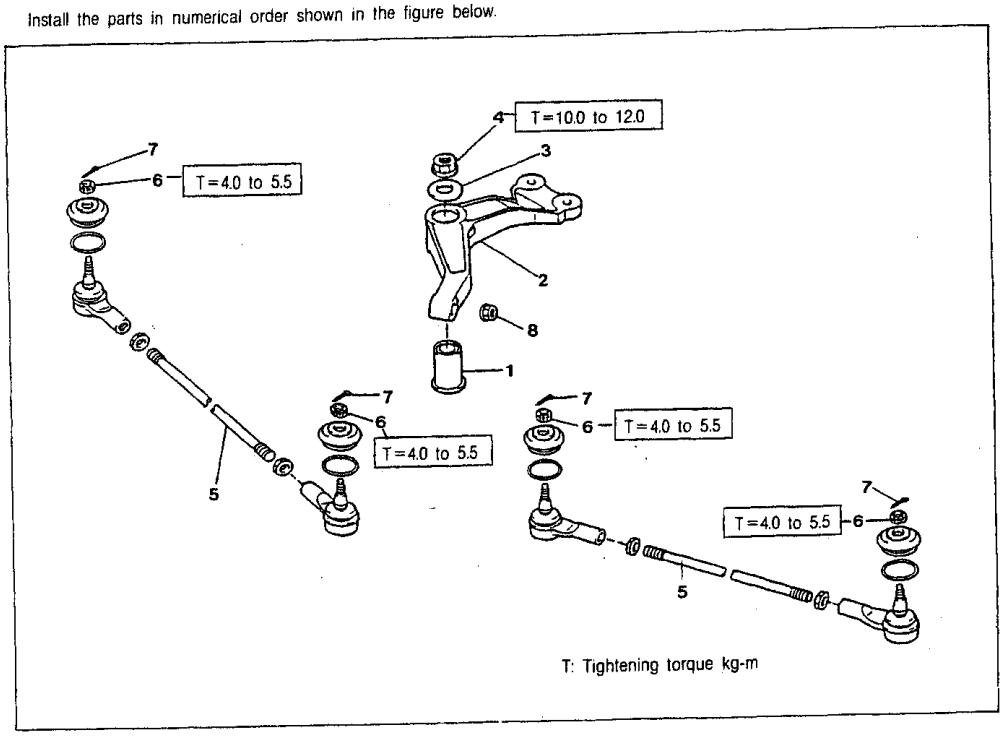


Fig. 11-53

1. Bush
2. Steering center arm
3. Plate washer
4. Lock out
5. Tie rod Ay
6. Castle nut
7. Cotter pin
8. Lock nut

MAIN POINTS OF INSTALLATION

Bush

Press the bush into position. For this installation, use a set of the following SSTs in conjuction with a press, as indicated in the right figure.

ⓐ SST: Differential drive pinion bearing cone rear replacer
09506-87302-000

ⓑ SST: Rear axle shaft bearing replacer
SST: 09515-21010-000

ⓒ SST: Transmission rear bearing anvil
SST: 09334-87301-000

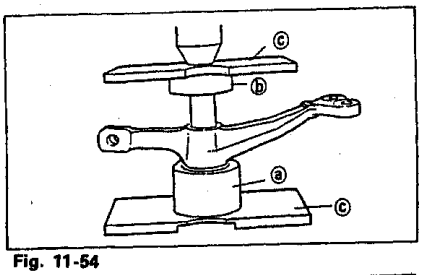


Fig. 11-54

TIE RODS

REMOVAL

Remove the parts in numerical order shown in the figure below.

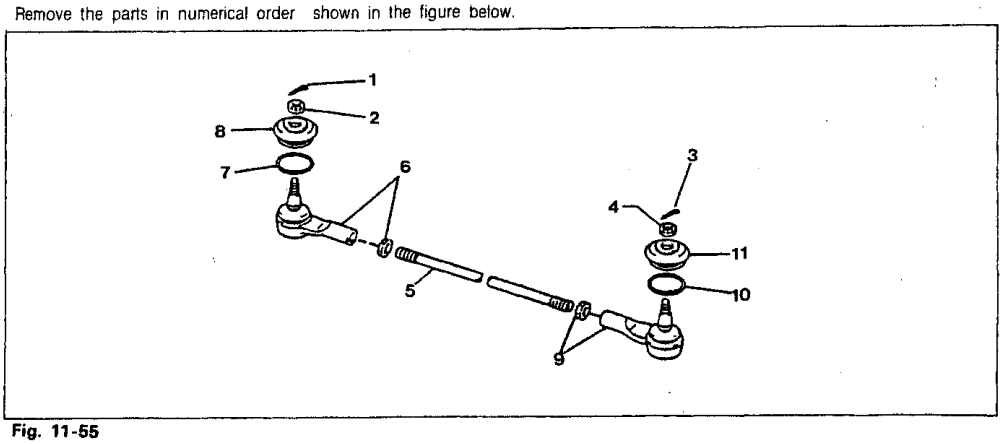


Fig. 11-55

1. Cotter pin
2. Castle nut
3. Cotter pin
4. Castle nut
5. Tie rod Ay
6. Tie rod No. 1 end S/A
7. Steering joint dust seal band
8. Tie rod No. 2 end S/A
9. Steering joint dust seal band
10. Steering link joint dust seal

MAIN POINTS OF REMOVAL

1. Jack up the vehicle.

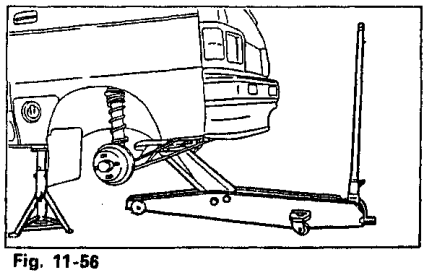


Fig. 11-56

2. Remove the tie end assembly, using the following SST below.

   SST: Tie rod end puller
   09611-87701-000

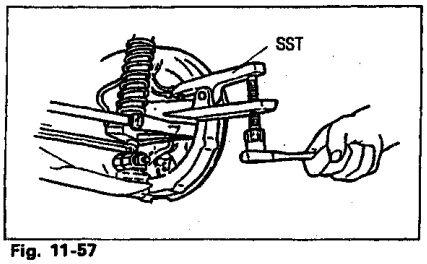


Fig. 11-57

INSPECTION

Inspect the following parts. Replace any parts which exhibit defects.

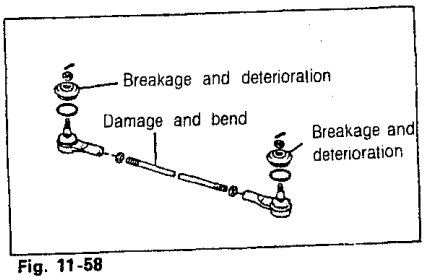


Fig. 11-58

INSTALLATION

Install the parts in numerical order shown in the figure below.

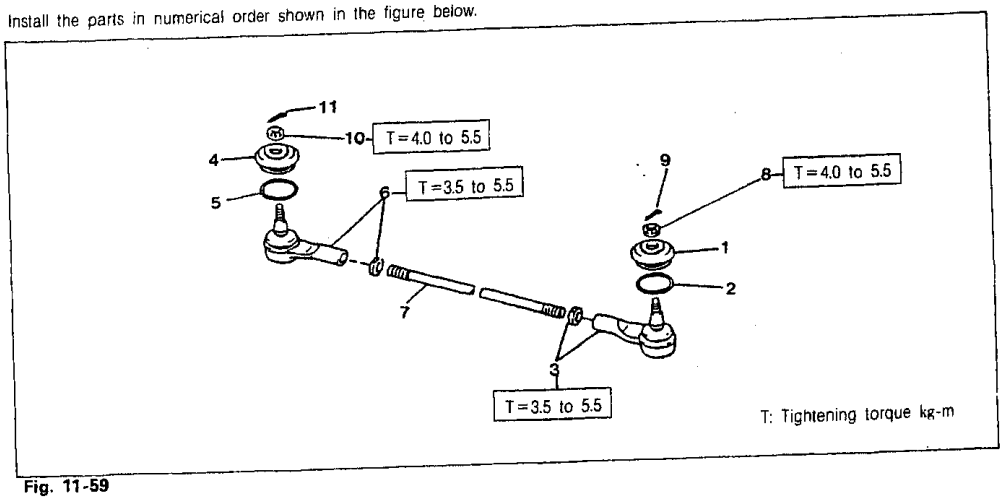


Fig. 11-59

1. Steering link joint dust seal
2. Steering joint dust seal band
3. Tie rod No. 2 end S/A
4. Steering link joint dust seal
5. Steering joint dust seal band
6. Tie rod No. 1 end S/A
7. Tie rod Ay
8. Castle nut
9. Cotter pin
10. Castle nut
11. Cotter pin

MAIN POINTS OF INASTALLATION

Grease applying point

Apply the MP grease to the point specified in the right figure.

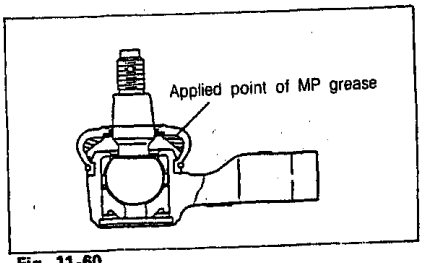


Fig. 11-60

Tie rod end S/A No. 1

NOTE
Make sure that the tie rod ends having left-hand threads come at the center arm side of the right tie rod assembly and at the knuckle side of the left tie rod assembly.

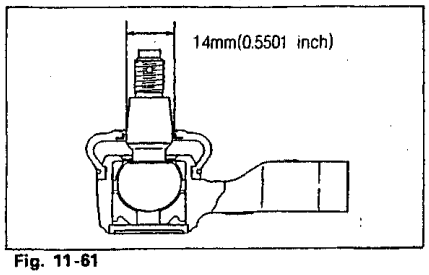


Fig. 11-61

Tie rod Assy

Set the distance between the tie rod ends to the dimension specified in the right figure. Temporarily tighten the lock nuts. (Upon completion of the sideslip test, be sure to tighten these lock nuts securely.)

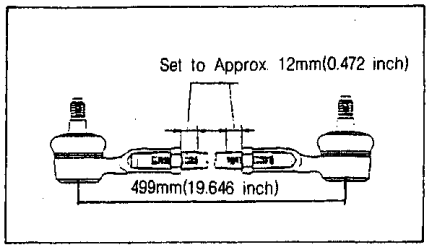


Fig. 11-62

◆ INSPECTION AFTER INSTALLATION OF TIE ROD ENDS

1. Check the side slip.
   Amount of sideslip:
   IN 3.0(0.118) to OUT 3.0(0.118)mm(inch)
   (per one meter)
2. Tighten the lock nuts of the tie rod ends.

FRONT WHEEL ALIGNMENT

CHECK AND ADJUSTMENT OF SIDESLIP AND TURNING ANGLES

1. Check the air inflation pressure of the tires. Place the vehicle on a level floor Rock the front and rear sections of the vehicle in an up-and-down direction in order that the front and rear suspensions may settle in their normal state.
2. Check to see if the tires exhibit uneven wear or runout and the wheels exhibit excessive play in the axial direction.
3. Ensure that each mechanism of the front suspension and steering exhibits no excessive play.
4. Slowly drive the vehicle onto a sideslip tester and pass through the tester while maintaining the vehicle under the straight-ahead condition. Read the scale of the sideslip tester.

   Amount of sideslip:
   IN 3.0(0.118) to OUT 3.0(0.118) mm(inch)
   (per one meter for both IN and OUT)

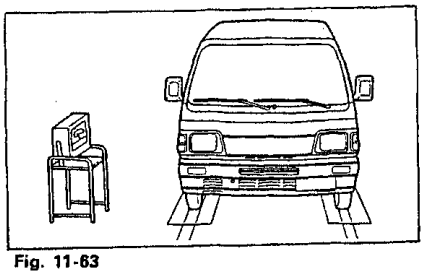


Fig. 11-63

5. If the amount of sideslip is not within the specified range, slacken the lock nuts of the tie ends. Perform the adjustment by turning the tie rod ends, and alter the tie rod length.

   NOTE
   The adjustment must be carried out in such a way that the tie rod length at the right and left sides may become the same.

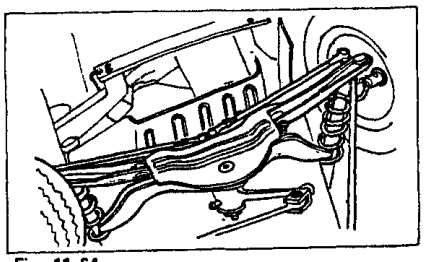


Fig. 11-64

6. Set the turning radius gauge to "0" degree. Place the front wheels under the straight-ahead condition. Perform the check of the turning angles as follows.
   1) Turning the steering wheel fully to the right and left sides, respectively. Read the scales of the turning radius gauges at the right and left sides.

   NOTE
   Make sure that there is no possibility that the wheels interfere with the body, etc. when the wheels are turned fully.

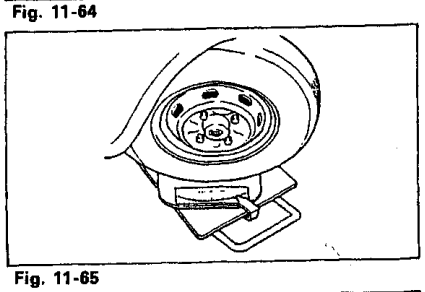


Fig. 11-65

   2) Check the tire turning angles when the steering wheel is turned fully to the right and left sides, respectively.

   NOTE
   If the length of the left tie rod is increased by two turns, it is necessary to decrease the length of the right tie rod by two turns, thereby making sure that the toe-in may remain the same.

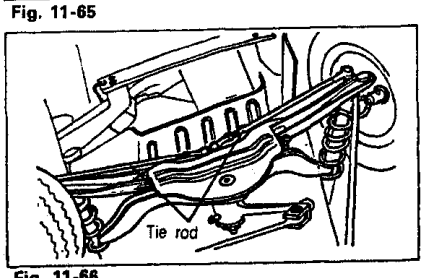


Fig. 11-66

Item	Turning angle
Inside	42.2°
Outside	31.3°
Difference between right and left sides	Within 3°

FRONT WHEEL ALIGNMENT

In the strut type suspension, the rigidity of its components is very high and the distance between the upper and lower supporting points is great, thus resulting in high body rigidity. Hence, the front wheel alignment remains unchanged, unless the motor vehicle has encountered with major motor vehicle accidents. Nevertheless, if the front wheel alignment seems to be out-of-adjustment because of the tire's abnormal wear, steering troubles or other symptons, it is advisable to check the front wheel alignment.

NOTE

1. **Before the front wheel alignment is measured, make sure to check the vehicle height, as is the case with the sideslip measurement. Also, ensure that vehicle exhibits no excessive looseness at any point.**
2. **Be sure to place the turning radius gauge on a level ground. Furthermore, raise the rear wheels of the vehicle by a height equivalent to the height of the turning radius gauge in order that the levelness of the motor vehicle may be maintained.**
   Morever, be sure to that the turning radius gauge moves lightly.
3. **Prior to the measurement, make certain to rock the front and rear parts of the vehicle in an up-and-down direction so that the front and rear suspensions may be settled under a natural condition.**
4. **The measurement should be carried out with the brakes in a locked state.**

Front wheel alignment

Camber	1° 35′
Caster	3°
Kingpin angle	11° 14′
Toe-in	5.5㎜(0.217in)
Sideslip	I N/OUT : 3.0/3.0

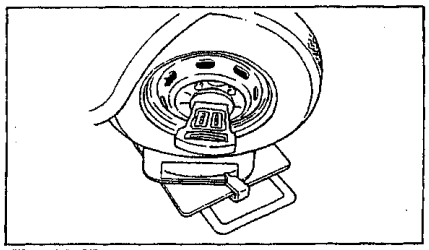


Fig. 11-67

BRAKES 12

BRAKE PEDAL

REMOVAL

Remove the parts in numerical order shown in the figure below.

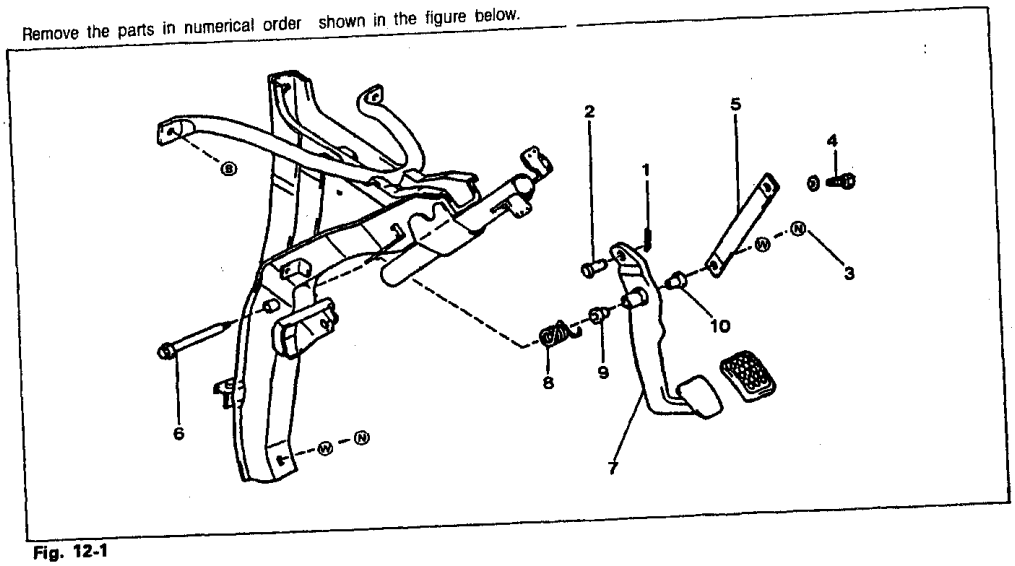


Fig. 12-1

1. Cotter pin
2. Pin with ball
3. Nut
4. Bolt
5. Pedal shaft lock plate
6. Pedal shaft
7. Brake pedal Ay
8. Spring
9. Bush
10. Bush

INSPECTION AND REPAIRS

Inspect the following parts. Replace any parts which exhibit defects.

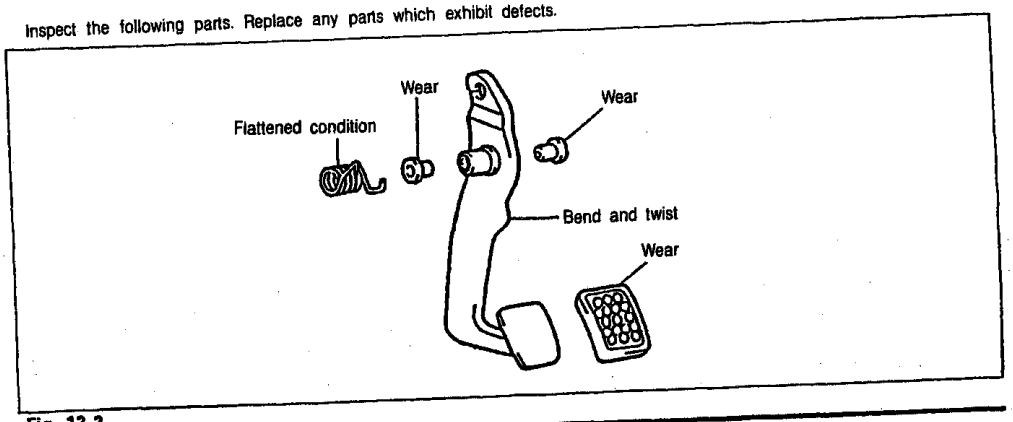


Fig. 12-2

INSTALLATION

Install the parts in numerical order shown in the figure below

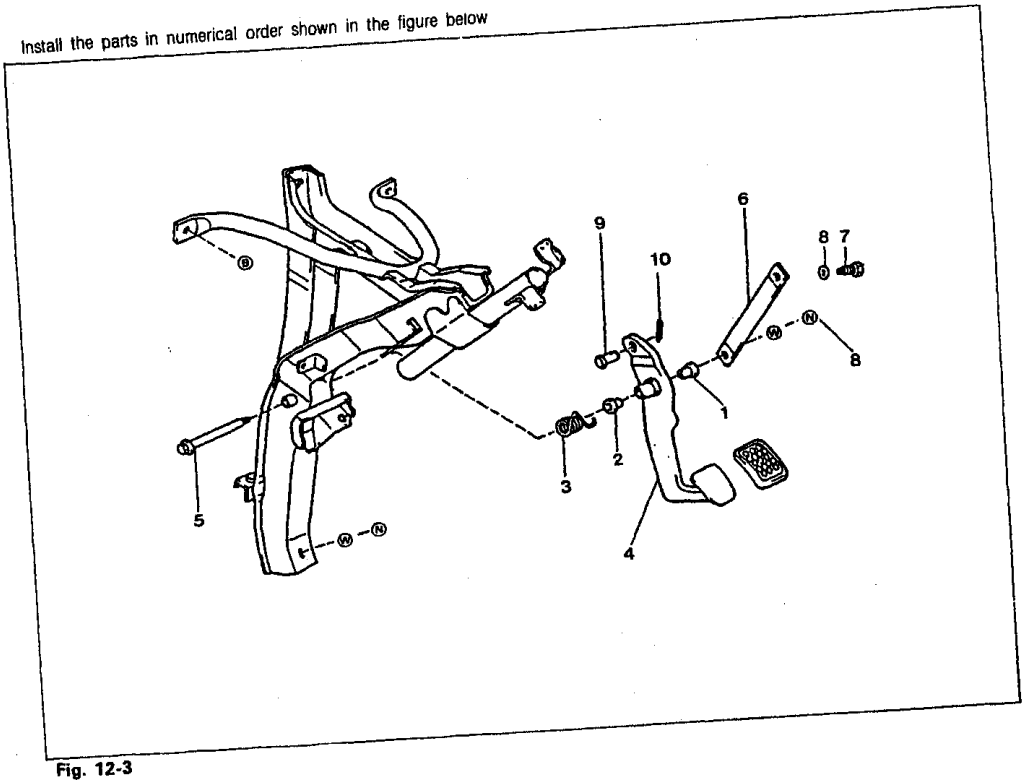


Fig. 12-3

1. Bush
2. Bush
3. Spring
4. Brake pedal Ay
5. Pedal shaft
6. Pedal shaft lock plate
7. Bolt
8. Nut
9. Pin with ball
10. Cotter pin

Specified values

Item	Specified value
Pedal height mm	139
Pedal free travel mm	2 to 7
Pedal reserve travel	above 78kg (When appling force to pedal is 50kg)

ADJUSTMENT

Adjustment of pedal height

1. Remove the pin of the push rod clevis.
2. Disconnect the connector of the stop lamp switch. Slacken the nut ① and turn the switch so that the pedal height is adjusted to the specification. Then, lock the nut ①.
3. Slacken the nut ② and turn the push rod ③ to align the clevis with the pin hole. Install the pin.
4. Adjust the pedal free travel and lock the nut ②.
5. After the adjustment has been completed, make sure that the stop lamp functions properly.

Adjustment of free travel of pedal

1. Staken the nut ② and turn the push rod ③ to adjust the pedal free travel.
2. After the adjustment has been completed, make sure that the pedal height is the specified value and that the stop lamp functions properly

Adjustment of reserve travel of brake pedal

1. Run the engine at the idling speed(For vehicle with booster only).
2. With the parking brake lever in its returned state, depress the brake pedal with a pedal applying force of 50 kg. Then, measure the distance between the stopped brake pedal and the front panel.

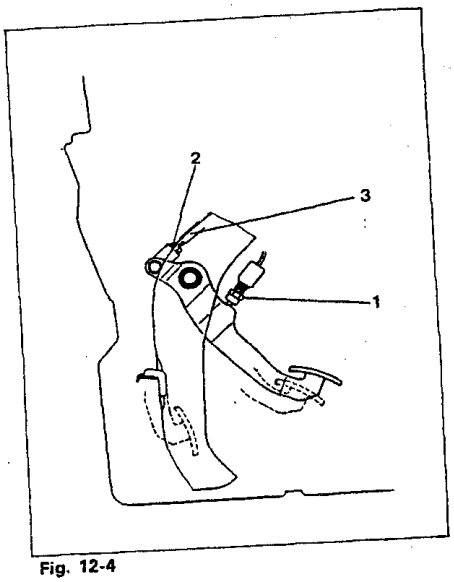


Fig. 12-4

BRAKE MASTER CYLINDER

STRUCTURAL VIEW

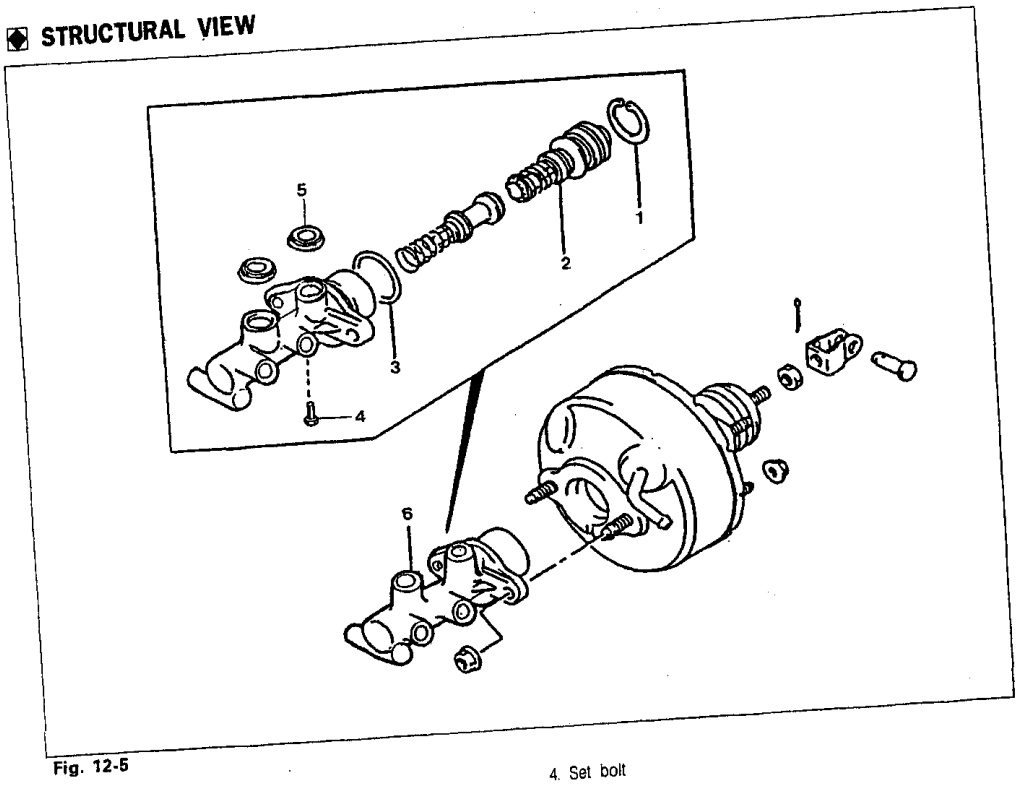
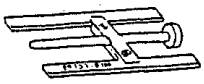


Fig. 12-5

1. Snap ring
2. 1st piston Ay
3. "O" ring
4. Set bolt
5. Grommet
6. Brake master cylinder Ay

ARTICLES TO BE PREPARED

	Shape	Part number and item	Use
SST		09737-87001-000 Brake booster push rod gauge	Adjustment of push rod clearance
Tools	Snap ring expander, pin punch, fountain pen filler(for sucking fluid in reservoir)		
Lubricant and grease	Brake fluid, rubber grease		

12 BRAKE MASTER CYLINDER

◆ REMOVAL

Remove the parts in numerical order shown in the figure below.

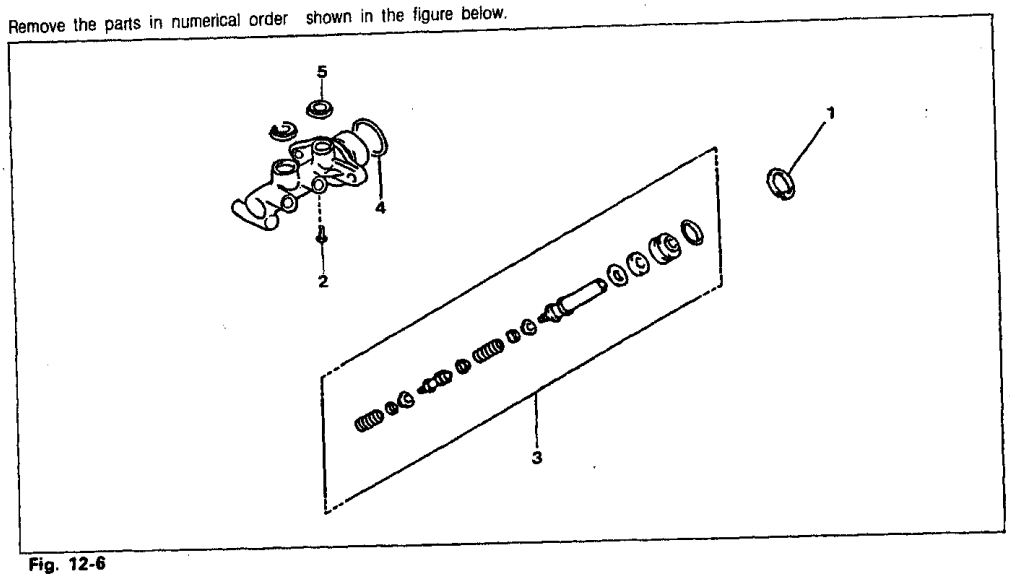


Fig. 12-6

1. Snap ring
2. Set bolt
3. Master cylinder kit
4. "O" ring
5. Grommet

Operation prior to disassembly

Clamp the flange section of the master cylinder in a vise, with jaw plates or the like interposed.

NOTE

Be sure not to clamp the cylinder portion of the master cylinder in a vise. Failure to observe this caution will cause cylinder distortion.

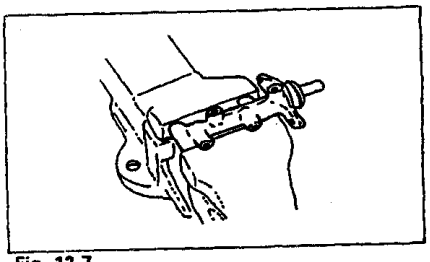


Fig. 12-7

Disassembly procedure

1. Set bolt

   Disassemble this part with the pistons No. 1 and No. 2 fully pushed.

NOTE

When pushing the pistons, care must be exercised not to splash the fluid.

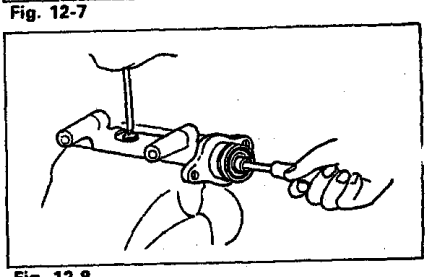


Fig. 12-8

2. Snap ring
   Using a snap ring expander, detach the snap ring while the pistons are being pushed by means of a screwdriver.

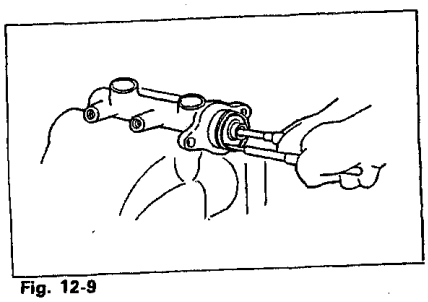


Fig. 12-9

◆ ASSEMBLY

Assemble the parts in numerical order shown in the figure below.

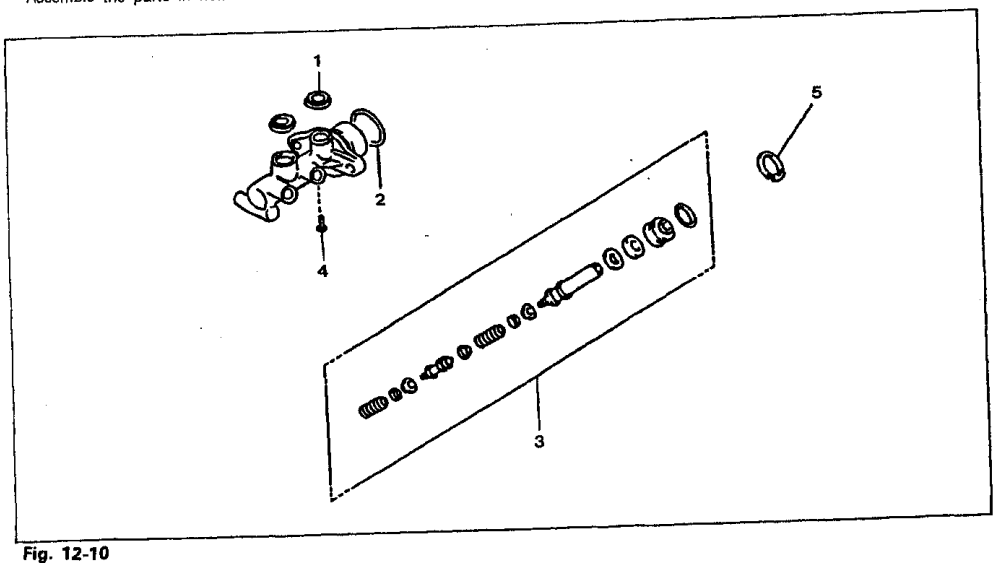


Fig. 12-10

1. Grommet
2. "O" ring
3. Master cylinder kit
4. Set bolt
5. Snap ring

◆ MAIN POINTS OF ASSEMBLY

Apply the rubber grease prior to the assembly.

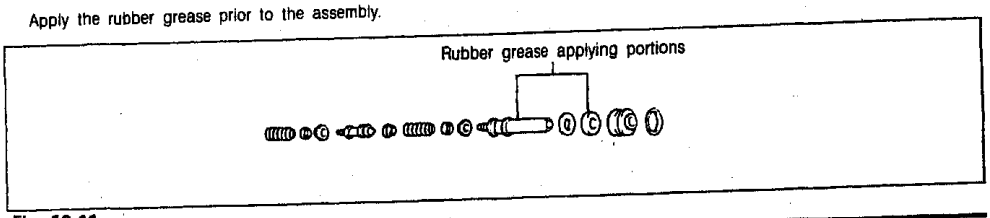


Fig. 12-11

Snap ring

Insert the pistons, No. 1 and No. 2, into the master cylinder. With the pistons fully pushed, install the snap ring, using a snap ring expander.

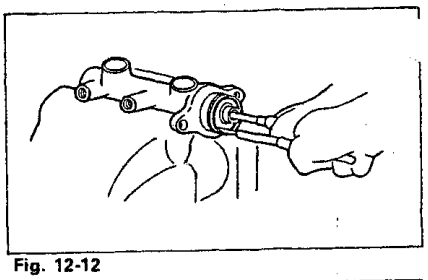


Fig. 12-12

Set bolt

While pushing the pistons fully by means of a screwdriver, assemble the set bolt with a new gasket interposed.

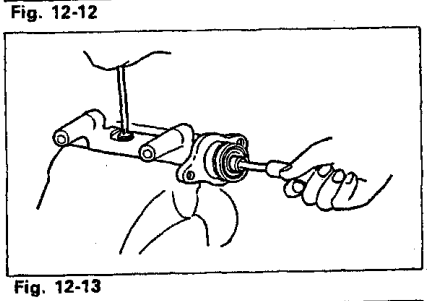


Fig. 12-13

◆ ADJUSTMENT AFTER ASSEMBLY

Adjustment of clearance of push rod

1. Set the SST in such a way that the SST's rod makes a light contact with the piston of the master cylinder, as indicated in the right figure.

   SST: Brake booster push rod gauge
   09737-87001-000

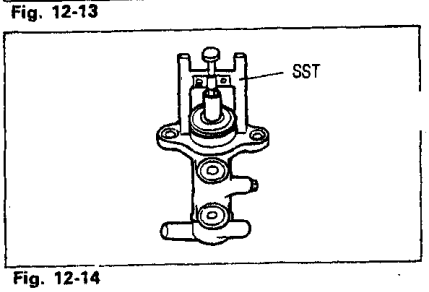


Fig. 12-14

2. Adjust the push rod so that the clearance between the SST and the push rod may become zero, as indicated in the right figure.

NOTE

Make sure that no vacuum remains indise the booster during the measurement. If the vacuum still remains, push the air valve several times on order that the inner pressure at the booster may become equal to be atmospheric pressure.

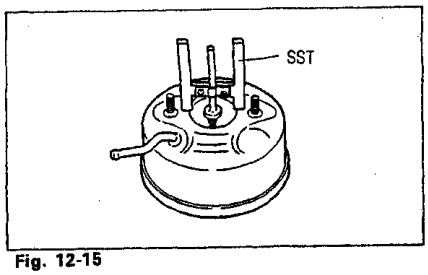


Fig. 12-15

Operation after installation

1. Air bleeding
2. Adjustment of brake pedal
3. Confirmation of brake warning switch

BRAKE BOOSTER

DISASSEMBLY

Disassemble the parts in numerical order shown in the figure below.

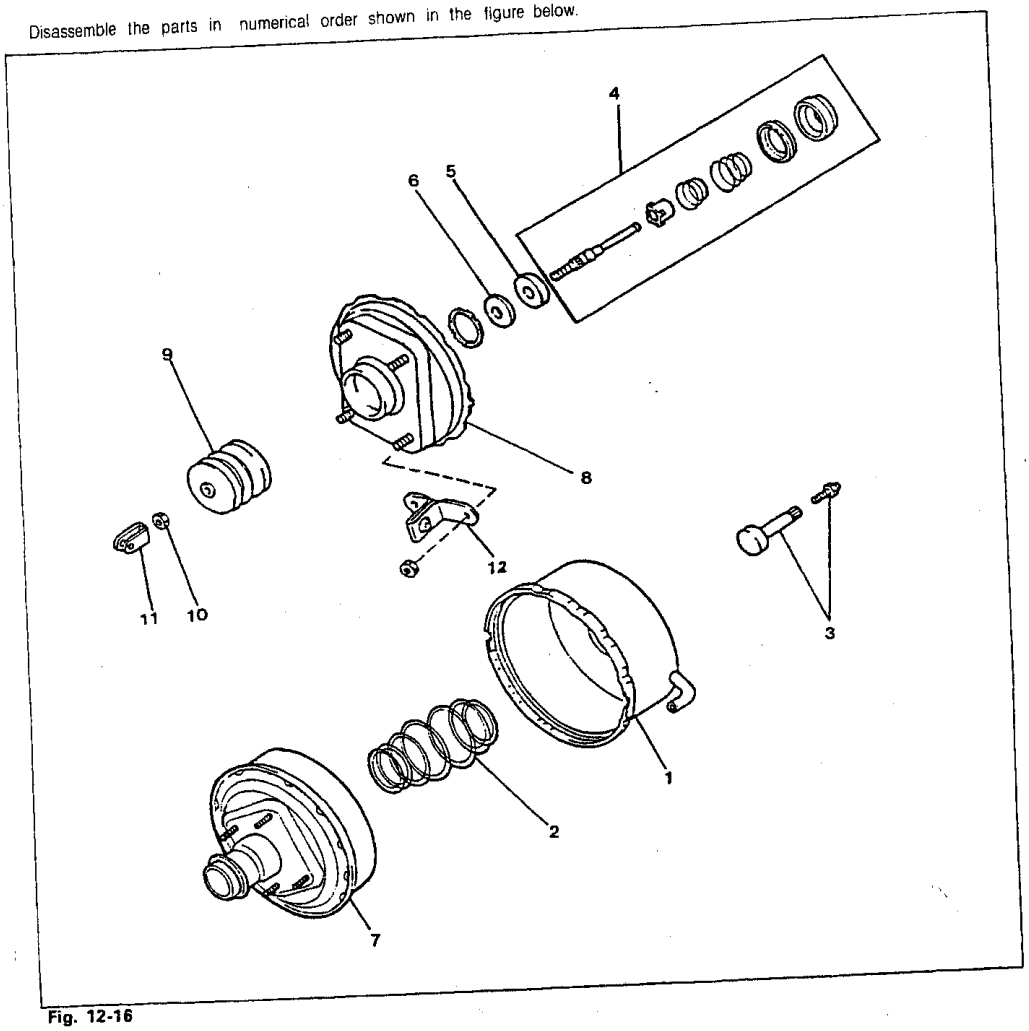


Fig. 12-16

1. Booster body No. 1 S/A
2. Booster piston return spring
3. Booster piston rod S/A
4. Booster air valve S/A
5. Air cleaner separator
6. Air cleaner element
7. Booster diaphragm
8. Booster body No. 2 S/A
9. Boot
10. Nut
11. Master cylinder push rod clevis
12. Booster support bracket

◆ MAIN POINTS OF REMOVAL

Booster body No. 2

Remove this part, using the following SST given below.

SST: Brake booster overhaul tool
09753-87701-000

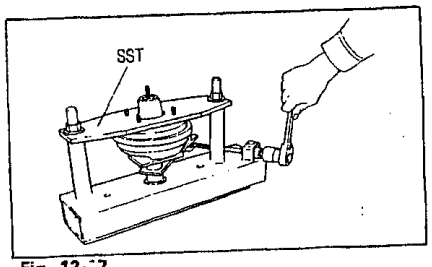


Fig. 12-17

Booster body No. 2 seal

Remove this part, using the following SSTs given below.

ⓐ **SST: Brake drum replacer nut**
09512-87201-000

ⓑ **SST: Input shaft front bearing replacer**
09304-12012-000

ⓒ **SST: Rear axle shaft bearing remover**
09527-87301-000

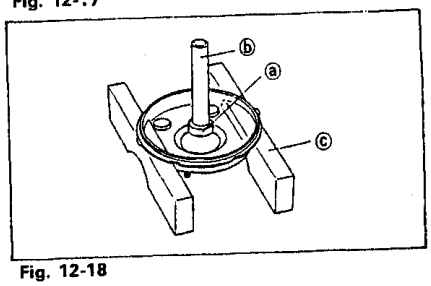


Fig. 12-18

◆ INSPECTION

Inspect the following parts. Replace any parts which exhibit defects.

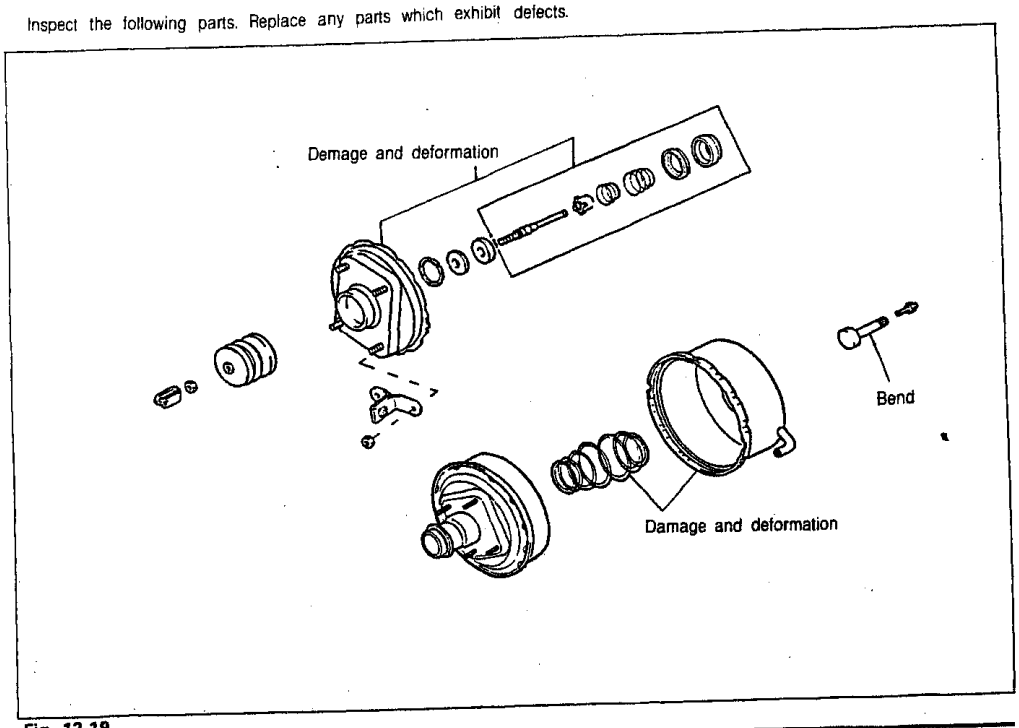


Fig. 12-19

◆ MAIN POINTS OF ASSEMBLY

Applied points of grease

Apply silicon grease to the following points specified in the figure below.

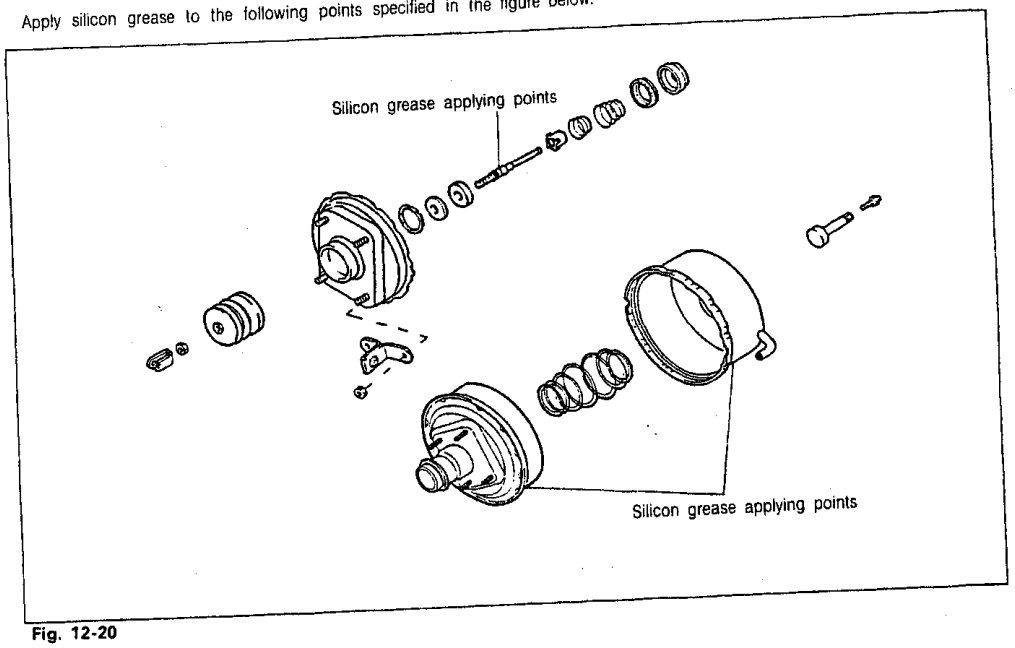


Fig. 12-20

Booster body No. 2 seal

Install this part, using the following SSTs given below.

ⓐ **SST: Rear axle shaft bearing replacer 09512-87301-000**

ⓑ **SST: Rear axle shaft oil seal replacer 09517-12010-000**

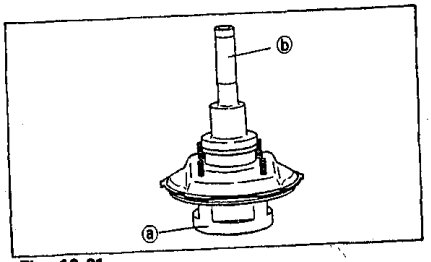


Fig. 12-21

Booster body No. 2

Install this part, using the following SST given below.

SST: Brake booster overhaul tool 09753-87701-000

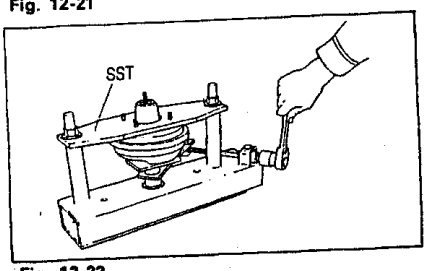


Fig. 12-22

◆ CHECKING THE PROCEDURE OF BOOSTER (AFTER INSTALLATION)

Simple booster check

1. Booster airtight performance ..... **Requirements:** **After stopping the engine, depress the brake pedal several times. The brake pedal position should become higher progressively at the second and third applications than the original height.**

2. Booster operation ..... **Requirements:** **Start the engine while depressing the brake pedal. The brake pedal should move in slighyly during the engine starting period.**

3. Booster airtight performance under loaded state ..... **Requirements:** **After stopping the engine, the brake pedal height should indicate no change.**

Booster does not conform to requirements.

Booster check using tester

4. Connection of booster tester

5. Booster airtight performance ..... **Requirements:** **After stopping the engine, the negative pressure should not show any drop for 15 seconds.**

6. Booster airtight performance under loaded state ..... **Requirements:** **After stopping the engine, the drop in negative pressure should remain within 25mmHg for 15 seconds.**

7. No-boosting operation ..... **Requirement:**

Brake pedal applying force	Hydraulic pressure
10kg	32kg/cm²
30kg	31.3kg/cm²

8. Boosting operation ..... **Requirements (Vacuum 450 mmHg)**

Brake pedal applying force	Hydraulic pressure
5kg	10kg/cm²
10kg	25kg/cm²
15kg	46kg/cm²
20kg	57kg/cm²

1. Checking of airtight performance of booster

Start the engine. After running the engine for one to two minutes, stop the engine. Depress the brake pedal several times, applying a force which would be used during normal brake application. If the brake pedal's position rises progressively at the second and third applications and so on, it indicates that the brake booster is functioning properly.

NOTE: Intervals between the first and second applications as well as between the second and third applications should be at least five seconds.

2. Checking of operation of booster

With the engine stopped, depress the brake pedal several times, applying the nearly same force at each brake application. Make sure that the brake pedal height will not vary at each brake applications. Then, start the engine while depressing the brake pedal. If the brake pedal moves in slightly, it indicates that the booster is functioning properly.

3. Checking of airtight performance of booster under loaded condition

With the engine running, depress the brake pedal. While maintaining this condition, stop the engine. If the brake pedal height remains at the same level at least for a period of 30 seconds, it indicates that the booster is functioning properly.

4. Connection of booster tester

Connect the booster tester as indicated in the figure. Carry out air bleeding operation of the booster tester. Then, conduct the following checks listed below.

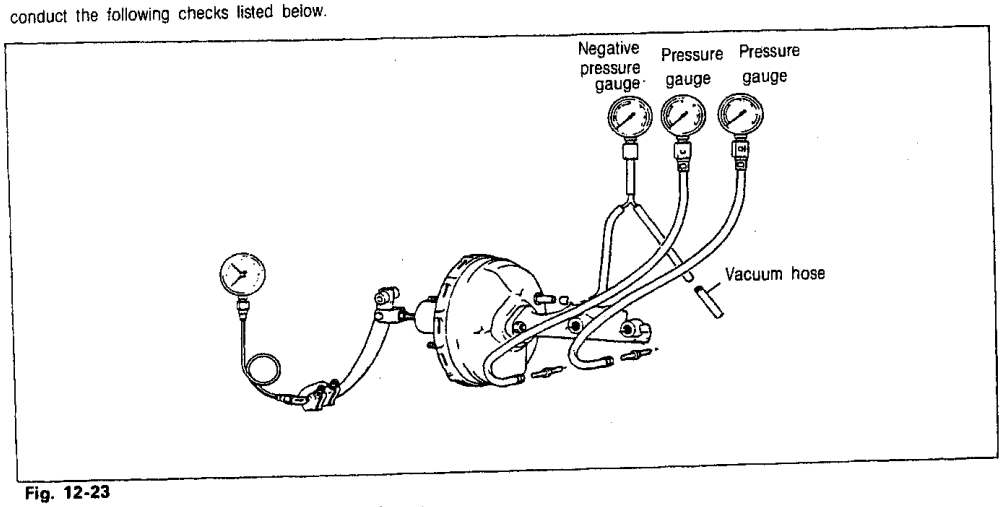


Fig. 12-23

5. Checking of airtight performance of booster

Start the engine. When the negative pressure gauge registers about 500mmHg, stop the engine. Then, proceed to check the booster air-tightness.

6. Checking of airtight performance of booster under loaded condition

With the engin running, depress the brake pedal with a pedal applying force of 20kg. Stop the engine when the negative pressure gauge registers 500mmHg. Then, proceed to check the booster air-tightness.

7. Checking of no-boosting operation

With the engine stopped, set the reading of the negative gauge to zero. Under this condition, check the relationship between the pedal applying force and the hydraulic pressure.

8. Checking of boosting operation

With the engine running, set the reading of the negative pressure gauge to about 500mmHg. Under this condition, depress the brake pedal. Then, check the relationship between the pedal applying force and the hydraulic pressure.

◆ AIR BLEEDING FOR BRAKE SYSTEM

1. Pouring of brake fluid

NOTE

If the brake fluid is spilled over the paint-finish surfaces of the motor vehicle inadvertently, quickly wipe off the brake fluid. Then, clean the area using white gasoline or the like.

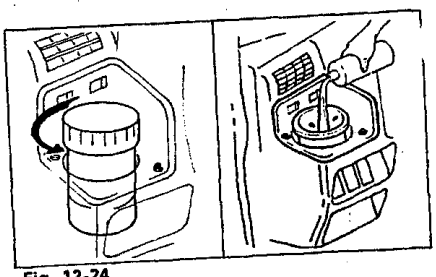


Fig. 12-24

2. Connection of vinyl hose to bleeder cylinder

Submerge one end of the vinyl hose in a container filled with the brake fluid. Connect the other end of the vinyl hose to the wheel cylinder bleeder plug of the motor vehicle.

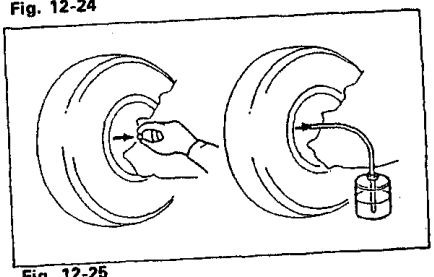


Fig. 12-25

3. Air bleeding

1) Perform the operation by two persons. Be sure to always keep the brake fluid tank full.
2) The other worker slackens the bleeder plug 1/3 through 1/2 turn at a time. Be certain to depress the pedal slowly one time and hold.
3) Tighten the bleeder plug and release the brake pedal.
4) Repeat the 2) and 3) steps above, until you no longer observe bubbles in the fluid.

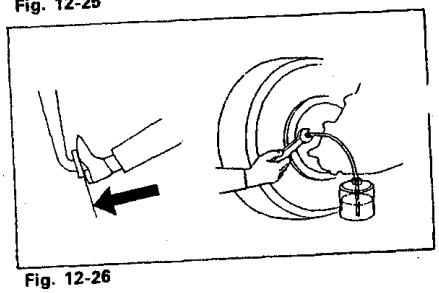


Fig. 12-26

4. Checking of the fluid leakage

Depress the brake pedal and ensure that each section of the pipe line exhibits no fluid leakage.

5. Checking of rear wheel cylinder hydraulic pressure

FRONT DISC BRAKE

REMOVAL OF DISC BRAKE PAD

Remove the parts in numerical order shown in the figure below.

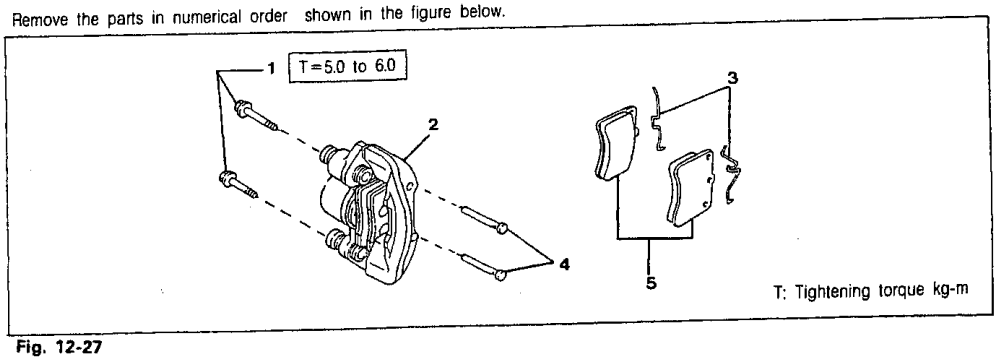


Fig. 12-27

1. Bolt
2. Disc brake caliper Ay
3. "M" clip caliper Ay
4. Pad pin
5. "K" spring & pad Ay

INSTALLATION

Install the parts in numerical order shown in the figure below.

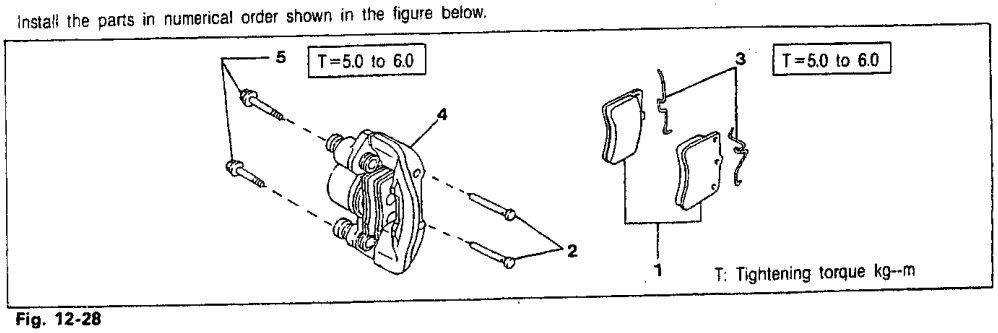


Fig. 12-28

1. "K" spring & pad Ay
2. Pad pin
3. "M" clip
4. Disc brake caliper Ay
5. Bolt

MAIN POINTS OF INSTALLATION

Disc brake caliper Ay

When installing this part, care must be exercised that the piston boot may not be pinched.

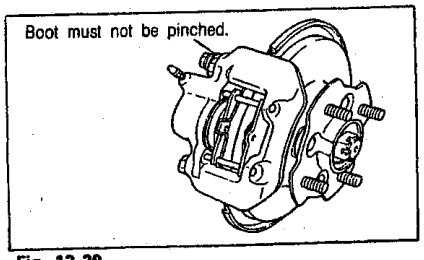


Fig. 12-29

◆ REMOVAL OF DISC BRAKE

Remove the parts in numerical order shown in the figure below.

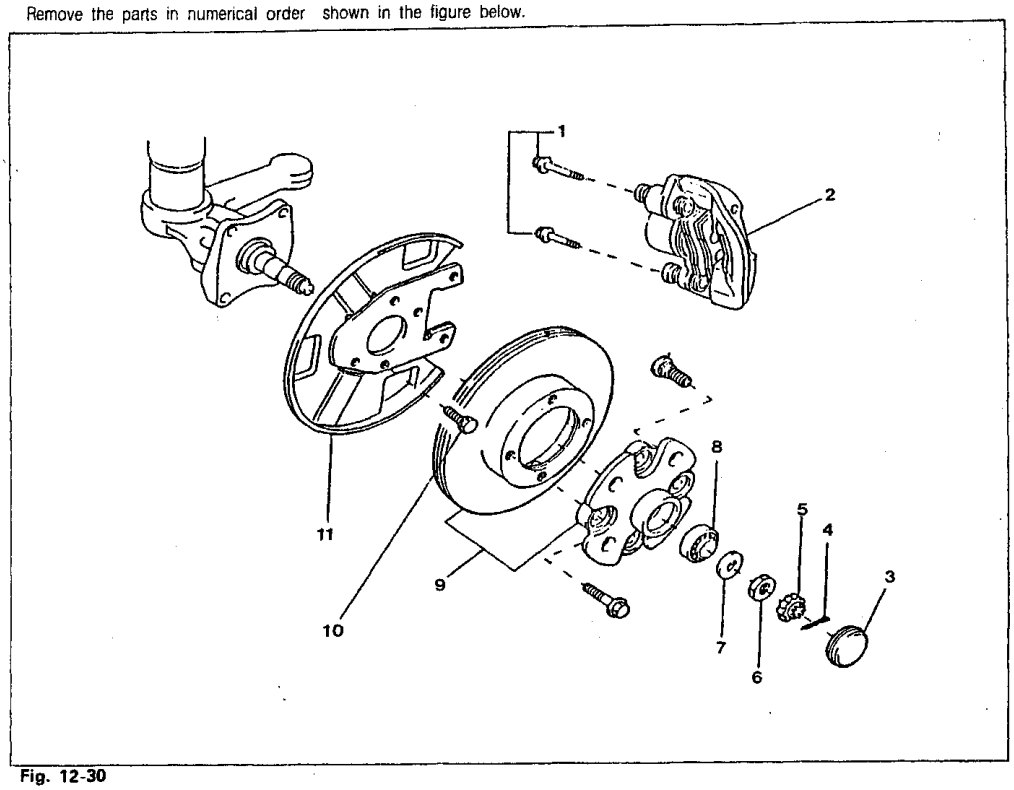


Fig. 12-30

1. Bolt
2. Disc brake caliper Ay
3. Front hub grease cap
4. Cotter pin
5. Front wheel adjust lock cap
6. Nut
7. Plate washer
8. Taper-rolier outer bearing
9. Hub & Disc Ay
10. Bolt
11. Disc brake dust cover

◆ OPERATION PRIOR TO REMOVAL

Disconnect the flexible hose.

◆ DISASSEMBLY OF DISC BRAKE CALIPER

Disassemble the parts in numerical order shown in the figure below.

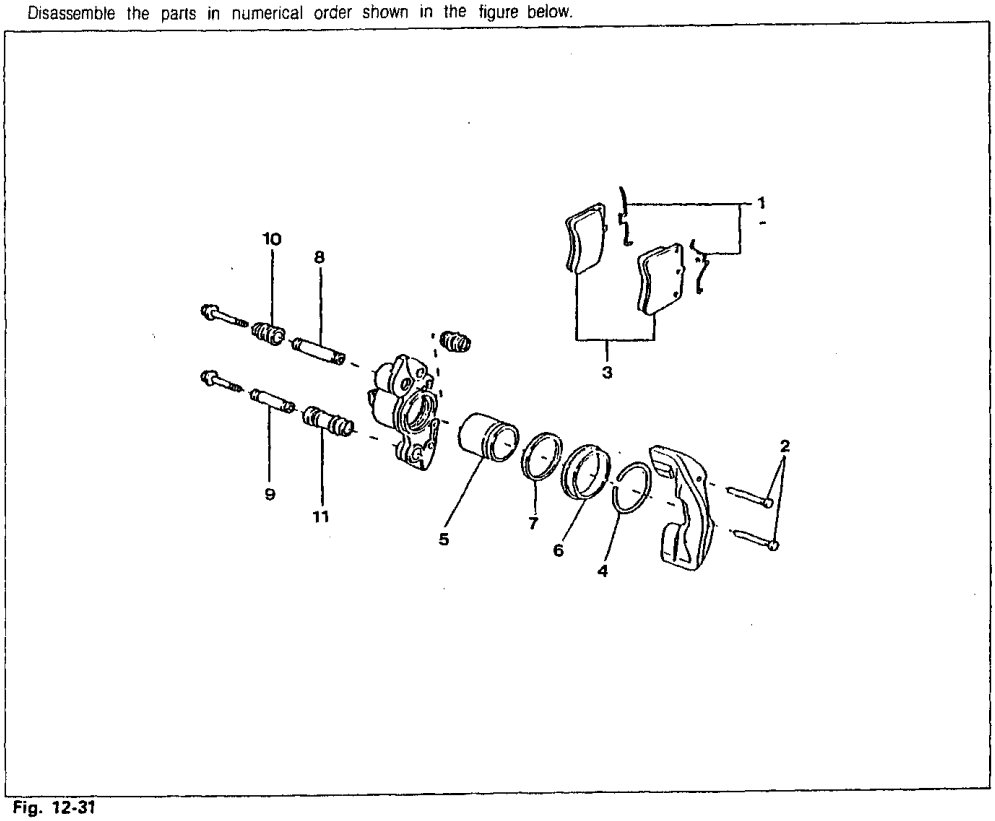


Fig. 12-31

1. "M" clip
2. Pad pin
3. "K" spring & pad Ay
4. Retaining ring
5. Piston
6. Piston boot
7. Piston seal
8. Main sleeve
9. Sub sleeve
10. Pin boot
11. Bush

◆ MAIN POINTS OF DISASSEMBLY

Piston

With a wooden piece or a cloth placed at the end of the disc brake cylinder, driven out the piston, using compressed air.

NOTE

During this operation, care must be exercised as to the piston being jumped out from position.

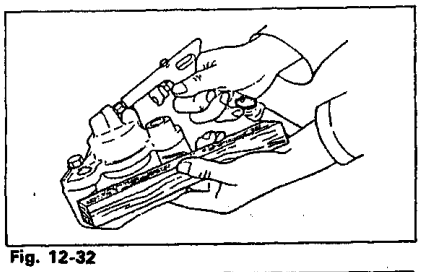


Fig. 12-32

INSPECTION OF DISC BRAKE CALIPER

Inspect the following parts. Replace any parts which exhibit defects.

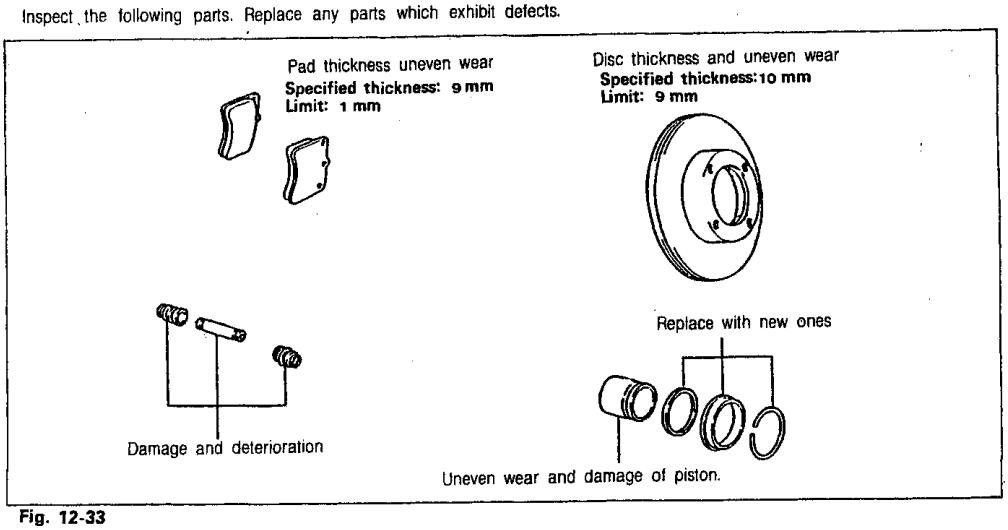


Fig. 12-33

ASSEMBLY

Assemble the parts in numerical order shown in the figure below.

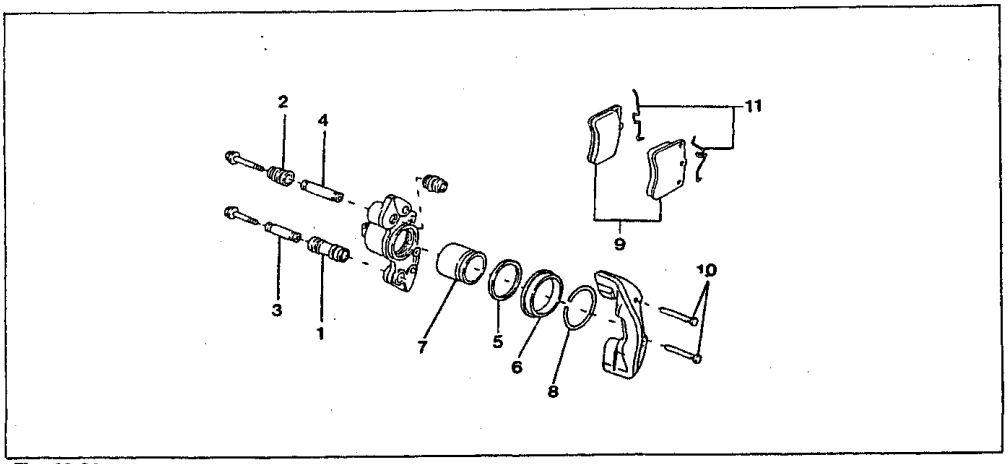


Fig. 12-34

1. Bush
2. Pin boot
3. Sub sleeve
4. Main sleeve
5. Piston seal
6. Piston boot
7. Piston
8. Retaining ring
9. "K" spring & pad Ay
10. Pad pin
11. "M" clip

INSTALLATION OF DISC BRAKE

Remove the parts in numerical order shown in the figure below.

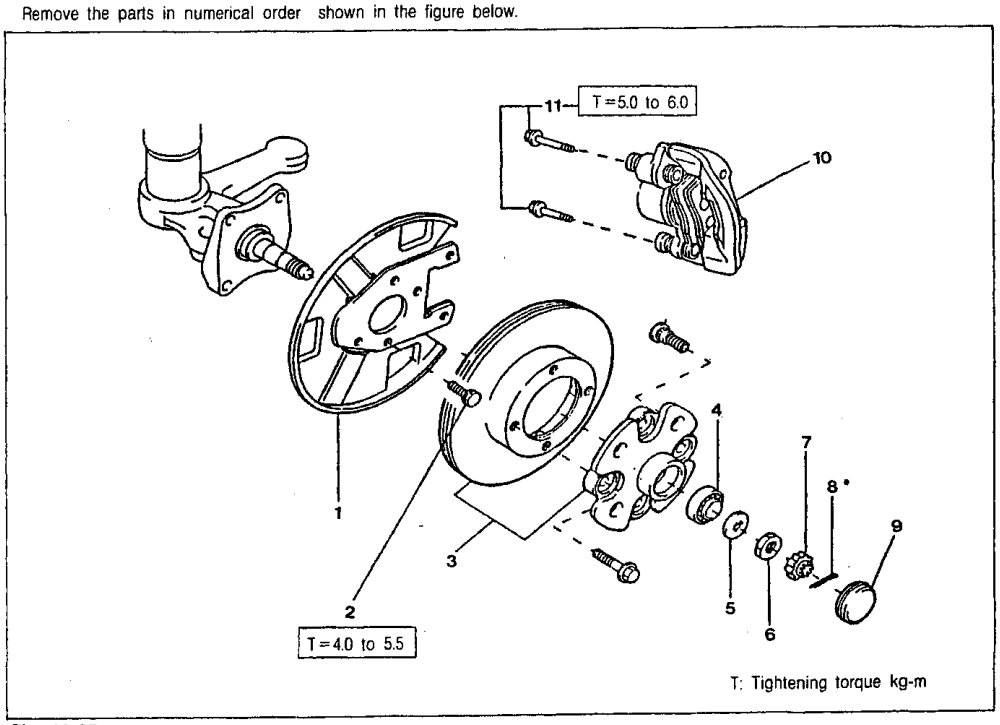


Fig. 12-35

1. Disc brake dust cover
2. Bolt
3. Hub & disc Ay
4. Tapered-roller outer bearing
5. Washer plate
6. Nut
7. Front wheel adjusting lock-up
8. Cotter pin
9. Front hub grease cap
10. Disc brake caliper Ay
11. Bolt

OPERATION AFTER INSTALLATION

1. Disc run-out check
   1) Prior to the disc run-out check, ensure that the front wheel bearings exhibit no excessive looseness.
   2) Measure the run-out of the disc rotor at the outer edge.
      Limit: 0.15mm
      (At point 10mm inboard from rotor outer periphery)
      If the run-out of the disc rotor exceeds the limit, replace the disc rotor.
2. Adjust the brake pedal installation height.

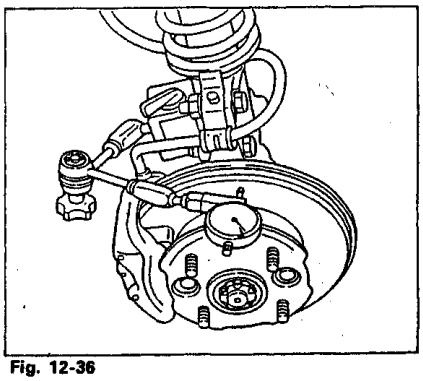


Fig. 12-36

REAR BRAKE

REMOVAL

Remove the parts in numerical order shown in the figure below.

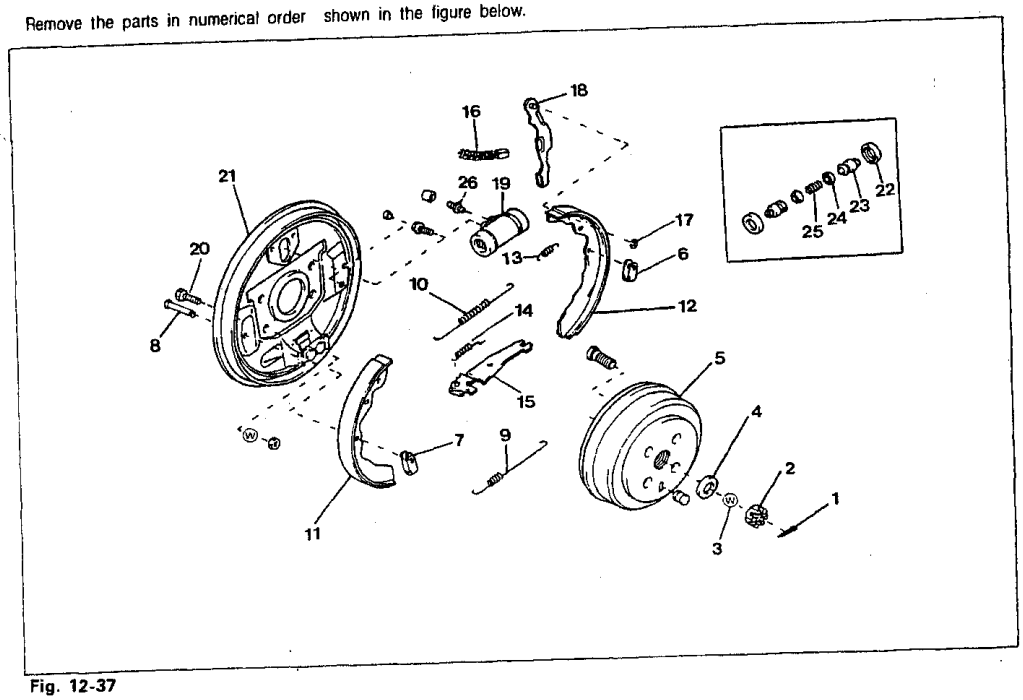


Fig. 12-37

1. Cotter pin
2. Castle nut
3. Spring washer
4. Plate washer
5. Brake drum Ay
6. Shoe hold-down spring
7. Shoe hold-down spring
8. Shoe hold-down pin
9. Tension spring
10. Tension spring
11. Brake shoe Ay
12. Brake shoe Ay
13. Tension spring No. 2
14. Tension spring No 3
15. Parking brake shoe strut
16. parking brake cable Ay
17. "E" ring
18. Parking brake shoe lever S/A
19. Rear wheel brake cylinder Ay
20. Bolt
21. Brake parking rear plate S/A
22. Wheel cylinder boot
23. Wheel brake cylinder piston
24. Cylinder cup
25. Compression spring
26. Bleeder plug

MAIN POINTS OF REMOVAL

Operation prior to removal

Disconnect the brake tube.

Castle nut (For S-84 only)

Remove the castle nut, using the following SST given below.

SST: Brake drum stopper
09511-87202-000

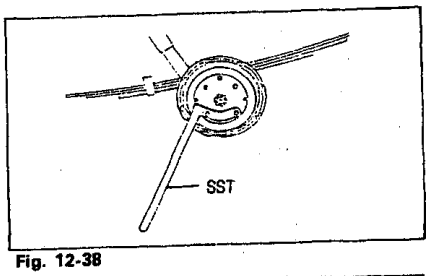


Fig. 12-38

Brake drum

Remove the brake drum, using the following SST given below.

SST: Front hub & drum puller
09510-87301-000

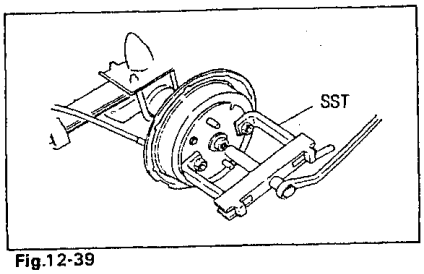


Fig.12-39

INSPECTION

Inspect the following parts. Replace any parts which exhibits defects.

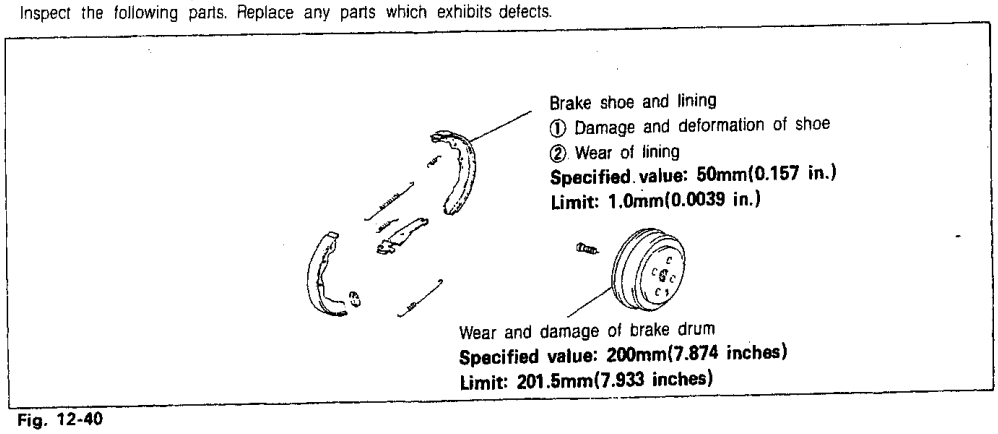


Fig. 12-40

GREASE APPLYING POINTS

Apply the rubber grease and brake grease to the following points specified in the figure below.

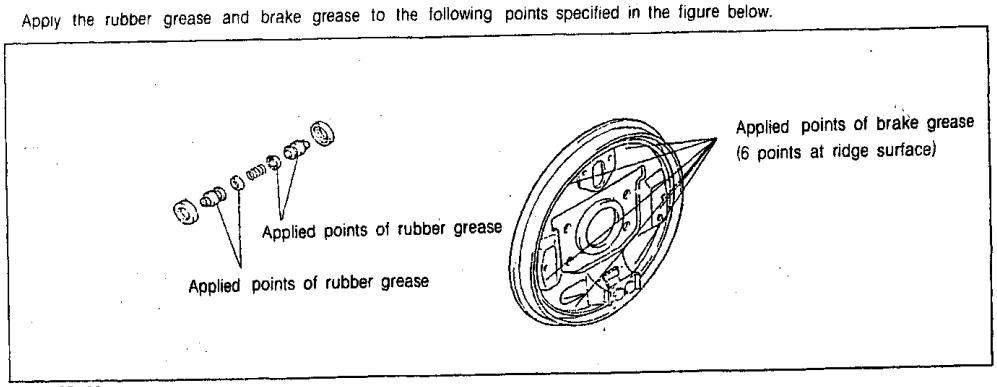


Fig. 12-41

◆ INSTALLATION

Install the parts in numerical order shown in the figure below.

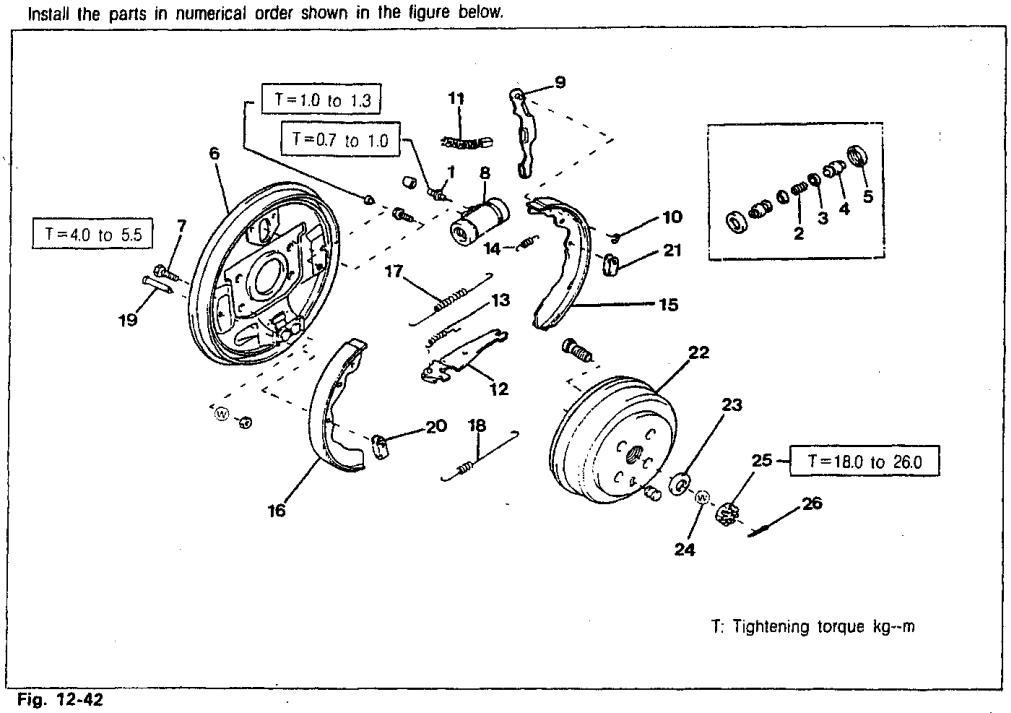


Fig. 12-42

1. bleeder plug
2. Compression spring
3. Cylinder cup
4. Wheel brake cylinder piston
5. Wheel cylinder boot
6. Brake parking rear plate S/A
7. Bolt
8. Rear wheel brake cylinder Ay
9. Parking brake shoe lever S/A
10. "E" ring
11. Parking brake cable Ay
12. Parking brake shoe strut
13. Tension spring No. 3
14. Tension spring No. 2
15. Brake shoe Ay
16. Brake shoe Ay
17. Tension spring
18. Tension spring
19. Shoe hold-down pin
20. Shoe hold-down spring
21. Shoe hold-down spring
22. Brake drum Ay
23. Plate washer
24. Spring washer
25. Castle nut
26. Cotter pin

◆ MAIN POINTS OF INSTALLATION

Backing plate

Apply the Three Bond 1212 to the end section of the rear axle housing, as indicated in the right figure. Then, install the backing plate to the rear axle.

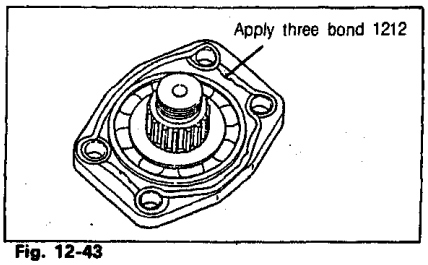


Fig. 12-43

Wheel cylinder Ay

Apply liquid gasket(equivalent to Three Bond TNK-520) to the section where the wheel cylinder is installed on the backing plate, as indicated in the right figure.

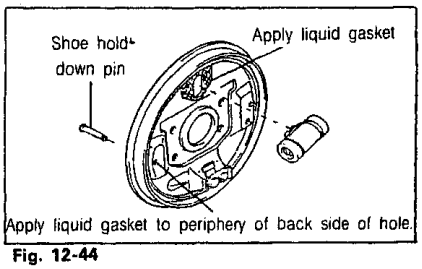


Fig. 12-44

Shoe hold-down pin

Apply liquid gasket(equivalent to Three Bond TNK-520) to the section where the shoe hold-down pin is installed to the backing plate, as indicated in the right figure.

Shoe hold-down spring

The shoe hold-down spring of the shoe equipped with a parking brake shoe lever has a collar, as shown in the right finger. Put this collar into between the shoe and the lever.

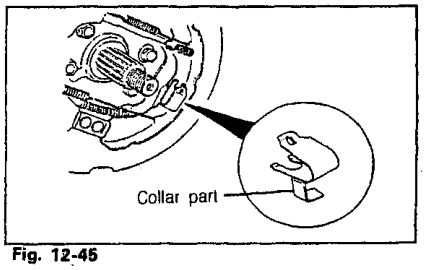


Fig. 12-45

Brake adjusting procedure

1. Detach the service hole plug of the brake drum. Align the service hole with the engaging section of the parking brake shoe strut.
   (This alignment position is obtained by setting the service hole to the vertical line. as indicated in the figure.)
2. Contract the shoe by moving the engaged point of the parking brake shoe strut. using a (−) screwdriver or the like.
3. Depress the brake pedal four or five times, (after performing air bleeding). Ensure that the automatic adjusting mechanism is operating by listening to an operating sound.
4. Adjust the installation height of the brake pedal.
5. Adjust the working travel of the parking brake lever.

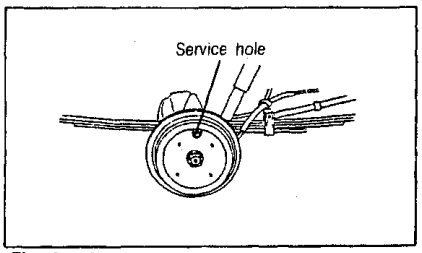


Fig. 12-46

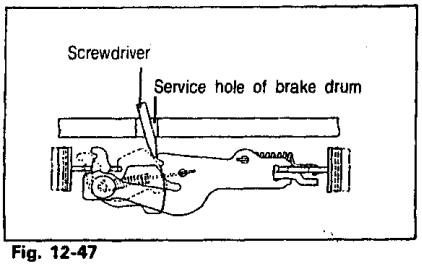


Fig. 12-47

PARKING BRAKE

REMOVAL OF PARKING BRAKE LEVER

Remove the parts in numerical order shown in the figure below.

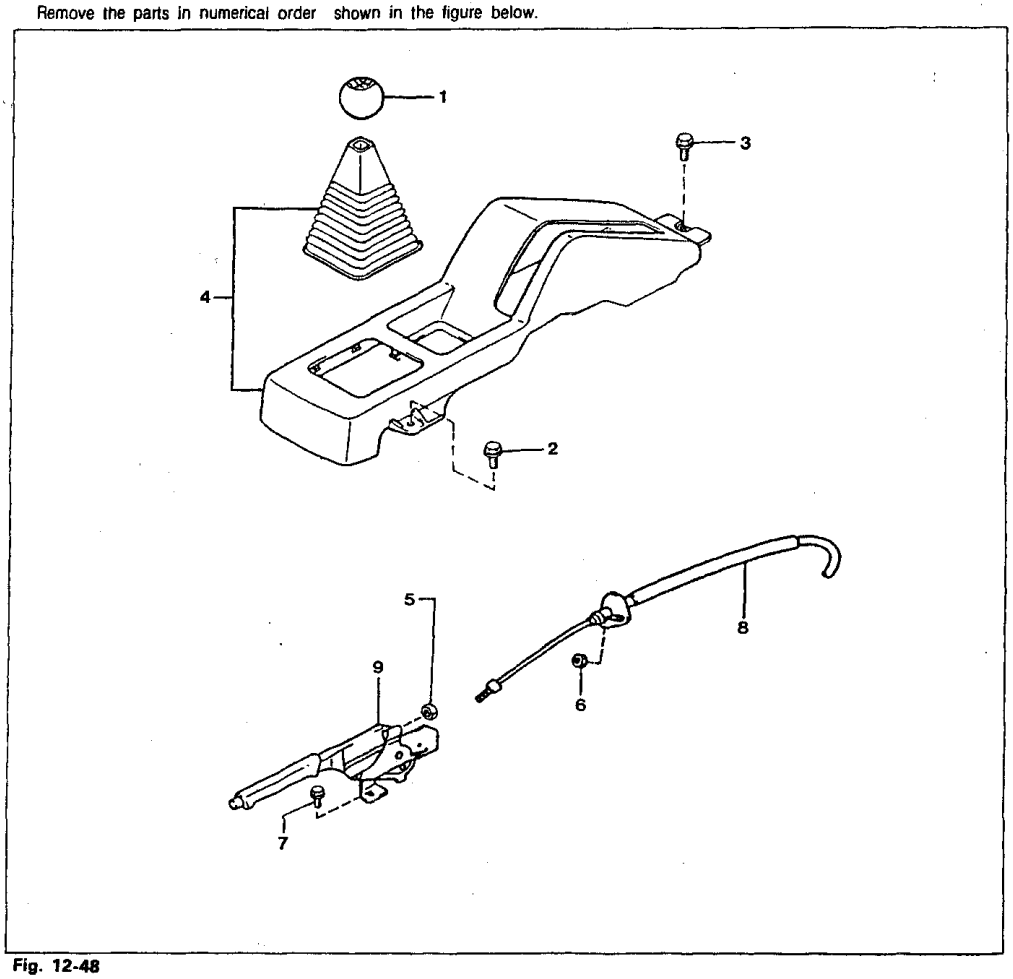


Fig. 12-48

1. Shift lever knob
2. Bolt
3. Bolt
4. Change boot & console box
5. Nut
6. Nut
7. Bolt
8. Parking brake front cable
9. Parking brake handle Ay

◆ INSTALLATION OF PARKING BRAKE LEVER

Install the parts in numerical order shown in the figure below.

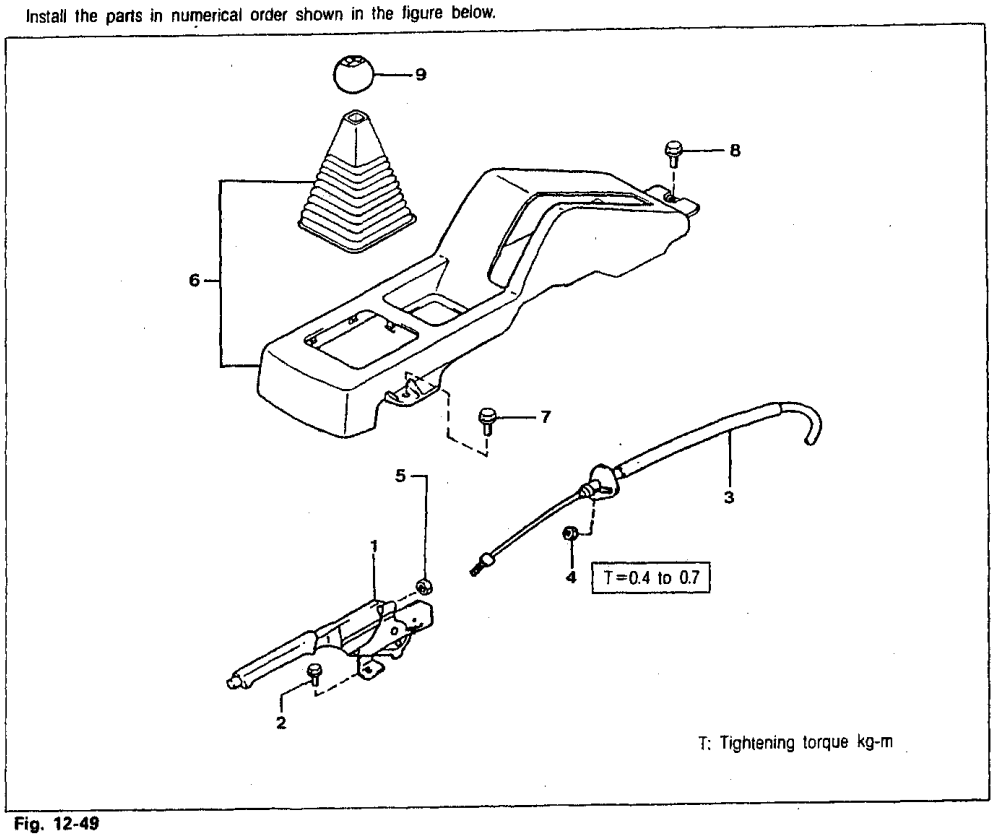


Fig. 12-49

1. Parking brake handle Ay
2. Bolt
3. Parking Brake front cable
4. Nut
5. Nut
6. Change boot & console box
7. Bolt
8. Bolt
9. Shift lever knob

◆ ADJUSTING PROCEDURE FOR PARKING BRAKE

1. Turn the adjusting nut to adjust the working travel of the parking brake lever.
   Specified value: 6 to 10 notches
   (When pulled upward by force of 20kg)

NOTE
The parking brake lever adjustment should be performed when the rear brake shoe clearance complies with the specifications.

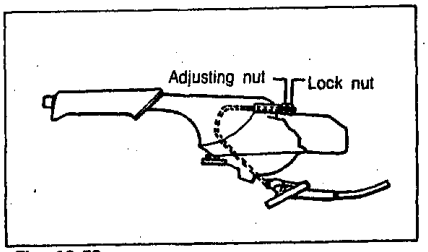


Fig. 12-50

◆ REMOVAL OF PARKING BRAKE CABLE

Remove the parts in numerical order shown in the figure below.

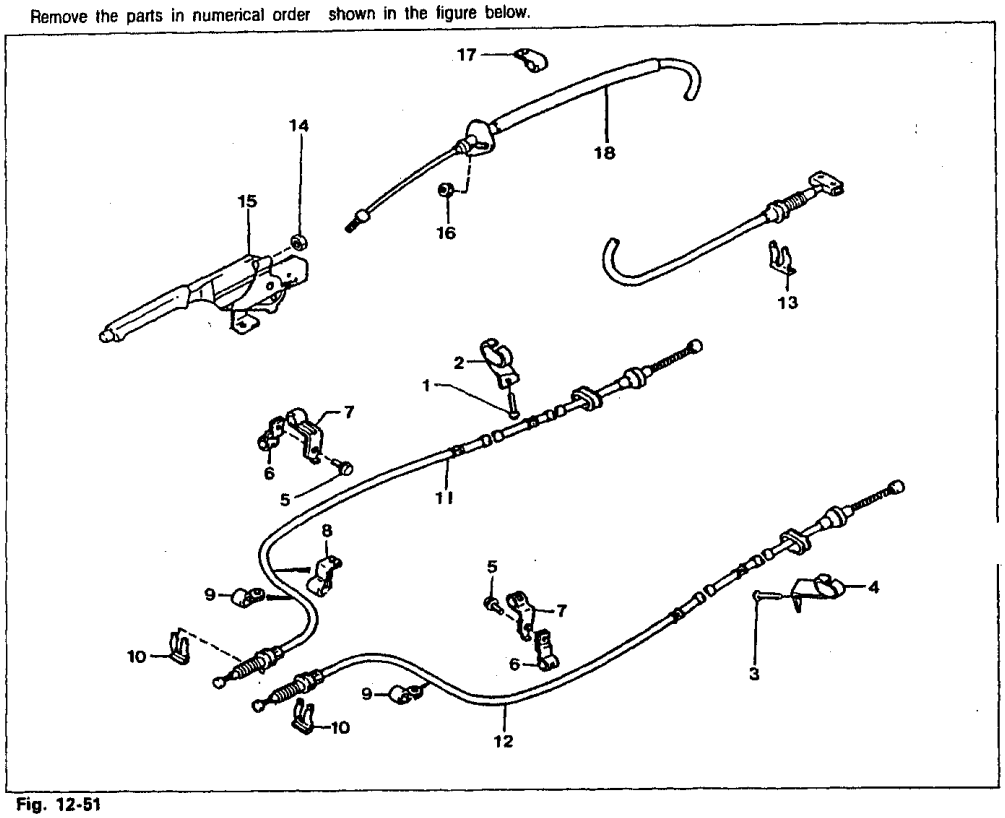


Fig. 12-51

1. Screw
2. Cable guide(right)
3. Screw
4. Cable guide(left)
5. Bolt
6. Clamp
7. Clamp
8. Clamp
9. Clamp
10. Clamp
11. Parking brake cable Ay(right)
12. Parking brake cable Ay(left)
13. Clamp
14. Nut
15. Parking brake lever Ay
16. Nut
17. Clamp
18. Parking brake front cable

◆ OPERATION PRIOR TO REMOVAL

1. Remove the engine service hole cover.
2. Raise the front/left seat.
3. Remove the rear brake drum. Detach the parking brake cable from the rear brake.

◆ INSTALLATION OF PARKING BRAKE CABLE

Install the parts in numerical order shown in the figure below.

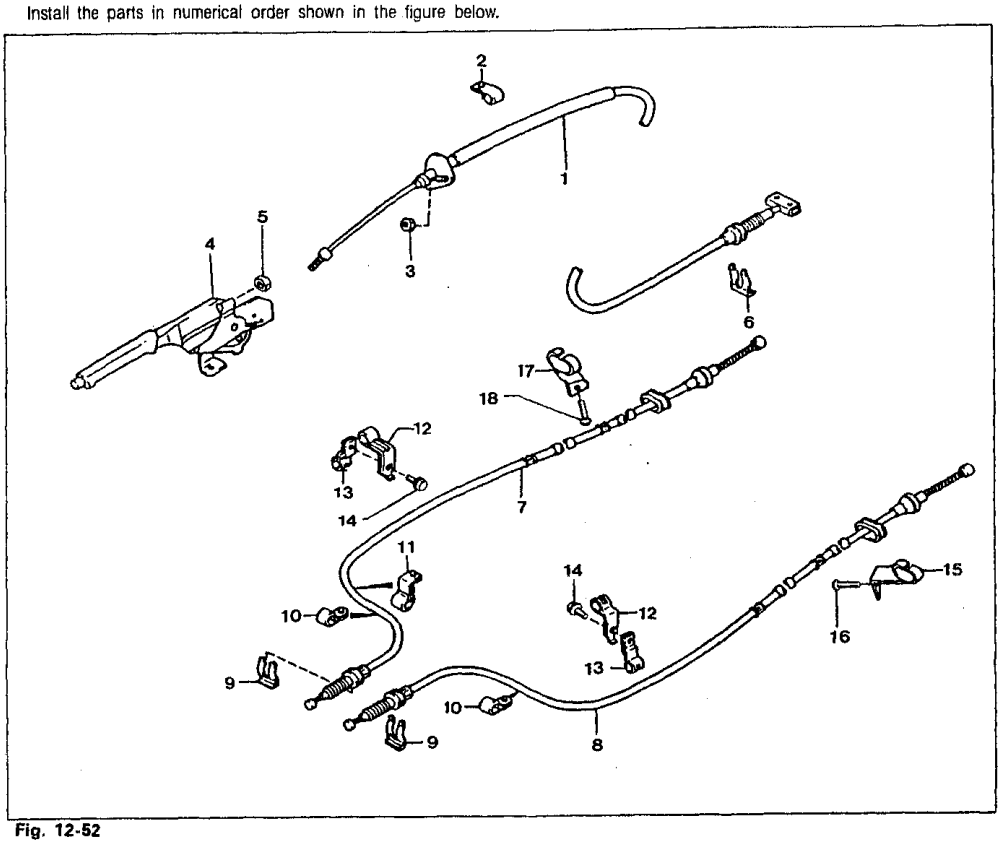


Fig. 12-52

1. Parking brake front cable
2. Clamp
3. Nut
4. Parking brake lever Ay
5. Nut
6. Clamp
7. Parking brake cable Ay(right)
8. Parking brake cable Ay(left)
9. Clamp cable
10. Clamp cable
11. Clamp
12. Clamp
13. Clamp
14. Bolt
15. Cable guide(left)
16. Screw
17. Cable guide(right)
18. Screw

Operation after installation

1. Adjust the rear brake.
2. Adjust the parking brake.

EXHAUST PIPE

REMOVAL

Remove the parts in numerical order shown in the figure below.

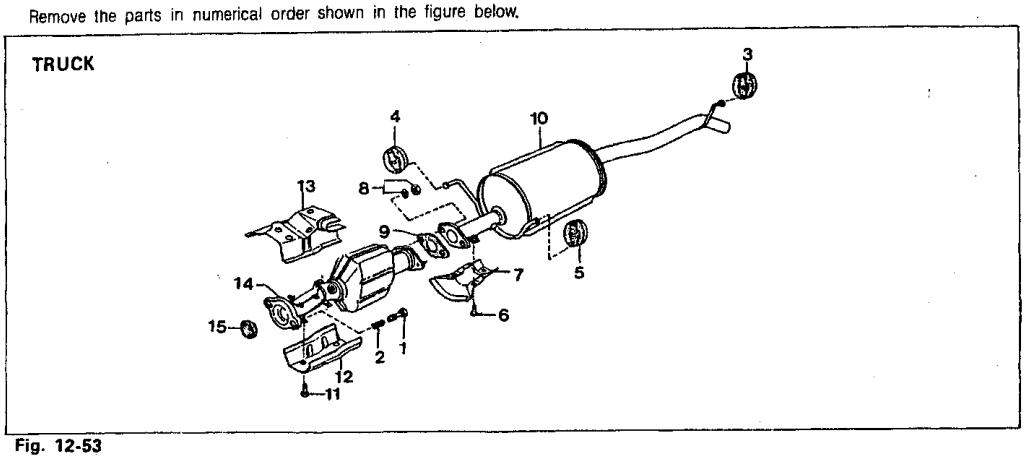


Fig. 12-53

1. Bolt
2. Exhaust pipe spring
3. Hanger rubber
4. Hanger rubber
5. Hanger rubber
6. Bolt
7. Protector seal
8. Washer & nut
9. Gasket
10. Main silencer Ay
11. Bolt
12. Protector No. 2
13. Protector No. 1
14. Catalyst convertor
15. Sealing

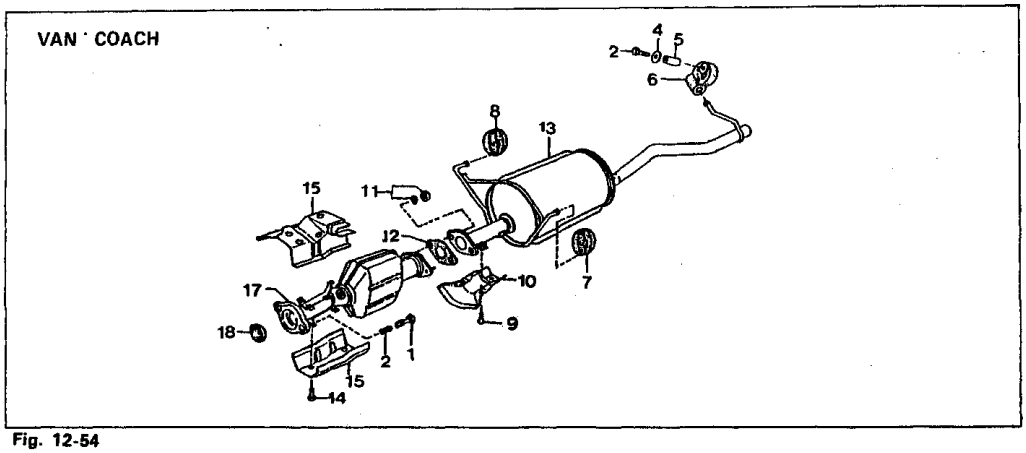


Fig. 12-54

1. Bolt
2. Exhaust pipe spring
3. Bolt
4. Washer
5. Stopper rubber
6. Hanger rubber
7. Hanger rubber
8. Hanger rubber
9. Bolt
10. Protector
11. Washer & spring
12. Gasket
13. Main silencer Ay
14. Bolt
15. Protector No. 2
16. Protector No. 1
17. Catalyst converter Ay
18. Sealing

◆ INSTALLATION

Install the parts in numerical order shown in the figure below.

TRUCK

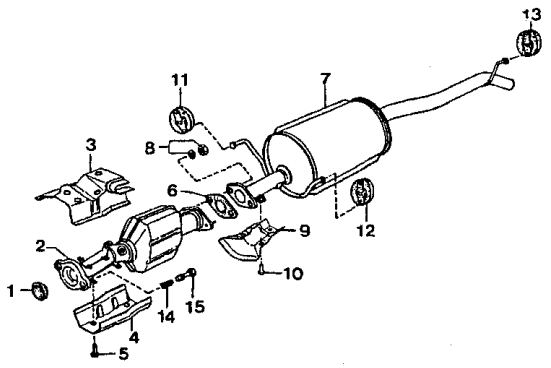


Fig. 12-55

1. Sealing
2. Catalyst convertor Ay
3. Protector No 1
4. Protector No. 2
5. Bolt
6. Gasket
7. Main silencer Ay
8. Washer and bolt
9. Protector
10. Bolt
11. Hanger rubber
12. Hanger rubber
13. Hanger rubber
14. Exhaust pipe spring
15. Bolt

VAN · COACH

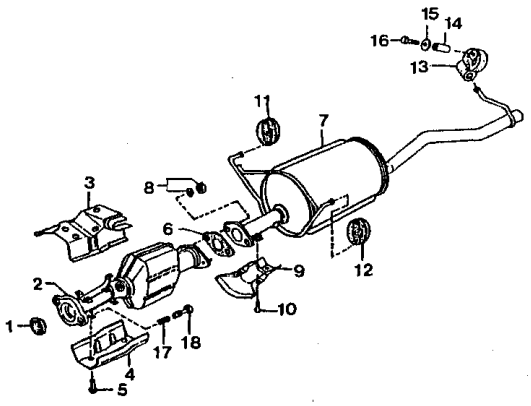


Fig. 12-56

1. Sealing
2. Catalyst convertor Ay
3. Protector No. 1
4. Protector No. 2
5. Bolt
6. Gasket
7. Main silencer Ay
8. Washer and bolt
9. Protector
10. Bolt
11. Hanger rubber
12. Hanger rubber
13. Hanger rubber
14. Stopper lever
15. Washer
16. Bolt
17. Exhaust pipe spring
18. Bolt

SUSPENSION 13

FRONT SHOCK ABSORBERS

REMOVAL

Operation prior to removal

1. Jack up the vehicle.
2. Open the front seat.
3. Disconnect the brake from the caliper.

Remove the parts in the numbered order shown in the figure below.

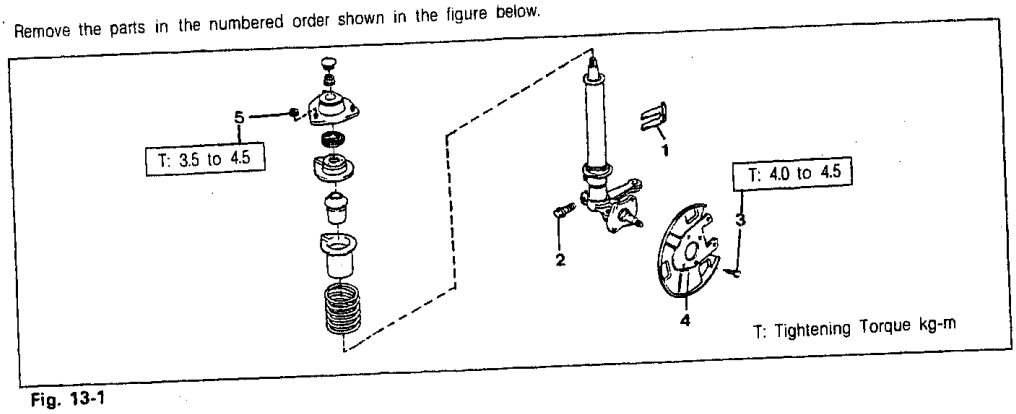


Fig. 13-1

1. Clamp
2. Bolt W/washer
3. Bolt W/washer
4. Disc brake dust cover
5. Nut

DISASSEMBLY

Remove the parts in numerical order shown in the figure below.

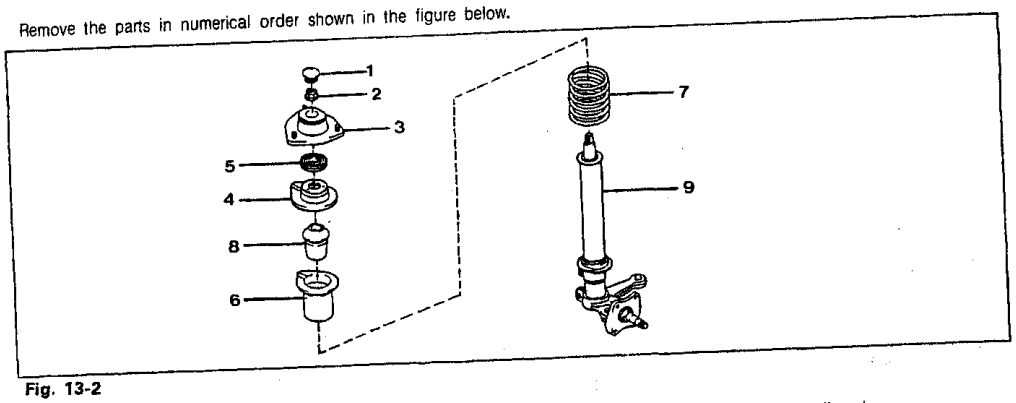


Fig. 13-2

1. Bearing dust cover
2. Lock nut
3. Front suspension support
4. Front spring upper seat
5. Bush
6. Shock absorber
7. Front coil spring
8. Front spring bumper
9. Front shock absorber

OPERATION PRIOR TO DISASSEMBLY

1. Clamp the spring upper seat section in a vise.
2. Compress the spring, using the SST below.
   SST: Front coil spring compressor
   09727-87701-000

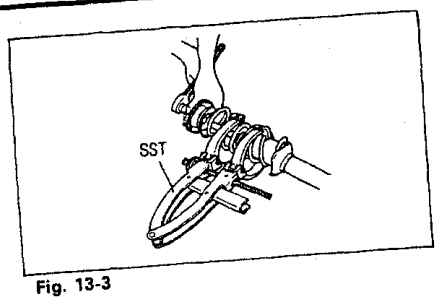


Fig. 13-3

INSPECTION

Inspect the following parts. Replace any parts which exhibit defects.

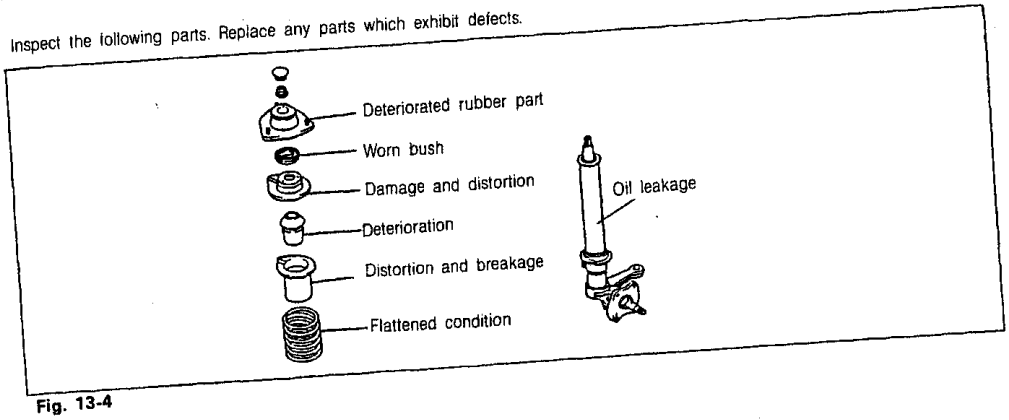


Fig. 13-4

ASSEMBLY

Install the parts in numerical order shown in the figure below.

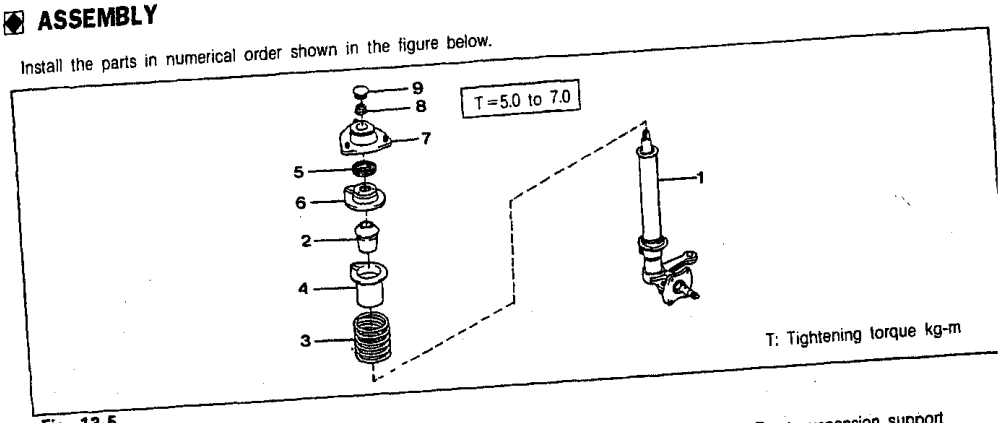


Fig. 13-5

1. Front shock absorber
2. Front spring bumper
3. Front coil spring
4. Shock absorber dust cover
5. Bush
6. Front spring upper seat
7. Front suspension support
8. Lock nut
9. Bearing dust cover

◆ MAIN POINTS OF ASSEMBLY

Front coil spring

Compress the coil spring, using the SST below.

SST: Front coil spring compressor
09727-87701-000

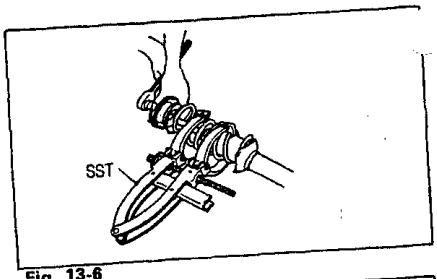


Fig. 13-6

Bush

When the bush is assembled to the spring upper seat, coat the upper surface of the bush with 0.5 gram or more of MP grease.

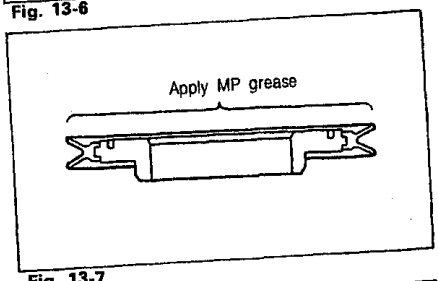


Fig. 13-7

Front suspension support

Align the cut-out section provided at the threaded section of the shock absorber rod with the cut-out section provided at the installation hole of the suspension support.

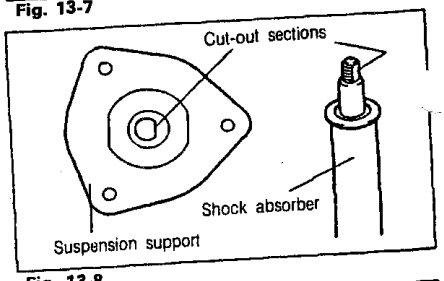


Fig. 13-8

Lock nut

After tightening the lock nut to a certain degree. Clamp the spring upper seat section in a vise. Tighten the lock nut to the specified torque.

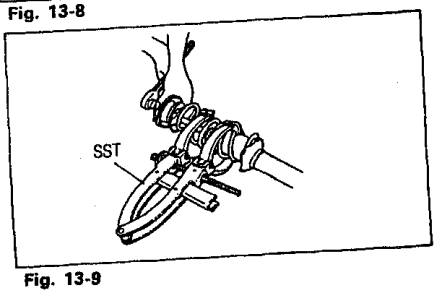


Fig. 13-9

LOWER ARMS

REMOVAL

Remove the parts in numerical order shown in the figure below.

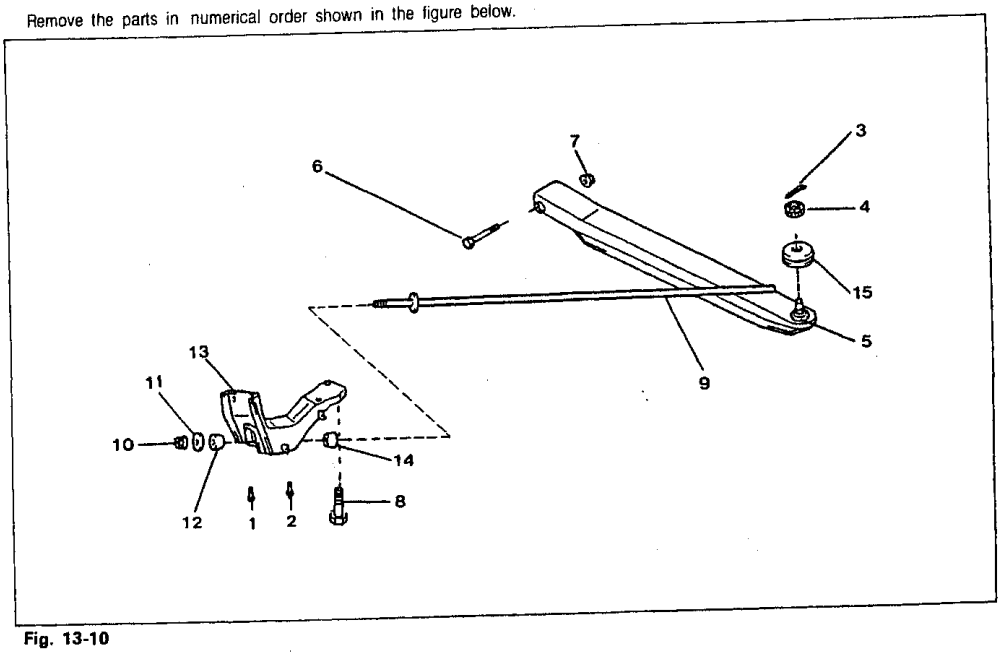


Fig. 13-10

1. Bolt (for clamping accelerator cable)
2. Bolt (for clamping speedometer cable)
3. Cotter pin
4. Castle nut
5. Bolt stud (not available as separate part)
6. Bolt
7. Lock nut
8. Hexagon nut
9. Suspension lower arm S/A
10. Lock nut
11. Plate washer
12. Strut bar cushion
13. Strut bar bracket S/A
14. Strut bar cushion
15. Lower ball joint dust cover

Operation prior to removal

1. Jack up the vehicle.
2. Detach the disc wheel.

Stud ball

SST: Tie rod end puller
09611-87701-000

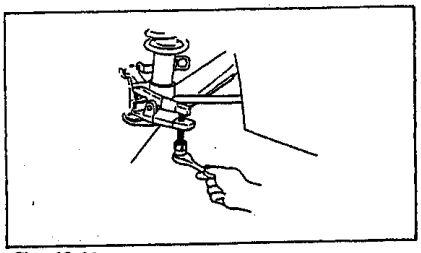


Fig. 13-11

INSPECTION

Inspect the following parts. Replace any parts which exhibits defects.

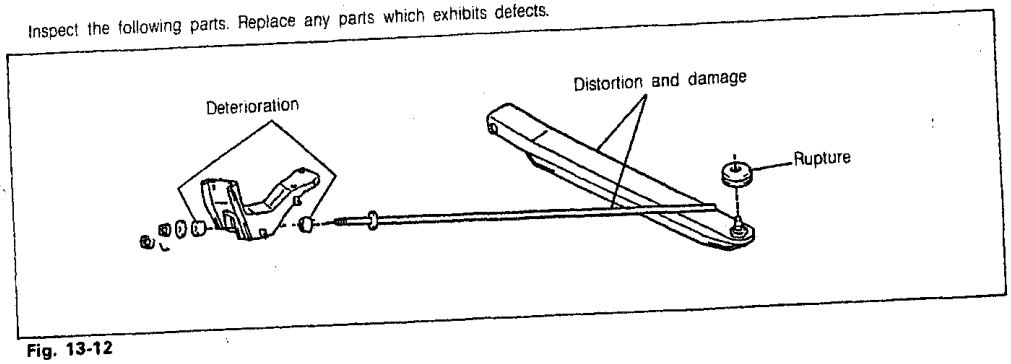


Fig. 13-12

INSTALLATION

Install the parts in numerical order shown in the figure below.

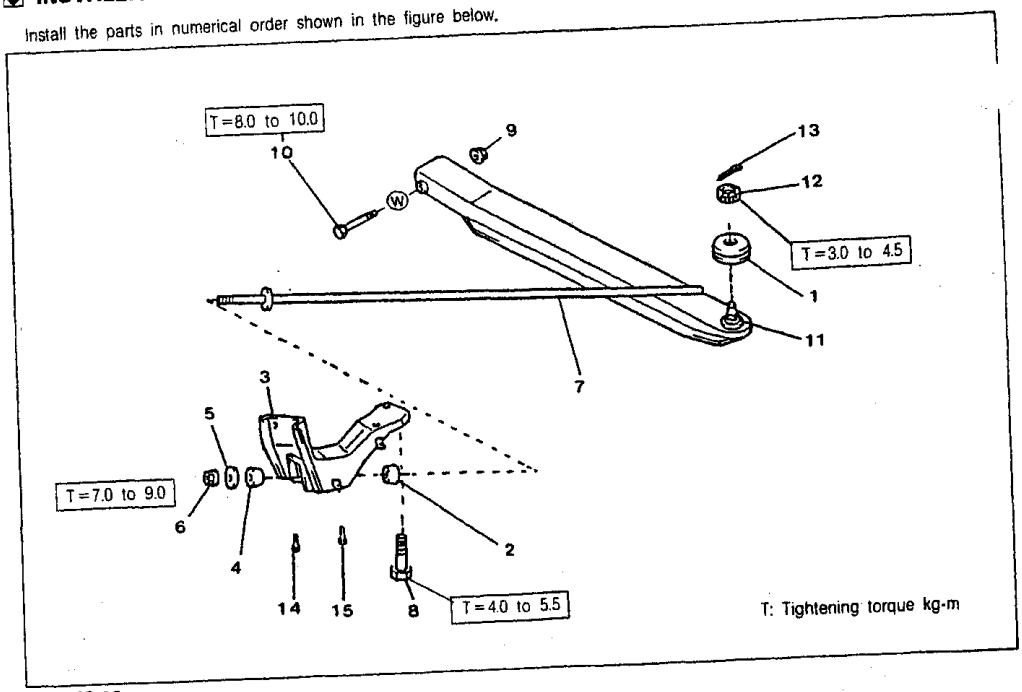


Fig. 13-13

1. Lower ball joint dust cover
2. Strut bar cushion
3. Strut bar bracket S/A
4. Strut bar cushion
5. Plate washer
6. Lock nut
7. Suspension lower arm S/A
8. Hexagon bolt
9. Lock nut
10. Bolt
11. Stud ball (not available as separate part)
12. Castle nut
13. Cotter pin
14. Bolt
15. Bolt

SST: Ball joint dust cover
09618-87301-000

Prior to the installation, pack the following points specified in the right figure with grease.

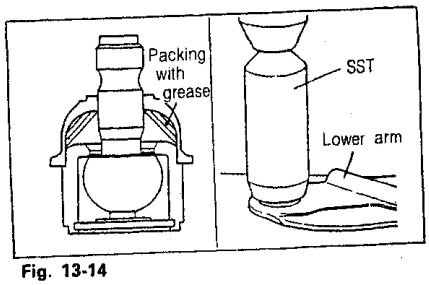


Fig. 13-14

REAR SPRINGS

REMOVAL

Remove the parts in numerical order shown in the figure below.

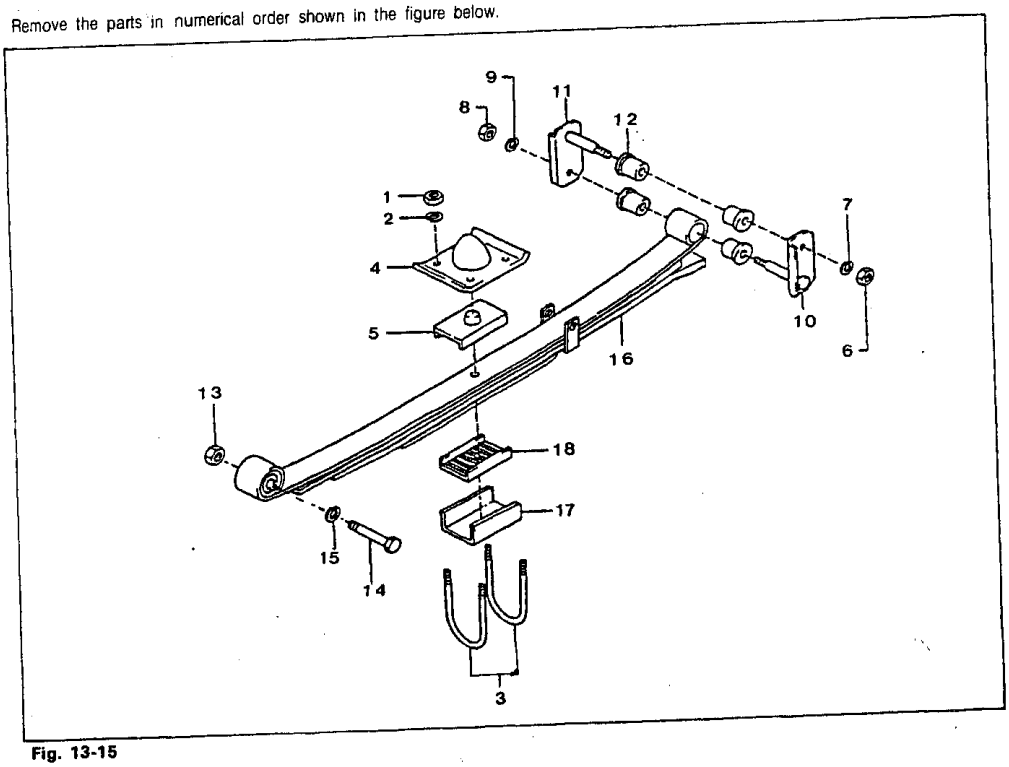


Fig. 13-15

1. Nut
2. Spring washer
3. "U" bolt
4. Rear spring bumper
5. Spring plate or pad
6. Nut
7. Spring washer
8. Nut
9. Spring washer
10. Rear spring shackle S/A
11. Rear spring shackle S/A
12. Bush
13. Nut
14. Spring bracket pin
15. Spring washer
16. Rear spring Ay W/bush
17. Spring pad retainer(Van · Coach)
18. Spring plate or pad(Van · Coach)

INSPECTION

Inspect the following parts. Replace any parts which exhibit defects.

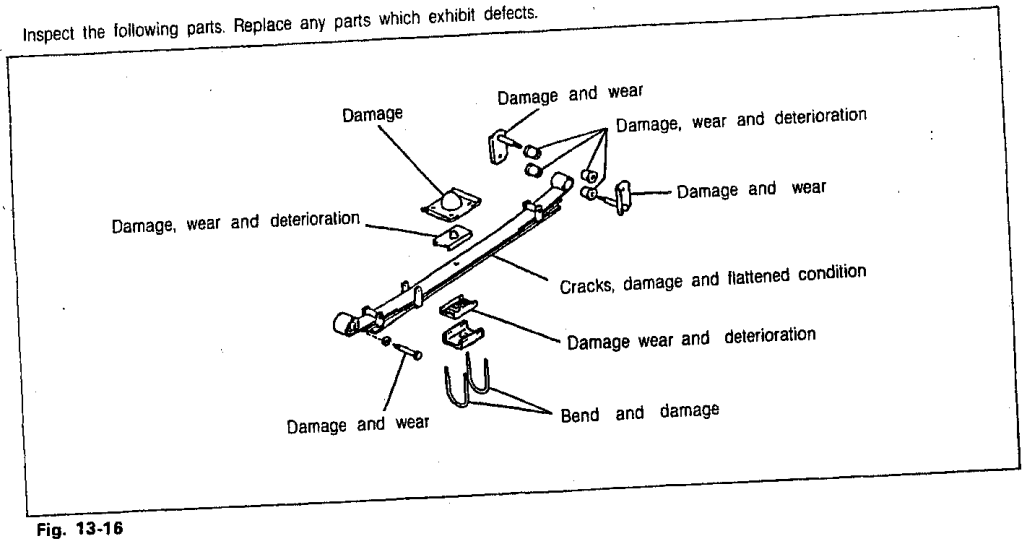


Fig. 13-16

INSTALLATION

Install the parts in numerical order shown in the figure below.

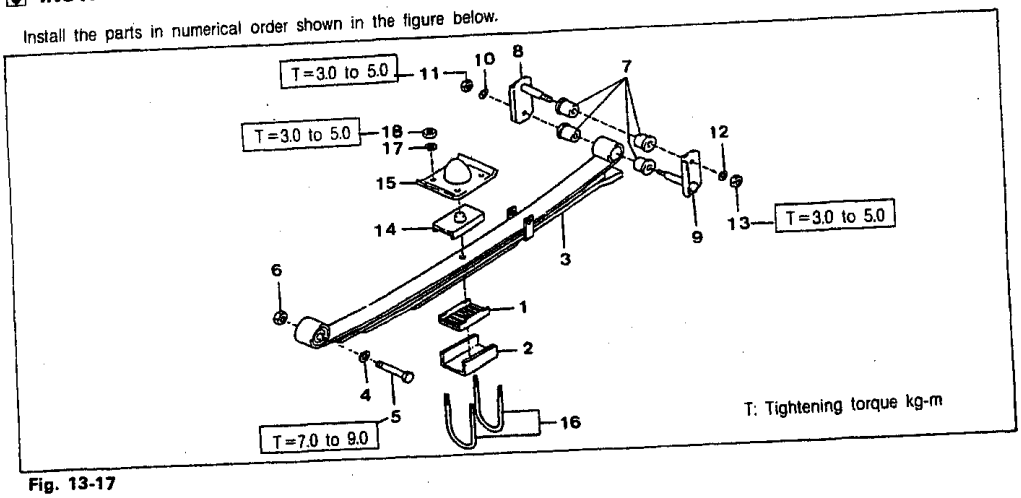


Fig. 13-17

1. Spring plate or pad
2. Spring pad retainer
3. Rear spring Ay W/bush
4. Spring washer
5. Spring bracket pin
6. Nut
7. Bush
8. Rear spring shackle S/A
9. Rear spring shackle S/A
10. Spring washer
11. Nut
12. Spring washer
13. Nut
14. Spring plate or pad
15. Rear spring bumper
16. "U" bolt
17. Spring washer
18. Nut

REAR SHOCK ABSORBERS

REMOVAL · INSTALLATION

Remove the parts in numerical order shown in the figure below.
Installation is in the reverse order of removal.

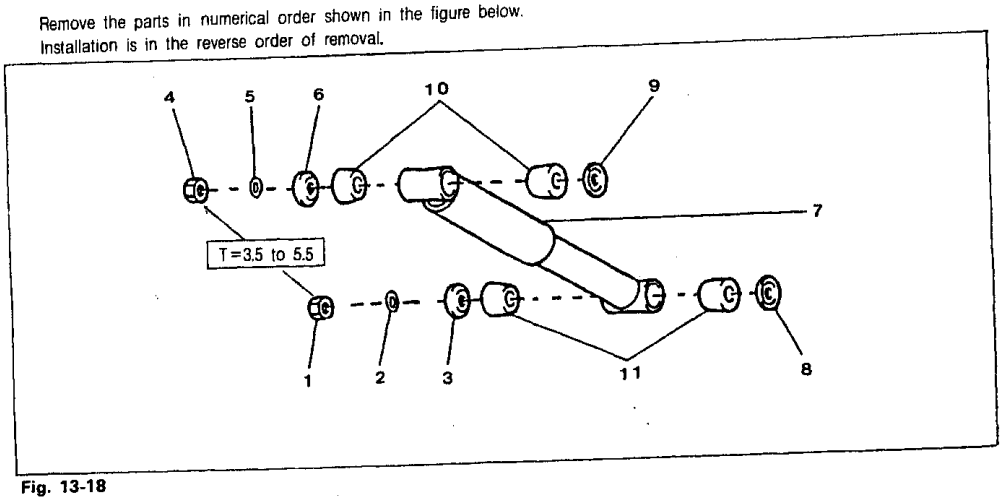


Fig. 13-18

1. Hexagon nut
2. Spring washer
3. Shock absorber cushion washer
4. Hexagon nut
5. Spring washer
6. Shock absorber cushion washer
7. Shock absorber
8. Shock absorber cushion washer
9. Shock absorber cushion washer
10. Cushion
11. Cushion

INSPECTION

Inspect the following parts. Replace any parts which exhibit defects.

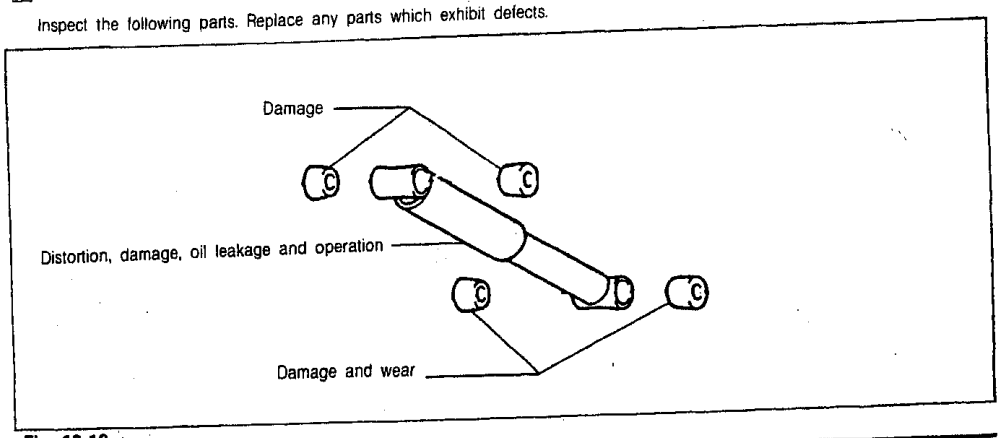


Fig. 13-19

BODY 14

HEAD LAMP HOUSING

REMOVAL

Remove the parts in numerical order shown in the figure below.

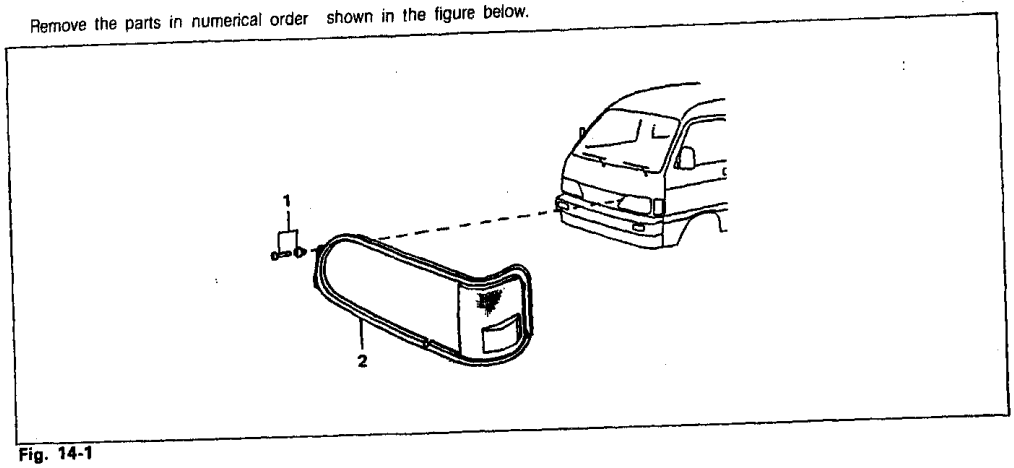


Fig. 14-1

1. Screw & screw grommet
2. Bezel

INSTALLATION

Install the parts in numerical order shown in the figure below.

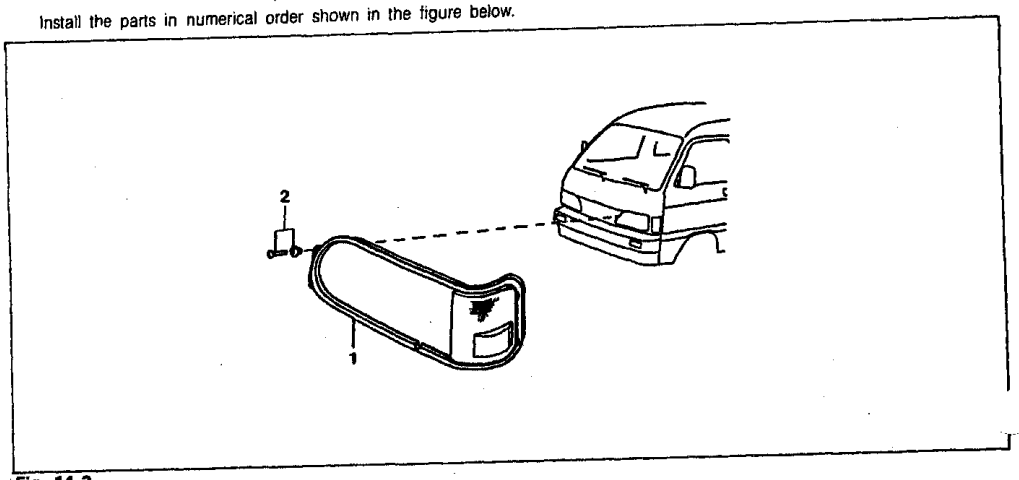


Fig. 14-2

1. Bezel
2. Screw & screw grommet

FRONT SIDE PANEL

REMOVAL

Remove the parts in numerical order shown in the figure below.

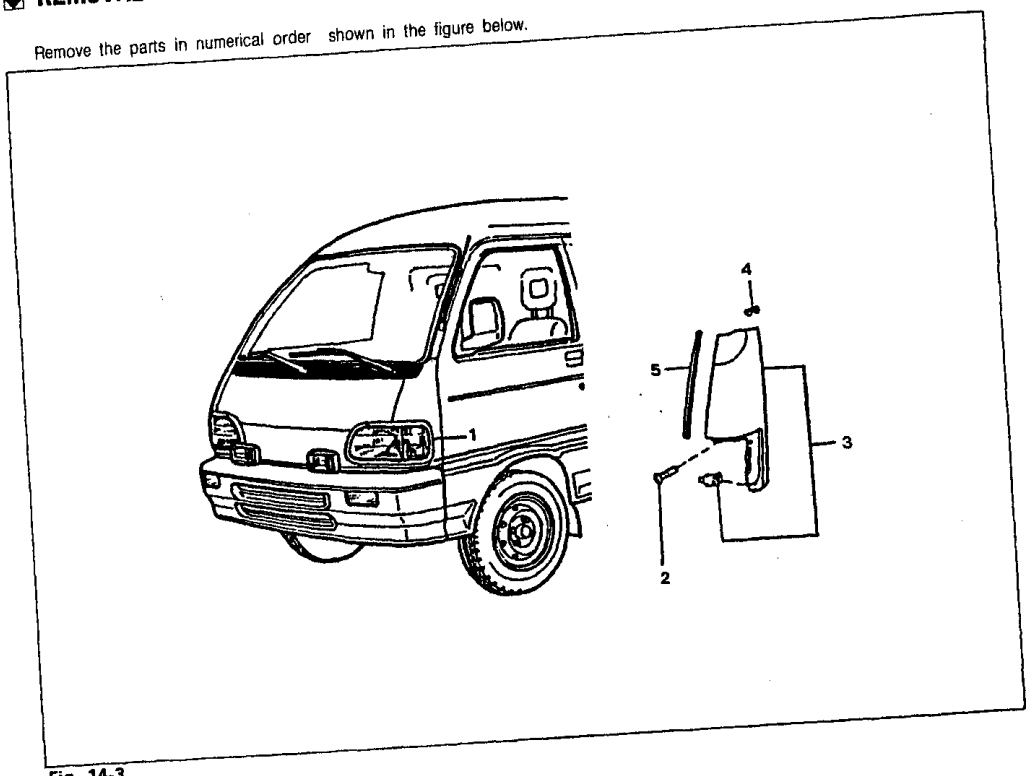


Fig. 14-3

1. Head lamp housing
2. Screw W/washer
3. Front side panel S/A
4. Front side panel protector No. 1
5. Front side panel protector No. 2

MAIN POINTS OF REMOVAL

Front side panel

The front side panel has been inserted in position by a clip. Hence, pick the clip, using radio pliers or the like, and take it out.

NOTE

When you remove the clip from the front pillar, turn the clip 90 degrees and remove it.

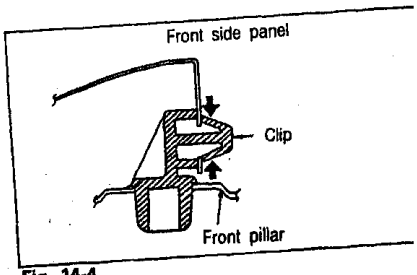


Fig. 14-4

◆ INSTALLATION

Install the parts in numerical order shown in the figure below.

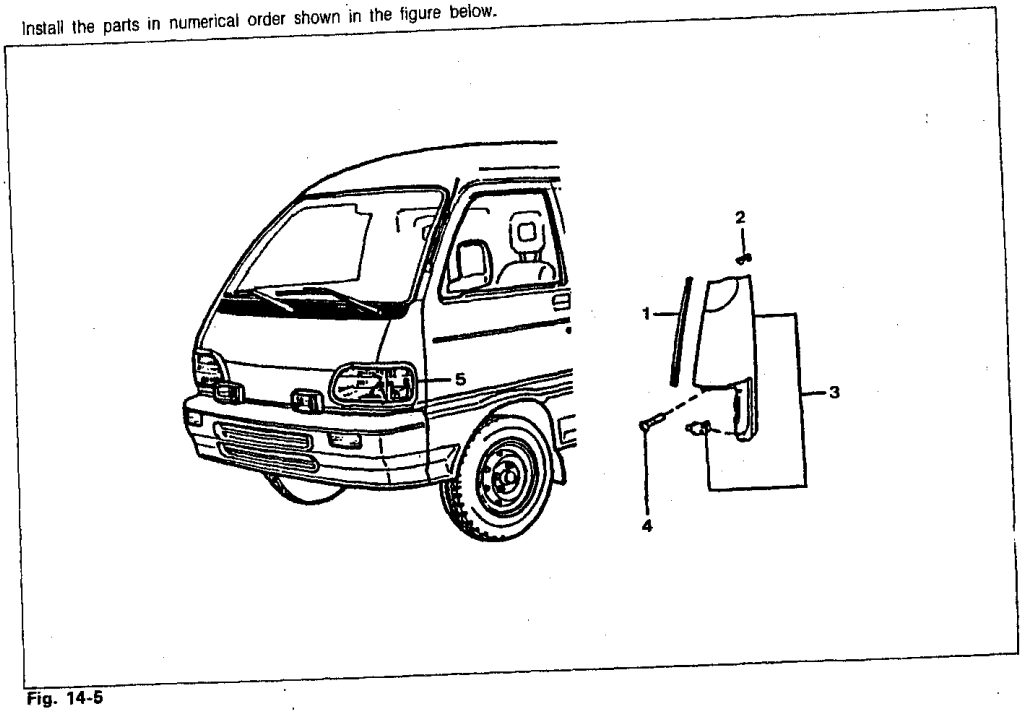


Fig. 14-5

1. Front side panel protector No. 2
2. Front side panel protector No. 1
3. Front side panel S/A
4. Screw W/washer
5. Head lamp housing

NOTE

Care must be exercised to ensure that the windshield weatherstrip rubber piece may not be pinched during the installation.

FRONT BUMPER

REMOVAL

Remove the parts in numerical order shown in the figure below.

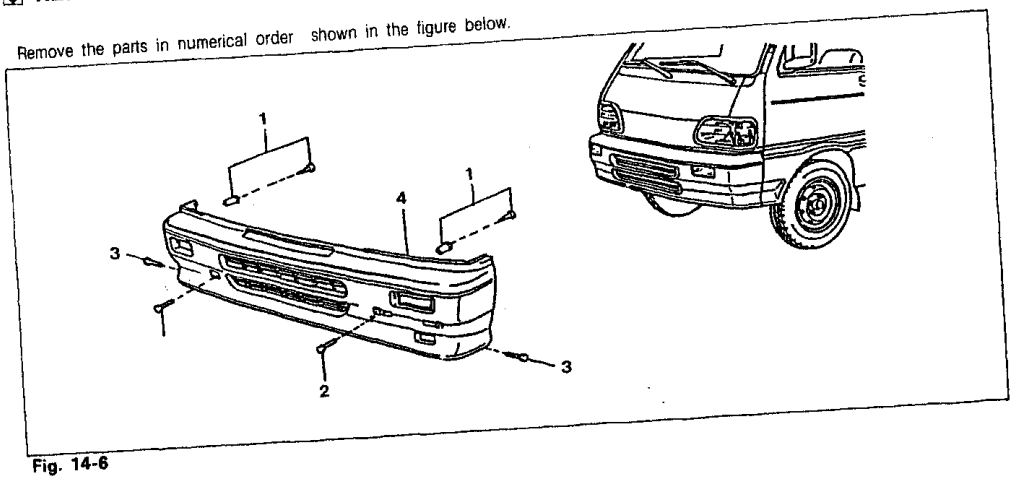


Fig. 14-6

1. Clip & screw
2. Bolt
3. Bolt
4. Front bumper

INSTALLATION

Install the parts in numerical order shown in the figure below.

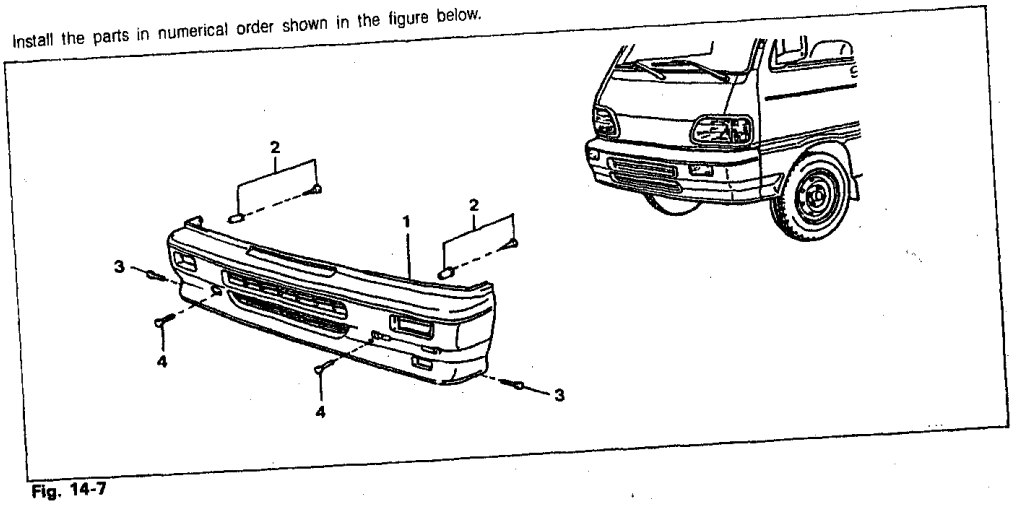


Fig. 14-7

1. Front bumper
2. Clip & screw
3. Bolt
4. Bolt

WINDSHIELD GLASS

FRONT WINDSHIELD GLASS

Remove the parts in numerical order shown in the figure below.

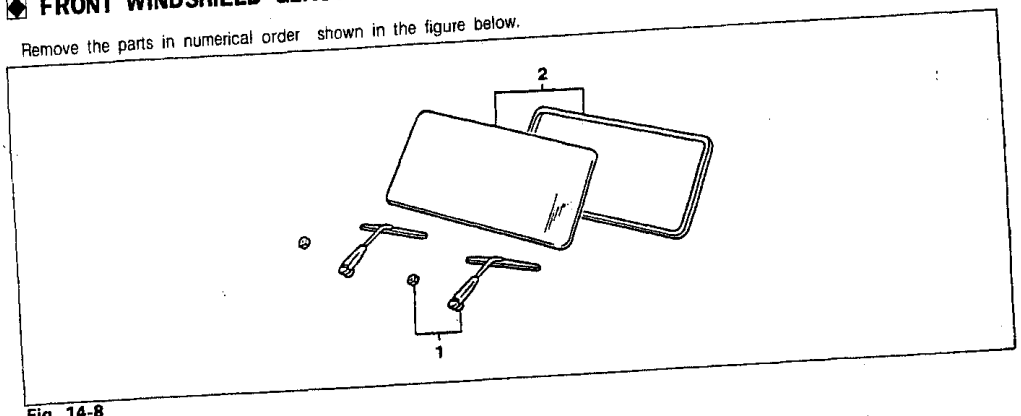


Fig. 14-8

1. Front wiper arm and blade
2. Windshield glass and windshield weather strip

ARTICLES TO BE PREPARED

	Item	Use
Tools and others	Operation rope(Approx. 5mm × 6m)	For use in installing glass
	Bamboo spatula	For use in installing glass
	Rubber hammer	For use in installing glass
	Brush, etc	For use in applying soap water
	Soap water	For in sliding glass easily during installation

MAIN POINTS OF REMOVAL

Windshield glass & windshield weatherstrip
(Operation by two persons)

1. Push the lip section of the weatherstrip outward from the body flange, using a bamboo spatula (or a ⊖ screwdriver, etc). This operation is performed from the vehicle interior.
2. Push the glass outward, while from the inside prying the upper sides of the weatherstrip at both ends. Proceed to remove the glass with the weatherstrip attached thereon.

NOTE

At this time, make sure to apply force to the glass evenly. Also, hold the glass from outside so that it may not spring out.

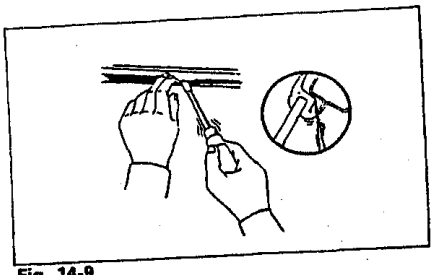


Fig. 14-9

INSTALLATION OF FRONT WINDSHIELD GLASS

Install the parts in numerical order shown in the figure below.

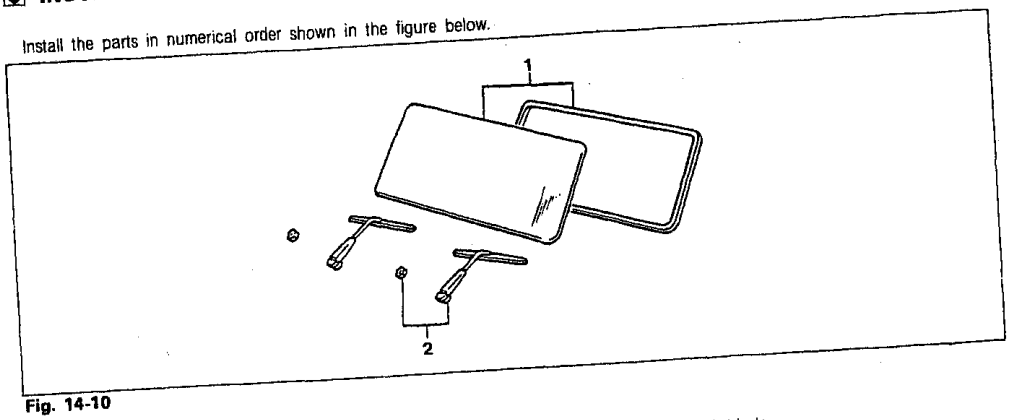


Fig. 14-10

1. Windshield glass & windshield weather strip
2. Front wiper arm & blade

MAIN POINTS OF INSTALLATION

Windshield glass & windshield weatherstrip (Operation by two persons)

1. Perform the preparatory operations as follows:
   1) Attach the weather strip to the windshield glass.
   Set an operation rope as indicated in the right figure.
   (Apply soap water to the periphery if the weather strip so that it can slide more easily.)

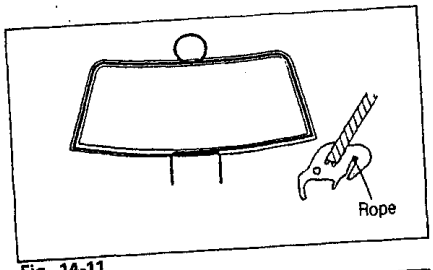


Fig. 14-11

2. Apply the windshield glass and windshield weather strip to the body in such a way that they are fitted evenly in an up-and-down as well as in a right-and-left direction. Ensure that the operation rope is suspended to the vehicle interior.

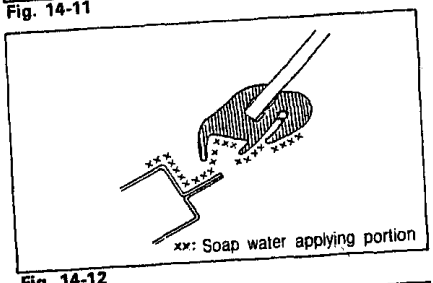


Fig. 14-12

3. Pull the rope in such an angle that the rope suspending to the vehicle interior may be allowed to cross over the flange. While doing so, the other person working from the outside pounds the portions of the windshield adjacent to the weather strip by his palms so that the windshield is installed in position.

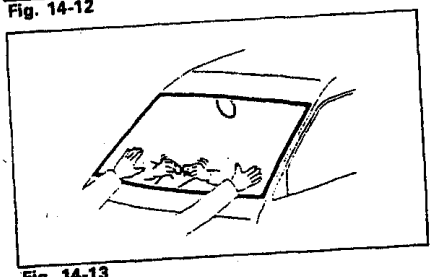


Fig. 14-13

4. Pound the windshield by your palms so that it is settled.

NOTE

1. **Never use again the weather strip which exhibits damage, cracksand so forth at its lip-section. Such defective weatherstrip may cause water leakage.**
2. **When you pound the windshield using a rubber hammer, if the operation is made in such a manner as if it pushes the windshield, it will facilitate the installation.**

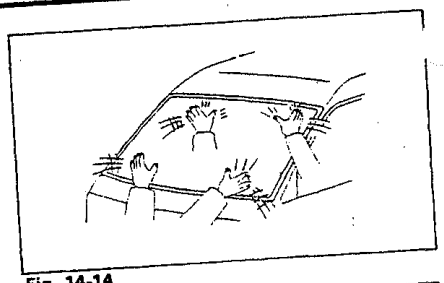


Fig. 14-14

Front wiper arm & blade

For the installing position, see the right figure.

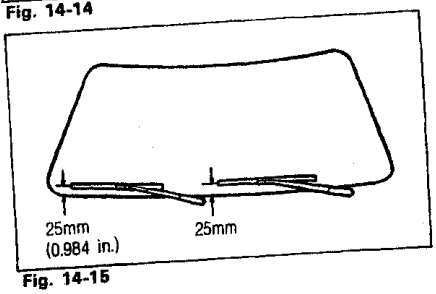


Fig. 14-15

◆ REMOVAL OF BACK WINDOW GLASS

Remove the parts in numerical order shown in the figure below.

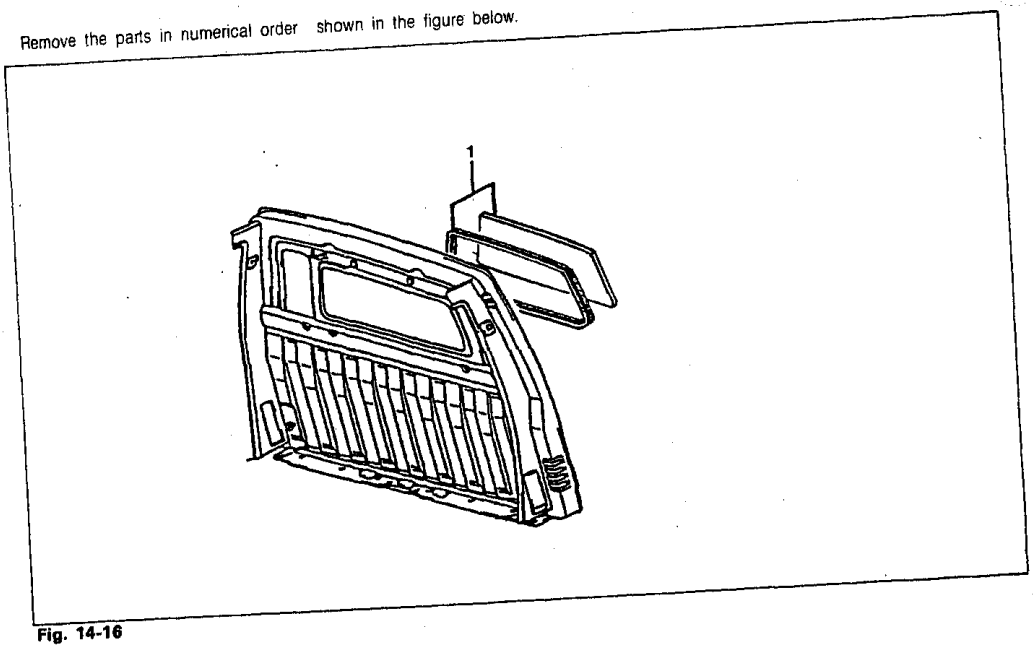


Fig. 14-16

1. Back window glass & weather strip

◆ INSTALLATION OF BACK WINDOW GLASS

Install the parts in numerical order shown in the figure below.

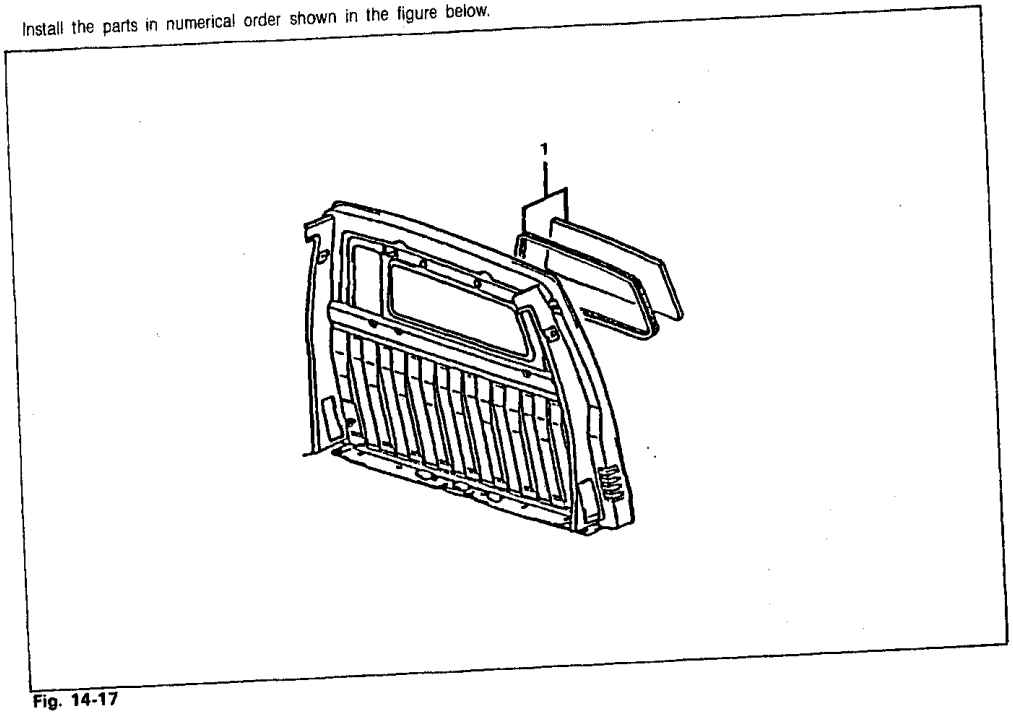


Fig. 14-17

1. Back window glass & weather strip

FRONT DOORS

REMOVAL OF DOOR TRIM & SERVICE HOLE COVER

Remove the parts in numerical order shown in the figure below.

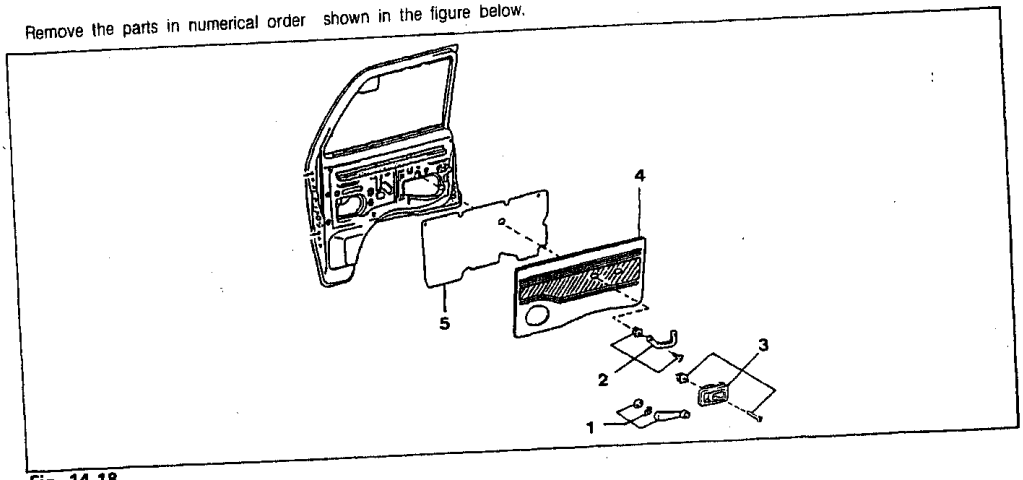


Fig. 14-18

1. Door window regulator handle Ay
2. Front door pulling handle Ay
3. Door inside handle Ay
4. Front door trim board S/A
5. Front door service hole cover

ARTICLES TO BE PREPARED

	Item	Use
Grease, etc	Butyl tape	For use in preventing water leakage
	MP grease	For lubrication
Others	Soap water	For use in sliding weatherstrip easily
	Brush, etc	For use in applying soap water
	Wooden hammer	For use in installing holder
		For use in removing shaft snap rings at door window regulator and inside of rear door (Fabricated by wire, etc)
	Touch-up paint	For use in touch-up painting after removal/installation and adjustment

MAIN POINTS OF REMOVAL

Shaft snap ring & door regulator inside handle plate

Insert a tool fabricated by wire, etc. into between the door trim and the plate. Pull out the snap ring, as shown in the right figure.

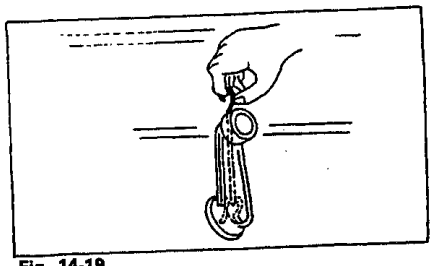


Fig. 14-19

Front door trim board

Insert a ⊖ screwdriver into between the retainer and the panel. Remove the trim board, as shown in the right figure.

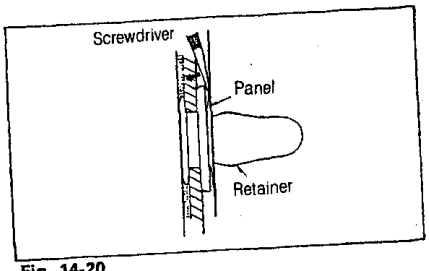


Fig. 14-20

Front door service hole cover

NOTE

Be sure to remove the service hole cover together with the butyl tape so that the cover may not be ruptured.

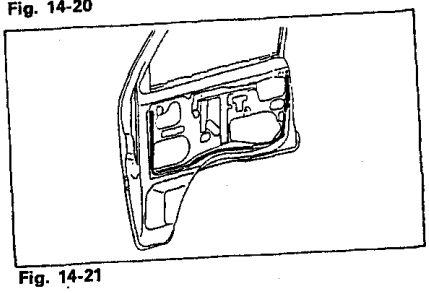


Fig. 14-21

◆ INSTALLATION OF DOOR TRIM & SERVICE HOLE COVER

Install the parts in numerical order shown in the figure below.

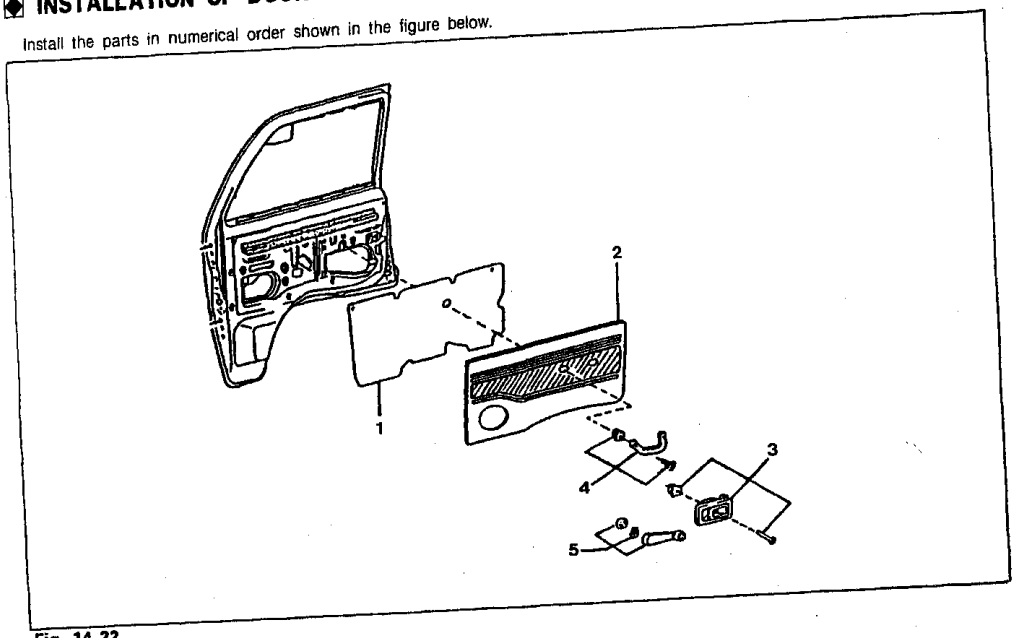


Fig. 14-22

1. Front door service hole cover No. 1
2. Front door trim board S/A
3. Door inside handle Ay
4. Front door pulling handle Ay
5. Door window regulator handle Ay

◆ MAIN POINTS OF INSTALLATION

Front door service hole cover

1. Be sure to affix the butyl tape along the panel groove without stretching.
2. After completion of the affixing, press the affixing portion of the service hole cover.
3. Be sure not to positively insert the lower end of the service hole cover into the panel hole.
   (If the service hole cover exhibits rupture or wrinkle, etc., it will cause water leakage.)

Front door window regulator handle

For the installation position, see the right figure.

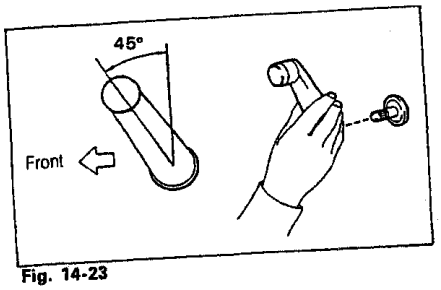


Fig. 14-23

◆ REMOVAL OF DOOR GLASS & DOOR WINDOW REGULATOR

Remove the parts in numerical order shown in the figure below.

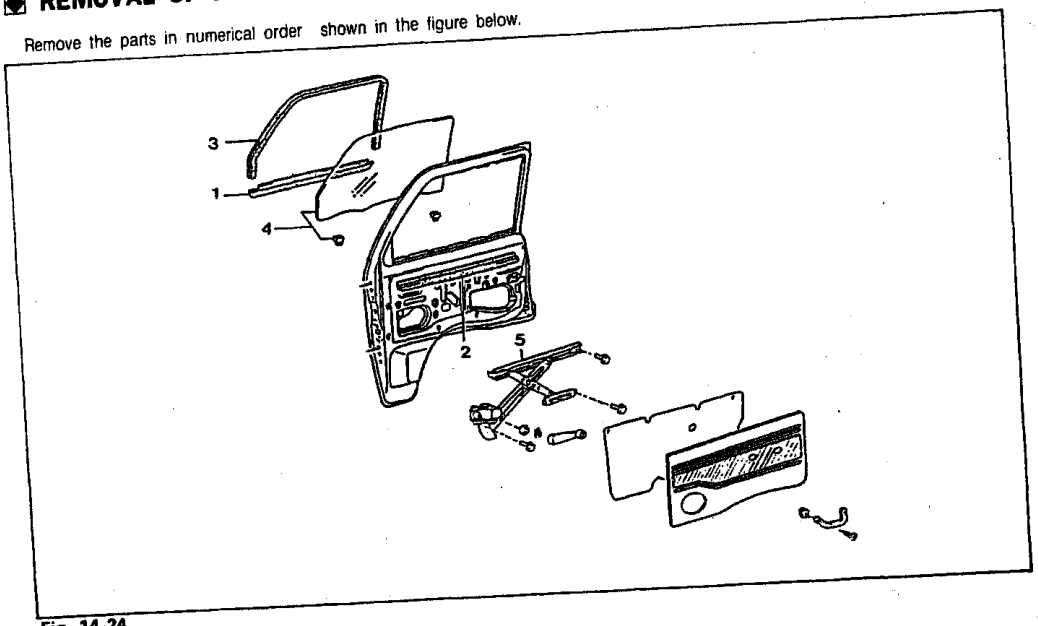


Fig. 14-24

1. Front door glass outer weather strip
2. Front door glass inner weather strip
3. Front door glass run
4. Front door glass
5. Front door window regulator Ay

◆ MAIN POINTS OF REMOVAL

Front door glass outer weather strip

NOTE

- **When removing this part, raise the claw section. This will facilitate the removal operation.**
- **After completion of the removal, correct the claw section of the weatherstrip to the original shape.**

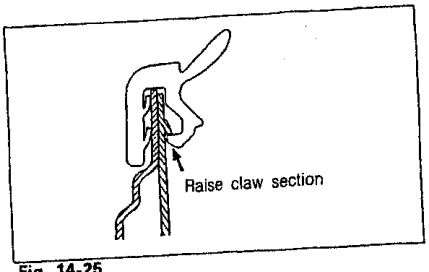


Fig. 14-25

Front door glass

While holding the glass vertically, pull it upward.

Front door window regulator

Put a mark on the first glass to indicate the installing position of holder for the door window glass holder cushion.

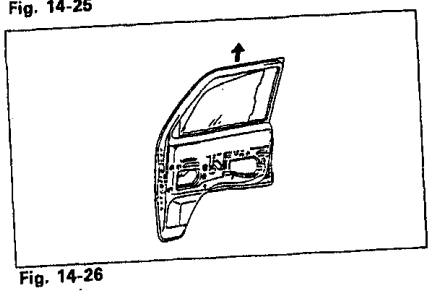


Fig. 14-26

◆ INSTALLATION OF DOOR GLASS & DOOR WINDOW REGULATOR

Install the parts in numerical order shown in the figure below.

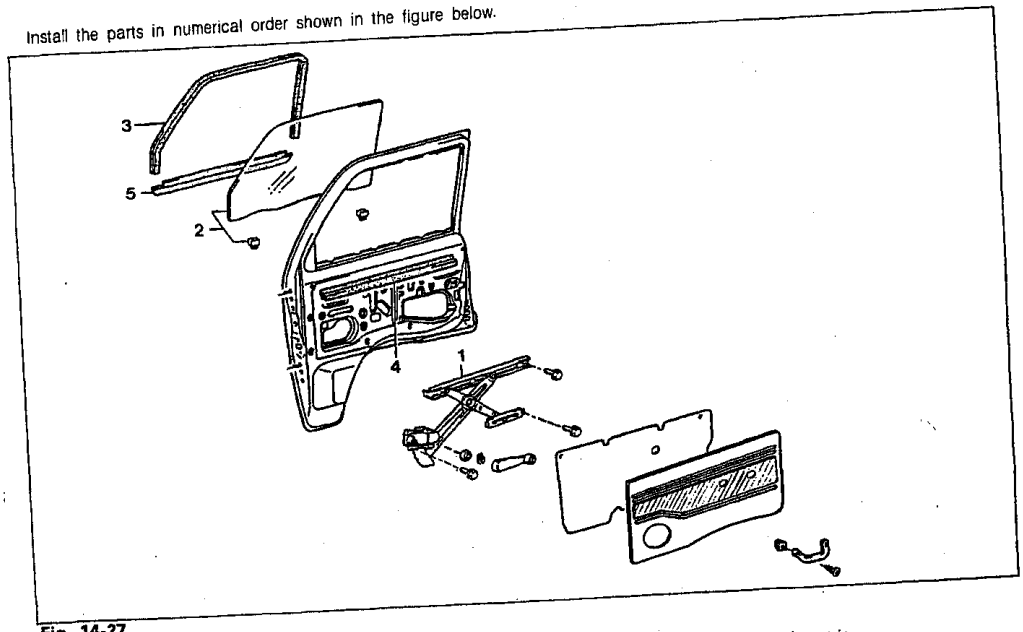


Fig. 14-27

1. Front door window regulator Ay
2. Front door glass
3. Front door glass run
4. Front door glass outer weather strip
5. Front door glass inner weather strip

◆ MAIN POINTS OF INSTALLATION

Cushion & door window glass holder

1. Put a mark on the glass to indicate the holder installation position for the door window glass holder cushion.
2. Apply soap water to the inside of the cushion.
3. To install the cushion and holder, tap them lightly, using a wooden hammer or the like.

Front door window regulator

1. Temporarily install the equalizer arm bracket. (This adjustment is carried out after the door glass has been installed.)
2. Apply the MP grease to each sliding section.

Front door glass

NOTE

Be sure to positively fit the glass into the door frame.

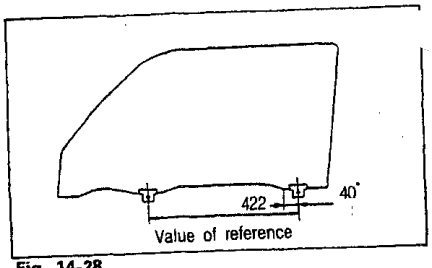


Fig. 14-28

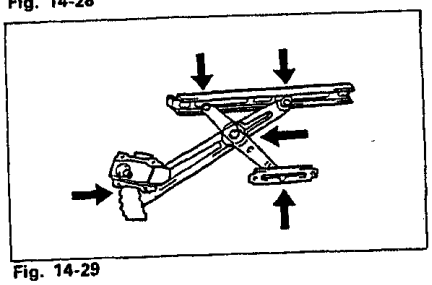


Fig. 14-29

◆ REMOVAL OF DOOR FRAME

Remove the parts in numerical order shown in the figure below.

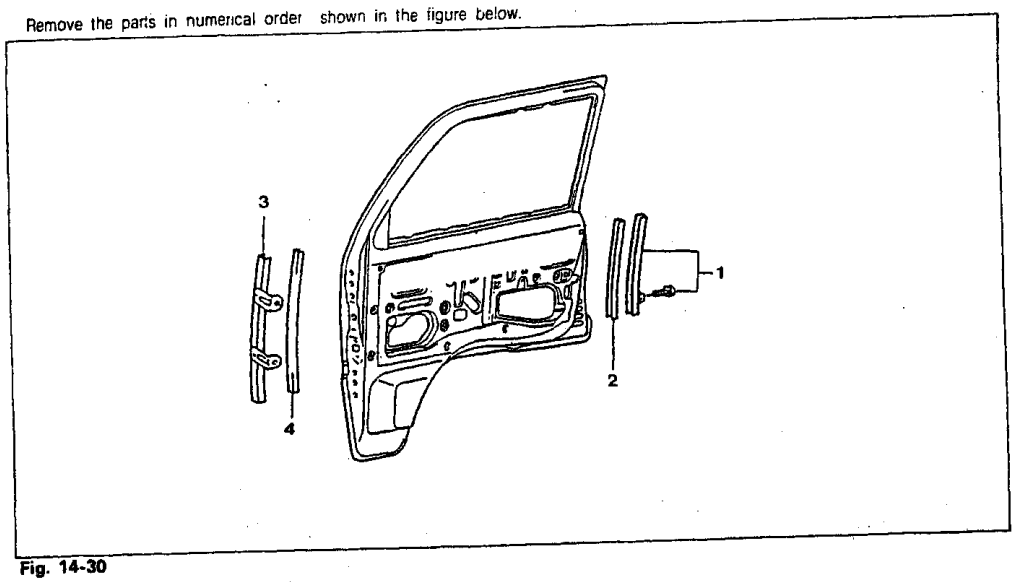


Fig. 14-30

1. Front door rear lower frame S/A
2. Front door window rear lower run
3. Front door front lower frame
4. Front door glass front run No. 2

◆ MAIN POINTS OF REMOVAL

Front door rear lower frame

NOTE

Be sure to perform the operation with the glass raised, while the frame is being pulled downward.

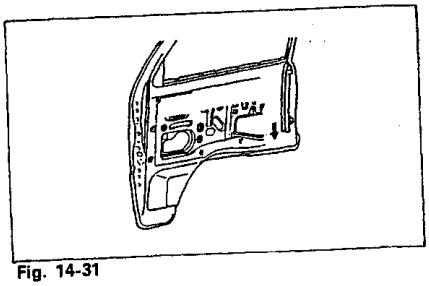


Fig. 14-31

◆ INSTALLATION OF DOOR FRAME

Install the parts in numerical order shown in the figure below.

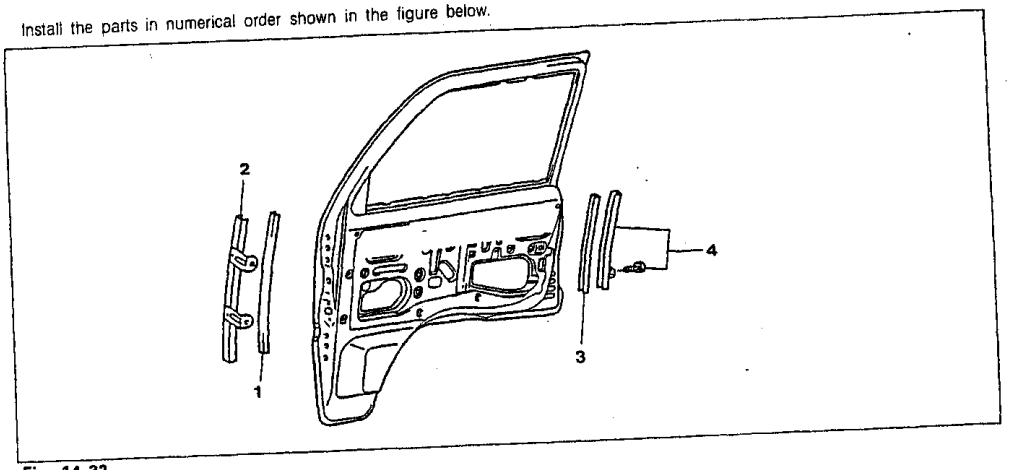


Fig. 14-32

1. Front door glass front run No. 2
2. Front door front lower frame
3. Front door window rear lower run
4. Front door rear lower frame

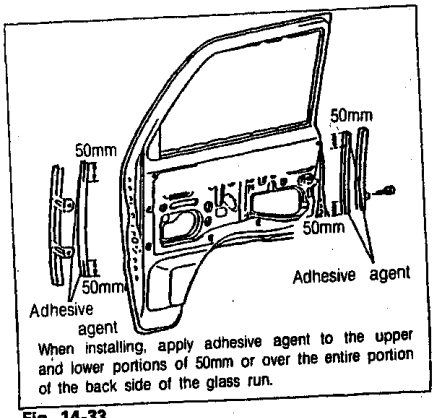
◆ MAIN POINTS OF INSTALLATION

Front door glass front run No. 2

NOTE: **When installing this part, be sure to use an adhesive agent.**

Front door window rear lower run

NOTE: **When installing this part, be sure to use an adhesive agent.**



When installing, apply adhesive agent to the upper and lower portions of 50mm or over the entire portion of the back side of the glass run.

Fig. 14-33

◆ REMOVAL OF DOOR AND DOOR HINGE

Remove the parts in numerical order shown in the figure below.

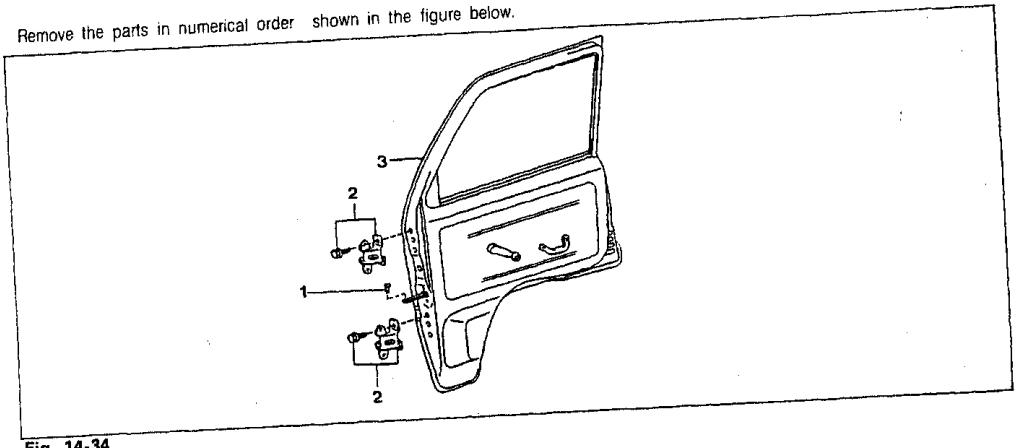


Fig. 14-34

1. Front door check pin
2. Front door hinge
3. Front door

◆ MAIN POINTS OF REMOVAL

Front door hinge

1. Remove the bolts at the door side.
2. Supporting the door panel at its lower side may facilitate the removal operation.

◆ INSTALLATION OF DOOR & DOOR HINGE

Install the parts in numerical order shown in the figure below.

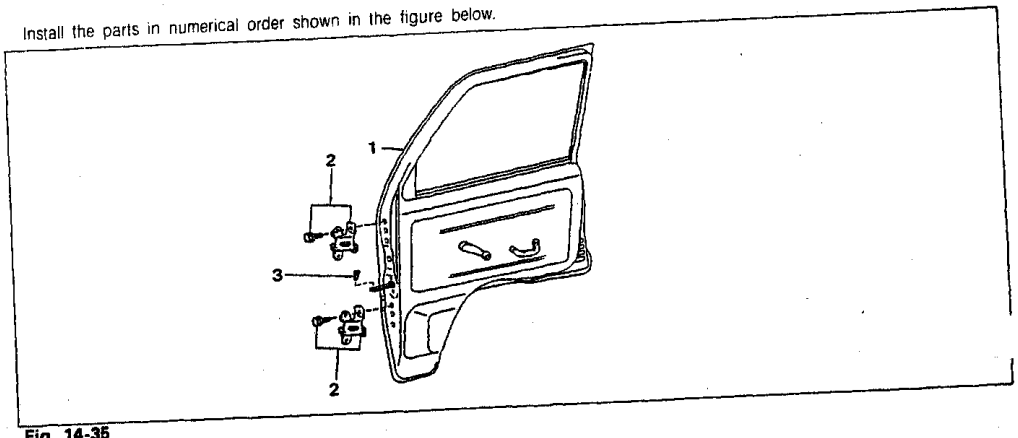


Fig. 14-35

1. Front door
2. Front door hinge
3. Front door check

Front door check
NOTE: Do not apply the grease to the lever section.

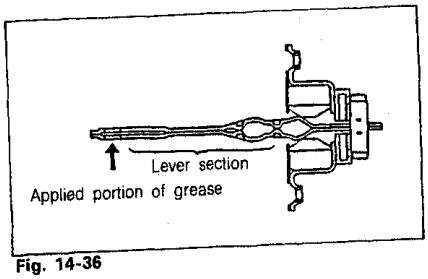


Fig. 14-36

◆ REMOVAL OF DOOR LOCK & OUTSIDE HANDLE

Remove the parts in numerical order shown in the figure below.

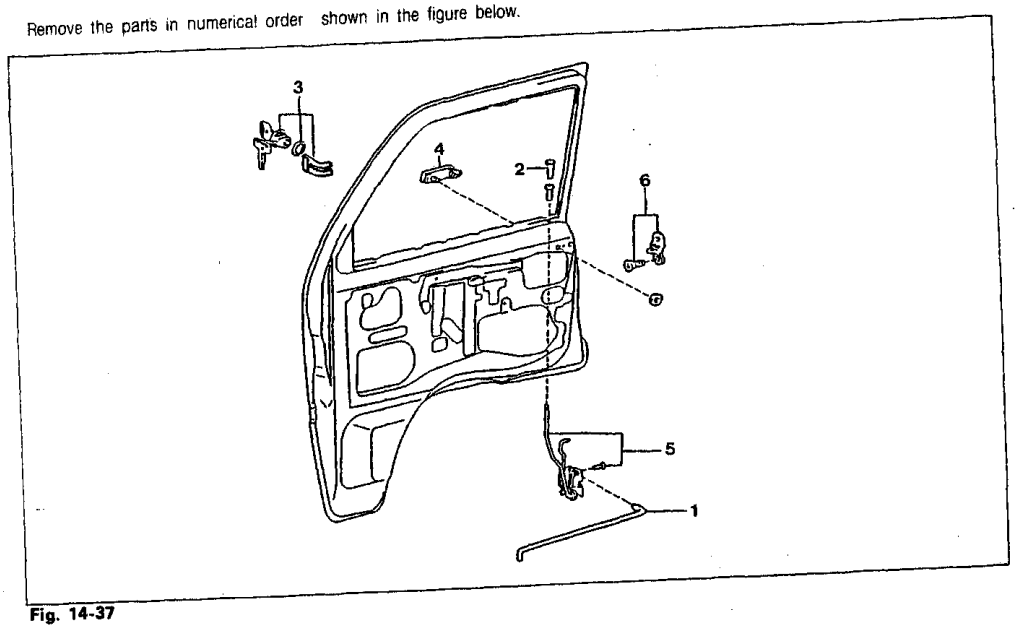


Fig. 14-37

1. Front door open control link
2. Door locking button
3. Door lock cylinder & door lock cylinder clamp
4. Front door outside handle
5. Front door lock
6. Front door plate

◆ INSTALLATION OF DOOR LOCK & OUTSIDE HANDLE

Install the parts in numerical order shown in the figure below.

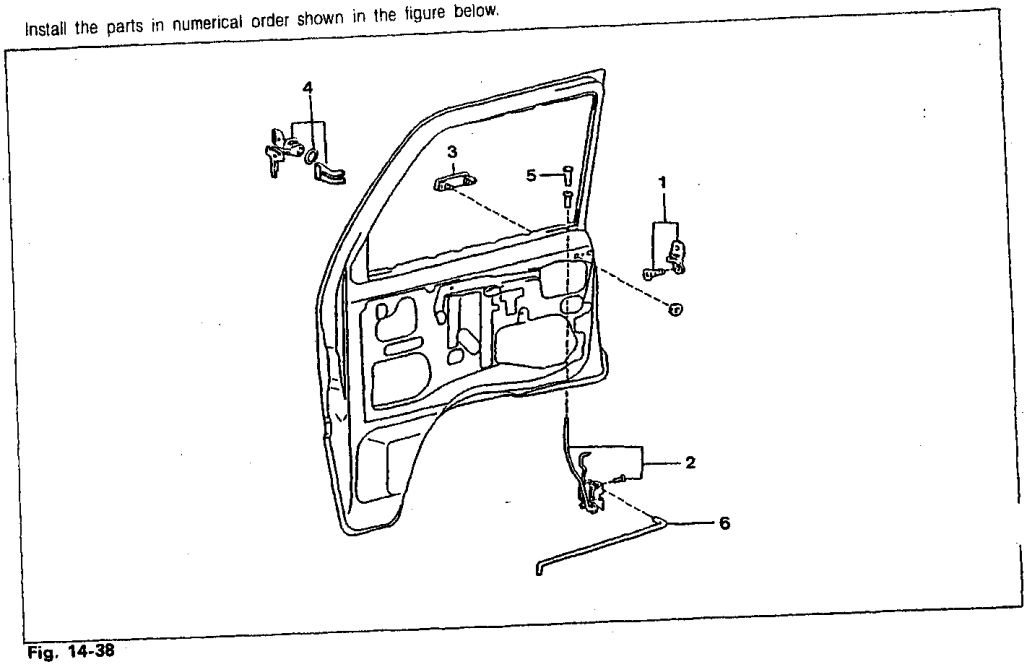


Fig. 14-38

1. Front door plate
2. Front door lock
3. Front door outside handle
4. Door lock cylinder & door lock cylinder clamp
5. Door locking button
6. Front door open control link

◆ MAIN POINTS OF INSTALLATION

Front door lock

Apply the MP grease to each sliding section.

Front door open control link

NOTE

After installation, be sure to check and adjust the lock condition.

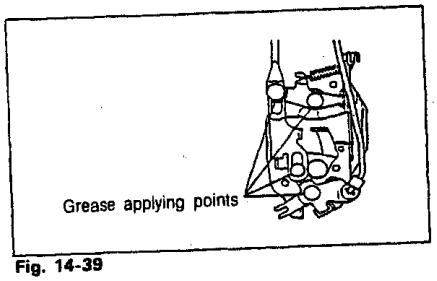


Fig. 14-39

◆ ADJUSTMENT OF FRONT DOOR ALIGNMENT

Specified alignment dimensions

Gap Ⓐ, Ⓑ, Ⓒ, Ⓓ
Specified value: 3.5 to 7.5mm(0.138 to 0.295 in.)
Deviation in each side Ⓐ, Ⓑ, Ⓒ
Specified value: Not to exceed 1.5mm(0.059 in.)
Deviation in each side Ⓓ
Specified value: Not to exceed 2.0mm(0.079 in.)
Difference in height
Specified value: Not to exceed ±1.5mm
Deviation between right and left sides
Specified value: Not to exceed 2.0mm(0.079 in.)

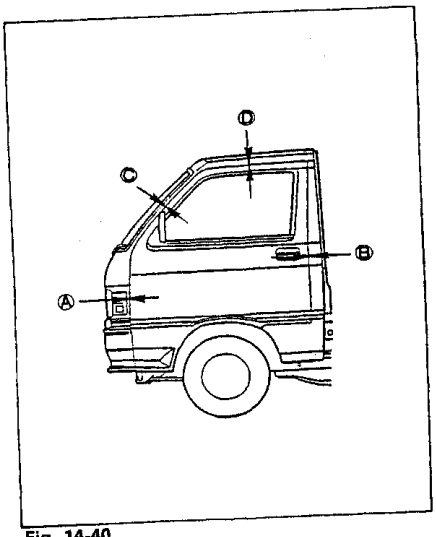


Fig. 14-40

Front door adjustment in Right-and-Left and Up-and-Down directions
Perform this adjustment after loosening the hinge bolts(two pieces) at the door side.

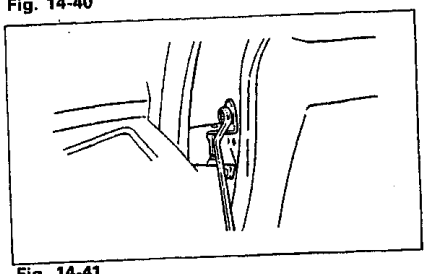


Fig. 14-41

Front door adjustment in Fore-and-After and Up-and-Down directions
Perform this adjustment after loosening the hinge bolts(two pieces) at the pillar side.

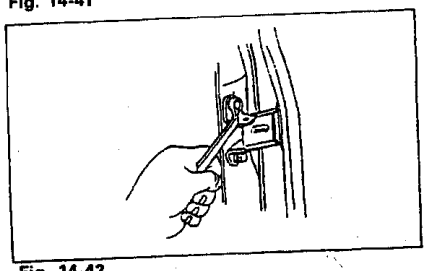


Fig. 14-42

Door plate adjustment
Loosen the door plate screw. Adjust and tighten the door plate so that the door is lightly closed and no difference in height with the rear pillar exists.

NOTE
If the door is sagged or raised at the rear section, never attempt to correct it at the door plate. This adjustment must be performed at the door hinge.

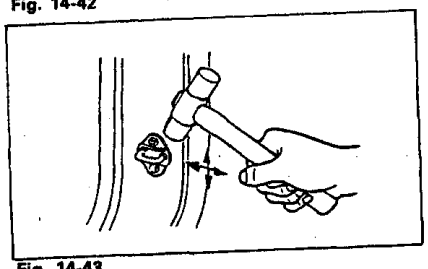


Fig. 14-43

GARNISH OF FRONT PANEL (VAN · COACH)

REMOVAL

Remove the parts in numerical order shown in the figure below.

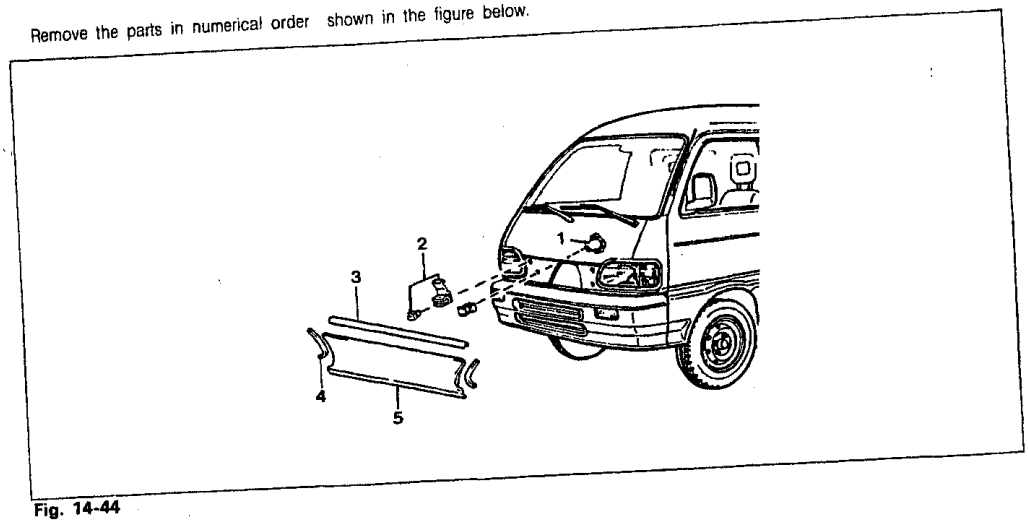


Fig. 14-44

1. Front cover mounting screw & clip
2. Clip
3. Center panel protector No. 2
4. Center panel protector No. 1
5. Front panel center cover S/A

MAIN POINTS OF REMOVAL

1. Turn the knob(orange color) at the vehicle interior to the left and remove it toward the vehicle interior.

   NOTE

   On the motor vehicles equipped with head lamp cleaners, the knob will not be removed, unless the washer fluid tank is removed first.

2. Slightly pull the lower section of the front panel toward you. Then, raise the panel to remove it.

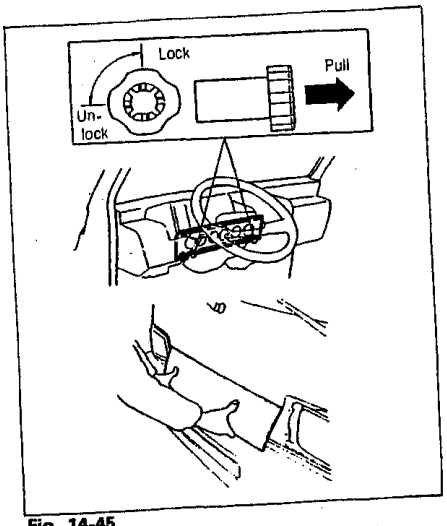


Fig. 14-45

INSTALLATION

Install the parts in numerical order shown in the figure below.

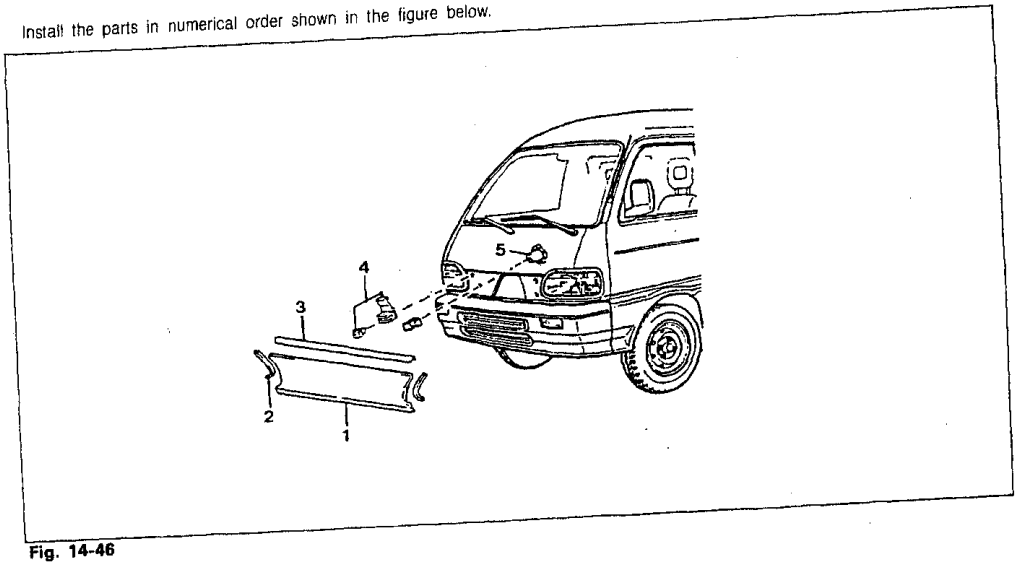


Fig. 14-46

1. Front panel center cover S/A
2. Center panel protector No. 1
3. Center panel protector No. 2
4. Clip
5. Front cover mounting screw & clip

MAIN POINTS OF INSTALLATION

1. Put the holes located at the upper part of the front panel into the K-shaped clips at the body side.
2. Under the condition (1), push the lower part of the front panel against the body so that the clip's legs may be inserted into the body.
3. Install the knob(orange color) from the interior by turning it to the right.

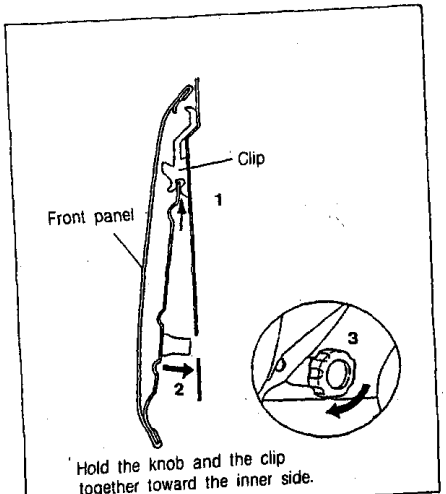


Fig. 14-47

REAR BUMPER(VAN · COACH)

REMOVAL

Remove the parts in numerical order shown in the figure below.

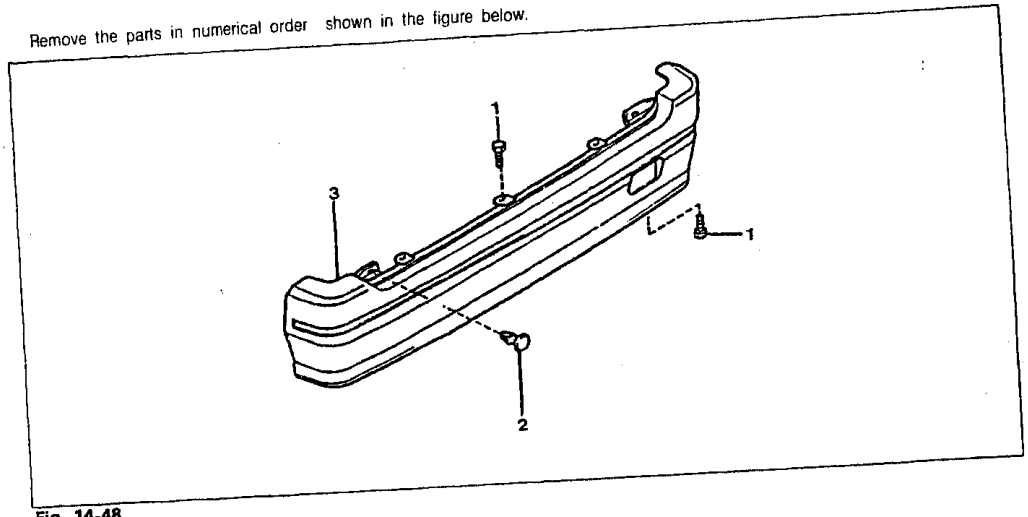


Fig. 14-48

1. Bolt
2. Clip
3. Rear bumper S/A

INSTALLATION

Install the parts in numerical order shown in the figure below.

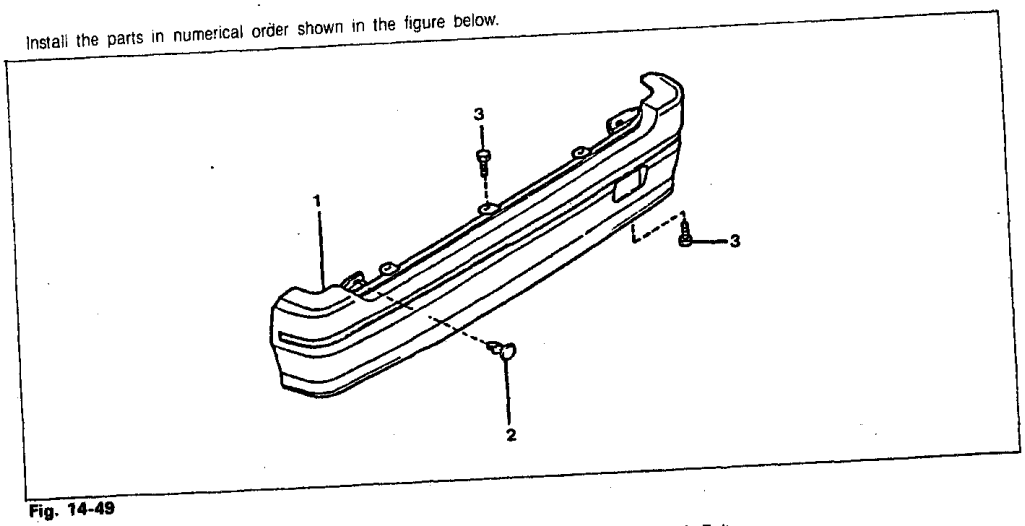


Fig. 14-49

1. Rear bumper S/A
2. Clip
3. Bolt

STRIPES

REMOVAL

Raise the end portion of the tape by your nails or with a knife, and slowly pull the tape to peel it off.

INSTALLATION

1. Clean the stripe affixing area of the body, using a cloth. If that area is contaminated by mineral oil, grease and so forth, clean the area by white gasoline.
2. Peel off the stripe protecting paper.
3. Affix the stripe to the position shown in the figure below. Press the stripe firmly by your hand.
   NOTE: Be sure to strongly press the wrapped portion of the hemming section.
4. Peel off the application tape, starting from one end and proceeding continuously to the other hand.
   NOTE: Be sure to slowly peel off the application tape, while paying attention so that the stripe may not float from the body.
5. If bubbles are trapped under the stripe, expel the air, using a setting pin or the like. Then, press the area by your finger.
6. Press the stripe strongly by your hand.
   NOTE: Do not wash the vehicle within 24 hours after the installation of the stripe.

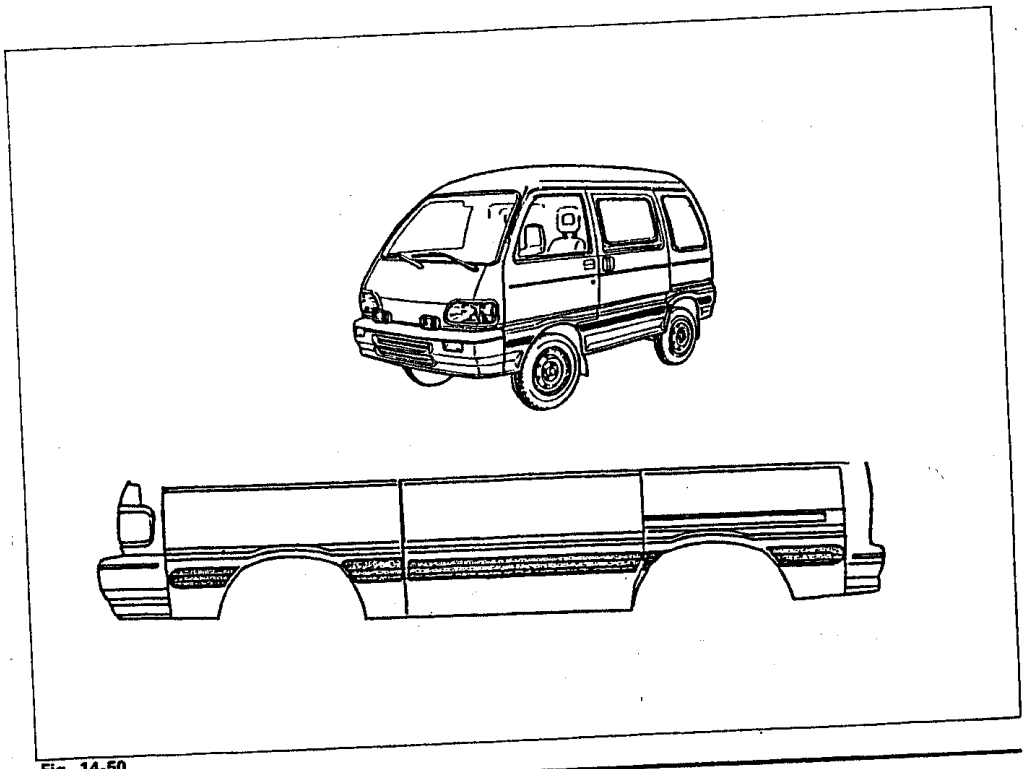


Fig. 14-50

REAR DOORS

REMOVAL OF DOOR TRIM & SERVICE HOLE COVER

Remove the parts in numerical order shown in the figure below.

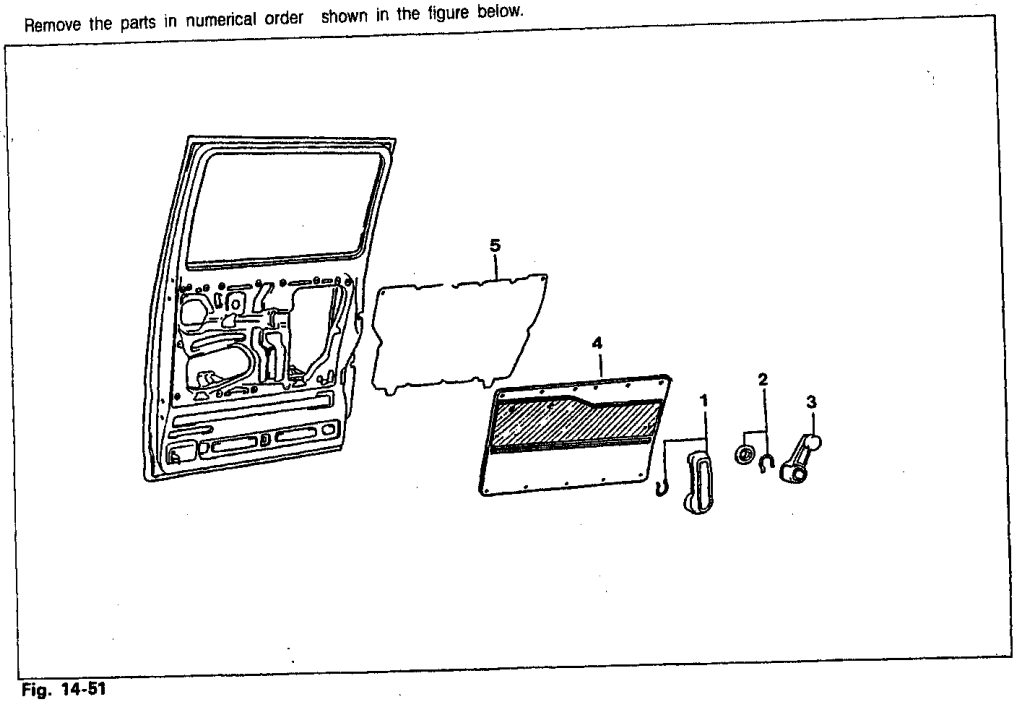


Fig. 14-51

1. Shaft snap ring & rear door inside
2. Shaft snap ring & door window regulator handle plate
3. Door window regulator handle
4. Rear door trim board
5. Door service hole cover

ARTICLES TO BE PREPARED

	Item	Use
Grease, etc	Butyl tape	For use in preventing water leakage
	MP grease	For lubrication
Others	Soap water	For use in sliding weather strip easily
	Brush, etc	For use in applying soap water
	Wooden hammer	For use in installing holder
		For use in removing shaft snap rings at door window regulator and inside of rear door (Fabricated by wire, etc)
	Touch-up paint	For use in touch-up painting after removal/installation and adjustment

◆ MAIN POINTS OF REMOVAL

Shaft snap ring & rear door inside handle
Shaft snap ring & door window regulator handle plate

Insert a tool fabricated by wire, etc. into between the door trim and the plate. Pull out the snap ring, as shown in the right figure.

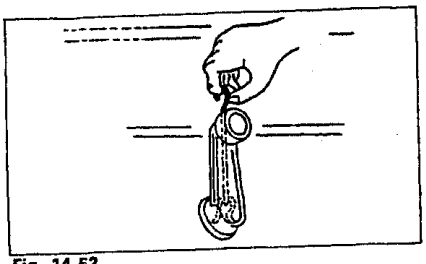


Fig. 14-52

Rear door trim board

Insert a ⊖ screwdriver into between the retainer and the panel. Remove the trim board, as shown in the right figure.

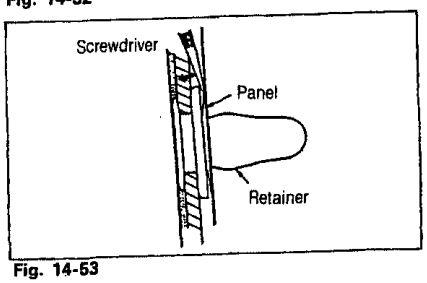


Fig. 14-53

Rear door service hole cover

NOTE

Be sure to remove the service hole cover together with the bytyl tape so that the cover may not be ruptured.

◆ INSTALLATION OF DOOR TRIM & SERVICE HOLE COVER

Install the parts in numerical order shown in the figure below.

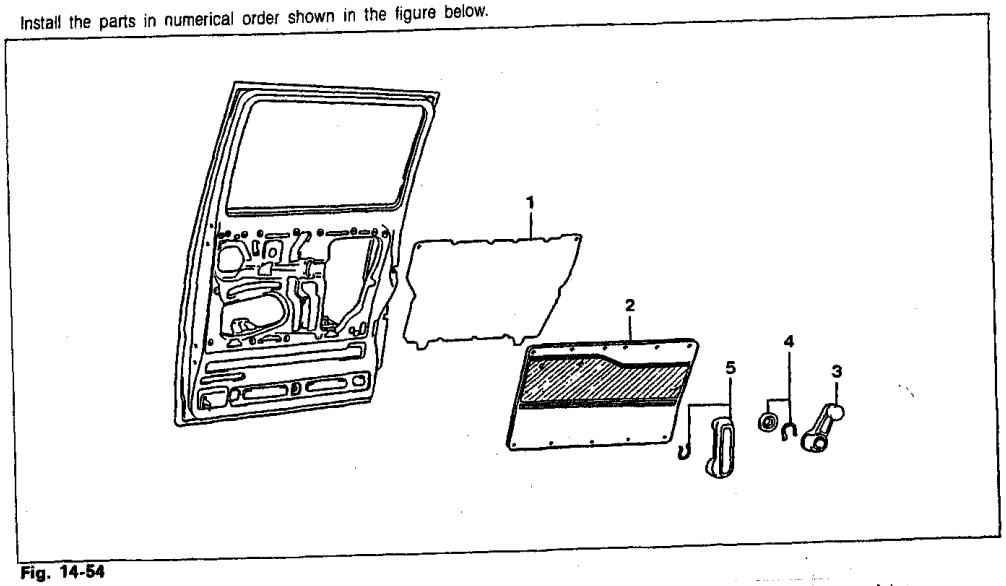


Fig. 14-54

1. Door service hole cover
2. Rear door trim board
3. Door window regulator handle
4. Shaft snap ring & door window regulator handle plate
5. Shaft snap ring & door inside

◆ MAIN POINTS OF INSTALLATION

Door service hole cover

1. Be sure to affix the butyl tape along the panel groove without stretching it.
2. After completion of the affixing, press the affixing portion of the service hole cover.
3. If the service hole cover exhibits rupture or wrinkle, etc., it will cause water leakage.

Rear door trim board

Rear window regulator handle

For the installed position, see the right figure.

Shaft snap ring & door window regulator plate

Shaft snap ring and rear inside handle

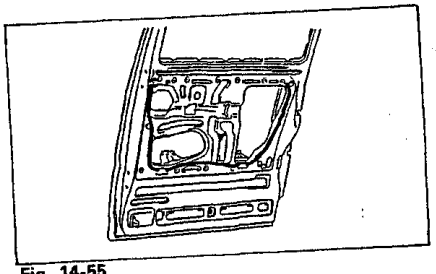


Fig. 14-55

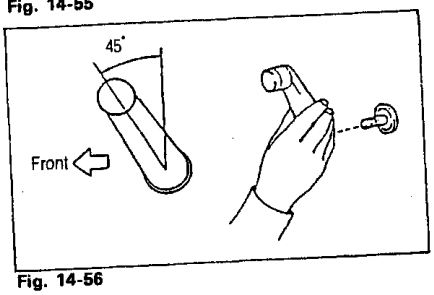


Fig. 14-56

◆ REMOVAL OF DOOR GLASS & DOOR WINDOW REGULATOR

Install the parts in numerical order shown in the figure below.

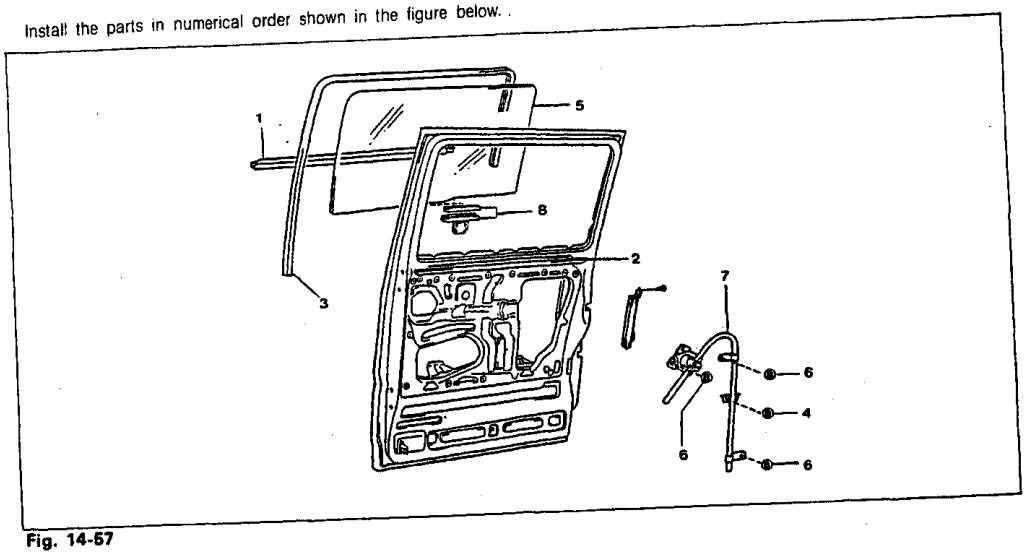


Fig. 14-57

1. Rear door glass weather strip
2. Rear window glass inner weather strip
3. Rear door glass run
4. Bolt W/washer
5. Rear door window glass
6. Bolt W/washer
7. Rear door window regulator Ay
8. Rear door window & rear window glass channel weather strip

◆ MAIN POINTS OF REMOVAL

Rear door window glass

NOTE
Take out the glass to the outside, starting from the front/upper portion, with the glass tilted rearward.

Rear door window weatherstrip & rear door window glass channel

NOTE
Put a mark on the glass to indicate the installed position of channel.

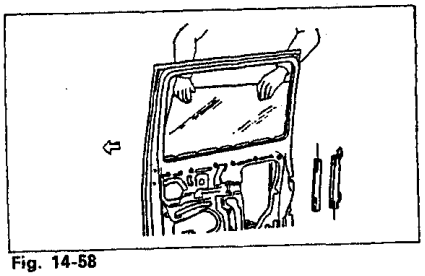


Fig. 14-58

◆ INSTALLATION OF GLASS DOOR & DOOR WINDOW REGULATOR

Install the parts in numerical order shown in the figure below.

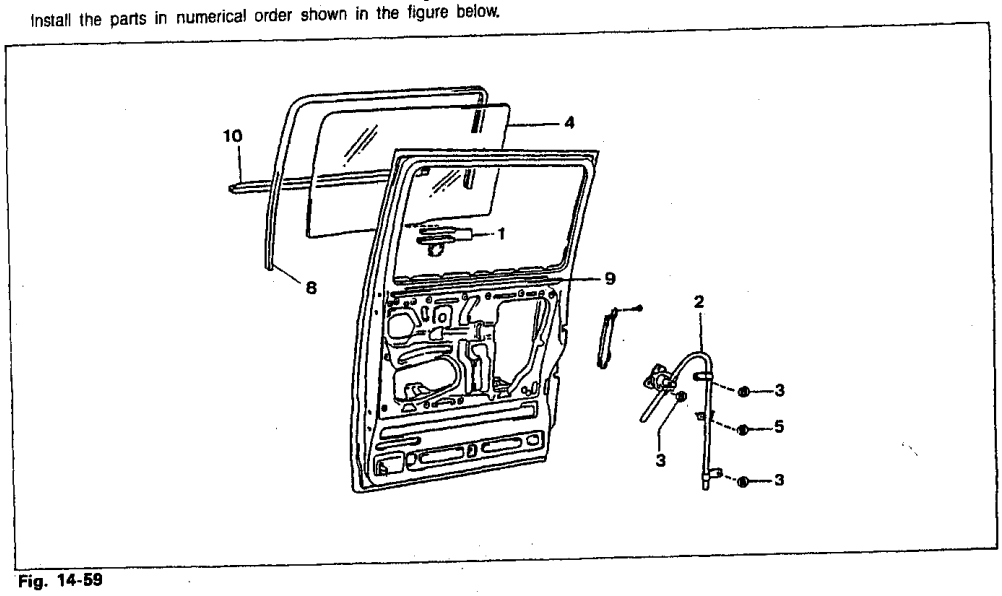


Fig. 14-59

1. Rear door window weatherstrip & rear window Glass channel
2. Rear door window regulator Ay
3. Bolt W/washer
4. Rear window glass
5. Bolt W/washer
8. Rear door glass run
9. Rear window glass inner weather strip
10. Rear door glass weather strip

◆ MAIN POINTS OF INSTALLATION

Rear door window weather strip & rear door window glass channel

1. Put a mark on the glass to indicate the installed position of weather strip & channel.
2. Apply soap water to the inside of the weatherstrip.
3. To install the weather strip & channel, tap them lightly, using a wooden hammer or the like.

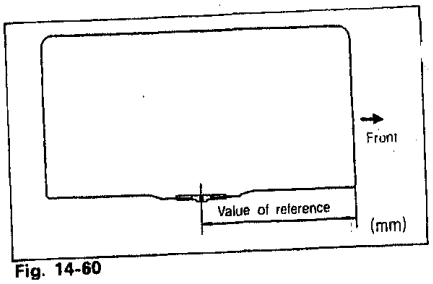


Fig. 14-60

◆ REMOVAL OF DOOR FRAME

Remove the parts in numerical order shown in the figure below.

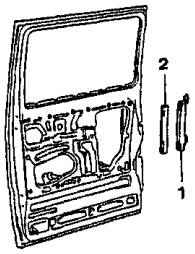


Fig. 14-61

1. Rear door window frame S/A
2. Rear door glass run

NOTE: Be sure to perform the operation with the glass raised.

◆ INSTALLATION OF DOOR FRAME

Remove the parts in numerical order shown in the figure below.

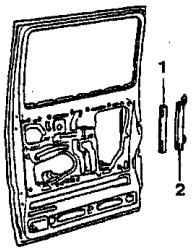


Fig. 14-62

1. Rear door glass run
2. rear door window frame S/A

◆ MAIN POINTS OF INSTALLATION

Rear door glass run

When installing, apply adhesive agent to the upper and lower 50mm-portions or over the entire portion of the back side of the glass run.

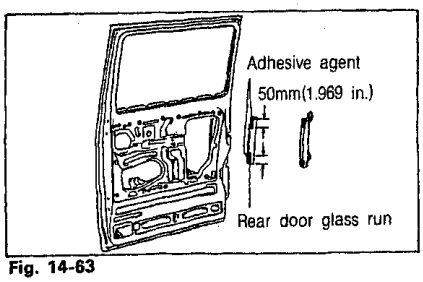


Fig. 14-63

◆ INSTALLATION OF DOOR LOCK & OUTSIDE HANDLE

Remove the parts in numerical order shown in the figure below.

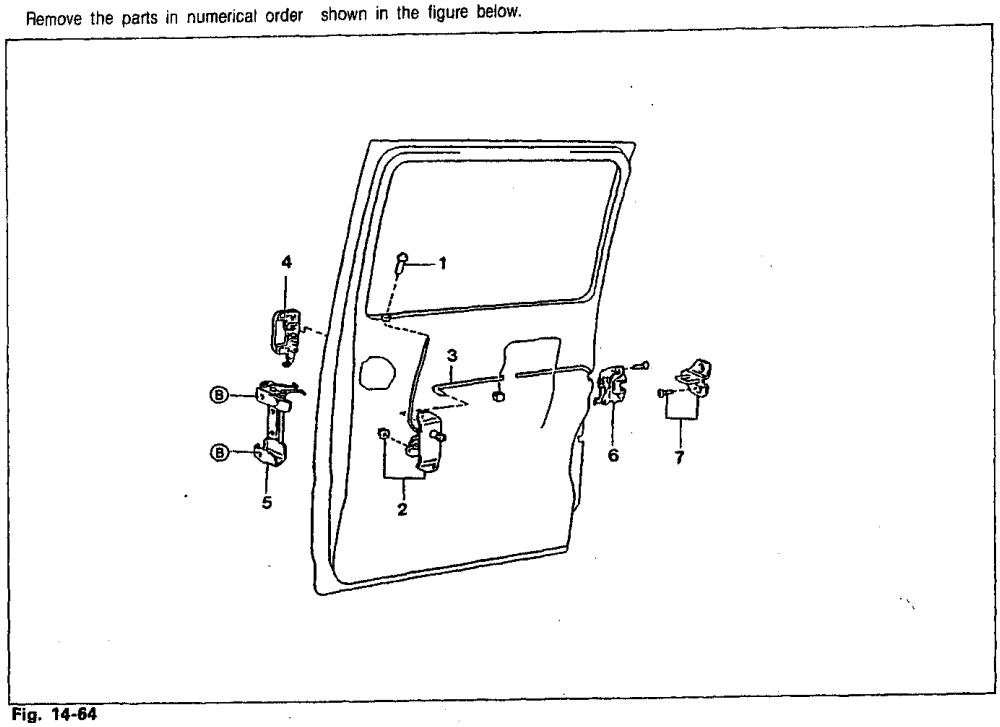


Fig. 14-64

1. Door lock locking button
2. Rear door lock remote control Ay
3. Rear door locking S/A
4. Rear door outside handle Ay
5. Rear door locking link S/A
6. Door lock Ay
7. Rear door lock striker plate Ay

NOTE: Be sure to perform the operation with the glass raised.

◆ INSTALLATION OF DOOR LOCK & OUTSIDE HANDLE

Install the parts in numerical order shown in the figure below.

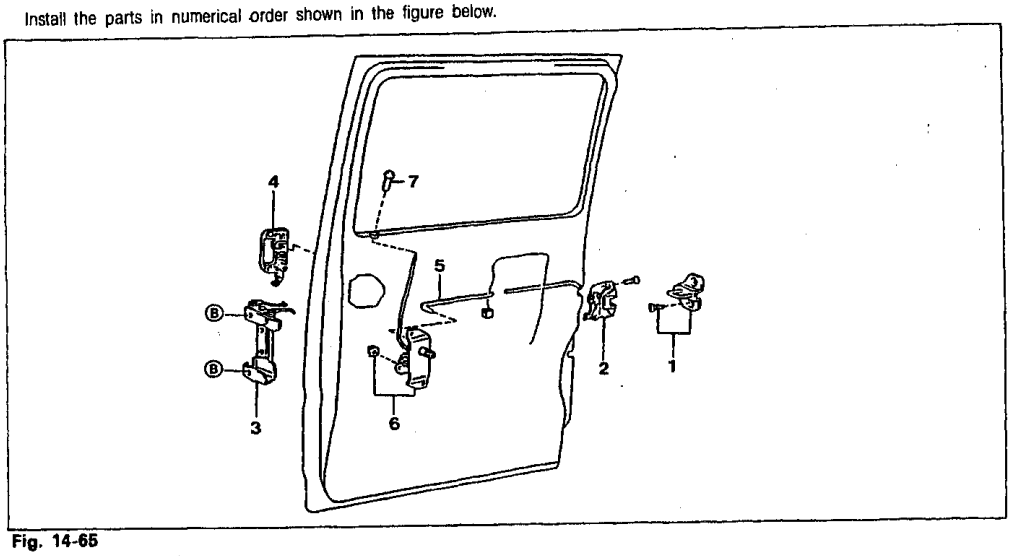


Fig. 14-65

1. Rear door lock striker plate Ay
2. Door lock Ay
3. Rear door locking link S/A
4. Rear door outside handle Ay
5. Rear door locking link S/A
6. Rear door lock remote control Ay
7. Door lock locking button

NOTE

1. Apply the MP grease to each sliding section
2. After completion of the installation, be sure to perform the check and adjustment for the locking condition.

◆ REMOVAL OF ROLLER & HINGE SLIDE DOOR UPPER ROLLER

Remove the parts in numerical order shown in the figure below.

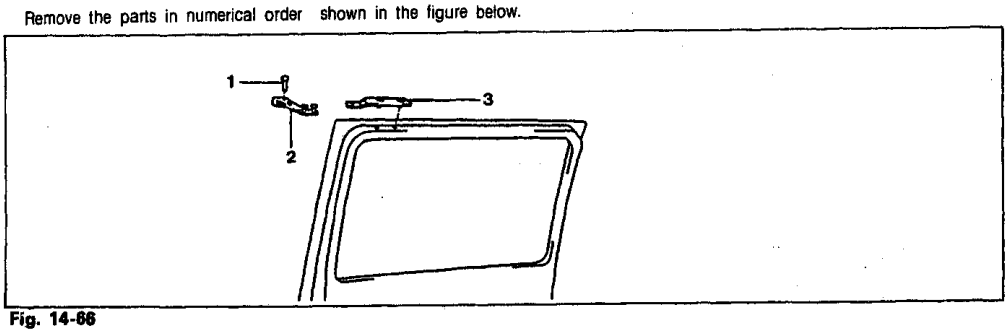


Fig. 14-66

1. Rear door guide roller pin
2. Slide door upper roller arm
3. Rear door roller upper base

◆ MAIN POINTS OF REMOVAL

Rear door roller upper base

Remove the rear door glass run and remove the nut in the frame.

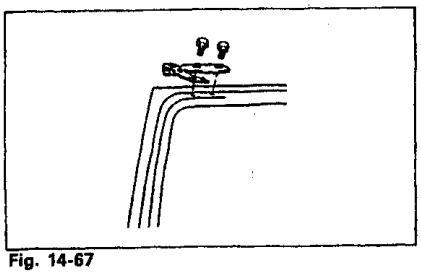


Fig. 14-67

◆ INSTALLATION OF ROLLER & HINGE SLIDE DOOR UPPER ROLLER

Install the parts in numerical order shown in the figure below.

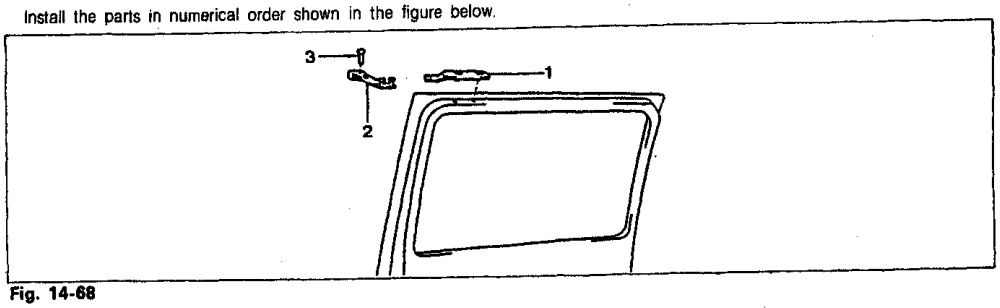


Fig. 14-68

1. Rear door roller upper base
2. Slide door upper roller arm
3. Rear door guide roller pin

NOTE

1. Apply the MP grease to each sliding section.
2. After completion of the installation, be sure to perform the alignment adjustment and the check and adjustment for the locking condition.

◆ REMOVAL OF REAR DOOR LOWER ROLLER

Remove the parts in numerical order shown in the figure below.

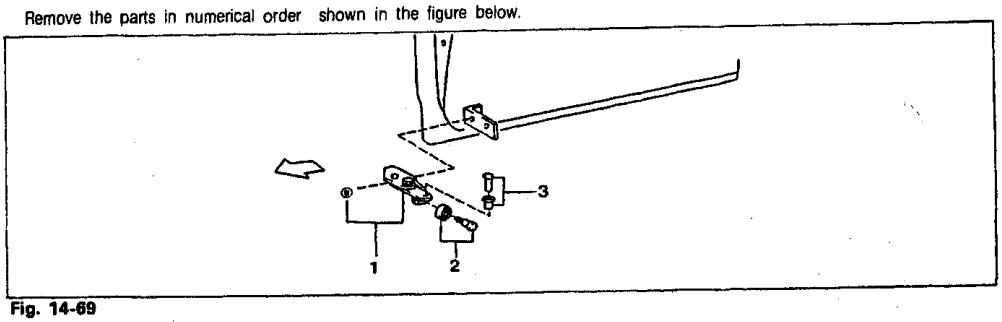


Fig. 14-69

1. Rear door lower roller pin
2. Rear door center guide pin & slide door lower roller
3. Rear door guide roller pin & slide door lower roller

INSTALLATION OF REAR DOOR LOWER ROLLER

Install the parts in numerical order shown in the figure below.

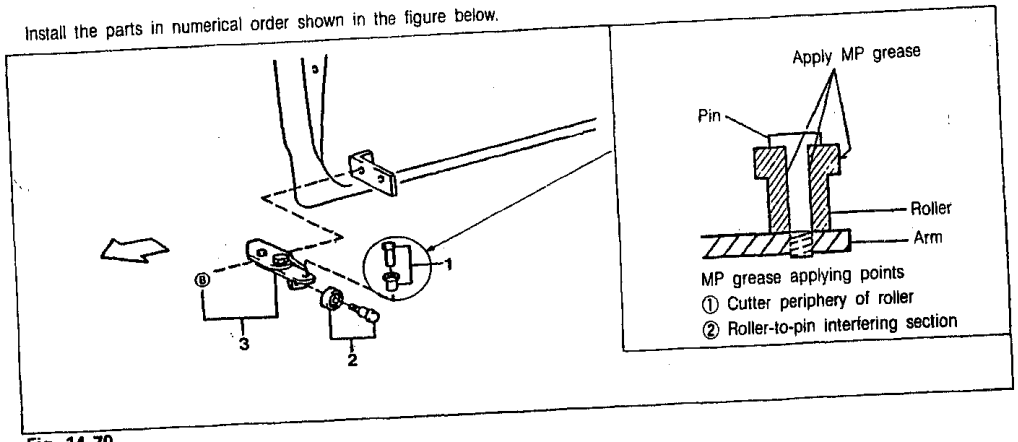


Fig. 14-70

1. Rear door guide roller pin No. 2 & slide door lower roller
2. Rear door center guide pin & slide door lower roller
3. Rear door lower arm

NOTE

1. Apply the MP grease to each sliding section.
2. After completion of the installation, be sure to perform the alignment adjustment and the locking adjustment.

REMOVAL OF SLIDE DOOR CENTER HINGE

Remove the parts in numerical order shown in the figure below.

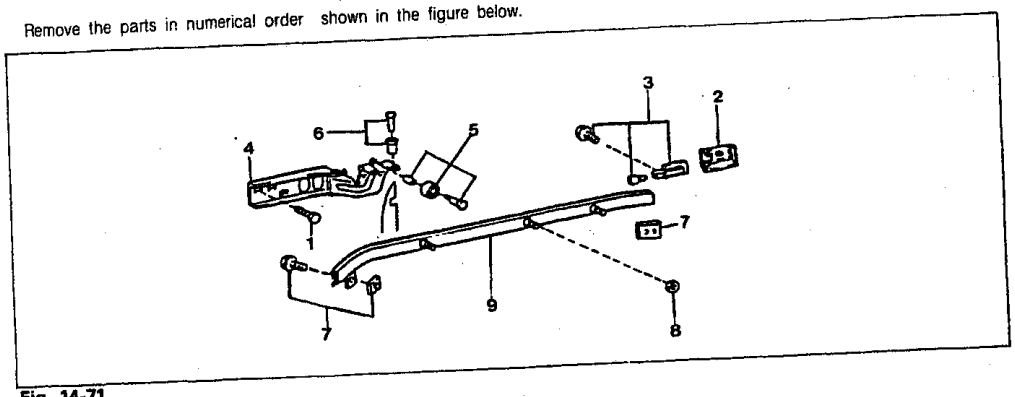


Fig. 14-71

1. Washer and bolt
2. Center rail cover
3. Center rail brake & bolt
4. Slide door hinge Ay
5. Center guide, bearing & spacer
6. Rear door guide roller pin & slide lower roller
7. Door center rail pad & bolt
8. Bolt
9. Rear door center rail S/A

◆ MAIN POINTS OF REMOVAL

Bolt W/washer

When removing the bolt, support the lower end of the door panel by means of a jack, with a wooden block interposed.

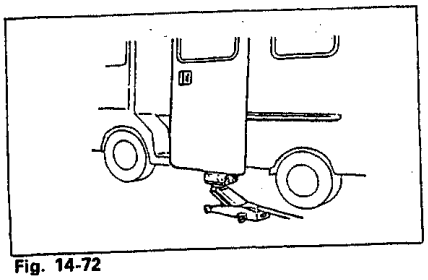


Fig. 14-72

◆ REMOVAL OF SLIDE DOOR CENTER HINGE

Install the parts in numerical order shown in the figure below.

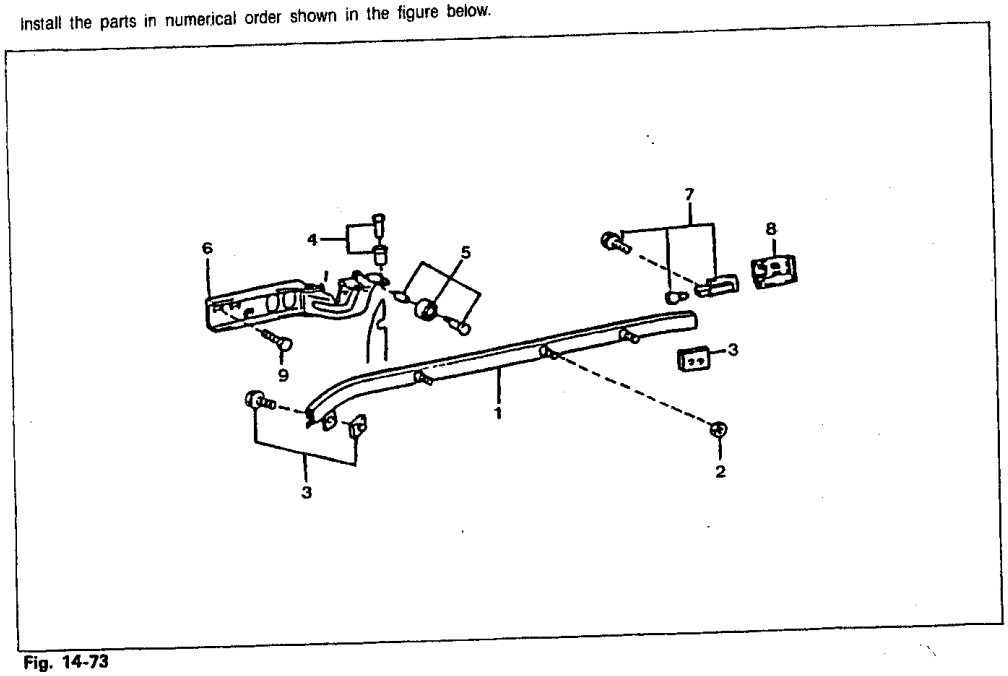


Fig. 14-73

1. Rear door center rail S/A
2. Bolt
3. Door center rail pad & bolt
4. Rear door guide roller pin & slide door roller
5. Center guide pin, bearing & spacer
6. Slide door hinge Ay
7. Center rail hinge Ay
8. Center rail cover
9. Washer & bolt

NOTE

1. **Apply the MP grease to each sliding section**
2. **After completion of the installation, be sure to perform the alignment adjustment and the check and adjustment for the locking condition.**

REAR DOOR Ay REMOVAL

Remove the parts in numerical order shown in the figure below.

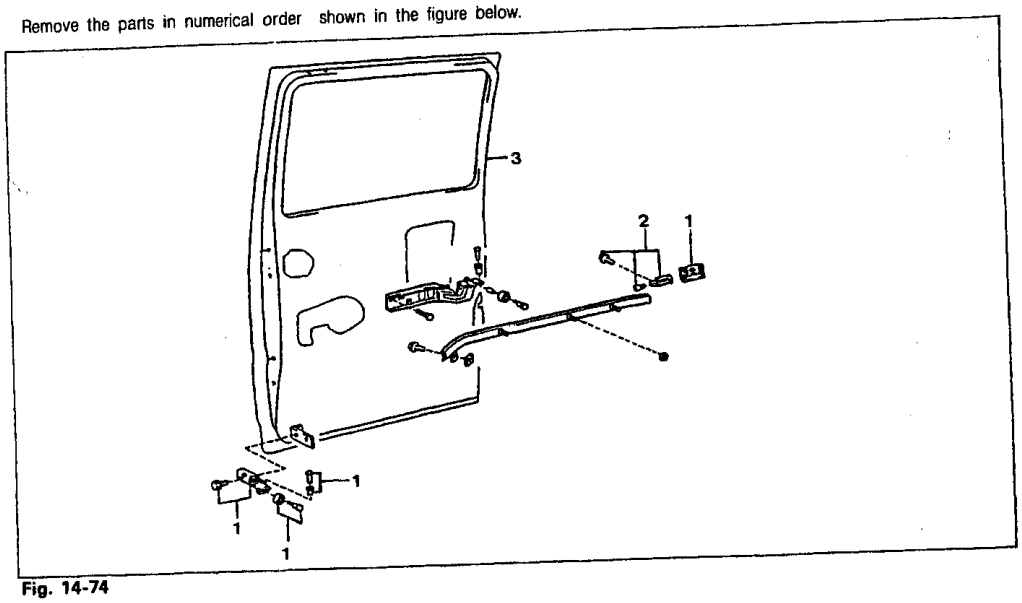


Fig. 14-74

1. Center rail cover, center guide pin & roller S/A bearing
2. Center rail bracket
3. Rear door

MAIN POINTS OF REMOVAL

NOTE

The operation must be performed while another person supports the door so that the door may not tilt.

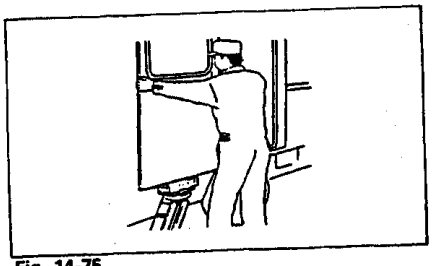


Fig. 14-75

Rear door center rail cover

NOTE

This cover is hooked with a claw. Hence, move the cover in the arrow-headed direction. Then, remove the cover at the front section toward the vehicle outside.

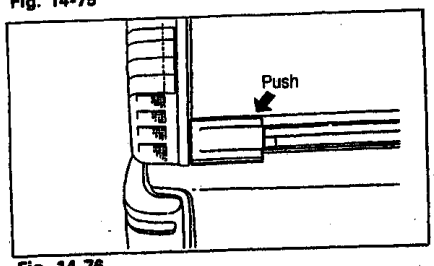


Fig. 14-76

Rear door

Slide the door. Then, remove the upper roller and center hinge from the rail, starting from the rear(cut-out section for removal)

◆ INSTALLATION OF REAR DOOR Ay

Install the parts in numerical order shown in the figure below.

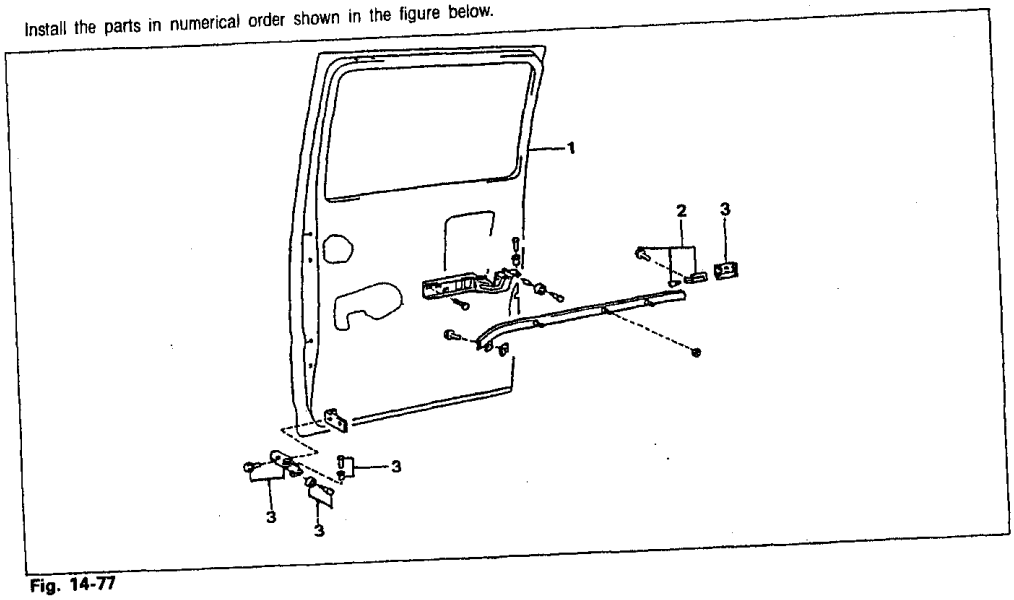


Fig. 14-77

1. Rear door
2. Center rail bracket
3. Center rail cover, center guide pin roller S/A & bearing

◆ MAIN POINTS OF INSTALLATION

Slide door lower roller

NOTE

1. **Apply the MP grease to each sliding section.**
2. **After completion of the installation, be sure to perform the alignment adjustment and the check and adjustment for the locking condition.**

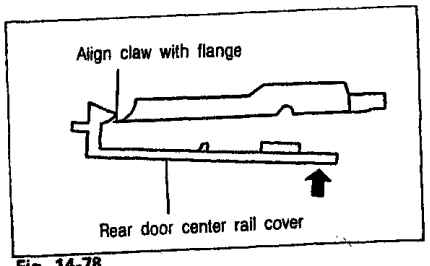


Fig. 14-78

Rear door center rail cover

NOTE

1. **Align the claw with the flange.**
2. **Attach the cover by pushing it in the arrow-headed direction.**
3. **Alignment**

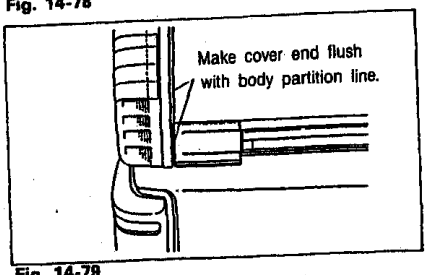


Fig. 14-79

◆ REAR DOOR ALIGNMENT ADJUSTMENT

Specified alignment dimensions

Gap Ⓑ, Ⓖ, Ⓗ
Specified vlaue: 3.5 to 7.5mm(0.138 to 0.295 in.)

Deviation in each side Ⓑ, Ⓖ
Specified value: Not to exceed 1.5mm(0.059 in.)

Deviation in each side Ⓗ
Specified value: Not to exceed 2.0mm(0.079 in.)

Difference in height
Specified value: Not to exceed ±1.5mm(0.059 in.)

Deviation between right and left sides Ⓑ, Ⓖ, Ⓗ
Specified value: Not to exceed 2.0mm(0.079 in.)

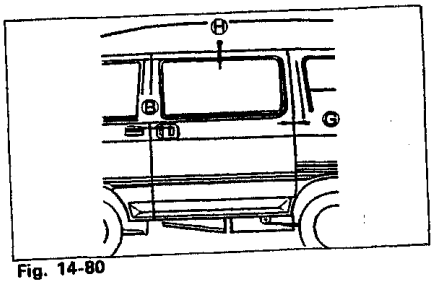


Fig. 14-80

Adjustment in Up-and-Down direction

1. As for the front side, perform the adjustment after loosening setting bolts(two pieces) of the lower roller.
   Adjustable range: Approx. ±2mm(0.079 in.)
   At this time, move the down male stopper by a distance equal to the lower roller movement.

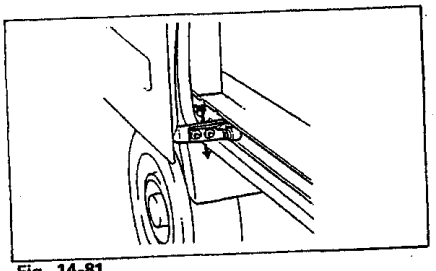


Fig. 14-81

2. As for the rear side, perform the adjustment after loosening the setting bolts(two pieces) of the center hinge.
   Adjustable range: Approx. ±2mm(0.079 in.)

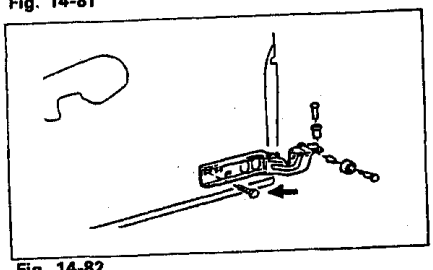


Fig. 14-82

Adjustment in Fore-and-Aft directions

Perform this adjustment after loosening the setting bolts(two pieces) of the center hinge.
Adjustable range: Approx. ±2mm(0.079 in.)
Even after the center hinge has been adjusted, if the gap at the door front side(point (G) in the right figure) is too narrow, adjust this by inserting a shim to the down male stop attaching section.
Shim thickness: ±1mm(0.039 in.)

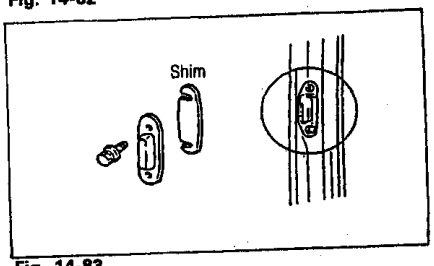


Fig. 14-83

Adjustment of difference in height

1. As for the front side, perform the adjustment after loosening the setting bolt of the lower roller.
   Adjustable range: Approx. ±2mm(0.079 in.)

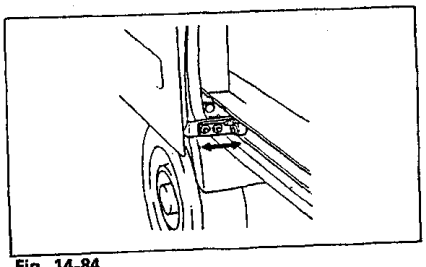


Fig. 14-84

2. As for the rear side, perform the adjustment after loosening the setting screw of the lock striker plate.
   Adjustable range: Approx. ±2mm(0.079 in.)

NOTE

If the door is sagged or raised at the rear section, never attempt to correct this at the door plate. This adjustment must be performed at the door hinge.

2. Loosen the door plate screw. Adjust and tighten the door plate so that the door is lightly closed and no difference in height with the rear pillar exists.

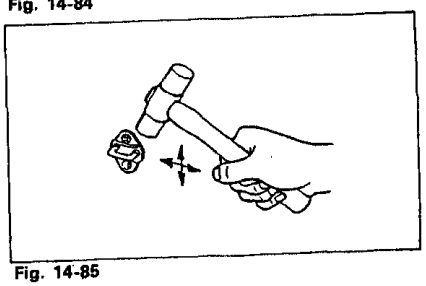


Fig. 14-85

3. Move the down male stop by a distance equal to the movement.
   1) Temporarily install the door by tightening the down male stop attaching bolts.
   2) After repeating the opening/closing of the door two or three times, tighten the bolts securely.

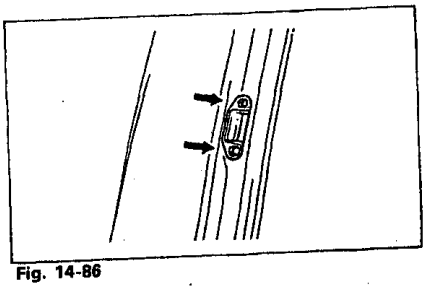


Fig. 14-86

QUARTER WINDOWS

REMOVAL OF QUARTER WINDOW GLASS

Remove the parts in numerical order shown in the figure below.

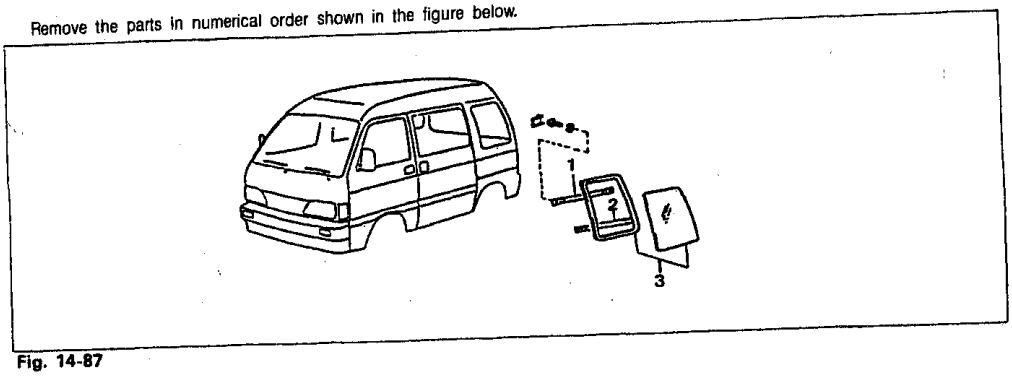


Fig. 14-87

1. Quarter upper guide rail
2. Quarter lower guide rail
3. Quarter window weather strip

ARTICLES TO BE PREPARED

	Item	Use
Tools and others	Operation rope(Approx. 5mm × 6m)	For use in installing glass
	Bamboo spatula	For use in installing glass
	Rubber hammer	For use in installing glass
	Brush, etc.	For use in applying soap water
	Soap water	For in sliding glass easily during installation

MAIN POINTS OF INSTALLATION

Side window weather strip & quarter window glass

1. Push the lip section of the weather strip outward from the body flange, using a bamboo spatula(or a common screw-driver, etc.) This operation is performed from the vehicle interior.
2. Push the glass outward, while prying the upper sides of the weather strip at both ends from the inside. Proceed to remove the glass with the weather strip attached thereon.

NOTE

At this time, make sure to apply force to the glass evenly. Also, hold the glass from the outside so that it may not spring out.

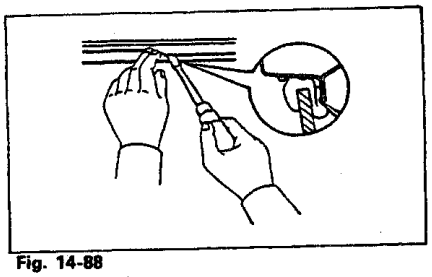


Fig. 14-88

INSTALLATION OF QUARTER WINDOW GLASS

Install the parts in the numerical order shown in the figure below.

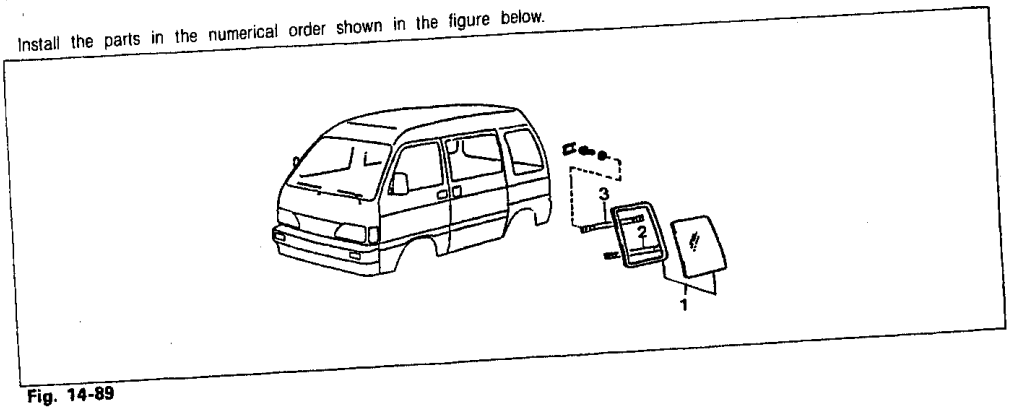


Fig. 14-89

1. Quarter window weather strip & Glass
2. Quarter lower guide rail
3. Quarter upper guide rail

MAIN POINTS OF INSTALLATION

Side window weatherstrip & quarter window glass (Operation by two persons)

1. Perform the preparatory operation as follows:
   1) Attach the weather strip to the quarter window glass.
   2) Set an operation rope as indicated in the right figure. Apply soap water to the periphery of the weather strip so that it can slide more easily.
2. Apply the quarter window glass and weather strip to the body in such a way that they are fitted evenly in an up-and-down as well as in a right-and-left direction. Ensure that the operation rope is suspended to the vehicle interior.
3. Pull the rope in such an angle that the rope suspending to the vehicle interior may be allowed to cross over the flange. While doing so, the other person working from the outside pounds the portions of the quarter window adjacent to the weather strip by his palms so that the quarter window may be installed into position.
4. Pound the quarter window by your palms that it may be settled.

NOTE
The weather strip which exhibits damage, cracks, and so forth at its lip-section may cause water leakage.

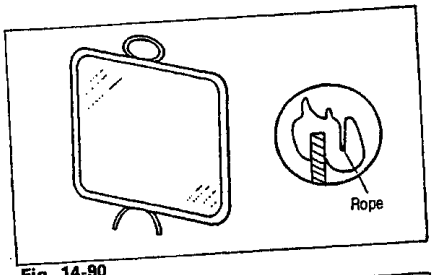


Fig. 14-90

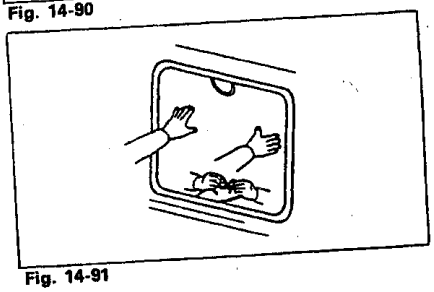


Fig. 14-91

◆ REMOVAL OF QUARTER WINDOW INSIDE TRIM BOARD & QUARTER SERVICE HOLE FILM

Remove the parts in numerical order shown in the figure below.

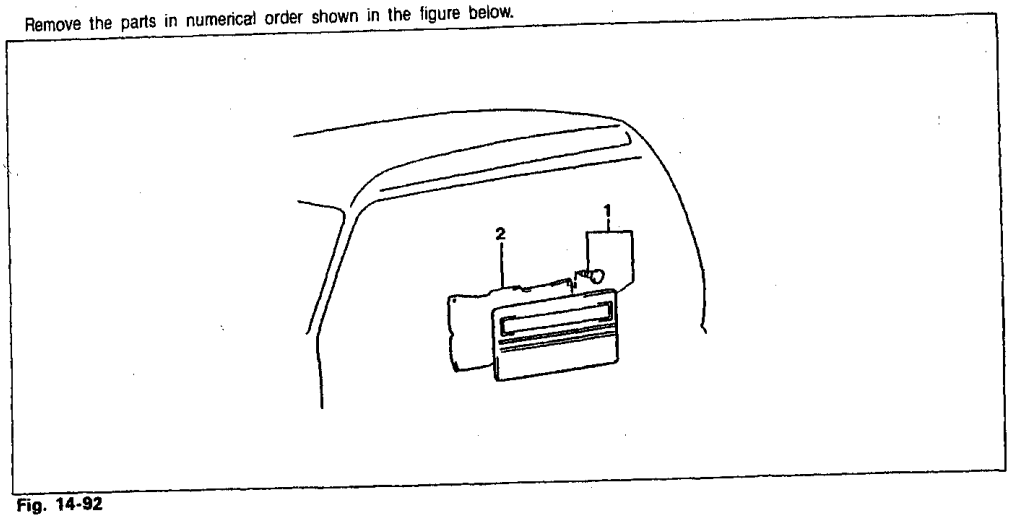


Fig. 14-92

1. Quarter window inside trim board
2. Quarter service hole film

◆ MAIN POINTS OF REMOVAL

Quarter window inside trim board
Insert a ⊖ screwdriver into between the retainer and the panel. Remove the clip, as shown in the right figure.

Quarter service hole film
Be sure to remove the service hole film together with the butyl tape so that the film may not be ruptured.

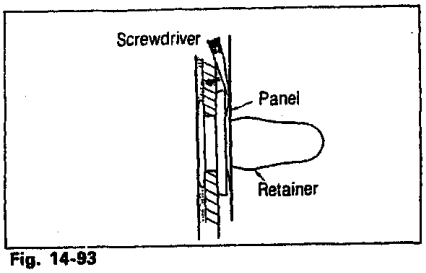


Fig. 14-93

INSTALLATION OF QUARTER WINDOW INSIDE TRIM BOARD & QUARTER SERVICE HOLE FILM

Install the parts in numerical order shown in the figure below.

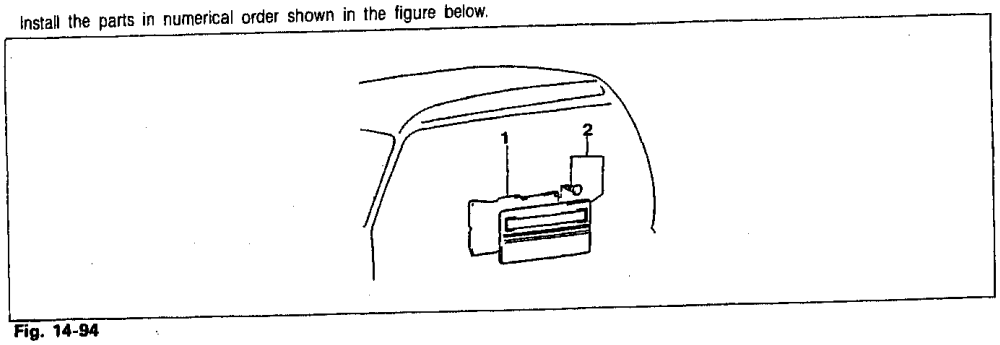


Fig. 14-94

1. Quarter service hole film
2. Quarter window inside trim board

MAIN POINTS OF INSTALLATION

Quarter service hole film

1. Be sure to affix the butyl tape along the panel groove without stretching it.
2. If the film exhibits rupture or wrinkle, etc., it will cause water leakage.
3. After completion of the affixing, press the affixing portion of the butyl tape.

REMOVAL OF CENTER RAIL

Remove the parts in numerical ordern shown in the figure below.

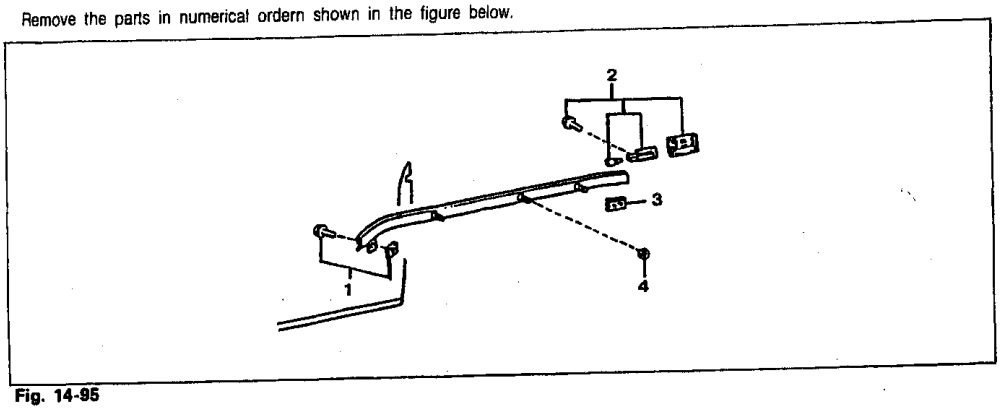


Fig. 14-95

1. Bolt W/washer
2. Center rail cover & bracket
3. Lower center rail pad
4. Nut

OPERATION PRIOR TO REMOVAL

Detach the quarter window inside trim board & quarter service hole film.

MAIN POINTS OF REMOVAL

Bolt W/washer
Support the lower end of the door panel by means of a jack, with a wooden block interposed.

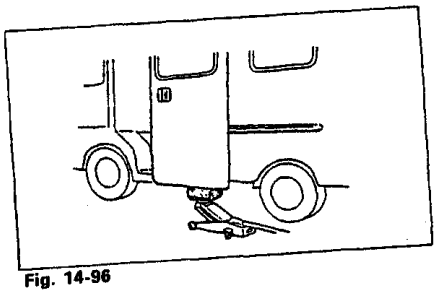


Fig. 14-96

INSTALLATION OF CENTER RAIL

Install the parts in numerical order shown in the figure below.

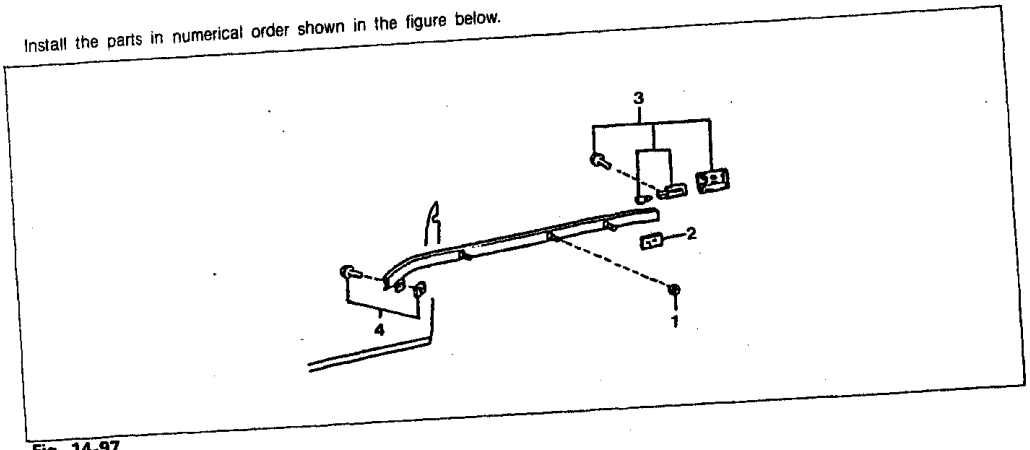


Fig. 14-97

1. Nut
2. Door center rail pad
3. Center rail cover & bracket
4. Pad & Bolt W/washer

BACK DOOR

REMOVAL OF REAR DOOR GLASS

Remove the parts in numerical order shown in the figure below.

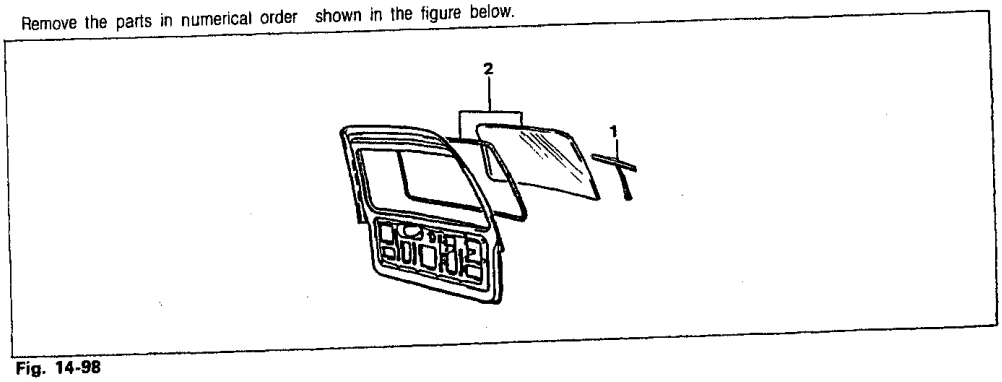


Fig. 14-98

1. Back wiper arm & blade
2. Back door glass & weather strip

ARTICLES TO BE PREPARED

	Item	Use
Tools and others	Operation rope(Approx. 5㎜ × 6m)	For use in installing glass
	Bamboo spatula	For use in installing glass
	Rubber hammer	For use in installing glass
	Brush, etc.	For use in applying soap water
	Soap water	For in sliding glass easily during installation

INSTALLATION OF BACK DOOR GLASS

Install the parts in numerical order shown in the figure below.

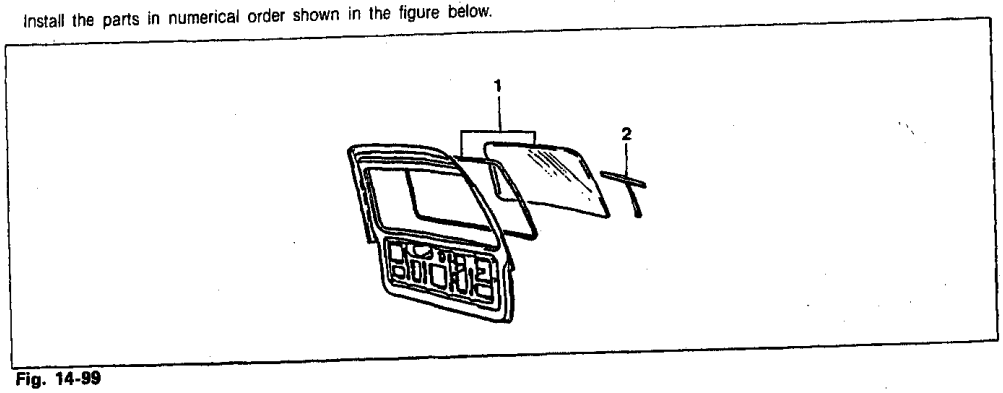


Fig. 14-99

1. Back door glass & weather strip
2. Back wiper arm & blade

◆ MAIN POINTS OF INSTALLATION

Rear wiper arm & blades

For the installation position, see the right figure.

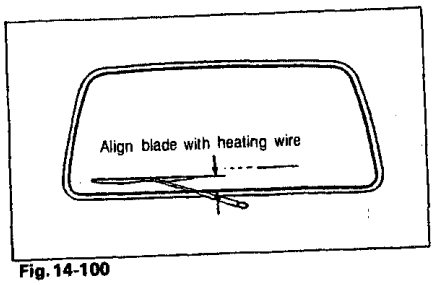


Fig. 14-100

◆ REMOVAL OF BACK DOOR TRIM & BACK DOOR SERVICE HOLE

Remove the parts in numerical order shown in the figure below.

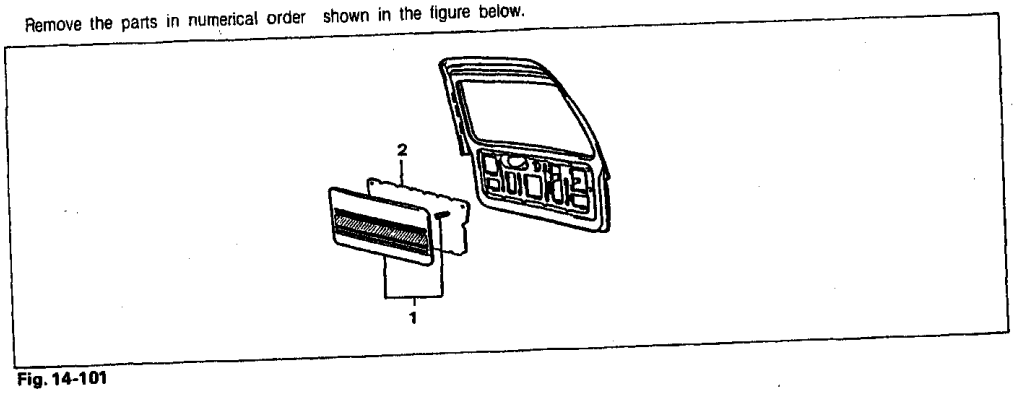


Fig. 14-101

1. Back door trim & fastner
2. Back door screen

◆ INSTALLATION OF BACK DOOR TRIM & BACK DOOR SERVICE HOLE

Install the parts in numerical order shown in the figure below.

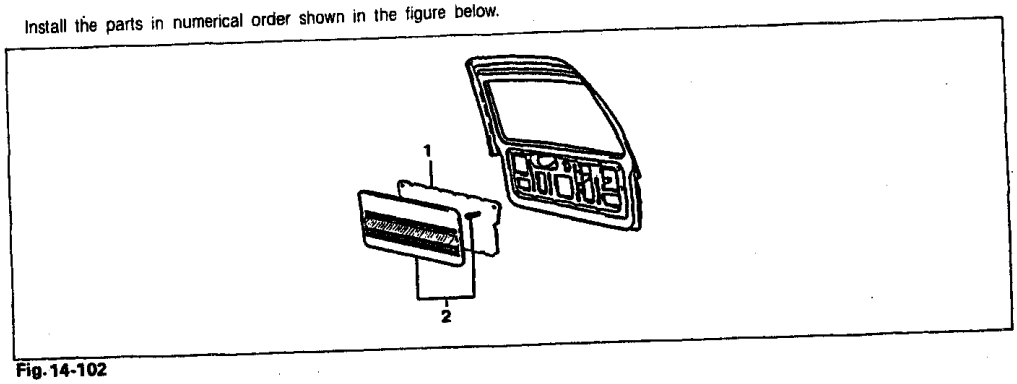


Fig. 14-102

1. Back door screen
2. Back door trim & fastner

◆ REMOVAL OF BACK DOOR LOCK & DOOR HANDLE

Remove the parts in numerical order shown in the figure below.

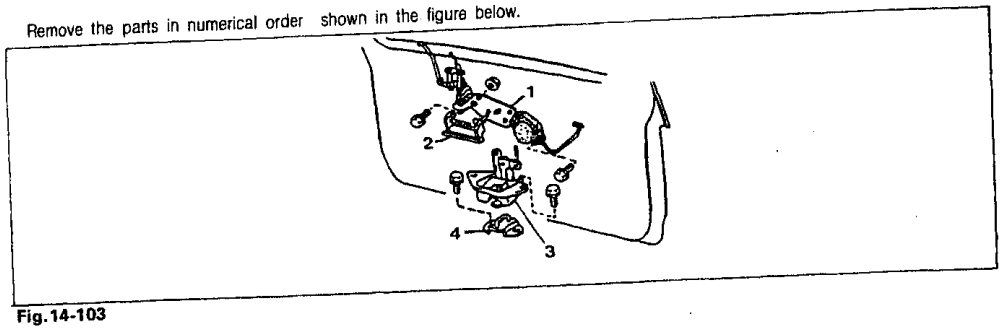


Fig.14-103

1. Remote controller
2. Outer handle Ay
3. Back door lock Ay
4. Back door lock striker Ay

◆ OPERATION PRIOR TO REMOVAL

Remove the door trim & back door service hole cover.

◆ INSTALLATION OF BACK DOOR LOCK & DOOR HANDLE

Install the parts in numerical order shown in the figure below.

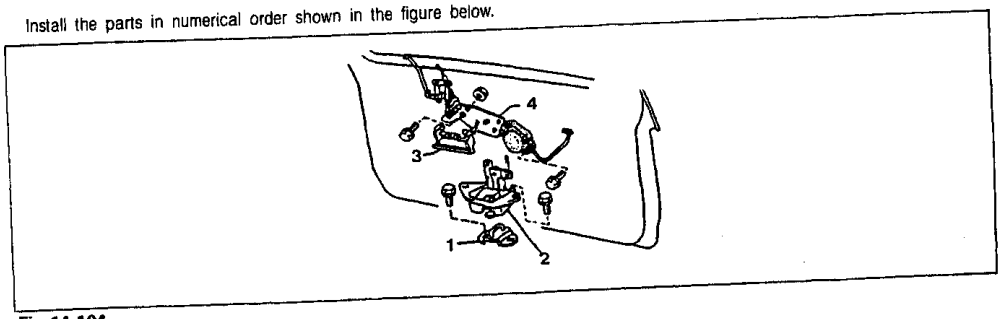


Fig.14-104

1. Back door lock striker Ay
2. Back door lock Ay
3. Outer handle Ay
4. Remote controller

◆ MAIN POINTS OF INSTALLATION

Back door lock striker
After completion of the installation, be sure to perform the check and adjustment for the locking condition.

Back door lock

NOTE: Apply the MP grease to each sliding section.

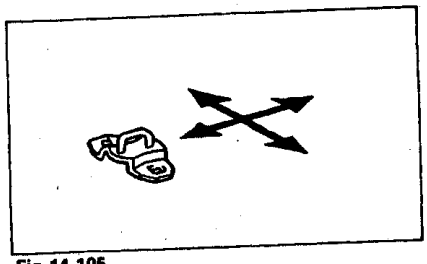


Fig.14-105

REMOVAL OF BACK DOOR PANEL

Remove the parts in numerical order shown in the figure below.

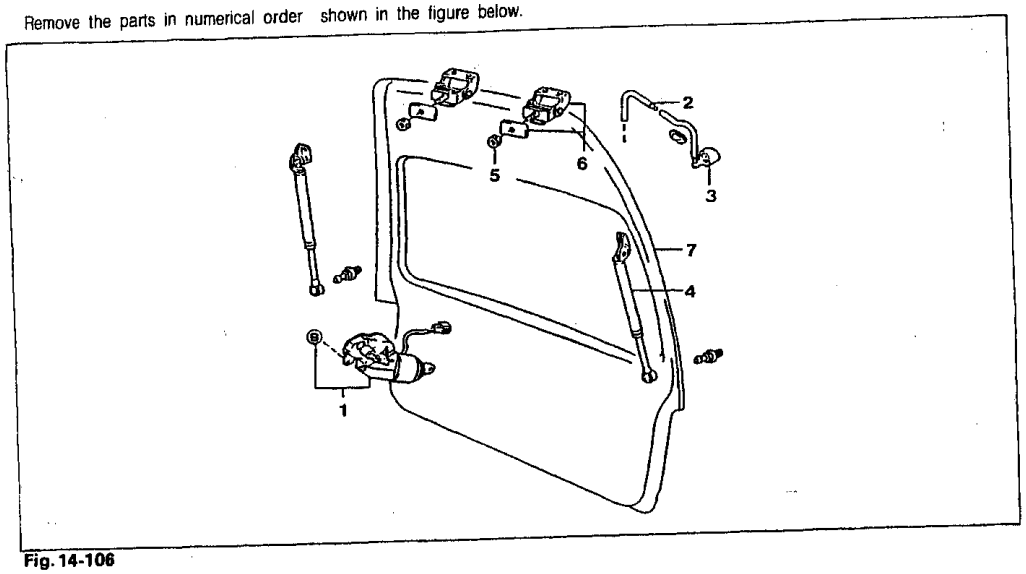


Fig. 14-106

1. Rear wiper motor & bracket Ay
2. Rear washer hose
3. Rear washer nozzle Ay
4. Back door stay Ay
5. Nut
6. Back door hinge & back door hinge packing
7. Back door

MAIN POINTS OF REMOVAL

Operation prior to removal

1. Remove the back door glass.
2. Remove the trim & back door service hole cover.
3. Remove the door lock & door handle.

Rear wiper motor & bracket

NOTE
When pulling out the wire harness, passing a wire, etc., through it in advance will facilitates the operation.

Rear washer hose

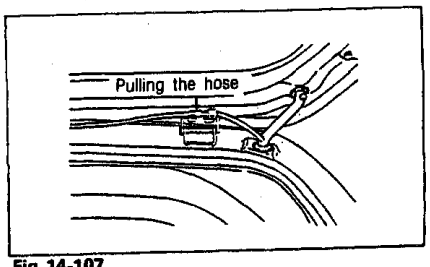


Fig. 14-107

Rear washer nozzle

Separate the part of the lock and use the ⊖ screwdriver because the rear washer nozzle is an insert type.

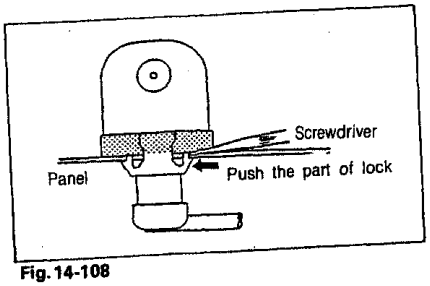


Fig. 14-108

Nut

Tighten the nut to a certain extent to fix the door firmly.

◆ INSTALLATION OF BACK DOOR PANEL

Install the parts in numerical order shown in the figure below.

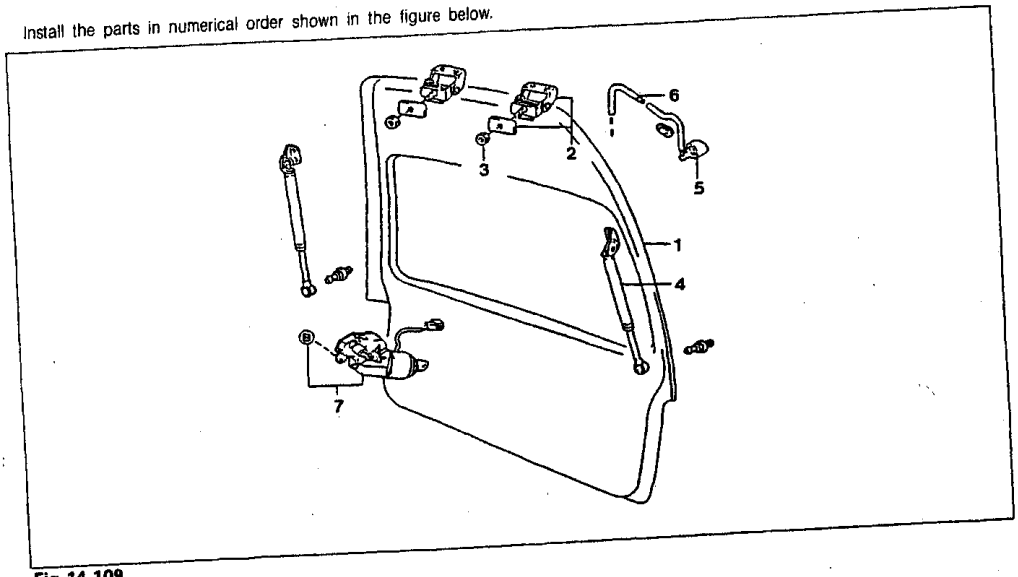


Fig. 14-109

1. Back door
2. Hinge Ay and packing of back door
3. Nut
4. Stay Ay of back door
5. Nozzle Ay of back washer
6. Hose of back washer
7. Motor and bracket Ay of back wiper

◆ MAIN POINTS OF INSTALLATION

Back door

NOTE: After completion of the installation, be sure to perform the alignment adjustment and the check and adjustment for the locking condition.

Rear washer nozzle

For the spray position, refer to the right figure.

Rear wiper motor & bracket

NOTE: After completion of the installation, check to see if it functions properly.

License plate lamp

NOTE: After completion of the installation, check to see if it lights.

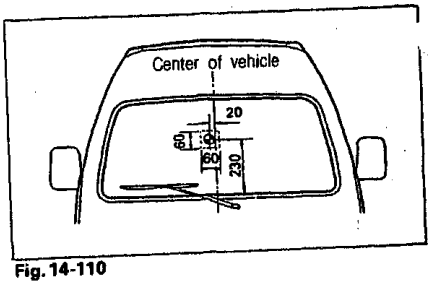


Fig. 14-110

◆ BACK DOOR PANEL ALIGNMENT ADJUSTMENT

Specified alignment dimensions

Gap Ⓙ
Specified value: 3.6 to 8.6mm(0.142 to 0.338 in.)
Gap Ⓚ
Specified value: 4.6 to 8.6mm(0.181 to 0.338 in.)
Gap Ⓟ
(Standard)
Specified value: 5.5 to 9.5mm(0.217 to 0.374 in.)
(Not standard)
Specified value: 7.0 to 11.0mm(0.276 to 0.433 in.)
Deviation in each side
Specified value: Not to exceed 2.0mm(0.079 in.)
Difference in height
Specified value: Not to exceed ±1.5mm(0.059 in.)

Deviation between right and left sides

Specified value: Not to exceed 2.0mm(0.079 in.)

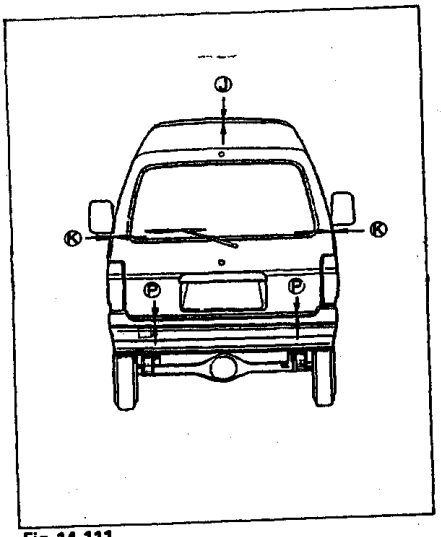


Fig. 14-111

Adjustment of upper section in Fore-and-Aft direction

Perform this adjustment after loosening the hinge bolts at the body side.

NOTE

1. **When adjusting the door upper section in a Fore-and-Aft direction, be sure that the gap between the rear quarter pillar side surface and the back door side surface will not exceed 4.6 to 8.6mm(0.181 to 0.339 in.).**
2. **In respect to the adjustment not exceeding 2.0mm(0.079 in.), loosen the hinge bolts at the door side.**

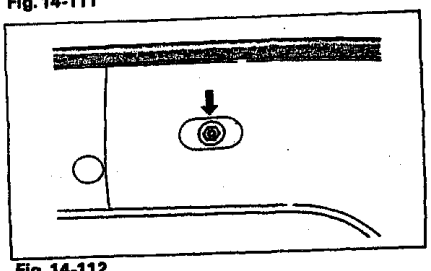


Fig. 14-112

Adjustment of lower section in Fore-and-Aft direction and adjustment of closing condition.

Perform these adjustments by changing the installed position of lock striker.

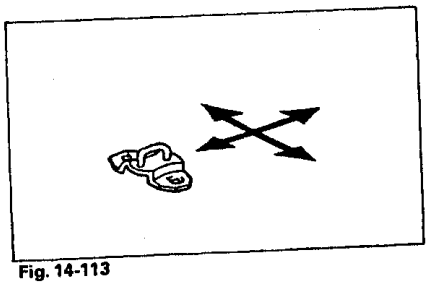


Fig. 14-113

FRONT SEAT

DISASSEMBLY (VAN · COACH)

Disassemble the parts in numerical order shown in the figure below.

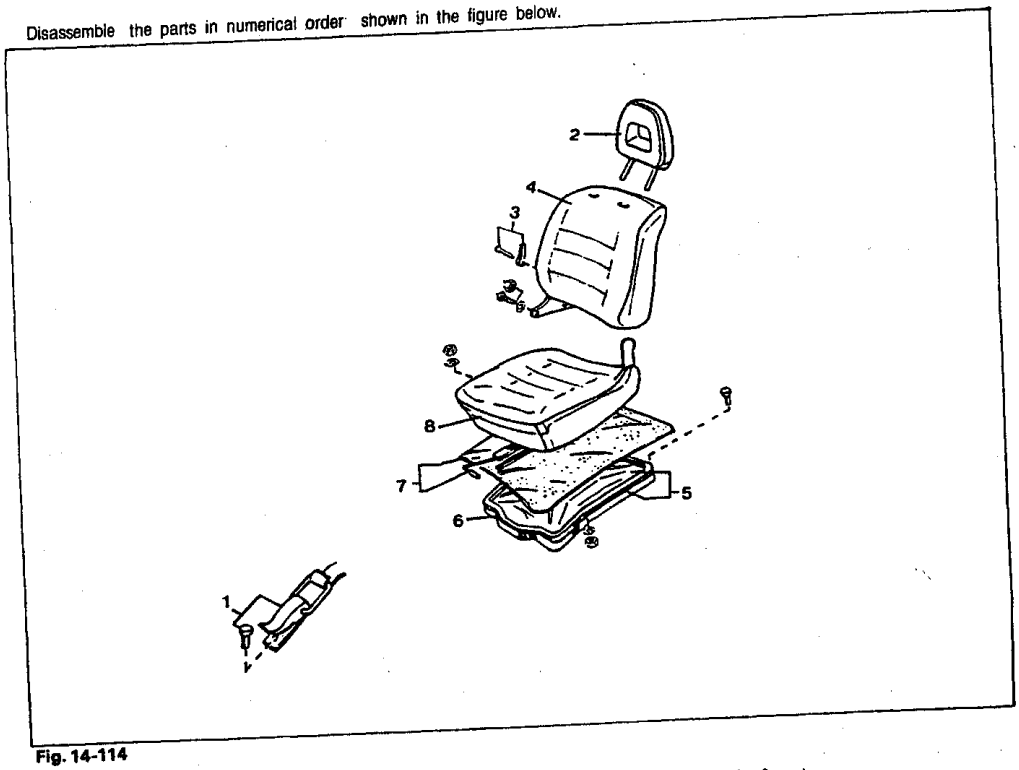


Fig. 14-114

1. Catch Ay
2. Head rest
3. Knuckle lever
4. Back seat Ay
5. Service panel & packing
6. Cushion
7. Slider Ay & mat
8. Cushion seat Ay

◆ DISASSEMBLY(TRUCK)

Disassemble the parts in numerical order shown in the figure below.

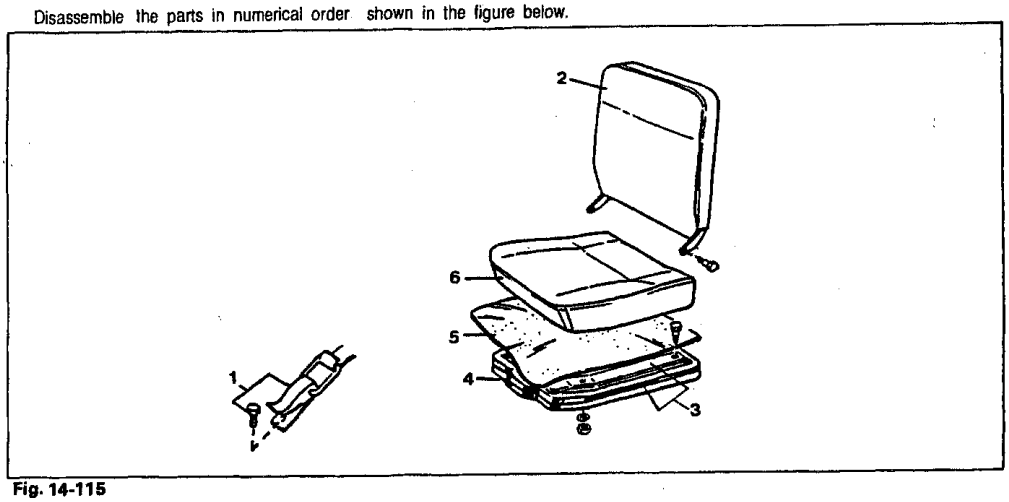


Fig. 14-115

1. Catch Ay
2. Back seat Ay
3. Service panel & packing
4. Cushion
5. Mat
6. Cushion seat Ay

◆ INSTALLATION(VAN · COACH)

Install the parts in numerical order shown in the figure below.

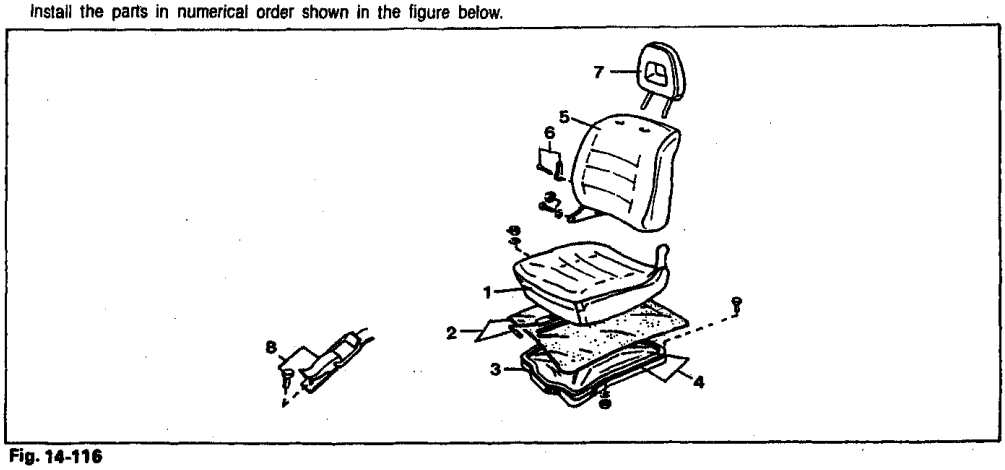


Fig. 14-116

1. Cushion seat Ay
2. Slider Ay & mat
3. Cushion
4. Service panel & packing
5. Back seat Ay
6. Knuckle
7. Head rest Ay
8. Catch Ay

◆ INSTALLATION(TRUCK)

Install the parts in numerical order shown in the figure below.

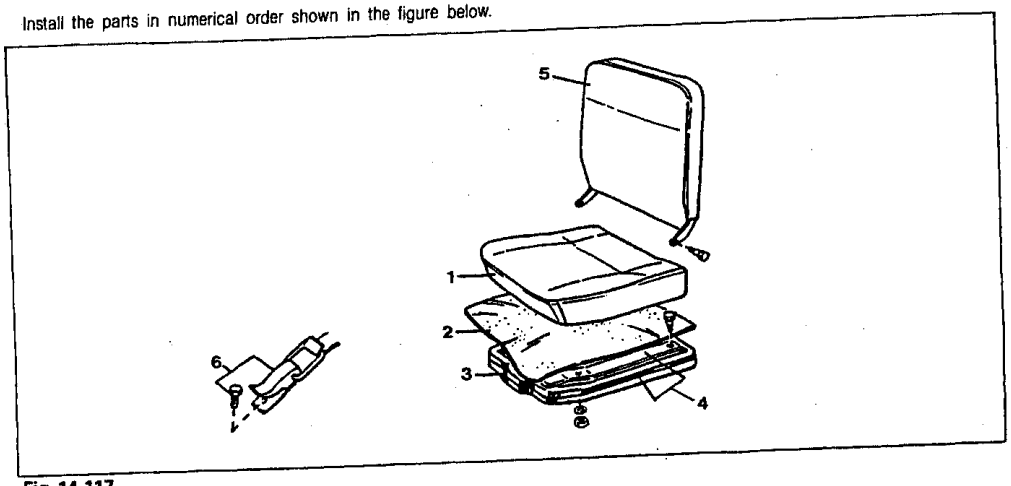


Fig. 14-117

1. Cushion seat
2. Mat
3. Cushion—
4. Service panel & packing
5. Back seat Ay
6. Catch Ay

REAR SEAT No. 1

REMOVAL(COACH DLX)

Remove the parts in numerical order shown in the figure below.

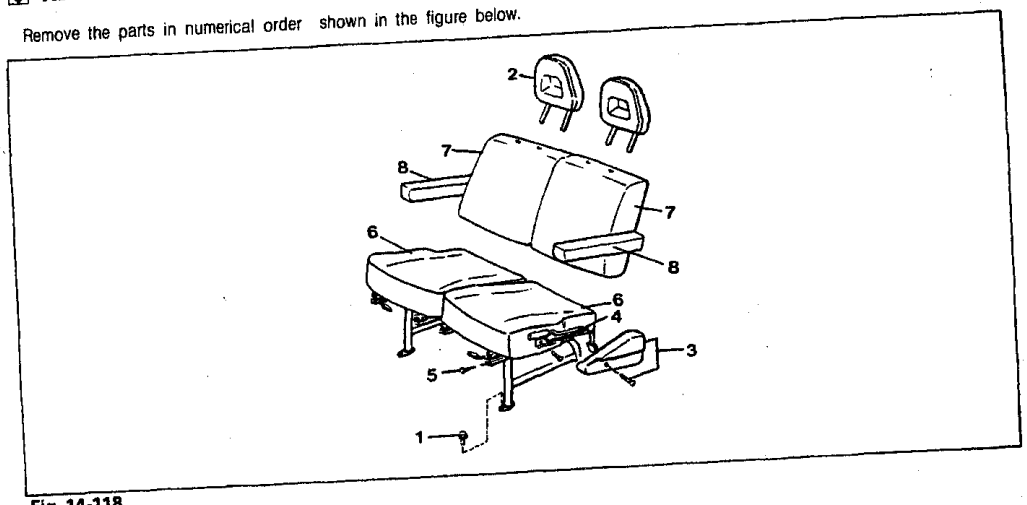


Fig. 14-118

1. Bolt
2. Head rest
3. Knuckle cover Ay
4. Work-in shaft & knob
5. Bolt & adjuster Ay
6. Cushion seat Ay
7. Back seat Ay
8. Arm rest Ay

REMOVAL(COACH STD)

Remove the parts in numerical order shown in the figure below.

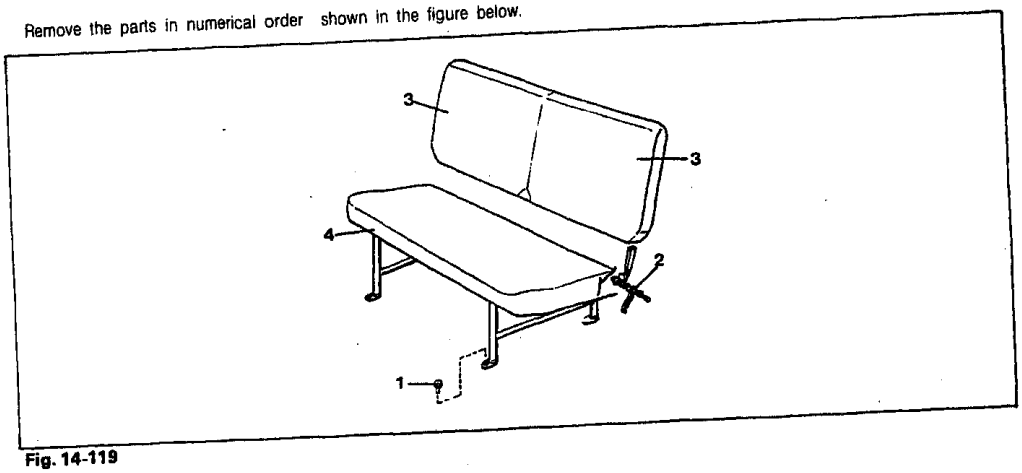


Fig. 14-119

1. Bolt
2. Hinge & spring Ay
3. Back seat Ay
4. Cushion seat Ay

◆ REMOVAL(5VAN DLX, SDX)

Remove the parts in numerical order shown in the figure below.

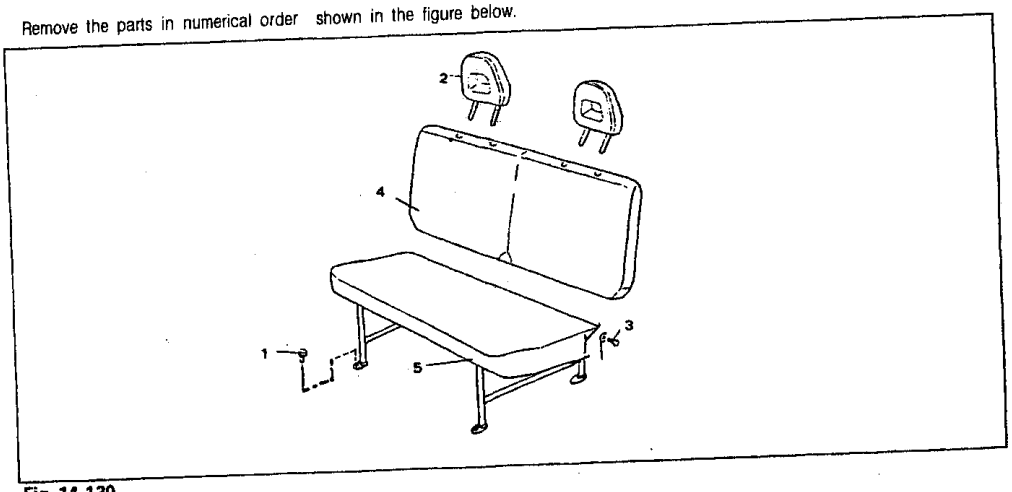


Fig. 14-120

1. Bolt
2. Head rest
3. Bolt W/washer.
4. Back seat Ay
5. Cushion seat Ay

◆ INSTALLATION(5VAN, DLX, SDX)

Install the parts in numerical order shown in the figure below.

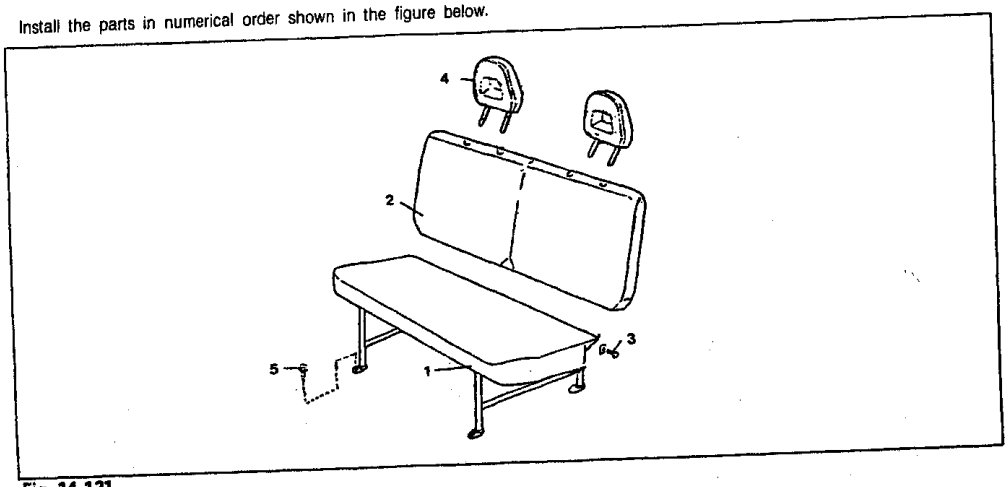


Fig. 14-121

1. Cushion seat Ay
2. Back seat Ay
3. Bolt W/washer
4. Head rest
5. Bolt

◆ INSTALLATION(COACH DLX)

Install the parts in numerical order shown in the figure below.

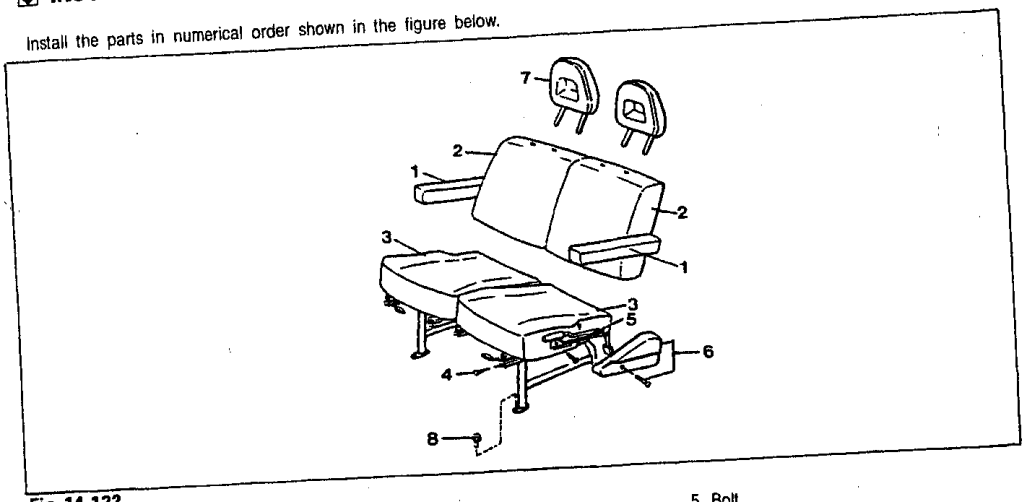


Fig. 14-122

1. Head rest Ay
2. Bush, bolt & washer
3. Back seat Ay
4. Cushion seat Ay
5. Bolt
6. Striker Ay

◆ INSTALLATION(COACH STD)

Install the parts in numerical order shown in the figure below.

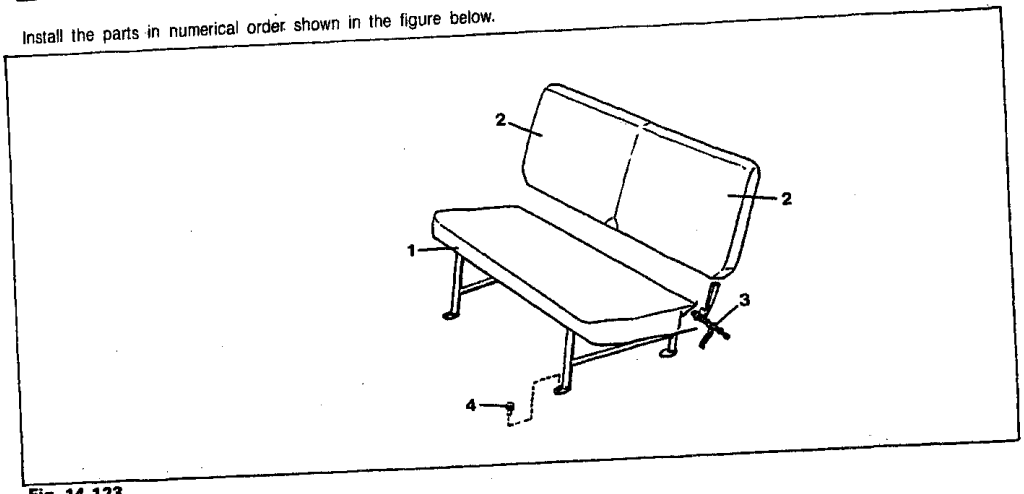


Fig. 14-123

1. Cushion seat Ay
2. Back seat Ay
3. Hinge & spring Ay
4. Bolt

REAR SEAT No. 2

REMOVAL(COACH DLX)

Remove the parts in numerical order shown in the figure below.

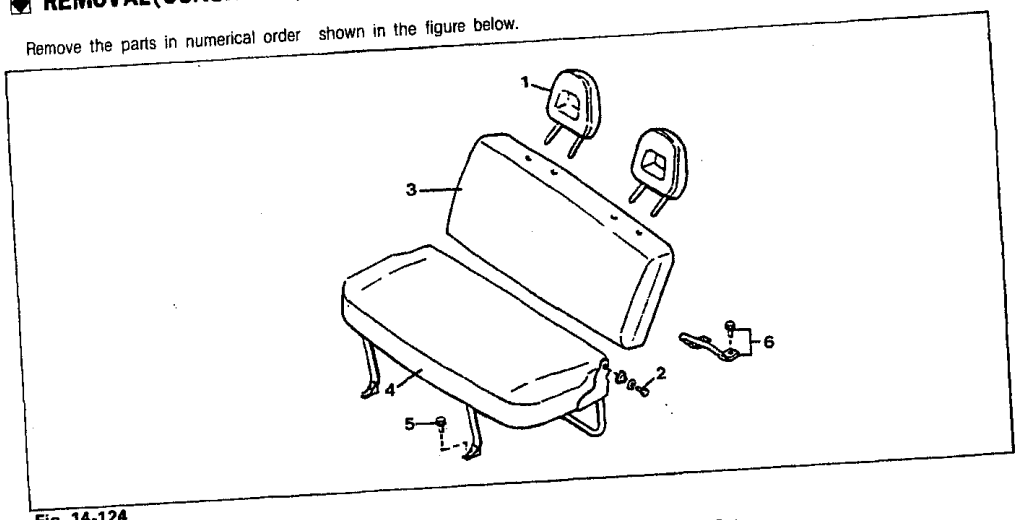


Fig. 14-124

1. Head rest Ay
2. Bush, bolt & washer
3. Back seat Ay
4. Cushion seat Ay
5. Bolt
6. Striker Ay

REMOVAL(COACH STD)

Remove the parts in numerical order shown in the figure below.

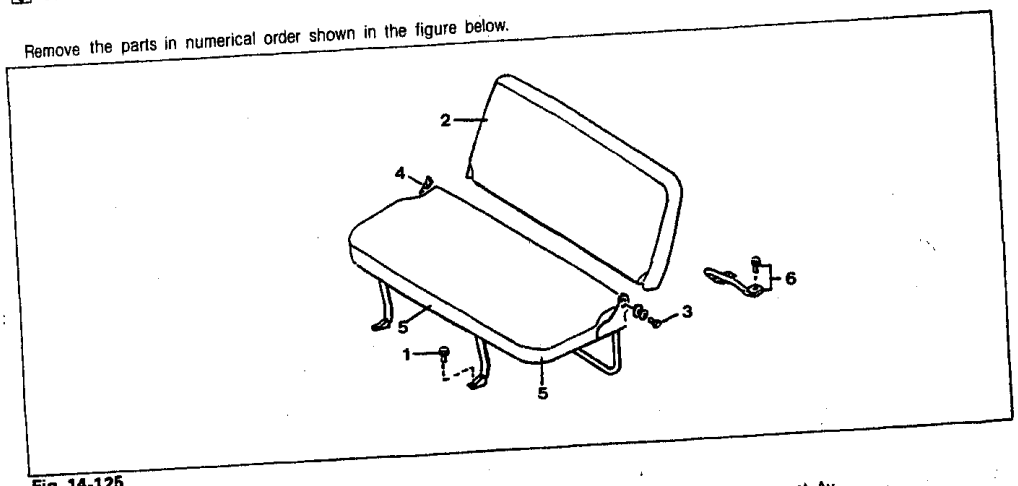


Fig. 14-125

1. Bolt
2. Back seat Ay
3. Bush bolt & washer
4. Coil spring Ay
5. Cushion seat Ay
6. Striker Ay

INSTALLATION(COACH DLX)

Install the parts in numerical order shown in the figure below.

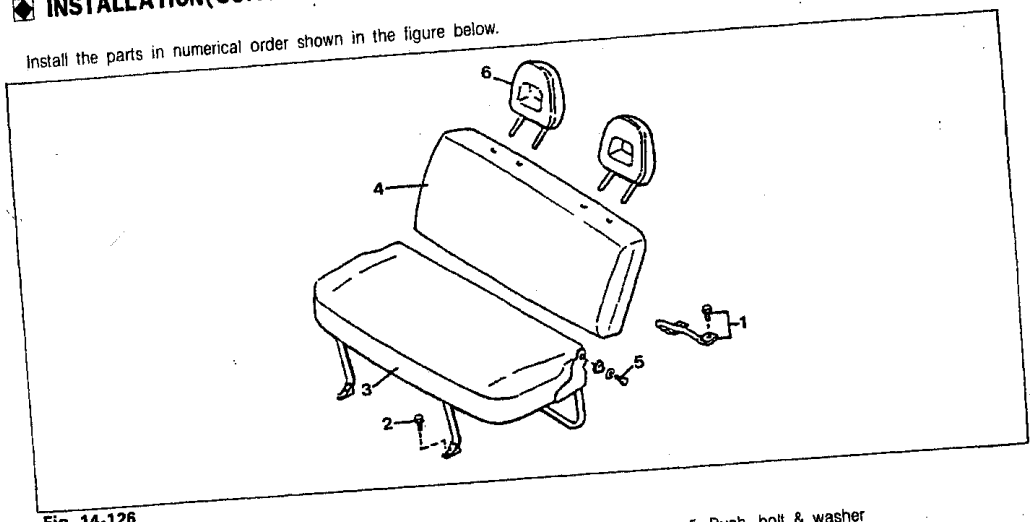


Fig. 14-126

1. Catch Ay
2. Bolt
3. Cushion seat Ay
4. Back seat Ay
5. Bush, bolt & washer
6. Head rest Ay

INSTALLATION(COACH STD)

Install the parts in numerical order shown in the figure below.

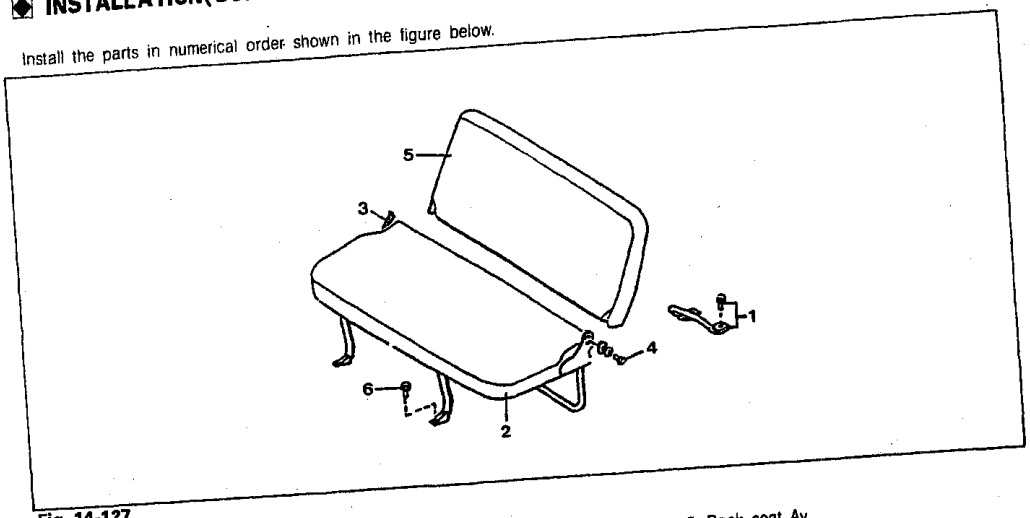


Fig. 14-127

1. Catch Ay
2. Cushion seat Ay
3. Coil spring Ay
4. Bush, Bolt & washer
5. Back seat Ay
6. Bolt

SEAT BELTS

REMOVAL OF FRONT SEAT BELT

Remove the parts in numerical order shown in the figure below.

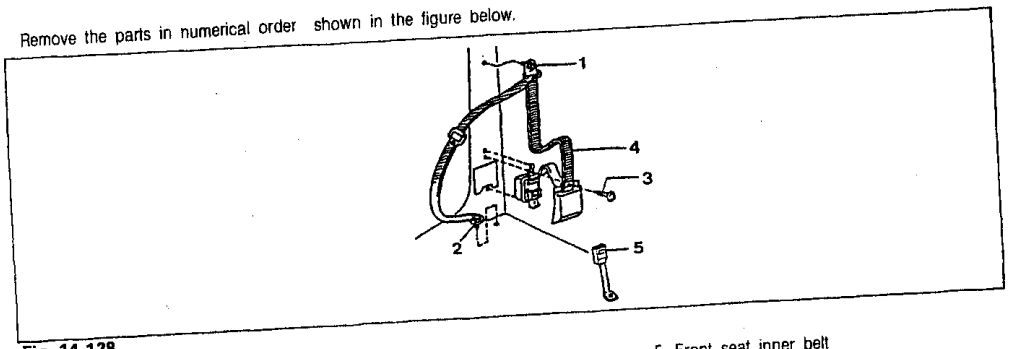


Fig. 14-128

1. Bolt
2. Bolt
3. Screw
4. Front seat outer belt
5. Front seat inner belt

INSPECTION OF FRONT BELT SEAT

Checking of inclinated angle at which ELR(Emergency Locking Retractor) starts locking

1. Gently tilt the retractor from the installated angle position. Ensure that the seat belt lock is not actuated in all directions when the inclinated angle is within 15 degrees.
2. Ensure that the seat belt remains locked when the inclinated angle exceeds 45 degrees.

NOTE: Never disassemble the retractor.

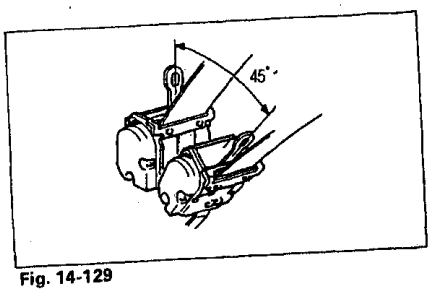


Fig. 14-129

INSTALLATION OF FRONT SEAT BELT

Install the parts in numerical order shown in the figure below.

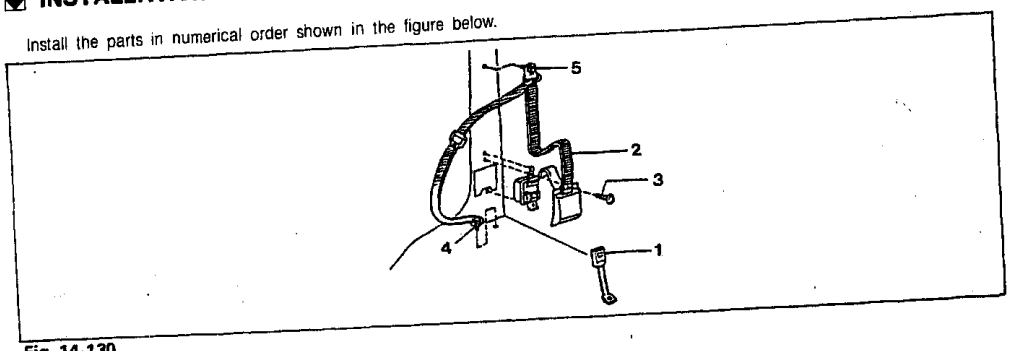


Fig. 14-130

1. Front seat inner belt
2. Front seat outer belt
3. Screw
4. Bolt
5. Bolt

REMOVAL OF REAR SEAT BELT

Remove the parts in numerical order shown in the figure below.

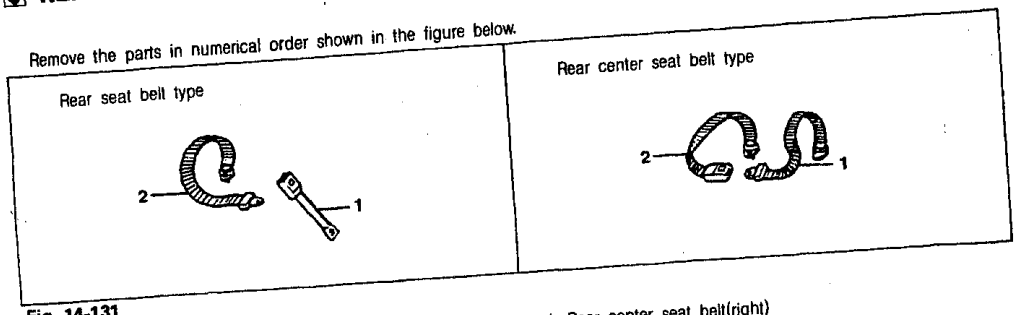


Fig. 14-131

1. Rear seat outer belt
2. Rear seat inner belt

1. Rear center seat belt(right)
2. Rear center seat belt(left)

REAR SEAT BELT INSTALLATION

Install the parts in numerical order shown in the figure below.

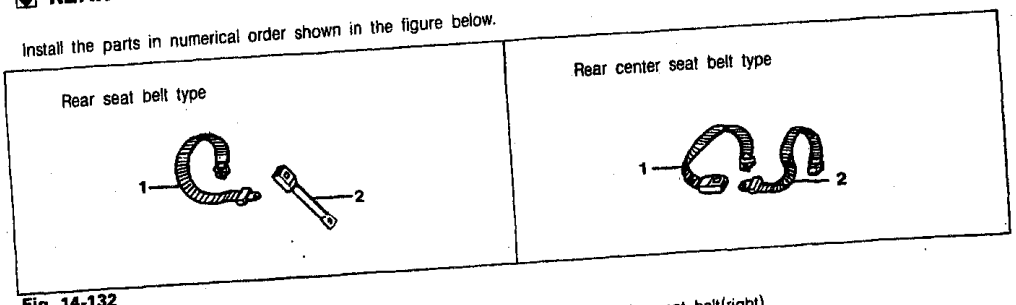


Fig. 14-132

1. Rear seat inner belt
2. Rear seat outer belt

1. Rear center seat belt(right)
2. Rear center seat belt(left)

MAIN POINTS OF INSTALLATION

Front seat inner belt Ay

Install the inner belt Ay, as shown in the right figure.

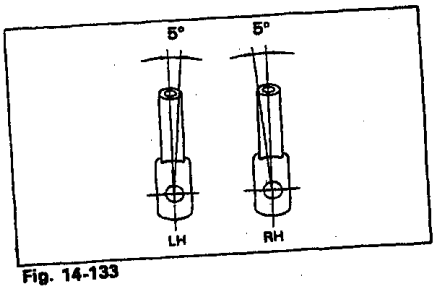


Fig. 14-133

Operation after installation

1. Ensure that the anchor at the shoulder section moves in the circumference direction of the bolt.
2. Ensure that the belt webbings is pulled out and retracted smoothly.

INSTRUMENT PANEL

REMOVAL

Remove the parts in numerical order shown in the figure below.

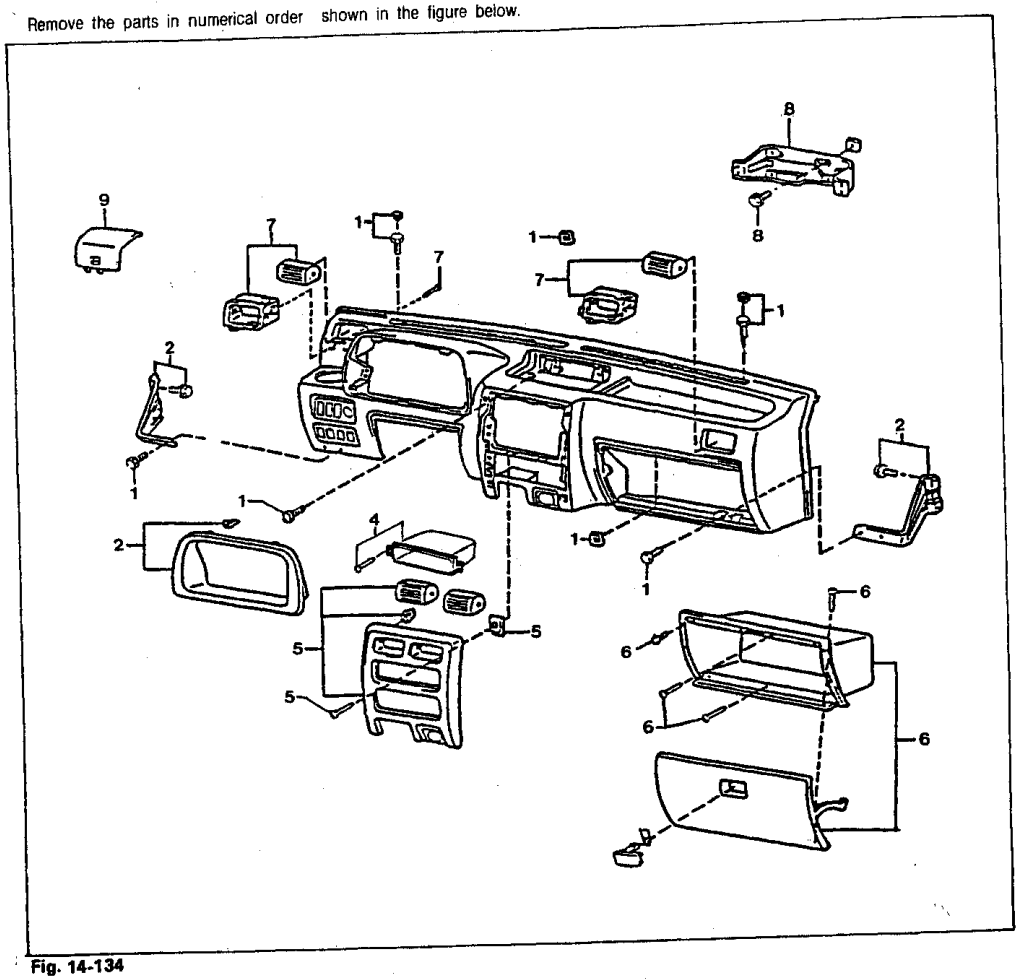


Fig. 14-134

1. Hole cover, bolt & spring nut
2. Side bracket & bolt
3. Meter hood & clip
4. Screw
5. Center panel Ay
6. Glove box Ay
7. Ventilation gril Ay
8. Center bracket
9. Reservoir hole door

◆ INSTALLATION

Install the parts in numerical order shown in the figure below.

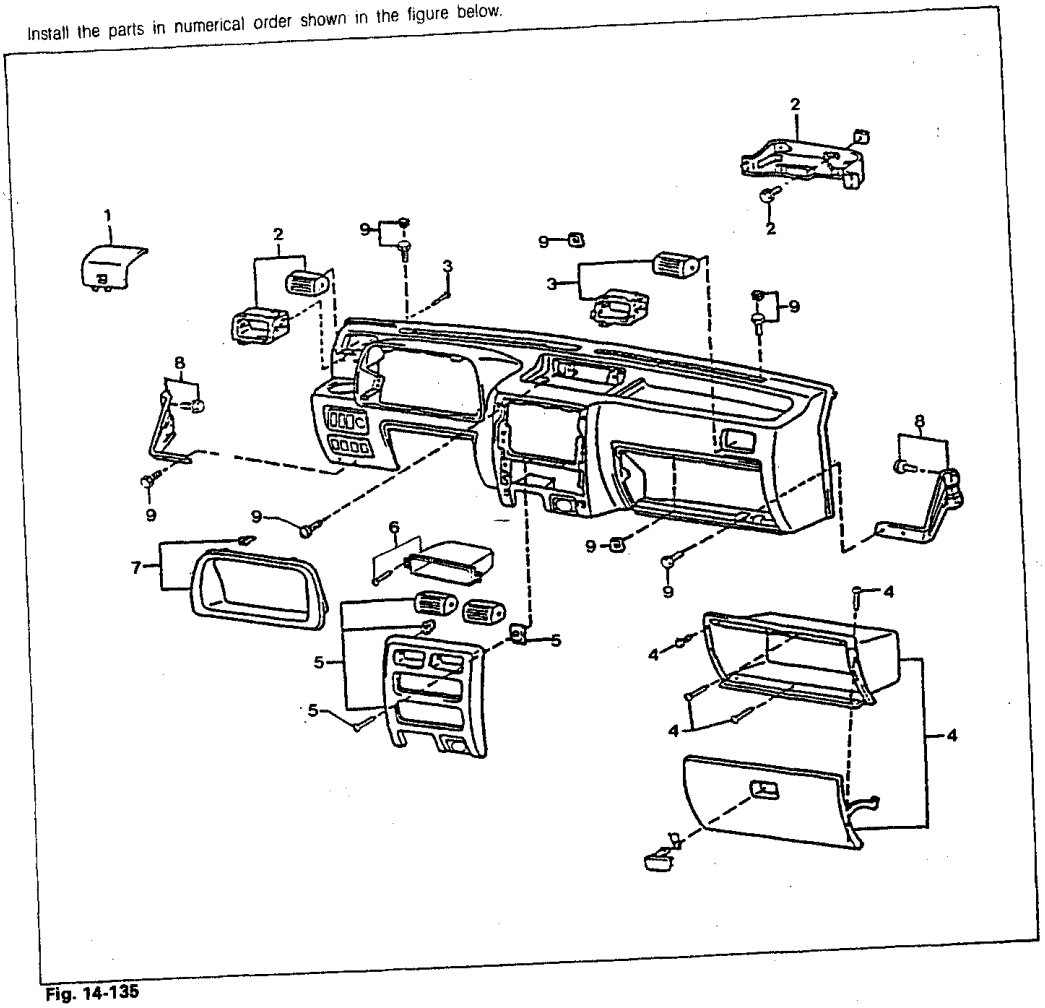


Fig. 14-135

1. Reservoir hole door
2. Center bracket
3. Ventilation gril Ay
4. Glove box Ay
5. Center panel Ay
6. Screw
7. Meter hood & clip
8. Side bracket & bolt
9. Hole cover, bolt & spring nut

ELECTRICAL SYSTEM OF BODY 15

WIRING HARNESS

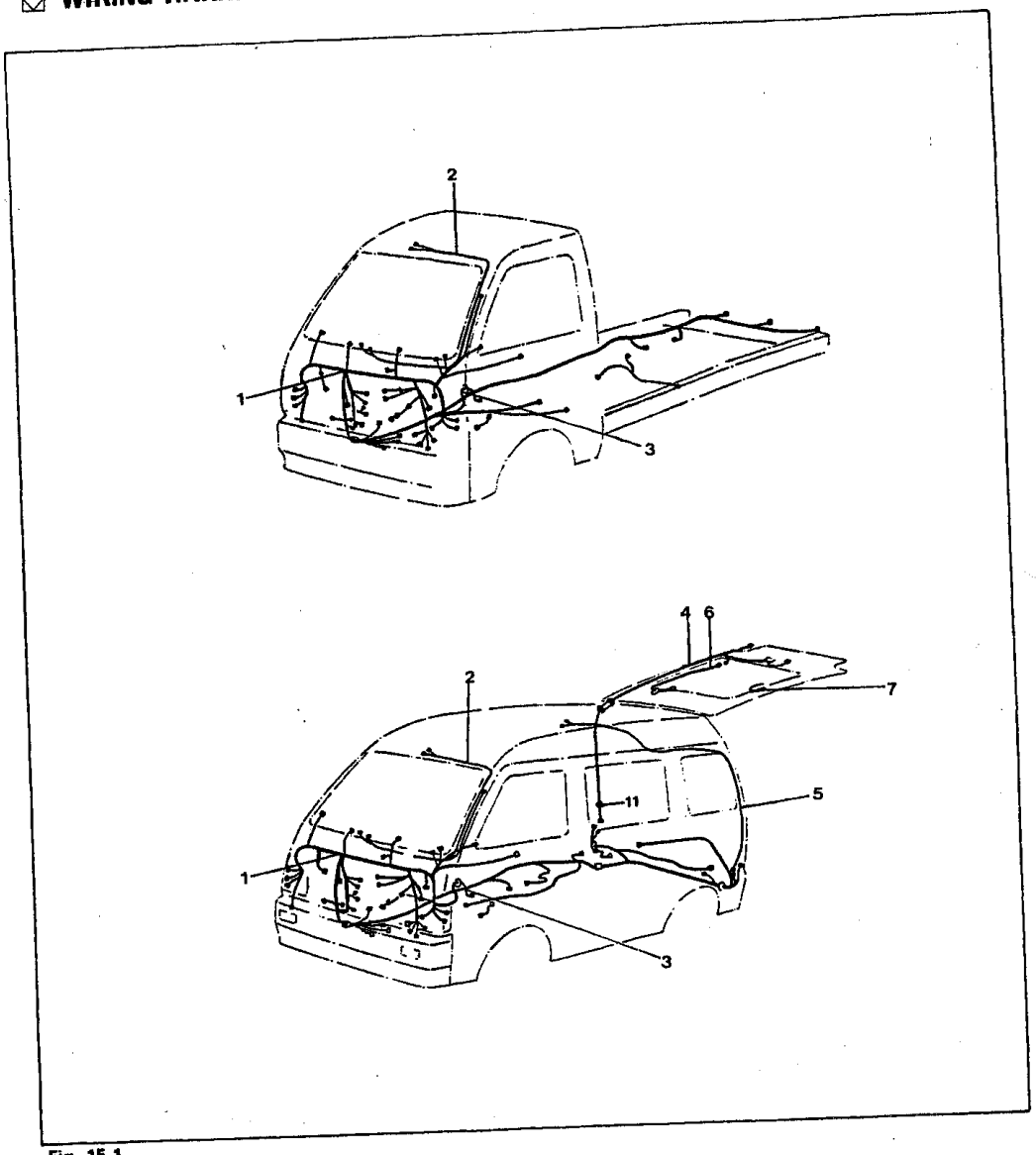


Fig. 15-1

1. Front harness
2. Roof wire harness
3. Front door harness
4. Back door harness
5. Rear dome lamp harness
6. Defogger harness
7. Defogger earth harness

FUSE BLOCK

INSTALLED POSITION

The fuse block is located at the left side of the steering wheel.

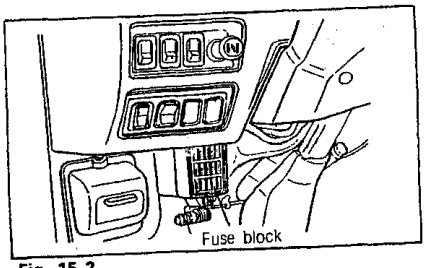


Fig. 15-2

STRUCTURAL VIEW

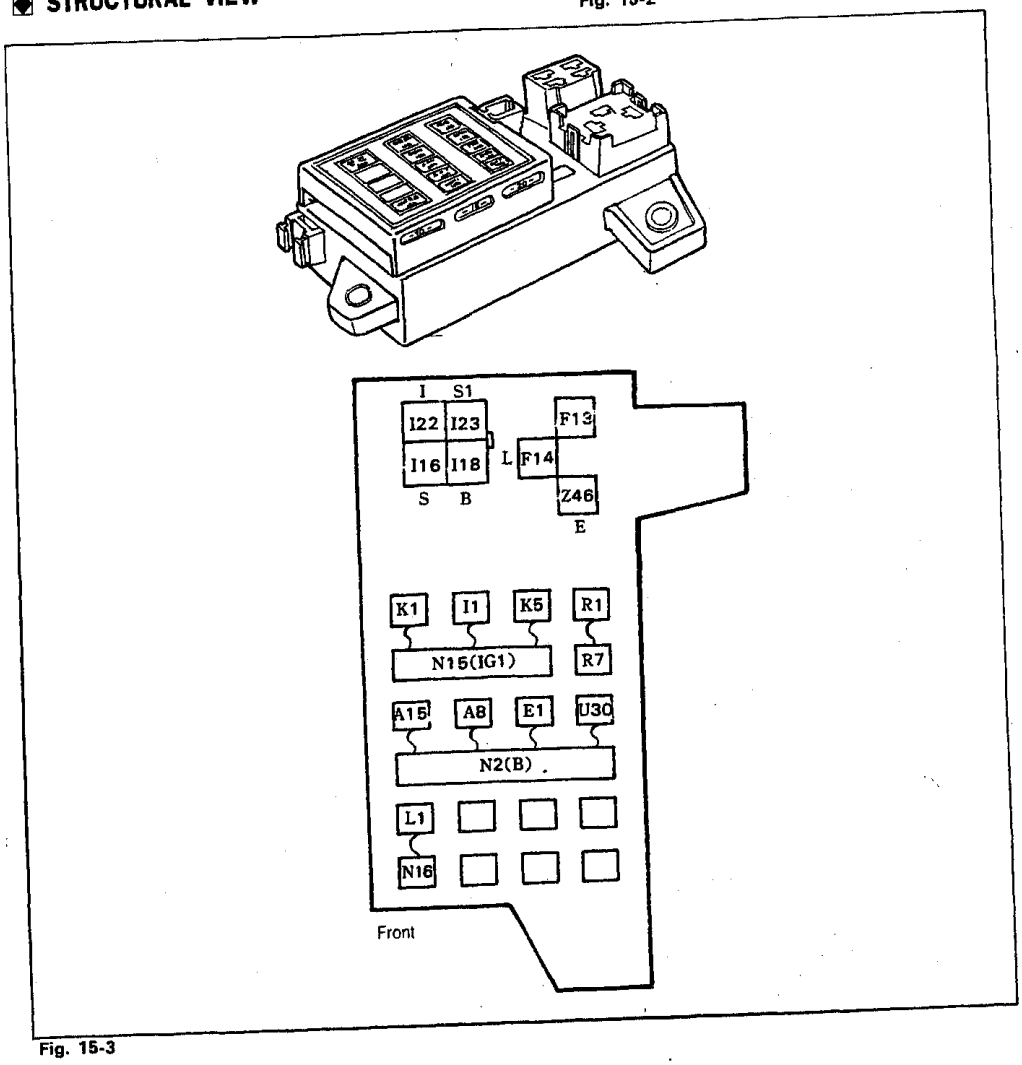


Fig. 15-3

◆ FUSE

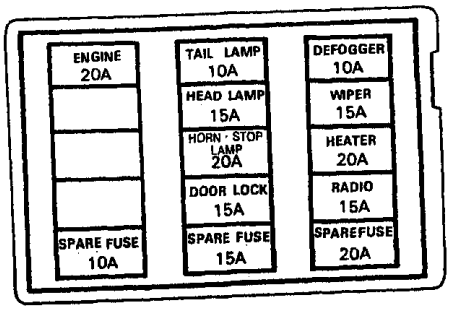


Fig. 15-4

Specifications of fuse

Kind of fuse	Capacity(A)	Connecting circuit
HORN	20	Horn, stop lamp and hazard
TAIL LAMP	10	Tail lamp, clearance lamp, license plate lamp, combination meter illumination, room lamp, dome lamp and heater control illumination
WIPER, TURN	15	Turn signal lamp, front wiper, rear wiper and washer
DEFOGGER	10	Defogger
A C C	15	Radio and cigar lighter
ENGINE	20	Fuel cut solenoid and radiator fan motor
HEATER	20	Warning lamp, water temperature gauge, fuel gauge, back up lamp, heater, air conditioner and shift indicator lamp
DOOR LOCK	15	Door lock
HEAD LAMP	15	Head lamp meter

LAMPS

REMOVAL OF HEAD LAMP

Remove the parts in numerical order shown in the figure below.

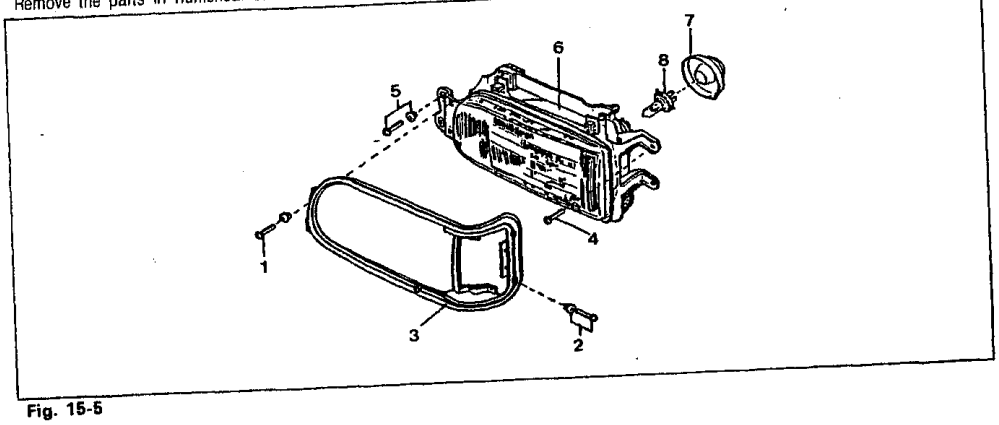


Fig. 15-5

1. Screw
2. Screw
3. Housing
4. Screw
5. Screw
6. Head lamp
7. Dust cover
8. Bulb

INSTALLATION OF HEAD LAMP

Install the parts in numerical order shown in the figure below.

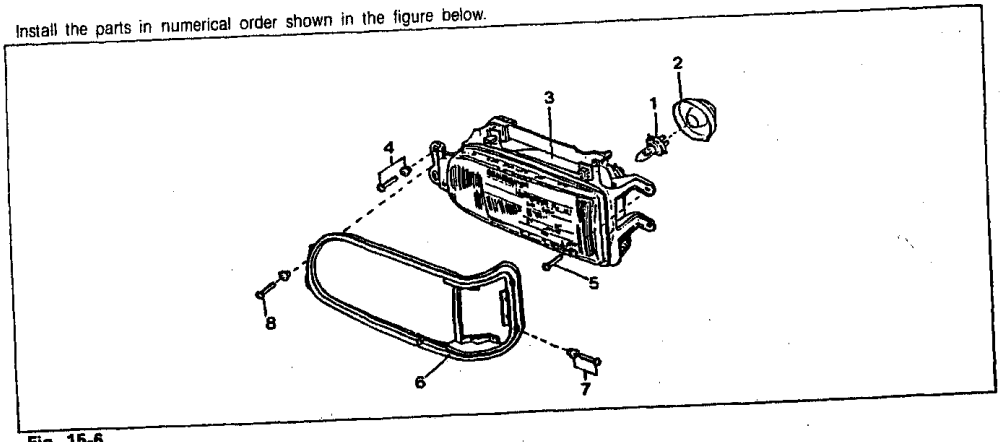


Fig. 15-6

1. Bulb
2. Dust cover
3. Head lamp
4. Screw
5. Screw
6. Housing
7. Screw
8. Screw

HEAD LAMP AIMING ADJUSTMENT (METHOD EMPLOYING SCREEN)

1. Perform the aiming adjustment with the entire air inflation pressure set to the specified value and with one person sitting at the driver's seat.
2. Position the vehicle on a level floor in front of the screen such that the head lamps of the vehicle come at a distance of three meters from the screen. Morever, the vehicle must be positioned normal to the screen.

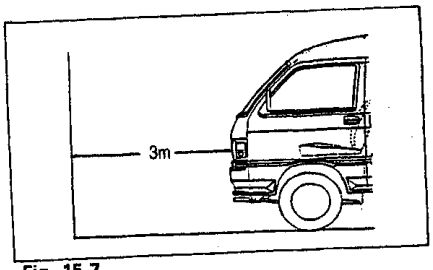


Fig. 15-7

3. Set the reference points for the head lamp aiming adjustment on the screen as follows:
   1) Measure the center height "H" of the head lamp. Draw a line as the adjustment line on the screen at a height 23mm(0.906 in.) below the center height "H".
   2) Draw a vertical straight line on the screen at the center of the head lamps on both right and left sides. Thus, determine each intersection point "F" made by the vertical center line and the adjustment line.

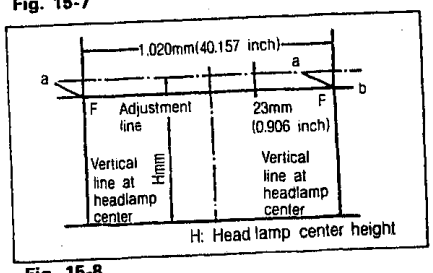


Fig. 15-8

4. Turn ON the head lamps with the lower beams selected. Then, you can get a light distribution pattern as indicated at the right figure. Perform the aiming adjustment at an intersection point made by the line "a" and the line "b" of cut-off lines.
5. With the low beams of the head lamps turned ON, perform the head lamp aiming adjustment by means of the adjusting screws in such a way that the intersection points of the cut-off lines may come at the respective intersection points "F" on the screen.

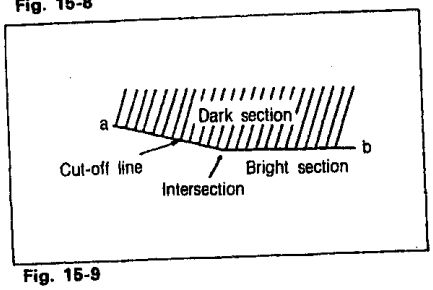


Fig. 15-9

NOTE

Carry out the head lamp aiming adjustment while the engine is running at 1500 rpm or more.

◆ REMOVAL OF FRONT TURN SIGNAL LAMP

Remove the parts in numerical order shown in the figure below.

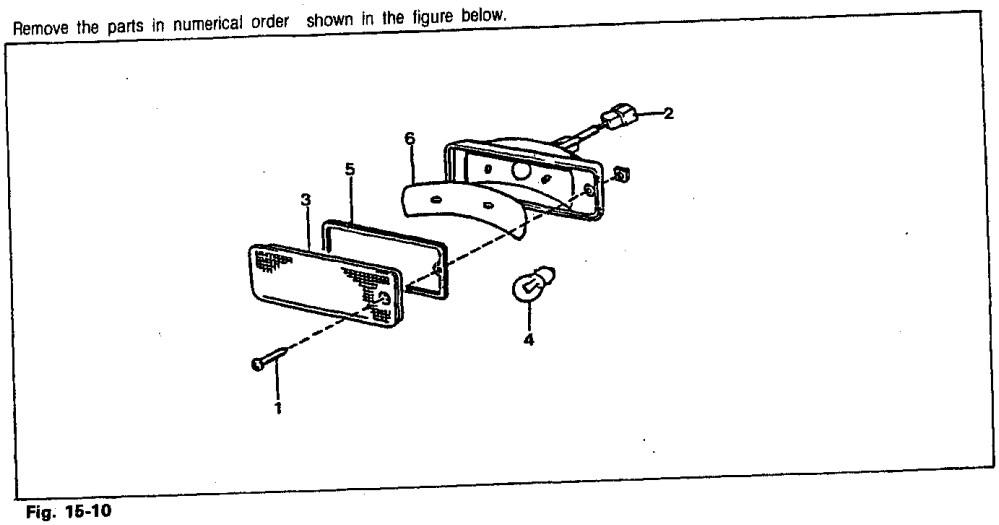


Fig. 15-10

1. Screw
2. Connector
3. Lens
4. Bulb
5. Packing
6. Reflector

◆ INSTALLATION OF FRONT TURN SIGNAL LAMP

Install the parts in numerical order shown in the figure below.

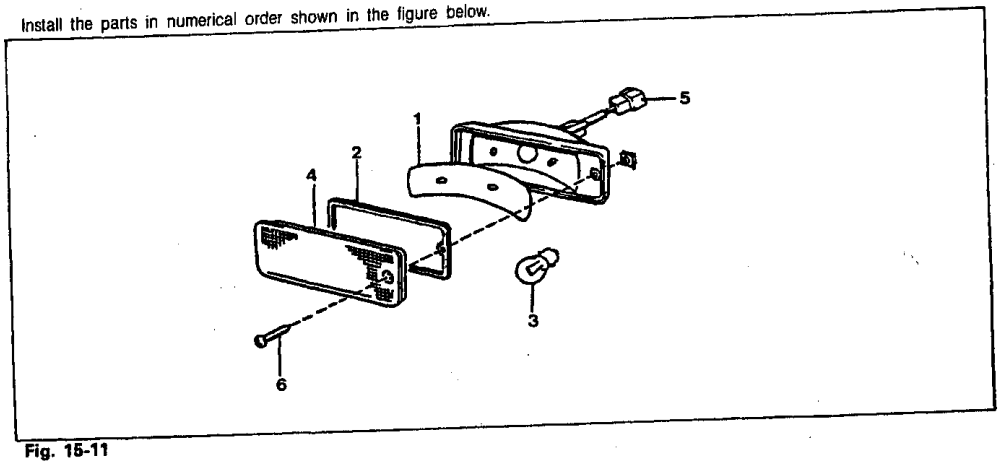


Fig. 15-11

1. Reflector
2. Packing
3. Bulb
4. Lens
5. Connector
6. Screw

◆ REMOVAL OF SIDE TURN SIGNAL LAMP

Remove the parts in numerical order shown in the figure below.

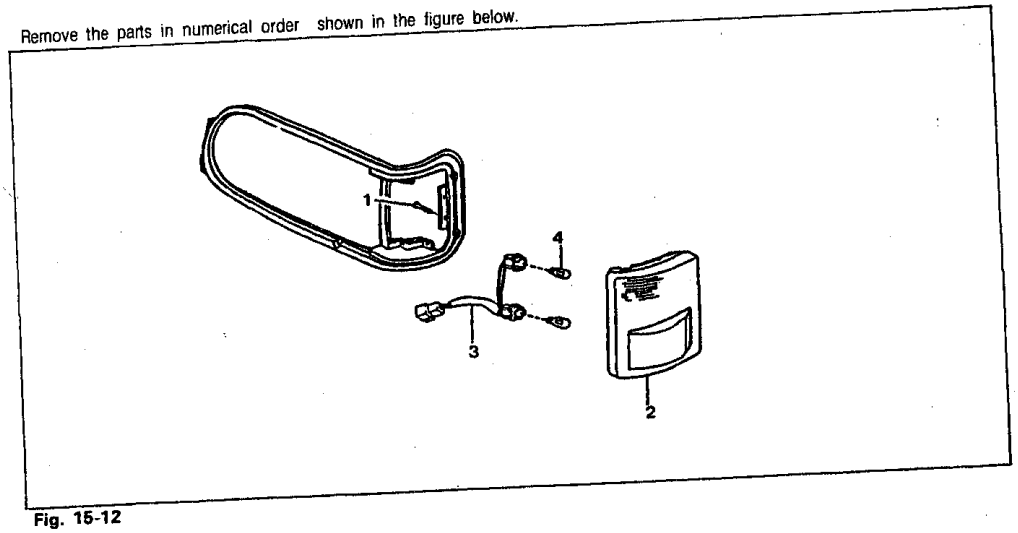


Fig. 15-12

1. Screw
2. Lens
3. Socket Ay
4. Bulb

◆ INSTALLATION OF SIDE TURN SIGNAL

Install the parts in numerical order shown in the figure below.

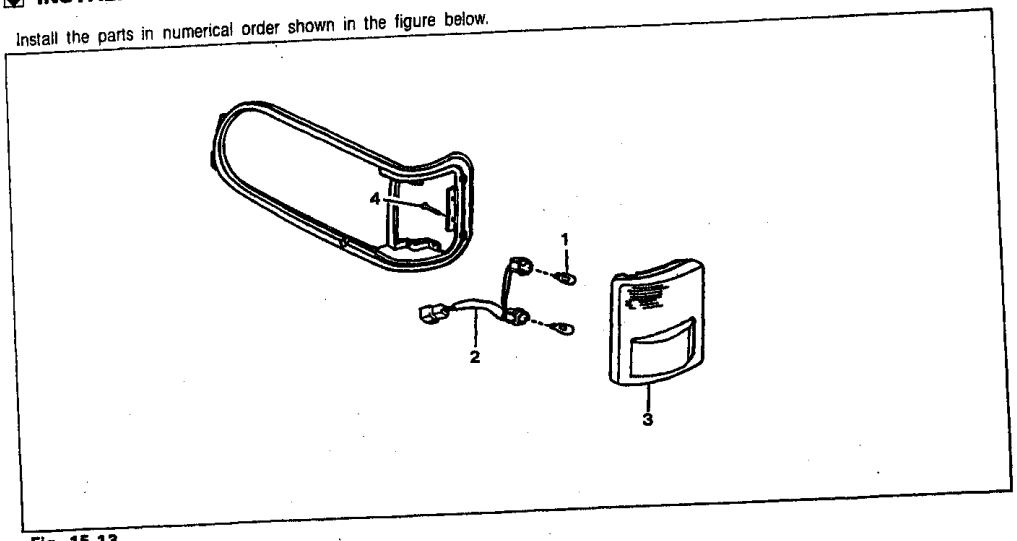


Fig. 15-13

1. Bulb
2. Socket Ay
3. Lens
4. Screw

◆ REMOVAL OF LICENCE PLATE LAMP

Remove the parts in numerical order shown in the figure below.

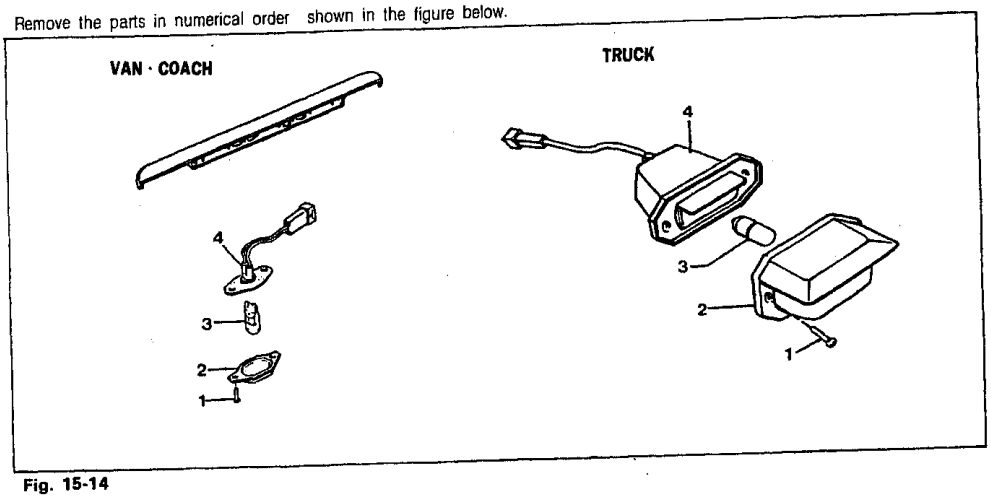


Fig. 15-14

1. Screw
2. Lens
3. Bulb
4. Socket Ay

◆ INSTALLATION OF LICENCE PLATE LAMP

Install the parts in numerical order shown in the figure below.

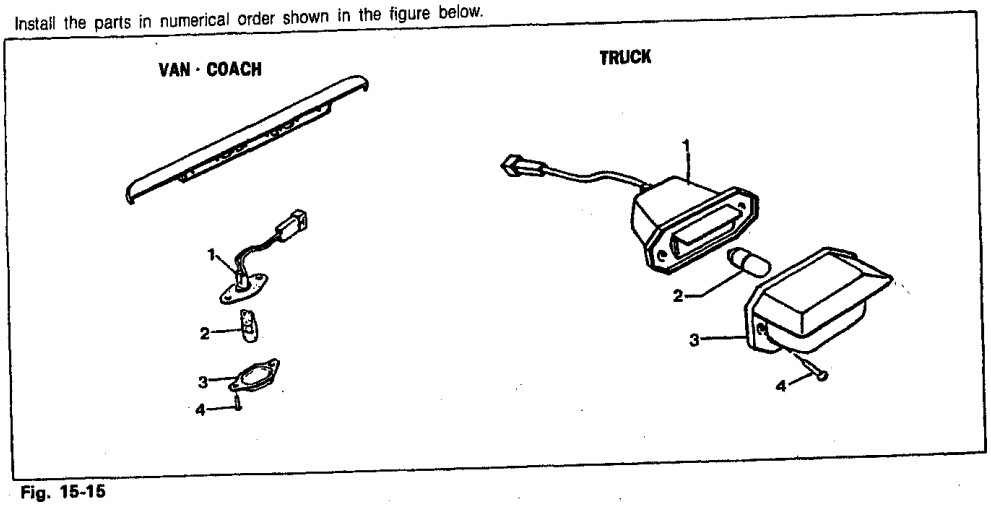


Fig. 15-15

1. Socket Ay
2. Bulb
3. Lens
4. Screw

◆ REMOVAL OF REAR COMBINATION LAMP(TRUCK)

Remove the parts in numerical order shown in the figure below.

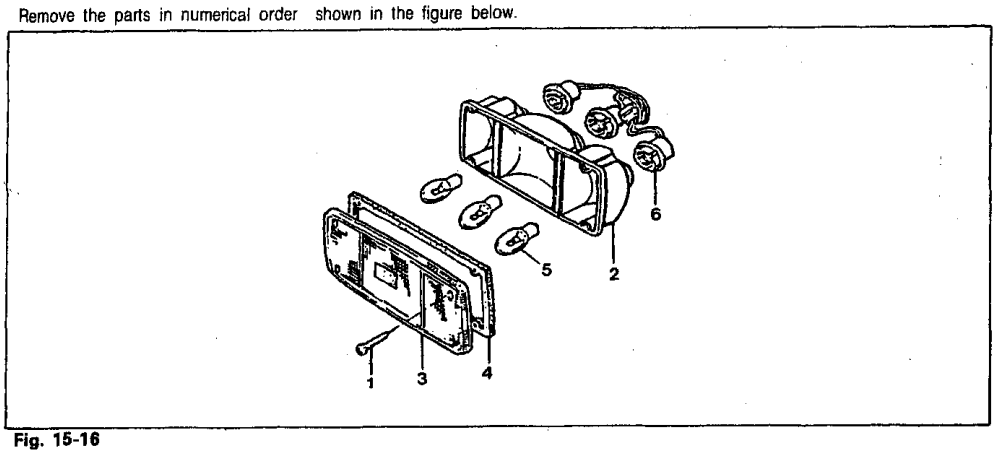


Fig. 15-16

1. Screw
2. Body
3. Lens
4. Packing
5. Bulb
6. Cord Ay

◆ INSTALLATION OF REAR COMBINATION LAMP(TRUCK)

Install the parts in numerical order shown in the figure below.

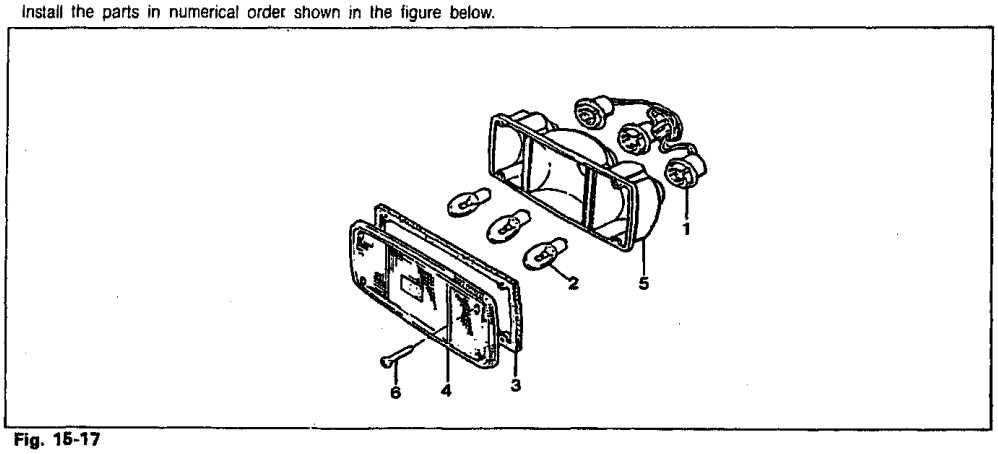


Fig. 15-17

1. Cord Ay
2. Bulb
3. Packing
4. Lens
5. Body
6. Screw

◆ REMOVAL OF REAR COMBINATION LAMP(VAN · COACH)

Remove the parts in numerical order shown in the figure below.

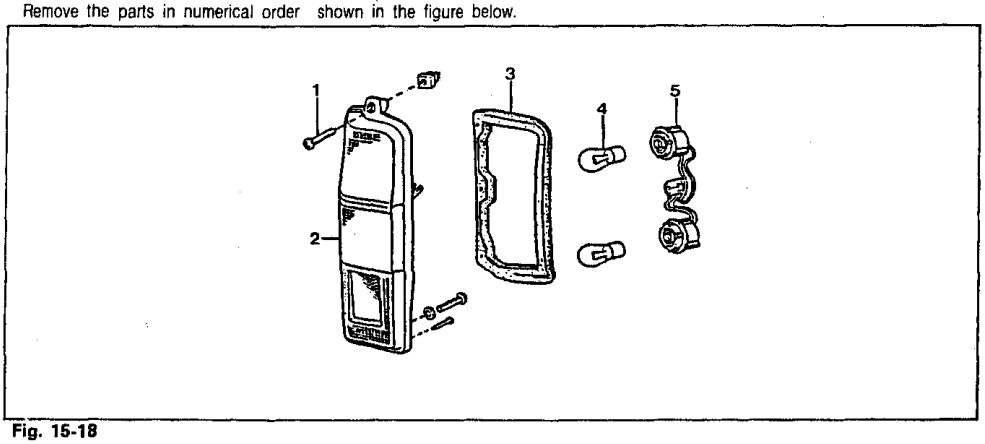


Fig. 15-18

1. Screw
2. Lens
3. Packing
4. Bulb
5. Cord Ay

◆ INSTALLATION OF REAR COMBINATION LAMP(VAN · COACH)

Install the parts in numerical order shown in the figure below.

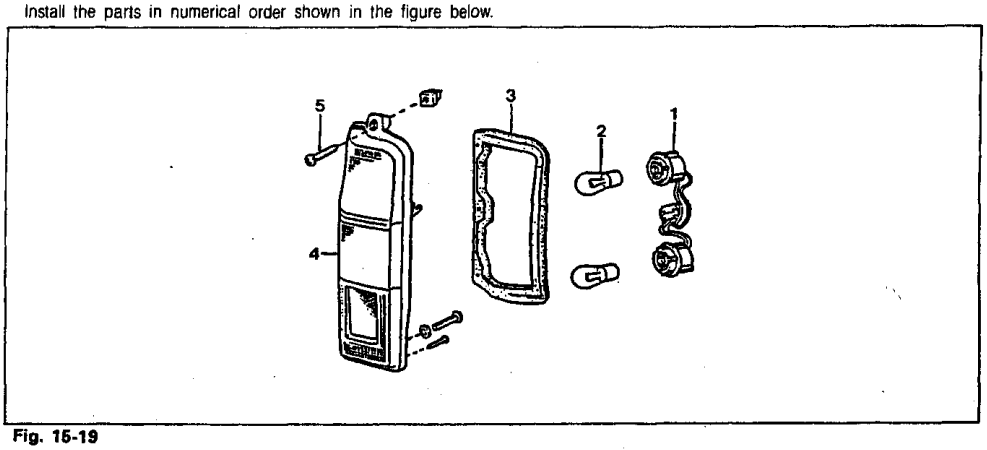


Fig. 15-19

1. Cord Ay
2. Bulb
3. Packing
4. Lens
5. Screw

◆ REMOVAL OF BACKUP LAMP(VAN · COACH)

Remove the parts in numerical order shown in the figure below.

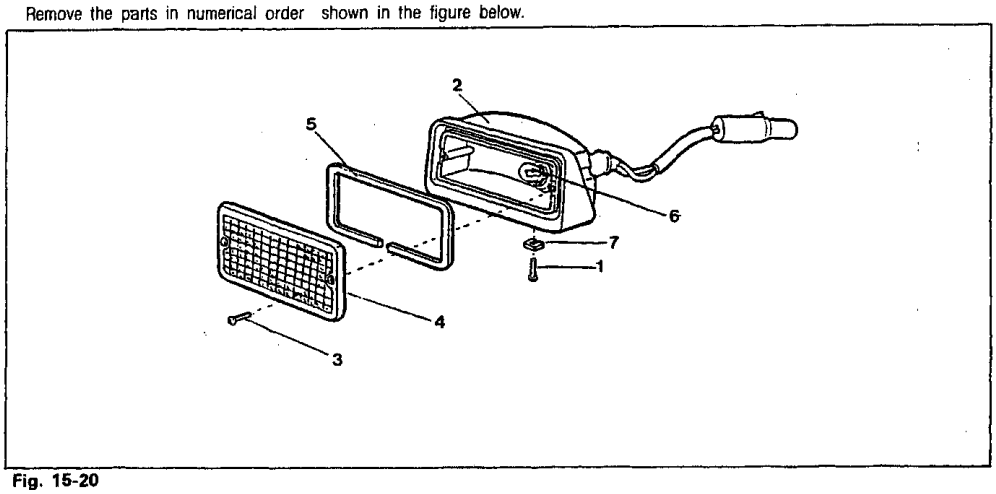


Fig. 15-20

1. Bolt
2. Body
3. Screw
4. Lens
5. Packing
6. Bulb
7. Spring nut

◆ INSTALLATION OF BACKUP LAMP

Install the parts in numerical order shown in the figure below.

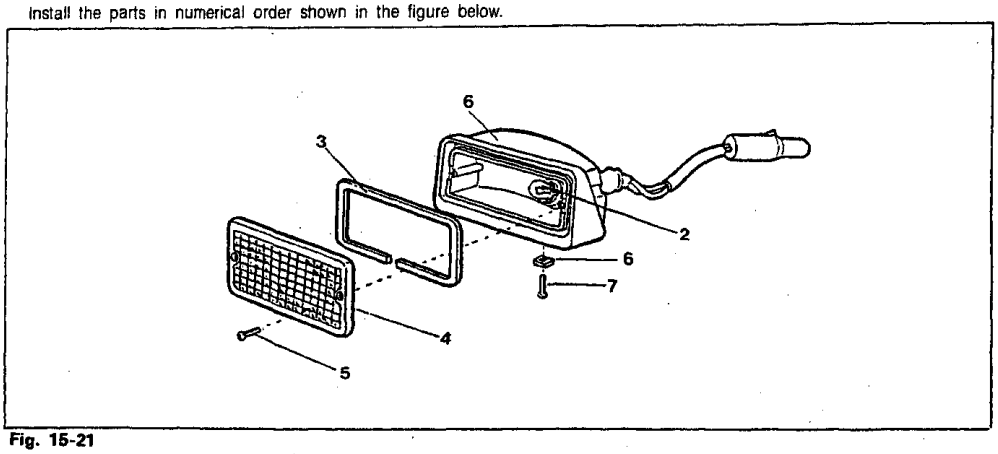


Fig. 15-21

1. Spring nut
2. Bulb
3. Packing
4. Lens
5. Screw
6. Body
7. Bolt

INSTALLATION OF ROOM LAMP

Remove the parts in numerical order shown in the figure below.

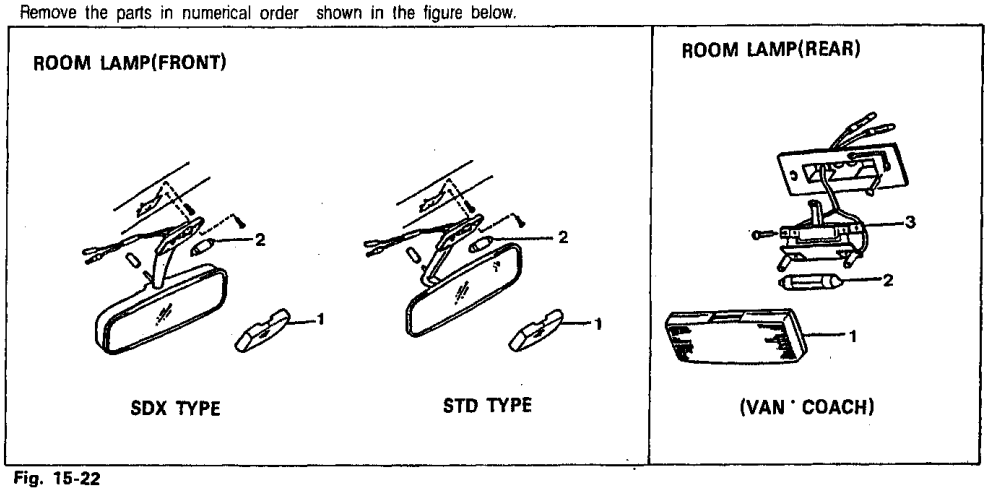


Fig. 15-22

1. Room lamp lens
2. Bulb

1. Lens
2. Bulb
3. Switch Ay

INSTALLATION OF ROOM LAMP

Install the parts in numerical order shown in the figure below.

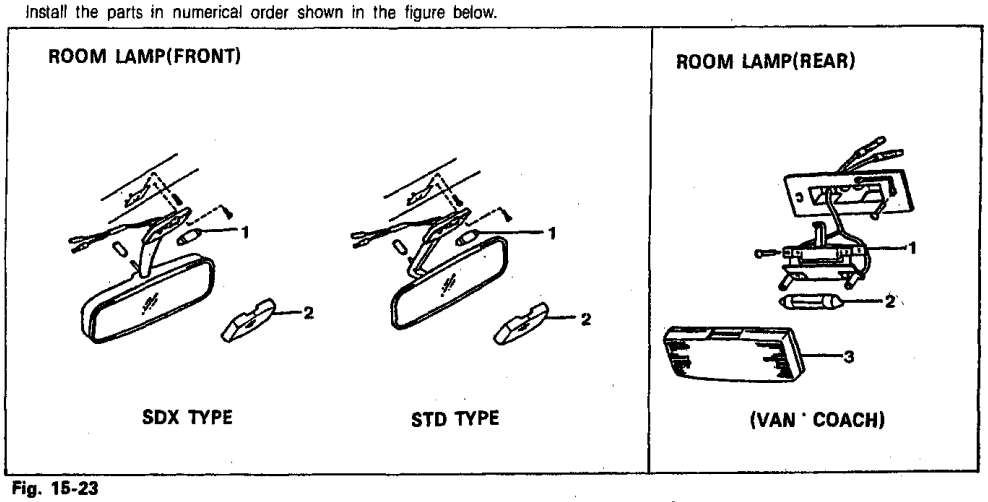


Fig. 15-23

1. Bulb
2. Room lamp bulb

1. Switch Ay
2. Bulb
3. Lens

◆ REMOVAL OF FRONT FOG LAMP

Remove the parts in numerical order shown in the figure below.

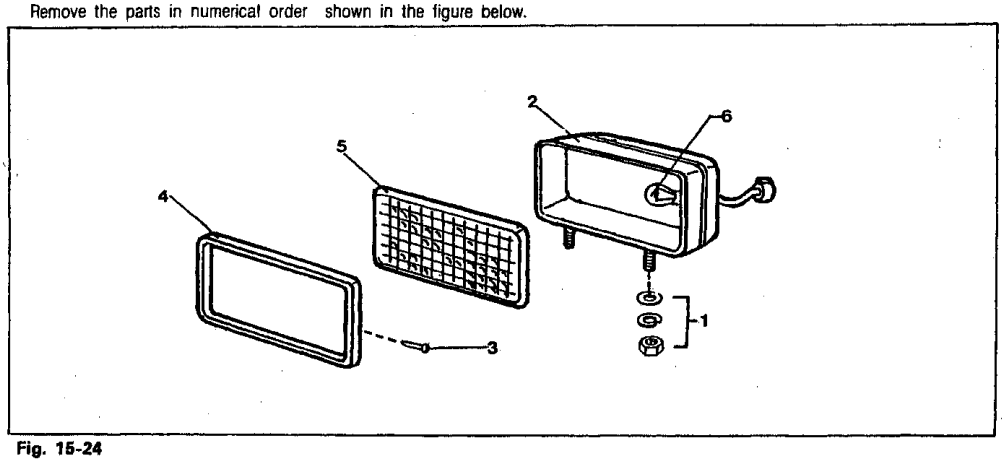


Fig. 15-24

1. Bolt W/washer
2. Body
3. Screw
4. Lim
5. Lens
6. Bulb

◆ INSTALLATION OF FRONT FOG LAMP

Install the parts in numerical order shown in the figure below.

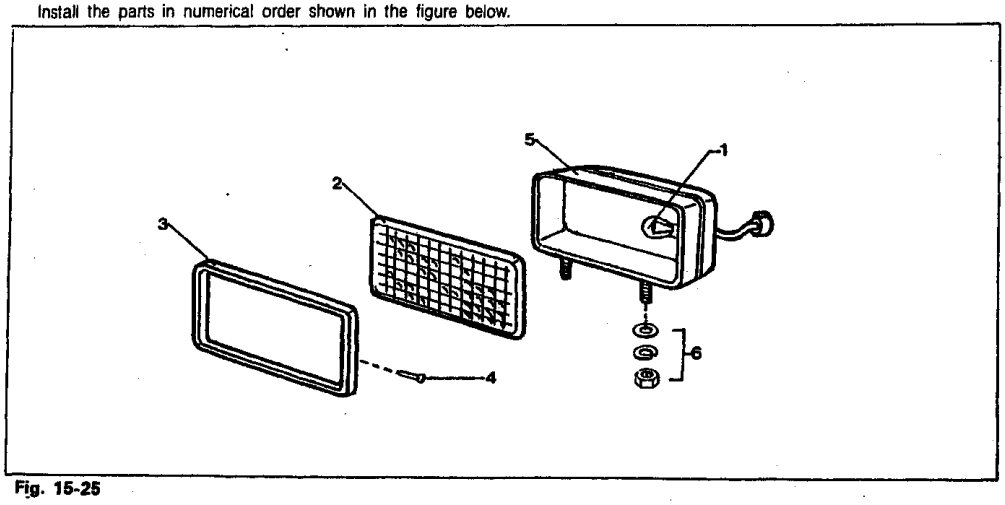


Fig. 15-25

1. Bulb
2. Lens
3. Lim
4. Screw
5. Body
6. Bolt W/washer

REMOVAL OF COURTESY SWITCH

Remove the parts in numerical order shown in the figure below.

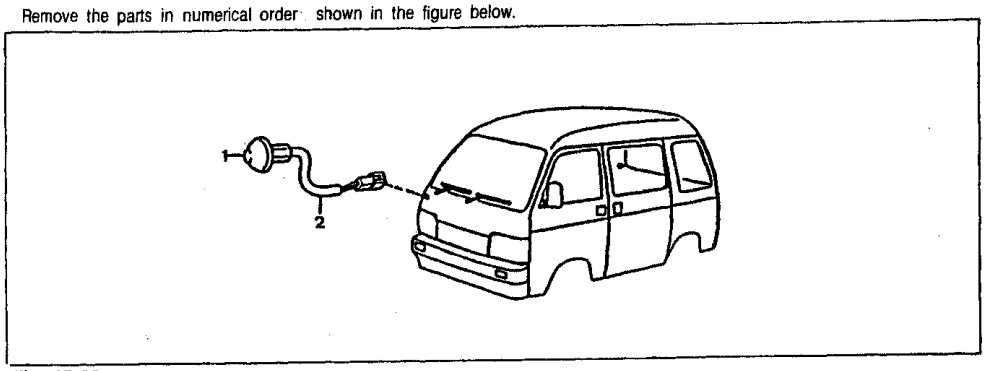


Fig. 15-26

1. Hole cover
2. Courtesy switch

INSTALLATION OF COURTESY SWITCH

Install the parts in numerical order shown in the figure below.

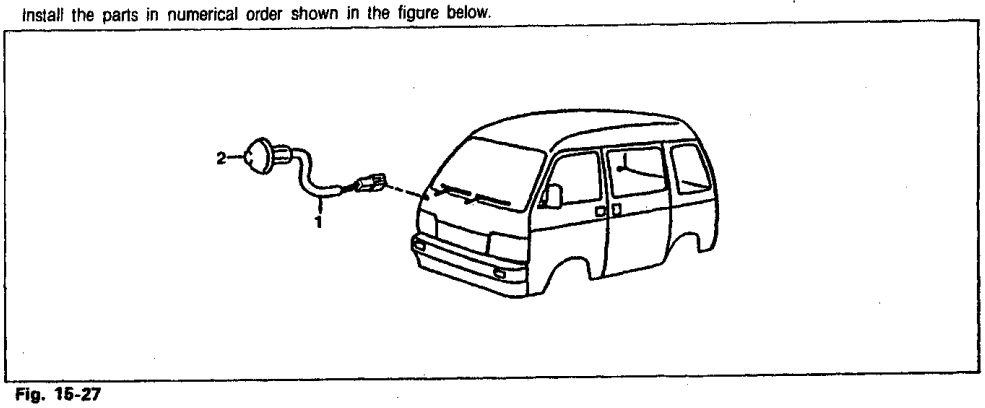


Fig. 15-27

1. Courtesy switch
2. Hole cover

INSPECTION OF COURTESY SWITCH

1. With the tip-end section pushed, ensure that no continuity exists between the harness.
2. With the tip-end section not pushed, ensure that continuity exists between the harness.

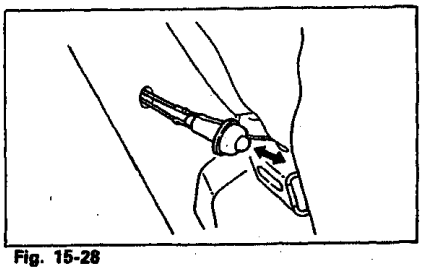


Fig. 15-28

METERS AND GAUGES

REMOVAL OF COMBINATION METER

Remove the parts in numerical order shown in the figure below.

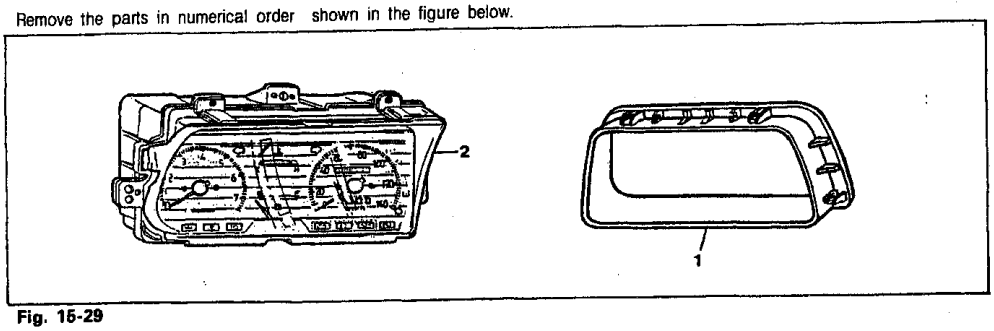


Fig. 15-29

1. Instrument cluster finish panel S/A
2. Combination meter Ay

STRUCTURAL VIEW OF COMBINATION METER

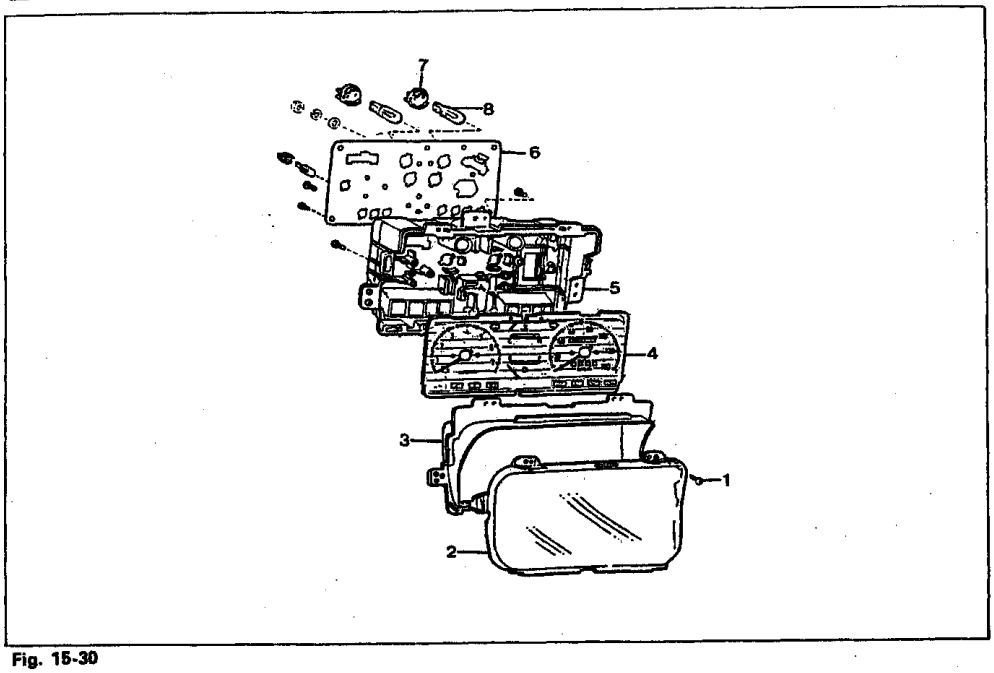


Fig. 15-30

1. Screw
2. Front glass
3. Window plate
4. Meter & speedometer
5. Case
6. Meter circuit plate
7. Socket
8. Bulb

INSTALLATION OF COMBINATION METER

Install the parts in numerical order shown in the figure below.

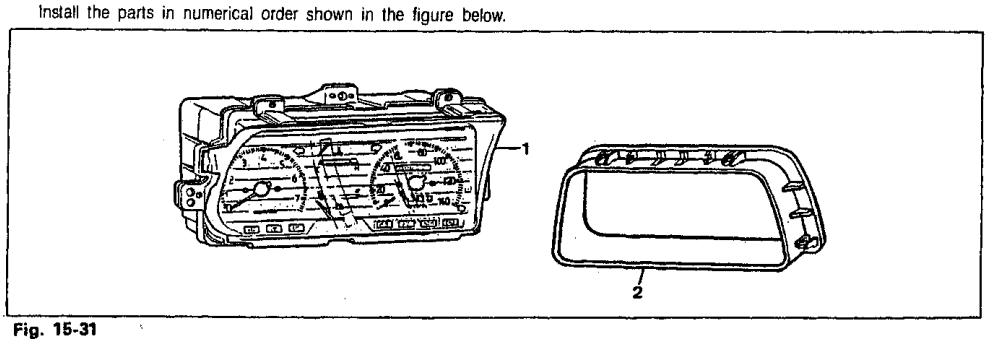


Fig. 15-31

1. Combination meter Ay
2. Instrment cluster finish panel S/A

CIRCUIT FOR COMBINATION METER

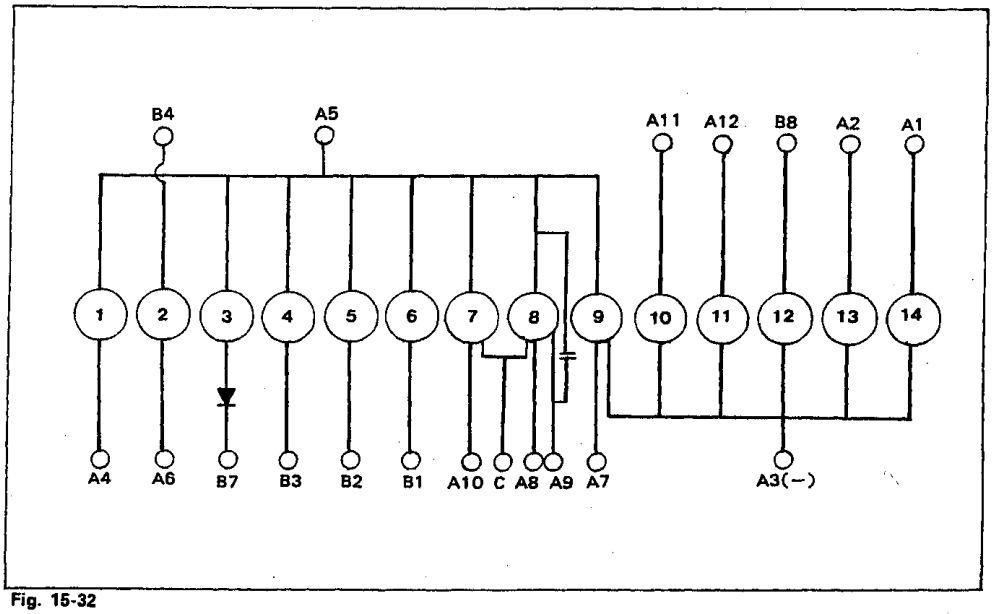


Fig. 15-32

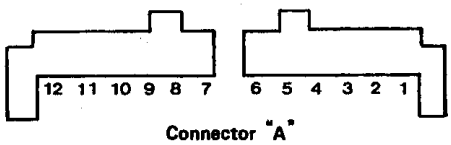
1. Belt
2. H-beam
3. Charge
4. Brake
5. Oil
6. Choke
7. TEMP
8. Fuel
9. Tachometer
10. Turn right
11. Turn left
12. Illuminator
13. Rear defogger
14. Spare

Connector arrangement

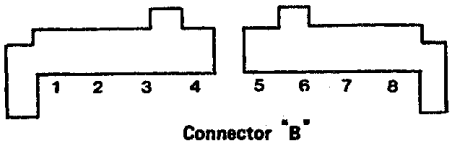
	NO	Relatively connecting
A	1	Spare(+)
	2	R – DEF(+)
	3	EARTH
	4	BELT(–)
	5	IGN(+)
	6	H – BEAM(–)
	7	TACHO SIGNAL
	8	FUEL-UNIT
	9	FUEL(–)
	10	TEMP UNIT
	11	TURN – R(+)
	12	TURN – L(+)

	NO	Connector
B	1	CHOCKE(–)
	2	OIL(–)
	3	BRAKE(–)
	4	H–BEAM(+)
	5	–
	6	–
	7	CHARGE(–)
	8	ILLUMI(+)

C	7 Connector (AIR CON)



Connector "A"



Connector "B"

Fig. 15-33

INSPECTION OF SPEEDOMETER

In-vehicle check

Using a speedometer tester, check the speedometer for any indication error, pointer fluctuation and abnormal noise. Furthermore, check to see if the odometer is functioning properly. If the measurement results are within the tolerance given in table below, it means that the speedometer is satisfactory.

NOTE

1. **Make sure that the tires are inflated to the specified air pressure. Excessive tire wear, over-inflation or under-inflation will cause indication errors of the speedometer.**
2. **Pointer fluctuations of the meter are often attributable to a defective meter cable.**

Indication error: Within ± 10% (at 40km/h)

Pointer fluctuation: Within 3.5km/h

◆ FUEL GAUGE & WATER TEMPERATURE GAUGE

CIRCUIT DIAGRAM

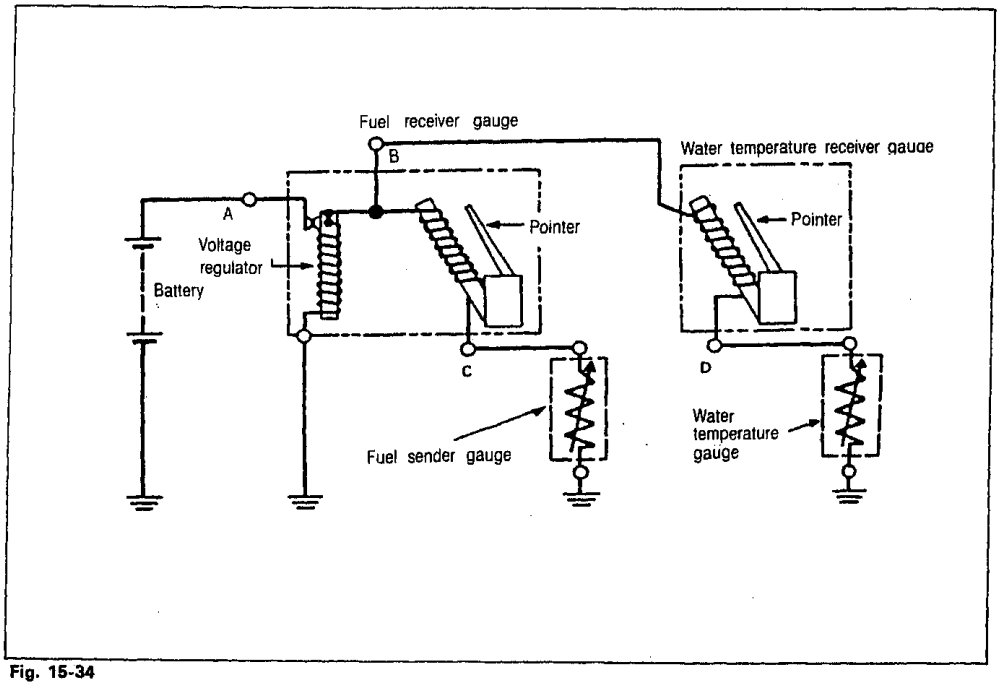


Fig. 15-34

◆ FUEL RECEIVER GAUGE

In-vehicle check

Disconnect the connector located at the upper parts of the fuel tank. Carry out the following checks at the terminal at the receiver side.

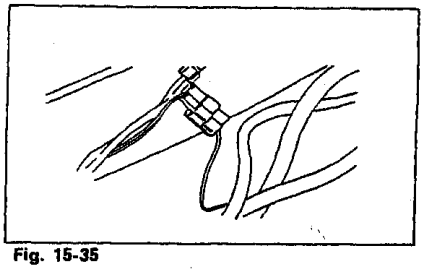


Fig. 15-35

Disconnect the connector from the harness of the fuel sender gauge. Earth the gauge through a test lamp.

↓

Turn ON the key switch.

↓

The test lamp goes on. After several seconds, the lamp should start flashing.

↓

The pointer of the receiver gauge should start to rise gradually.

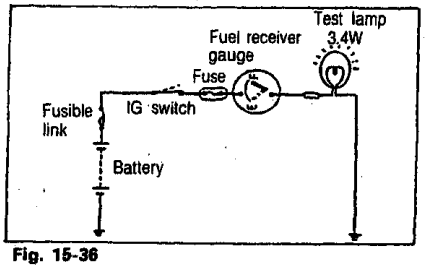


Fig. 15-36

FUEL SENSOR GAUGE

Remove the fuel tank. Then, remove the fuel sensor gauge.

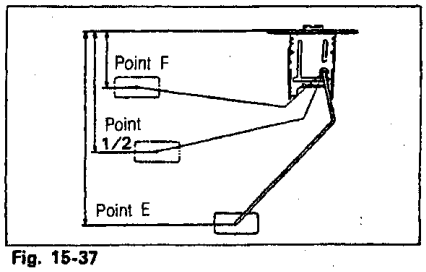


Fig. 15-37

Inspection

Measure the value of resistance between the terminal and the body at the following positions given below.

Measuring position	E	1/2	F
Value of resistance	95(Ω)	32.5(Ω)	7(Ω)
Allowance	±2°24′	±5°	±2°24′
Indication angle	−30°	0°	+30°

Inspection voltage: 13 V(20 to 25℃)

WATER TEMPERATURE RECEIVER GAUGE

In-vehicle inspection

Disconnect the connector from the harness of the water temperature sensor gauge. Earth the gauge through a test lamp.

↓

Turn ON the key switch.

↓

The test lamp goes on. After several seconds, the lamp should start flashing.

↓

The pointer of the receiver gauge should start to rise gradually.

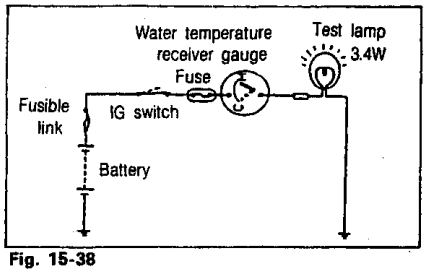


Fig. 15-38

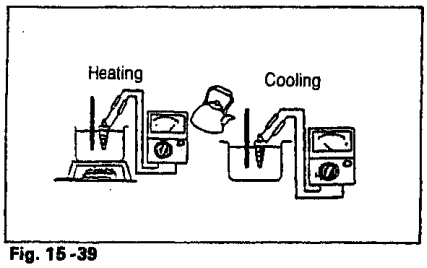


Fig. 15-39

WATER TEMPERATURE SENSOR GAUGE

Installation position

Rear end of the cylinder head

Inspection

Measure the value of resistence between the terminal and the earth at the following water temperatures specified in the table below.

Specifications

Temperature(°C)	Value of resistance
50	226
115	26.4

◆ WATER THERMO SWITCH

Inspection

Remove the connector(located at the upper part of the right/rear side of the cylinder block).

↓

Ensure that no continuity exists between the water thermo switch terminal and the earth.

↓

Start the engine. When the temperature of the cooling water is above 70℃, ensure that continuity exists between the water thermo switch terminal and the earth.

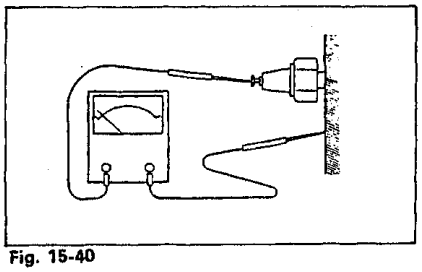


Fig. 15-40

◆ WARNING INDICATOR SYSTEM

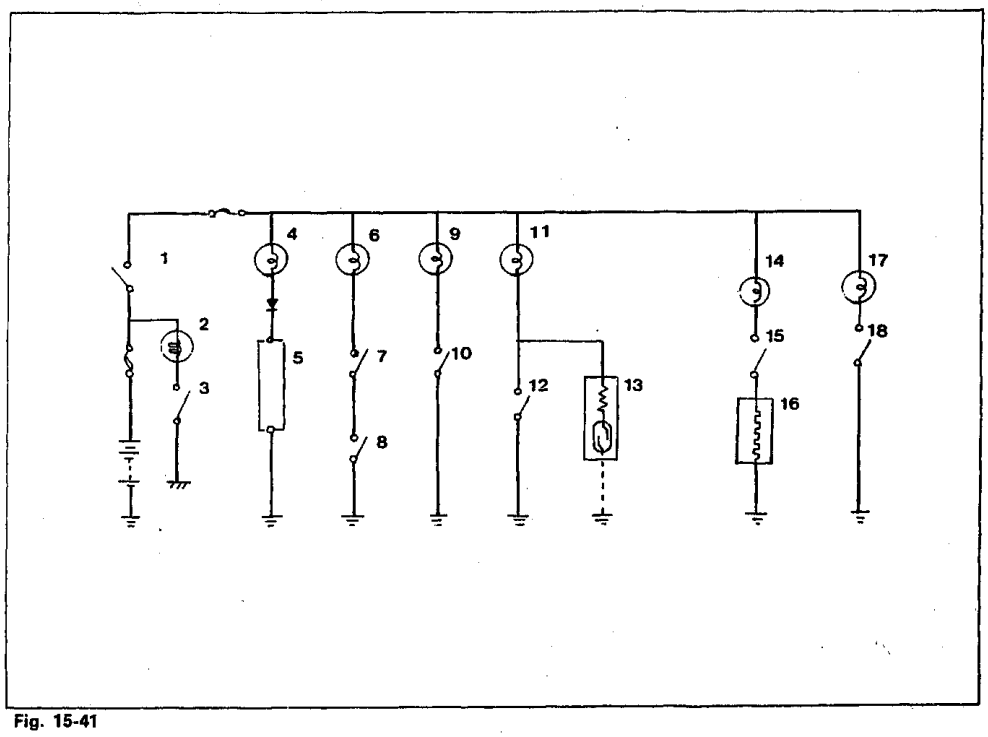


Fig. 15-41

1. Key switch
2. High beam indicator lamp
3. High beam switch
4. Charge warning lamp
5. Regulator
6. Choke warning lamp
7. Choke switch
8. Water temperature switch
9. Oil pressure warning switch
10. Oil pressure switch
11. Brake fluid warning switch
12. Parking brake switch
13. Brake fluid level sensor
14. Rear defogger lamp
15. Rear defogger switch
16. Rear defogger
17. Seat belt
18. Seat belt switch

◆ INSPECTION OF BRAKE FLUID LEVEL WARNING LAMP

Start the engine.

↓

Return the parking brake lever to the original position.

↓

Disconnect the connector of the brake fluid level warning switch.

↓

With the connector at the harness side shorted, the brake indicator lamp should go on.

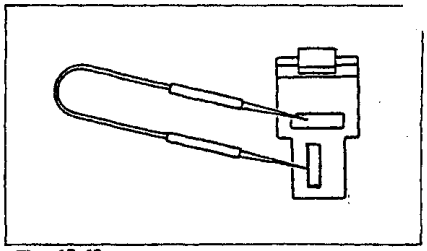


Fig. 15-42

◆ INSPECTION OF BRAKE FLUID LEVEL WARNING SWITCH

Disconnect the connector of the brake fluid level warning switch.

↓

Connect a circuit tester.

↓

Depress the brake fluid level warning switch(float). Ensure that continuity exists.

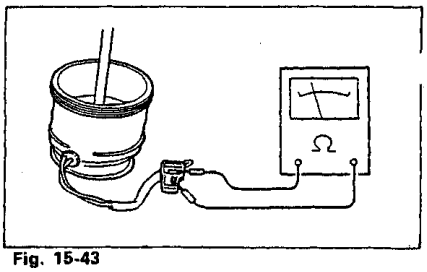


Fig. 15-43

NOTE

As for a rod to be used for depressing the float, be sure to thoroughly clean it. Special care must be exercised to ensure that no dust nor water gets into the reservoir.

◆ OIL WARNING LAMP INSPECTION

Pull out the connector(located at the left/upper part of the cylinder block).

↓

Earth the connector at the harness side.

↓

Turn ON the engine switch.

↓

The oil warning lamp should go on.

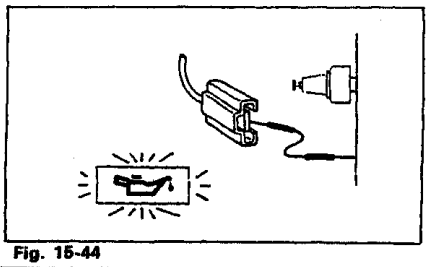


Fig. 15-44

INSPECTION OF OIL PRESSURE SWITCH

Pull out the connector(located at the left/upper part of the cylinder block).

↓

Ensure that continuity exists between the oil pressure switch terminal and the earth.

NOTE
It should be noted that no continuity exists while the engine is running.

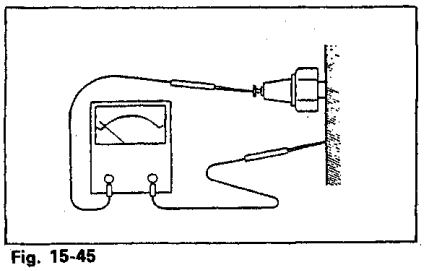


Fig. 15-45

CHOKE WARNING SYSTEM

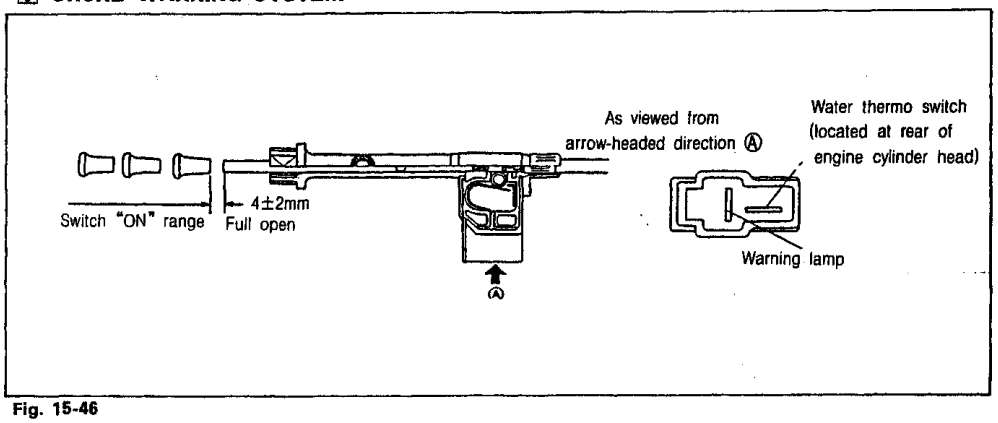


Fig. 15-46

INSPECTION OF CHOKE WARNING LAMP

Disconnect the connector at the choke control cable section.

↓

Earth the connector at the harness side.

↓

With engine switch turned ON, ensure that the warning lamp goes on.

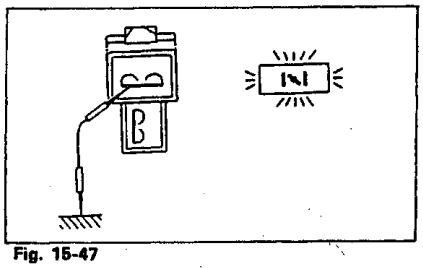


Fig. 15-47

INSPECTION OF CHOKE WARNING SWITCH

Disconnect the connector at the choke control cable section.

↓

Connect a circuit tester to the choke control cable side

↓

Ensure that continuity exists when the choke control cable is pulled out. Conversely, ensure that no continuity exists when the choke control cable is pushed in.

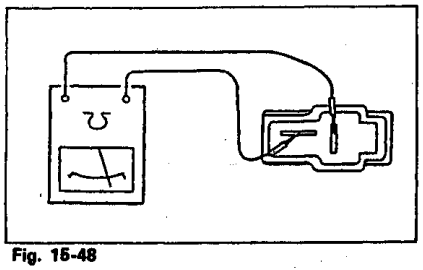
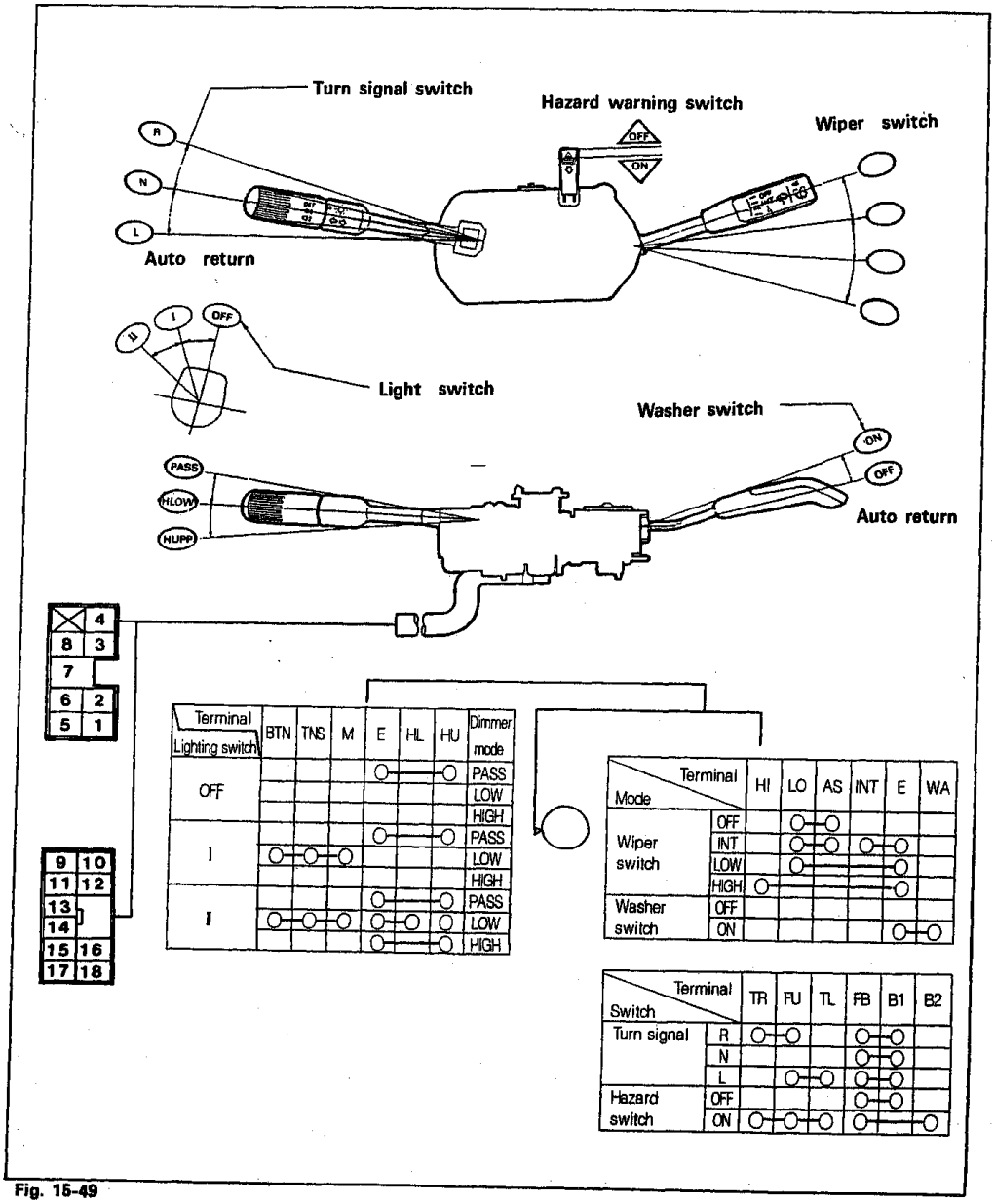


Fig. 15-48

SWITCHES

MULTI-USE LEVER SWITCH



Terminal / Lighting switch	BTN	TNS	M	E	HL	HU	Dimmer mode
OFF				○		○	PASS
							LOW
							HIGH
I				○		○	PASS
	○	○	○				LOW
							HIGH
II				○		○	PASS
	○	○	○	○	○	○	LOW
				○		○	HIGH

Mode / Terminal		HI	LO	AS	INT	E	WA
Wiper switch	OFF		○	○			
	INT		○	○	○	○	
	LOW		○			○	
	HIGH	○				○	
Washer switch	OFF						
	ON					○	○

Switch / Terminal		TR	FU	TL	FB	B1	B2
Turn signal	R	○	○		○	○	
	N				○	○	
	L		○	○	○	○	
Hazard switch	OFF				○	○	
	ON	○	○	○	○		○

Fig. 15-49

◆ TURN SIGNAL & HAZARD SWITCH

Circuit diagram

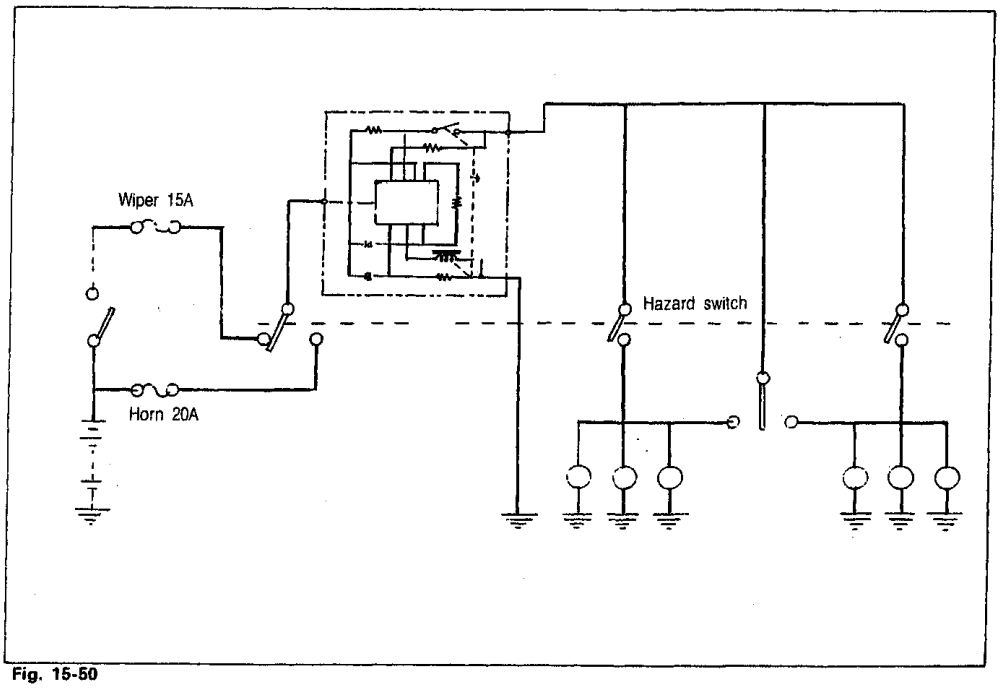


Fig. 15-50

Inspection

Ensure that continuity exists between the respective terminals as indicated in the following table.

Flashing speed: 90 $^{+11}_{-12}$ times/min

NOTE

If anyone of the front or rear turn signal lamp has open circuit, the flashing speed will exceed 160 times/min.

FRONT WIPER & WASHER

Circuit diagram

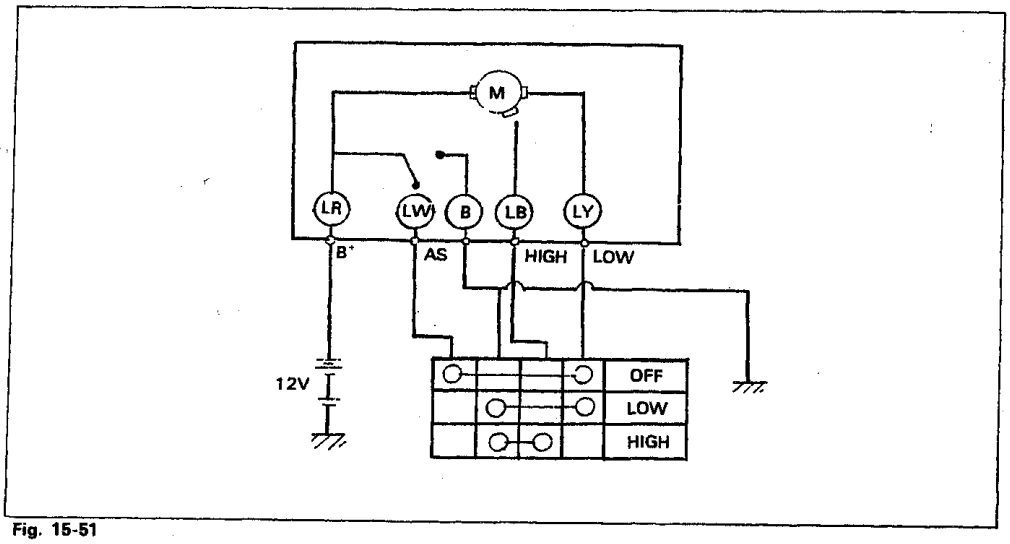


Fig. 15-51

REMOVAL OF WIPER & BLADE

Remove the parts in numerical order shown in the figure below.

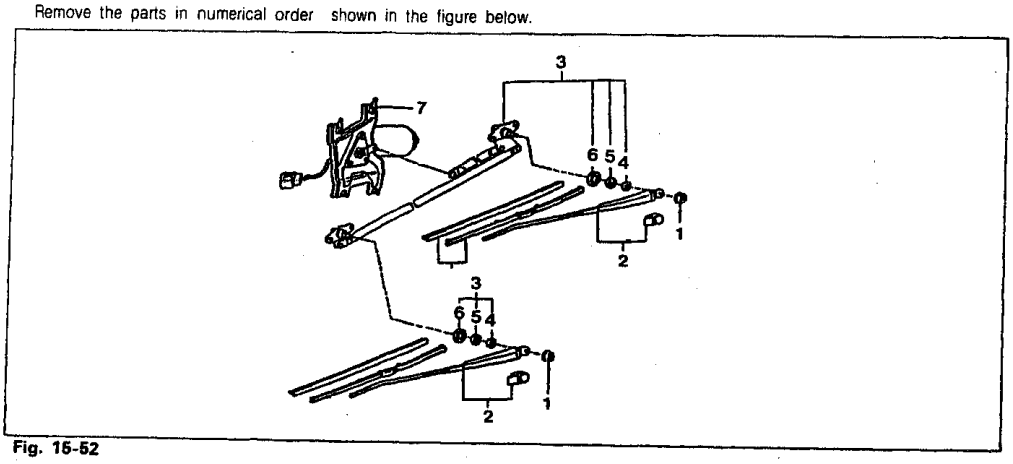


Fig. 15-52

1. Nut
2. Wiper arm
3. Windshield wiper link Ay
4. Washer
5. Packing waher
6. Hexagon nut
7. Front wiper motor

◆ INSTALLATION OF WIPER MOTOR & BLADES

Install the parts in numerical order shown in the figure below.

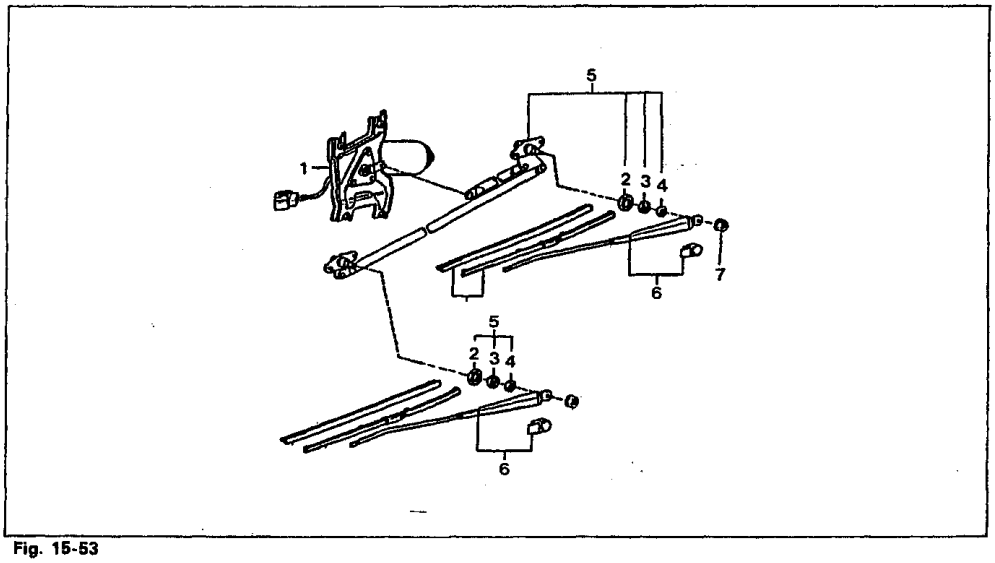


Fig. 15-53

1. Front wiper motor
2. Hexagon nut
3. Parking washer
4. Washer
5. Windshield wiper link Ay
6. Wiper arm
7. Nut

Wiper arms & blades

1. Operate the wiper motor and set it to the automatic stopping position.
2. Set the blades to the respective positions as indicated in the right illustration.

NOTE

The wiper arm should comply with the following identification given in the table below.

Item		Driver's seat side	Co-driver's seat side
Length ㎜(inch)	Arm	413	409
	Blade	400	375

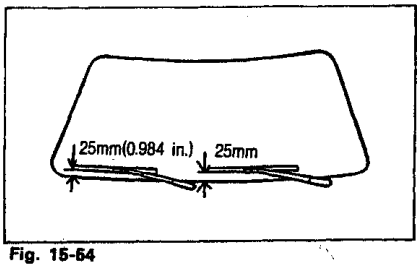


Fig. 15-54

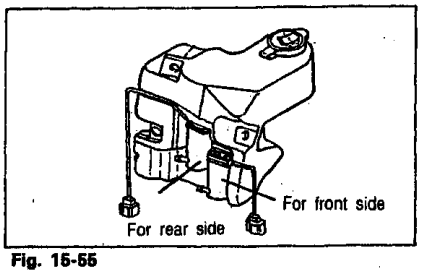


Fig. 15-55

◆ WASHER TANK

Installation tank

Install the tank at the first side of the engine compartment.

◆ INSPECTION OF FRONT WIPER & WASHER SWITCH

Continuity table

Knob position \ Terminal		S	+2	+1	I	E
Wiper switch	OFF	○		○		
	INT	○		○	○	○
	LOW			○		○
	HIGH		○			○
Washer switch	OFF					
	ON	○				○

Wire size and color of each circuit.

NO	Wire size & color	Circuit
1	AV 0.5 L	INT(WIPER)
2	AV 0.5 W	B1(T/SIGNAL)
3	AV 0.5 LgR	AS(WIPER)
4	AV 1.25 B	EARTH → E
5	AV 0.85 RL	BTN(LIGHT)
6	AV 0.5 G	FU(T/SIGNAL)
7	AV 0.5 GR	FB(T/SIGNAL)
8	AV 0.5 GW	B2(T/SIGNAL)
9	AV 0.5 GY	HORN
10	AV 0.5 L	WA(WASHER)
11	AV 0.5 LB	HI(WIPER)
12	AV 0.5 LY	LO(WIPER)
13	AV 0.85 RY	HU(LIGHT)
14	AV 0.5 RG	HL(LIGHT)
15	AV 0.85 G	M(LIGHT)
16	AV 0.5 G	TNS(LIGHT)
17	AV 0.5 GB	TL(T/SIGNAL)
18	AV 0.5 GY	TR(T/SIGNAL)

◆ INSPECTION OF WIPER CONTROL RELAY

Inspection

Ensure that continuity exists between the respective terminals indicated in the table below

Between terminals ② and ③	Continuity exists.
Between terminals ② and ④	No countinuity exists.

Connect the terminal ④ to the positive ⊕ terminal of the battery, the terminal ① to the negative ⊖ terminal of the battery. Ensure that an operating sound(clicking sound) takes place.

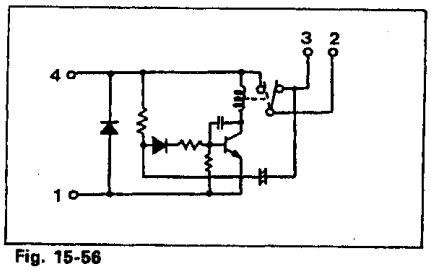


Fig. 15-56

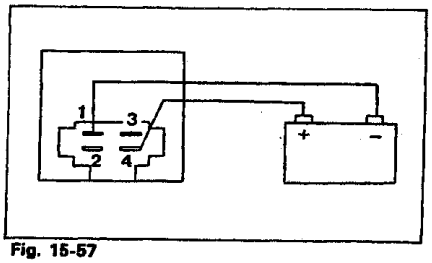


Fig. 15-57

Inspection of intermittent operation

Connect the terminal ④ to the positive ⊕ terminal of the battery; the terminal ② to the negative ⊖ terminal of the battery(Relay operating sound). The relay is turned ON.

↓

Connect the terminal ③ to the positive ⊕ terminal of the battery(for about one second). Afterward, earth the terminal(Relay operating sound). The relay is turned OFF.

↓

About four seconds later. an operating sound should take place(Intermittant operation).

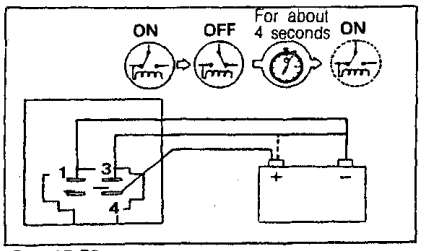


Fig. 15-58

◆ INSPECTION OF WINDSHIELD WIPER MOTOR

With the body of the wiper motor connected to the negative ⊖ terminal of the battery. carry out the following checks given below.

Connect the terminal +(blue/red) to the positive ⊕ terminal of the battery; the terminal +2(blue/black) to the negative ⊖ terminal of the battery. Ensure that the wiper is operating at the high speed.

↓

Connect the terminal +(blue/red) to the positive ⊕ terminal of the battery; the terminal +1(blue/yellow) to the negative ⊖ terminal of the battery. Ensure that the wiper is operating at the low speed.

↓

Under the above-described operating conditions. disconnect the terminal +(blue/red) from the positive ⊕ terminal of the battery so as to interrupt the wiper operation.

↓

Disconnect the terminal +2(blue/black) or the terminal +1(blue/yellow) from the negative ⊖ terminal of the battery. Again. connect the terminal +(blue/red) to the positive ⊕ terminal fo the battery. Ensure that the wiper stops at the automatic stopping position.

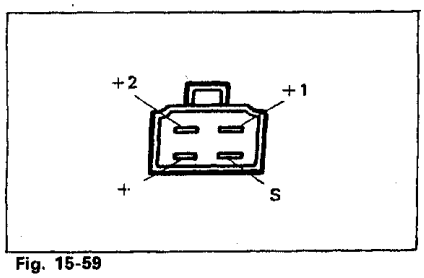


Fig. 15-59

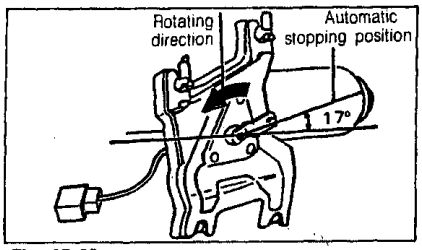


Fig. 15-60

◆ REAR WIPER

Wiring diagram

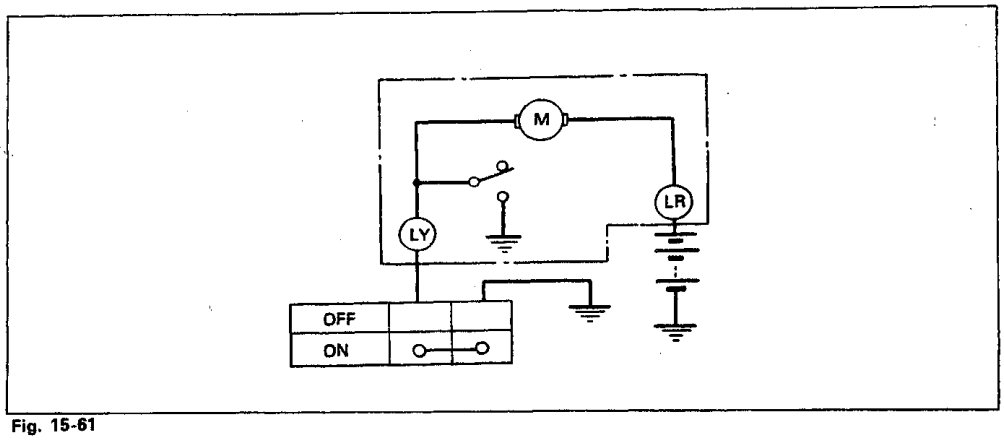


Fig. 15-61

◆ REMOVAL OF REAR WIPER MOTOR & BLADE

Remove the parts in numerical order shown in the figure below.

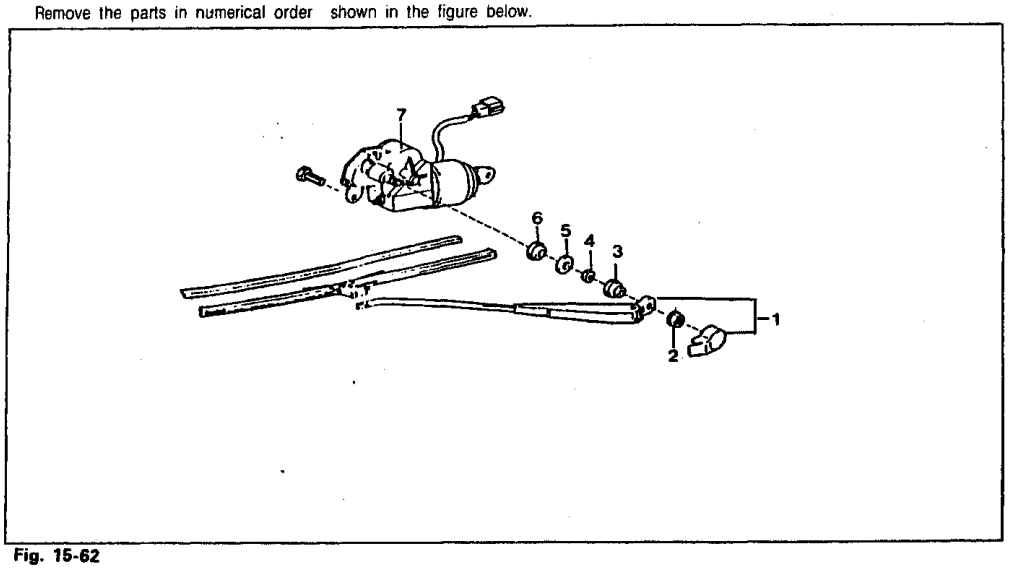


Fig. 15-62

1. Rear wiper arm
2. Nut
3. Shield cap
4. Nut
5. Washer
6. Gasket
7. Rear wiper motor Ay

◆ INSPECTION OF REAR WIPER & WASHER SWITCH

Ensure that continuity exists between the respective terminals as indicated in the table below.

Mode \ Connector	a	b	c
OFF			
ON 2. 3	○	○	
NO 1		○	○

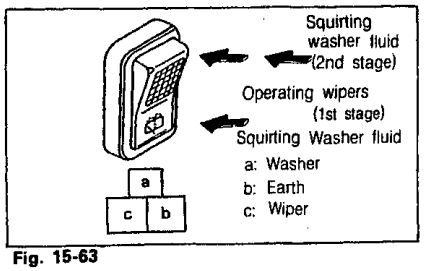


Fig. 15-63

◆ INSPECTION OF REAR WIPER MOTOR

With the body of the wiper motor connected to the negative ⊖ terminal of the battery, carry out the following checks given below.

Connect the terminal ⊖(blue/yellow) to the positive ⊖ terminal of the battery: the terminal ⊕ (blue/red) to the negative ⊕ terminal of the battery. Ensure that the wiper is operating.

↓

Under the above-described operating conditions, disconnect the terminal ⊕ (blue/red) from the positive ⊕ terminal of the battery so as to interrupt the wiper operation.

↓

Disconnect the terminal ⊖ (blue/yellow) from the negative ⊖ terminal of the battery. Again, connect the terminal ⊕ (blue/red) to the positive ⊕ terminal fo the battery. Ensure that the wiper stops at the automatic stopping position.

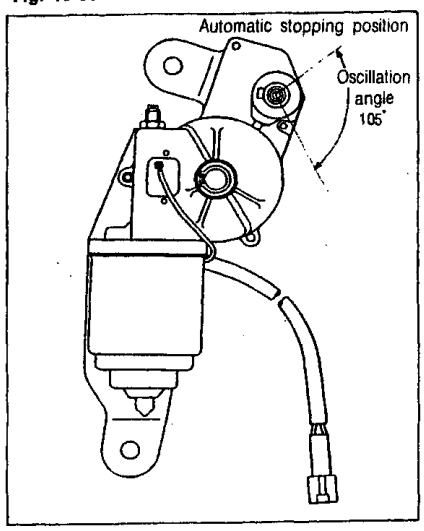


Fig. 15-64

◆ INSTALLATION OF REAR WIPER MOTOR & BLADE

Install the parts in numerical order shown in the figure below.

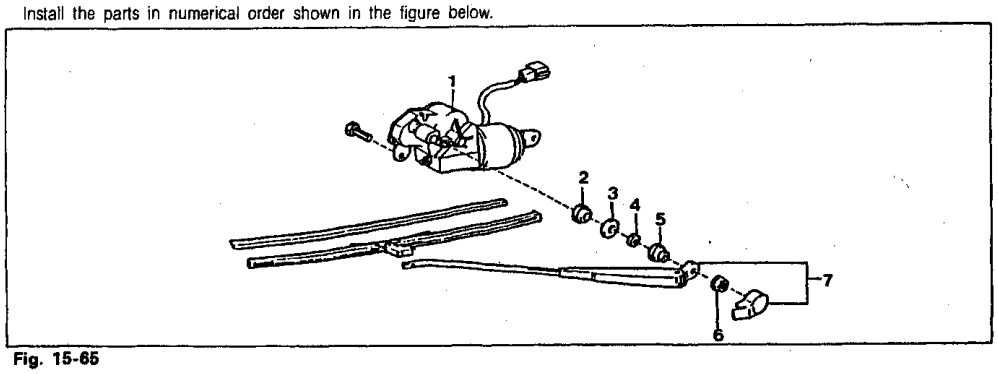


Fig. 15-65

1. Rear wiper Motor Ay
2. Gasket
3. Washer
4. Nut
5. Shield cap
6. Nut
7. Rear wiper arm

Wiper arm & blade

1. Operate the wiper motor and set it to the automatic stopping position
2. Align the blade with the bottom line of the rear window defogger. Tighten the nut.

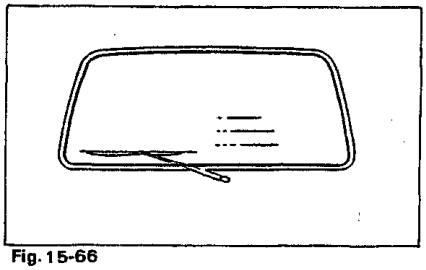


Fig. 15-66

INSPECTION OF KEY SWITCH

Ensure that the battery voltage is applied to the terminal B(white) regardless of the key switch position.

↓

Disconnect the connector

↓

Ensure that continuity exists between the respective terminals as indicated in the table below.

Position \ Terminal		B(AM)	1G1	1G2	ACC	ST	K1	K2
LOCK	ON						O—O	
	OFF						O—O	
ACC		O—	——	——	—O		O—O	
ON		O—	—O	O—	—O		O—O	
ST		O—	—O	——	——	—O	O—O	

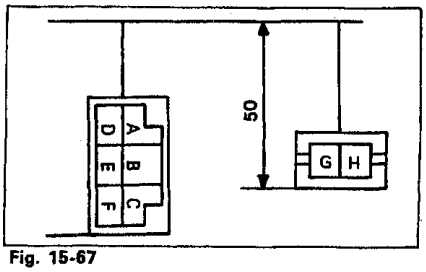


Fig. 15-67

	Terminal	Kind of wire
A	1G1	AV 3.0 BL
B	1G2	AV 3.0 RB
C	ST	AV 2.0 BY
D	Blank	
E	ACC	AV 2.0 BW
F	B	AV 3.0 W
G	K1	AV 0.5 YW
H	K2	AV 0.5 R

INSPECTION OF STOP LAMP SWITCH

Disconnect the connector of the stop lamp switch

↓

Ensure that continuity exists between the harness when the brake pedal is depressed.

↓

Ensure that continuity exists between the harness when the brake pedal is not depressed.

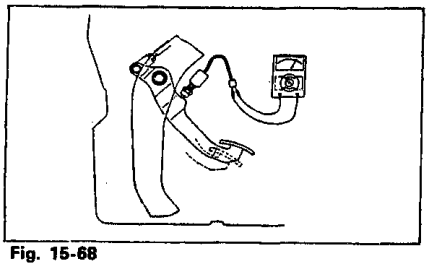


Fig. 15-68

◆ REMOVAL OF WASHER UNIT

Remove the parts in numerical order shown in the figure below.

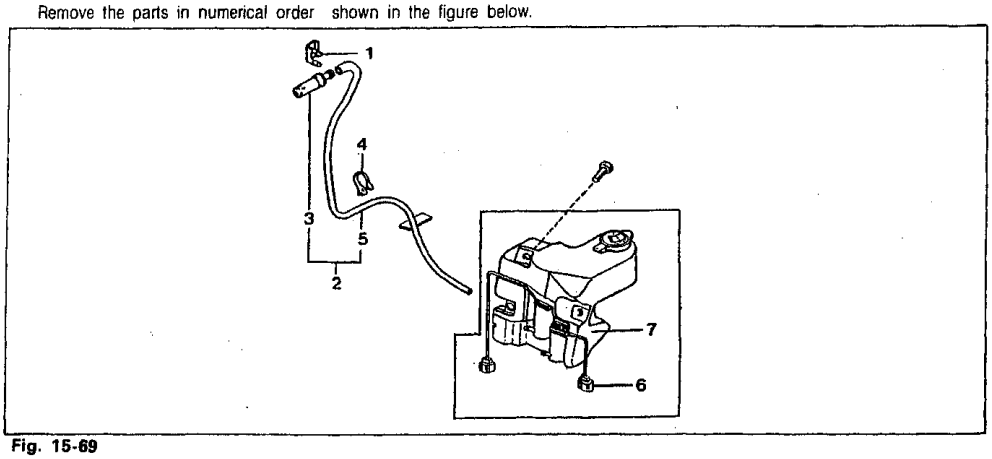


Fig. 15-69

1. Windshield nozzle holder
2. Windshield washer nozzle Ay
3. Washer nozzle
4. Clamp
5. Hose
6. Washer motor pump connector
7. Washer tank Ay

◆ WASHER UNIT INSTALLATION

Install the parts in numerical order shown in the figure below.

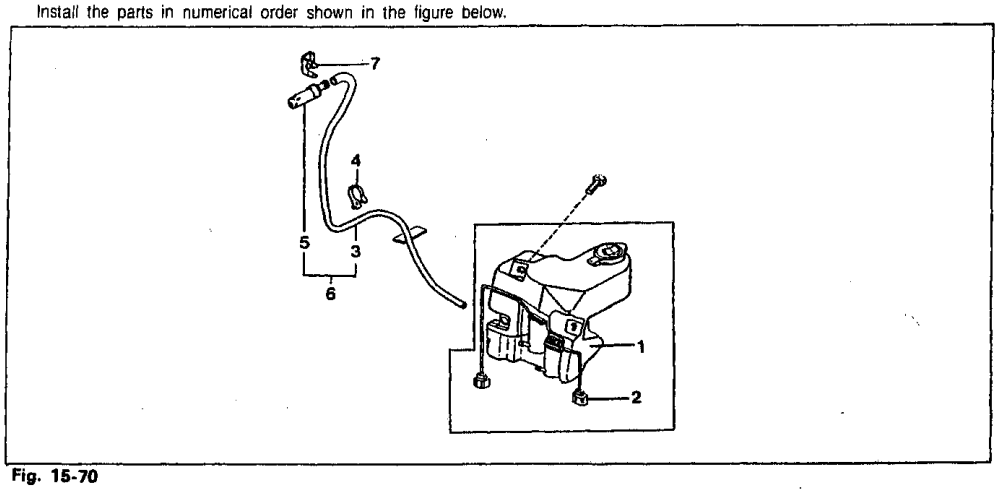


Fig. 15-70

1. Washer tank Ay
2. Washer motor pump connector
3. Hose
4. Clamp
5. Washer nozzle
6. Windshield washer nozzle Ay
7. Windshield nozzle holder

INSPECTION OF REAR WINDOW DEFOGGER SWITCH

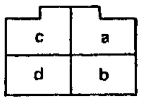
Remove the rear window defogger switch.

↓

Ensure that continuity exists between the respective terminals as indicated in the table below.

Switch \ Terminal	a	b	c	d
OFF			O	O
ON	O	O	O	O

Bulb



a: Power c: Tail power
b: Load d: Earth
(Rear heated glass wire)

Fig. 15-71

RADIO, SPEAKER & ANTENNA

REMOVAL OF RADIO

Remove the parts in numerical order shown in the figure below.

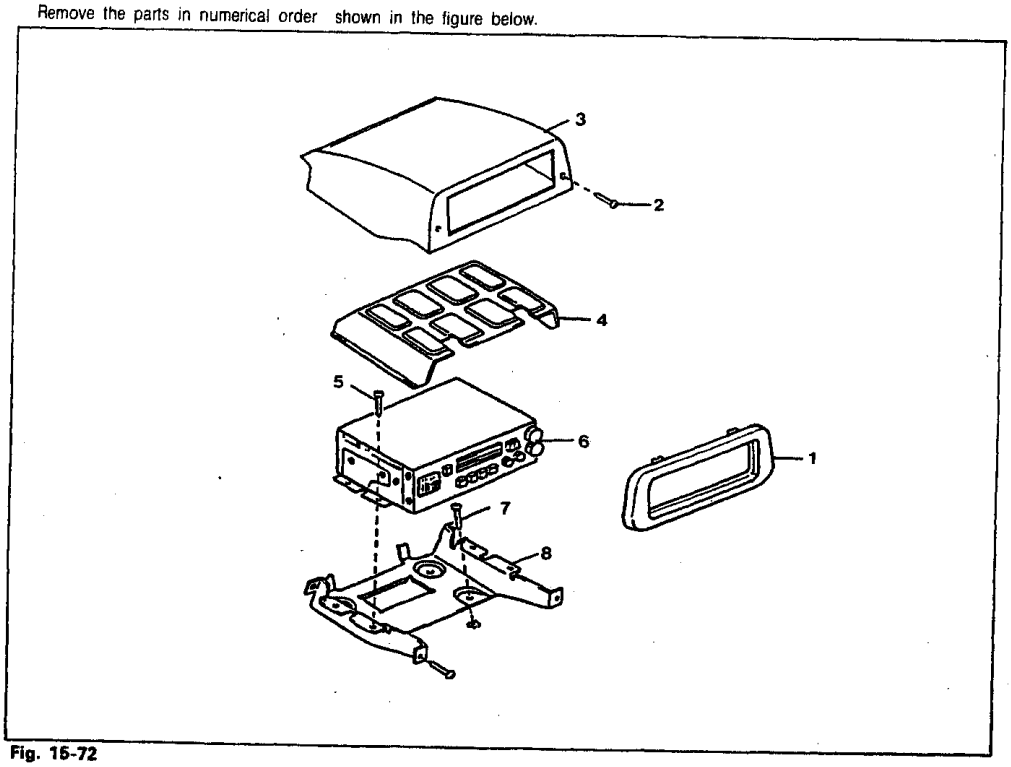


Fig. 15-72

1. Front console box
2. Screw
3. Upper console box
4. Radio cover
5. Screw
6. Radio
7. screw
8. Radio bracket

INSTALLATION OF RADIO

Install the parts in numerical order shown in the figure below.

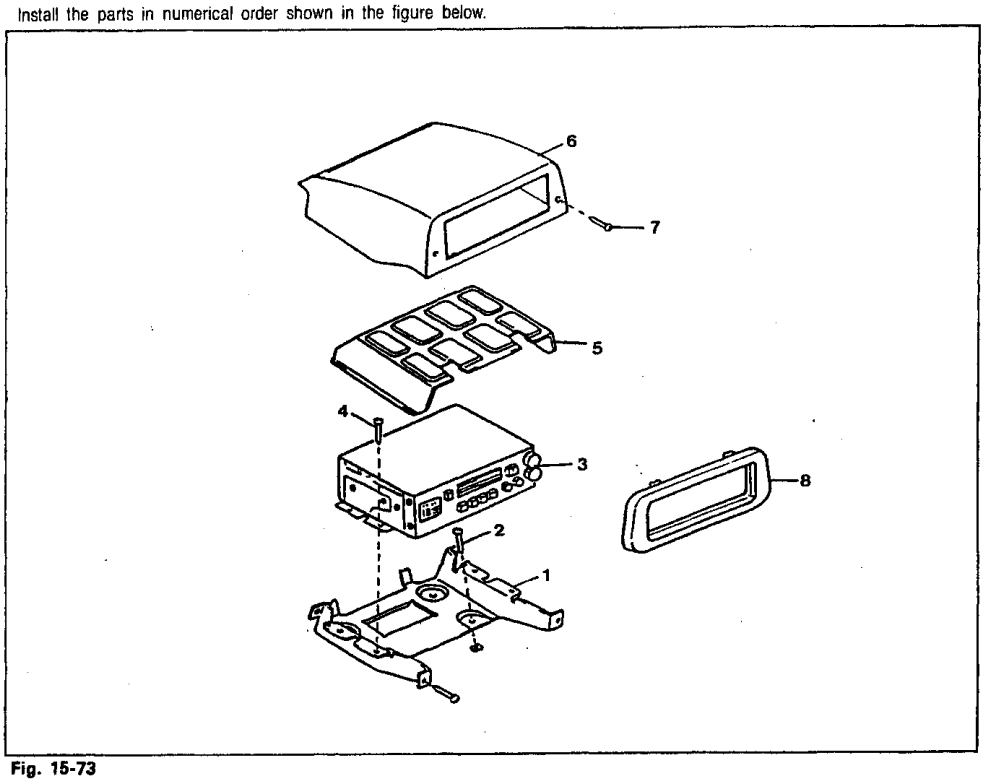


Fig. 15-73

1. Radio bracket
2. Screw
3. Radio
4. Screw
5. Radio cover
6. Upper console box
7. Screw
8. Front console box

HOW TO CONNECT THE CAR STEREO/AUDIO

NOTE: Connect various kinds of wires by the diagram of the wire connection in order to prevent the equipment from being damaged.

Terminal	Connecting Part	Terminal	Connecting Part
1	Left speaker of front(+)	8	Right speaker of rear(-)
2	Left speaker of front(-)	9	Ground
3	Right speaker of front(+)	10	Illumination
4	Right speaker of front(-)	11	Accessories
5	Left speaker of rear(+)	12	Memory back up B+
6	Left speaker of rear(-)	13	Fuse 7.5A
7	Right speaker of rear(+)		

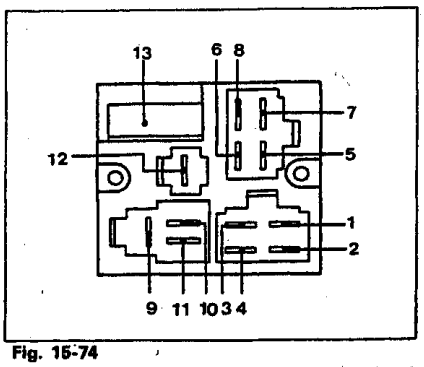


Fig. 15-74

REMOVAL OF SPEAKER & ANTENNA

Remove the parts in numerical order shown in the figure below.

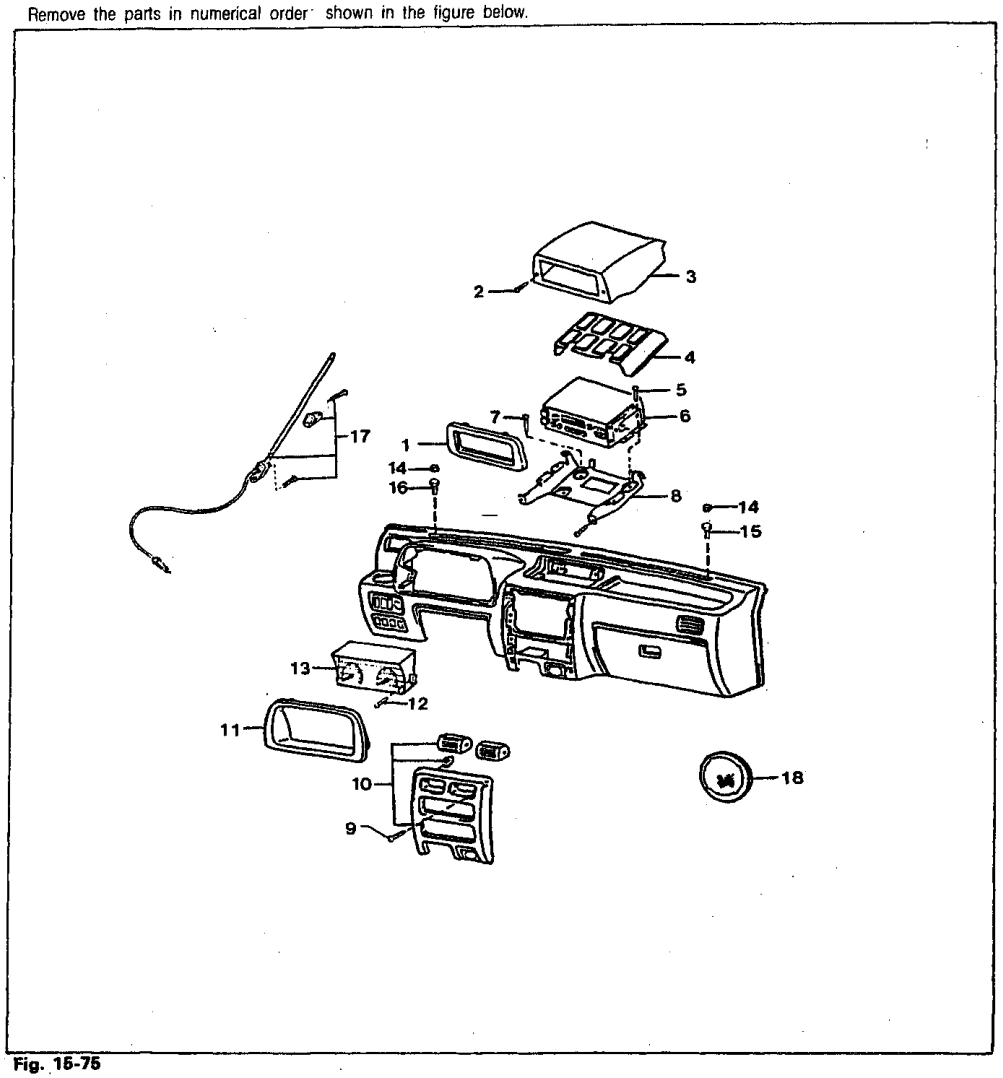


Fig. 15-75

1. Front console box
2. Screw
3. Upper console box
4. Radio cover
5. Screw
6. Radio
7. Screw
8. Radio bracket
9. Screw
10. Center panel Ay
11. Meter hood
12. Screw
13. Meter set
14. Hole cover
15. Bolt
16. Bolt
17. Antenna Ay
18. Speaker Ay

◆ INSTALLATION OF SPEAKER & ANTENNA

Install the parts in numerical order shown in the figure below.

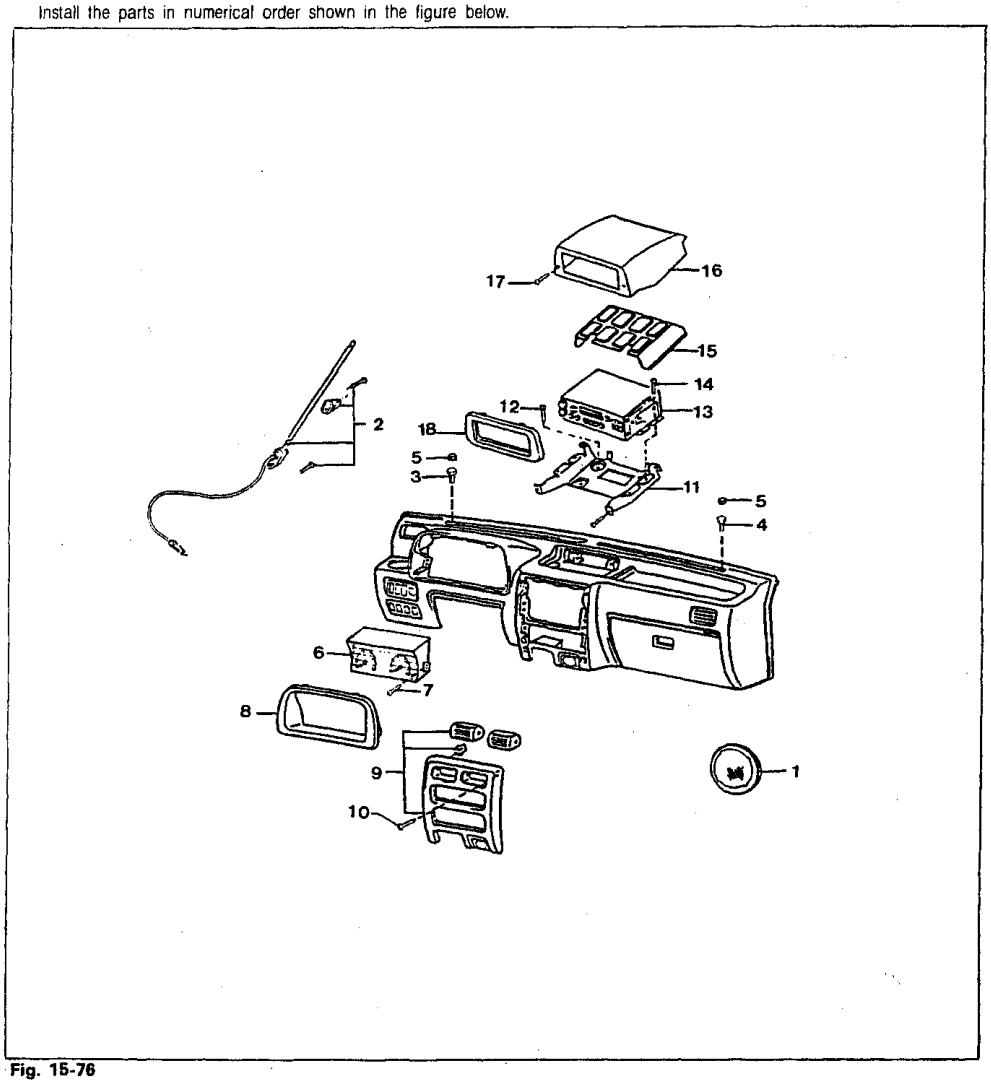


Fig. 15-76

1. Speaker Ay
2. Antenna Ay
3. Bolt
4. Bolt
5. Hole cover
6. Meter set
7. Screw
8. Meter hood
9. Center panel Ay
10. Screw
11. Radio bracket
12. Screw
13. Radio
14. Screw
15. Radio cover
16. Upper console box
17. Screw
18. Front console box

FRONT HEATER

REMOVAL

Remove the parts in numerical order shown in the figure below.

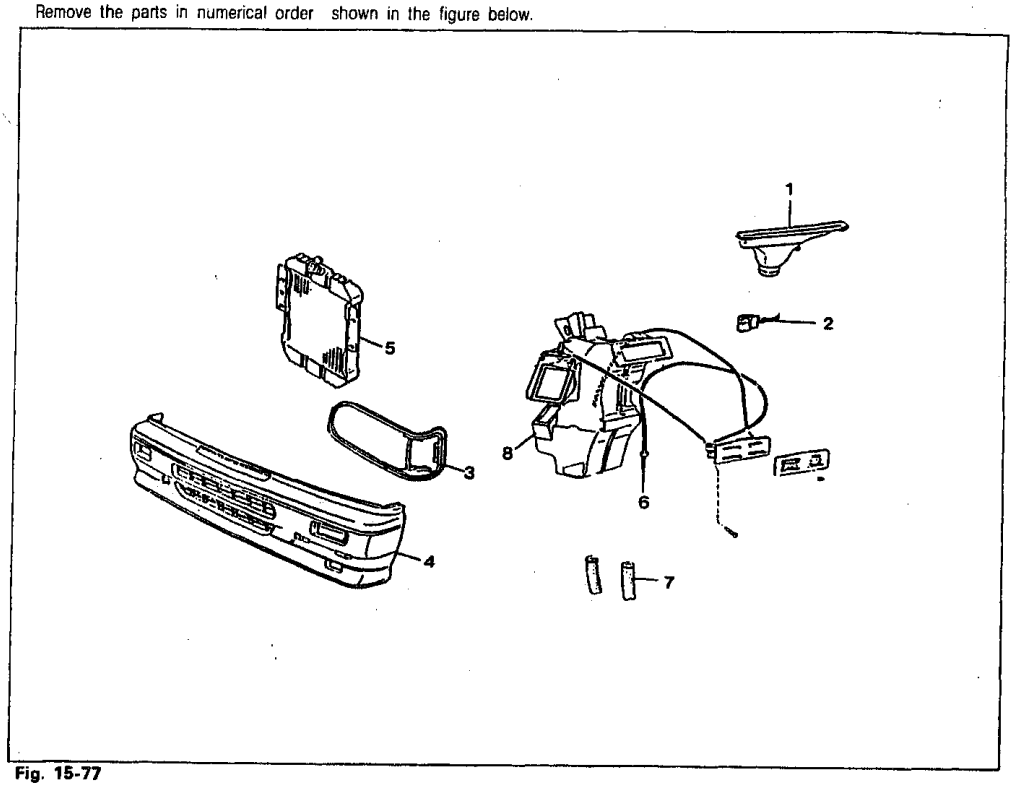


Fig. 15-77

1. Defroster
2. Connector
3. Head lamp bezel
4. Bumper
5. Radiator
6. Cable for temperature control
7. Heater hose
8. Heater Ay

OPERATION PRIOR TO REMOVAL

1. Disconnect the negative ⊖ terminal of the battery.
2. With the temperature regulating lever of the heater control set to the "WARM" side, drain the cooling water from the radiator.
3. Remove the instrument panel S/A
4. Remove the front panel garnish.

◆ INSTALLATION

Install the parts in numerical order shown in the figure below.

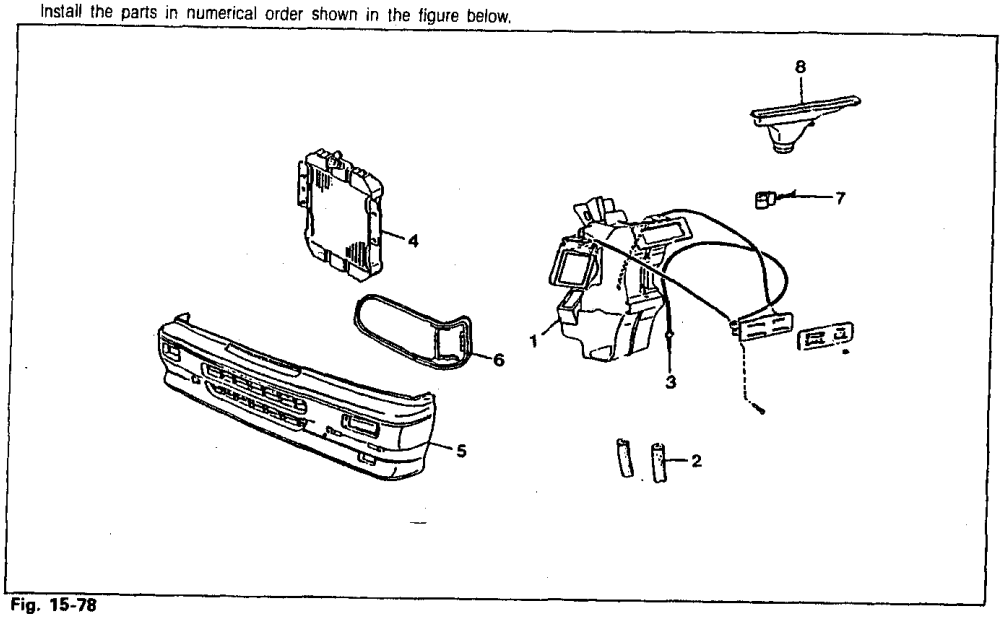


Fig. 15-78

1. Heater Ay
2. Heater hose
3. Cable for temperature control
4. Radiator(Van only)
5. Bumper(Van only)
6. Head lamp(Van only)
7. Connector
8. Defroster

◆ INSPECTION OF BLOWER REGISTER

Measure the resisance values of each terminals.

Specified value:

Lo ← → Me(about 2Ω)
Lo ← → Hi (about 3Ω)

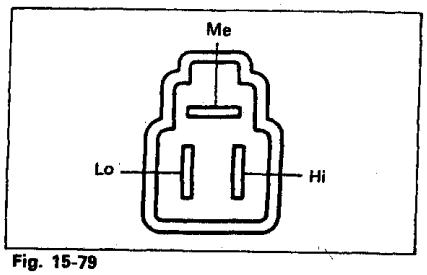


Fig. 15-79

Blower switch

Ensure that continuity exists between the respective terminals as indicated in the table below.

Switch \ Terminal	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
Hi						○	○		○	
Me						○	○	○		
Lo						○	○			
LAMP						○				○

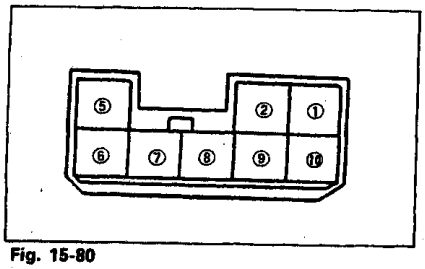


Fig. 15-80

◆ REMOVAL OF HEATER CONTROL

Remove the parts in numerical order shown in the figure below.

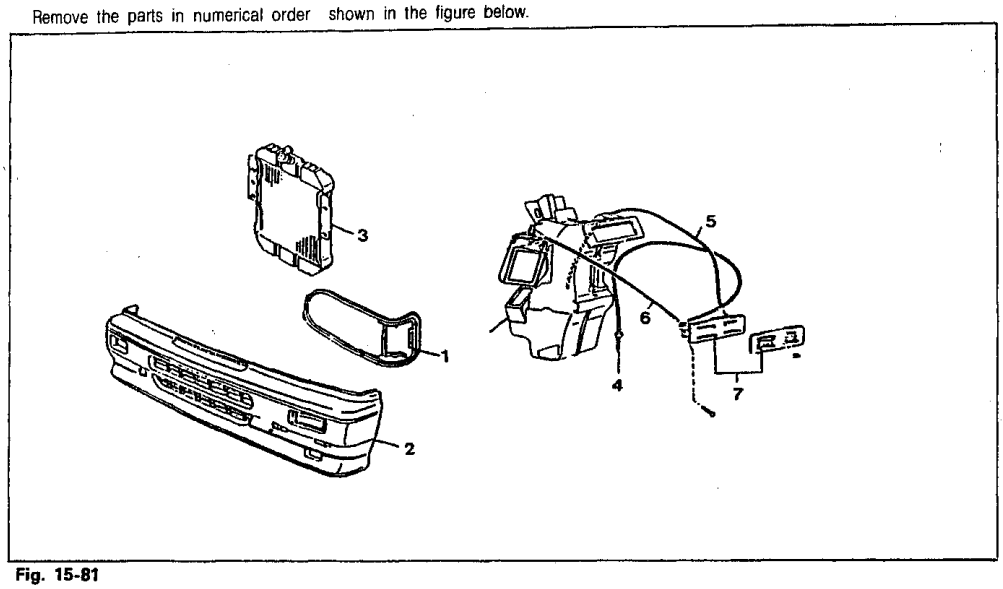


Fig. 15-81

1. Head lamp bezel
2. Bumper
3. Radiator
4. Cable for temperature control
5. Mode switching cable
6. Inside/outside air switching cable
7. Heater control Ay

◆ BLOWER SWITCH

Ensure that continuity exists between the respective terminals as indicated in the table below.

Switch \ Terminal	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
Hi						○	○		○	
Me						○	○	○		
Lo						○	○			
LAMP						○				○

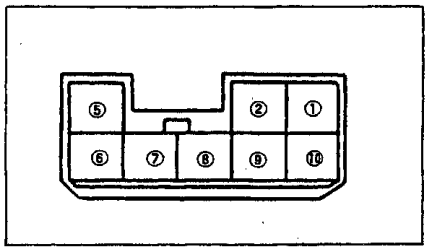


Fig. 15-82

◆ INSTALLATION OF HEATER CONTROL

Install the parts in numerical order shown in the figure below.

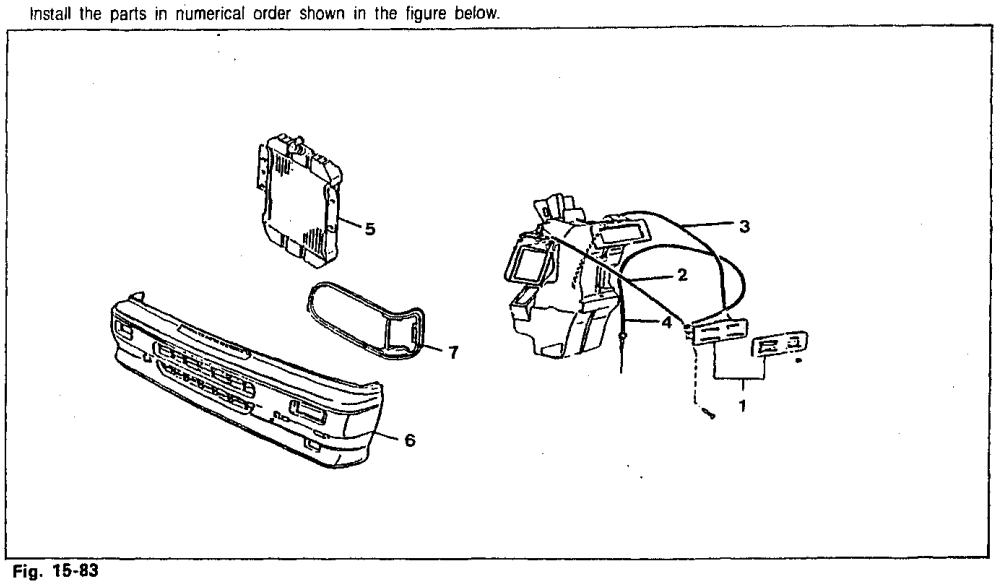


Fig. 15-83

1. Heater control Ay
2. Inside/outside air switching cable
3. Mode switching cable
4. Cable for temperature control
5. Radiator
6. Bumper
7. Head lamp bezel

◆ MAIN POINTS OF INSTALLATION

Inside/outside air switching cable

Set the inside/ outside air switching lever of the heater control to the (RECIRC) side, while set the inside/ outside air switching lever of the heater unit to the "RECIRC" side.

Proceed to insert and clamp the cable.

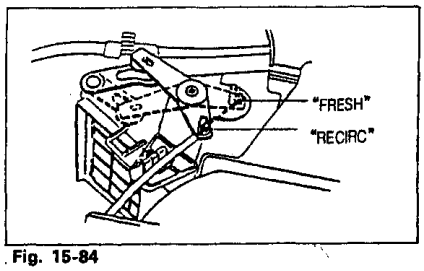


Fig. 15-84

Mode switching cable

Set the mode switching lever of the heater control to (VENT) side, while set the mode switching lever of the heater unit to the "VENT" side. Insert and clamp the cable.

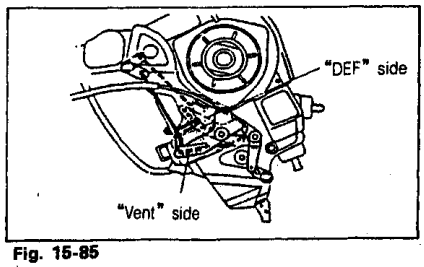


Fig. 15-85

Temperature regulating cable

Set the temperature regulating lever of the heater control to the ▭ (COOL) side, while set the cock lever at the heater inlet pipe section to the "SHUT" side. Proceed to insert the cable.

Also, install the cable clamp guide, by fitting it to the groove of the bracket positively.

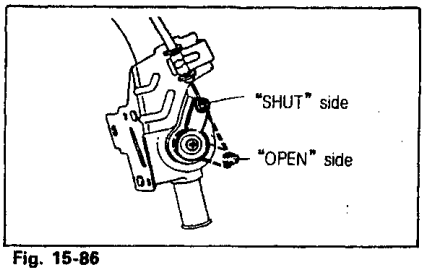


Fig. 15-86

Check after installation

Ensure that the amount of the air and the flowing direction of the air vary correctly in accordance with the position of the heater control lever.

TABLES OF MAINTENANCE SPECIFICATIONS 22

GENERAL SPECIFICATIONS

ENGINE TUNE-UP

Item \ Engine type		CD 800
Firing order		1–2–3
Ignition timing		5°±2° BTDC
Idling speed	rpm	950±50
Spark plug clearance	mm	0.8 to 0.9
Valve clearance(Hot)	mm	0.2
V-belt deflection	mm/kg	6 to 7/10
Engine oil capacity	l	2.9
Fuel tank capacity	l	35

ENGINE

Item \ Engine type				CD 800
Engine – Proper	Valve mechanism			Belt-driven, OHC
	Bore × stroke		mm(inch)	70×69(2.76×2.72)
	Piston displacement		CC	796
	Compression ratio			9.5
	Compression pressure		kg/cm²-rpm(psi-rpm)	12.5 - 350 (177.8-350)
	Maximum output		ps/rpm	40/5600
	Maximum torque		kg-m/rpm	6.0/3500
	Engine dimensions (Length×width×height)		mm(inch)	582×621×449 (22.91×24.45×17.68)
	Number of piston rings	Compression ring		2
		Oil ring		1
	Valve timing	Intake	Open	19° BTDC
			Close	51° ABDC
		Exhaust	Open	51° BBDC
			Close	19° ATDC
Lubricating System	Lubricating method			Fully-forced feed method
	Oil pump type			Trochoid type
	Oil filter type			Fully-flow filter type
	Lubrication oil capacity		l	2.9
Cooling System	Cooling method			Water cooled
	Radiator type			Corrugated fin & tube Pressure type
	Water pump type			Centrifugal type
	Thermostat type			Wax type
	Coolant Capacity		Truck	4.2
			Van	5.0
			Coach	5.5

Item \ Engine type			CD 800
Fuel System	Air cleaner	Type	Dry type
		Number	1
	Fuel pump type		Electronic type
	Fuel filter type		Filter paper type
	Carburetor	Type	Side draft, Single barrel
		Throttle bore diameter mm(inch)	ϕ32
		Ventri diameter mm(inch)	ϕ9
		Choke valve type	semi-automatic type
Engine Electrical System	Ignition timming (BTDC/rpm)		5°/950
	Firing order		1–2–3
	Distributor	Type	Coventional type
		Breaker type	Contactless point
		Centrifugal type	0/600~14/2,800(0°/RPM)
		Vacuum type	0/100~15/380(0°/mmHg)
	Spark plug	Type	BPR5EY
		Thread	M14×1.25
		Gap mm	0.8 to 0.9
	Alterrator	Type	Alternating current type
		Output V-A	12-50(Van, Coach) 12-40(Truck)
		Regulator type	IC type
	Starter	Type	Magnetic engaging type
		Output V-KW	12–0.8
	Radio noise suppressing device		Resistive cord (Plug incorporating resistor)

CHASSIS

Item			Specification
Clutch	Type		Dry single disc diaphragm
	Operation method		Mechanically-operated type
	Facing	Dimensions mm	170 × 110 ×3.2
		Area×The number of sheets cm²	131.9 × 1
Transmission	Type	Forward	Constant-mesh type
		Reverse	Sliding-mesh type
	Operation method		Manual-floor shift type
	Gear ratio	1st	3.915
		2nd	2.302
		3rd	1.561
		4th	1.000
		5th	0.855
		Reverse	4.215
Propeller shaft dimensions (Length×Outer dia. ×Inner dia)		Truck	384.8×45×41.8
		Van, Coach	615.3×45×41.8

Item				Specification
Rear Axle	Type			Semi-floating type
	Gear Type			Hyoid gear
	Reduction ratio		Truck	5.375
			Van, Coach	5.125
Front Axle	Type			Ball joint
	Toe-in ㎜			5.5 ± 1.5
	Chamber angle			1° 35′ ± $^{+40'}_{-50'}$
	Caster angle			3° 2′ ± 1°
	Kingpin angle			11° 14′ ± 1°
Steering	Wheel outer diameter ㎜			φ370
	Gear	Type		Rack and pinion
		Gear ratio		∞
	Turning angle	Inner		42.2° $^{0'}_{-3'}$
		Outer		31.3° $^{0'}_{-3'}$
Service Brakes	Type			Vacuum booster type
	Lining dimensions (Length×width×thicknes)		Front ㎜(inch)	79.3×41×9 (3.12×1.61×0.35)
			Rear ㎜(inch)	192×35×5 (7.56×1.38×0.20)
	Brake drum diameter		Front ㎜(inch)	φ174(6.85)
			Rear ㎜(inch)	φ200(7.87)
	Wheel cylinder diameter		Front ㎜(inch)	φ51.1(201)
			Rear ㎜(inch)	φ17.46(0.69)
	Master cylinder type			Tandem type
	Master cylinder inner diameter ㎜(inch)			φ19.05(0.75)
Parking brake	Type			Mechanical hand operation which applies to rear wheels
	Lining dimensions (Length×width×thicknes) ㎜(inch)			192×35×5 (7.56×1.38×0.20)
	Brake drum diameter ㎜(inch)			φ17.46(0.69)
Suspension	Type		Front	Independent suspension type
			Rear	Rigid axle type
	Spring type		Front	Coil spring
			Rear	Leaf spring
	Main spring dimensions	Front (Wire diameter×spring diameter×free length) ㎜(inch)	Truck	φ102×85×283.5-6.15 (φ0.40×3.45×11.16-0.24)
			Van Coach	φ10.4×65×290-6.54 (φ0.41×3.35×11.42-0.26)
		Rear (Length×width×thickness- number of leaves)	Truck	1000×50×7-1 (39.37×1.97×0.28-1)
				860×50×7-1 (33.86×1.97×0.28-1)
			Van Coach	1000×50×7-1 (39.37×1.97×0.28-1)
				880×50×12-1 (34.64×1.97×0.47-1)
	Auxiliary spring dimensions	Rear (Length×width×thickness- number of leaves)	Truck	860×50×12-1 (33.86×1.97×0.47-1)
				340×50×10-1 13.39×1.97×0.39-1)
			Van Coach	810×50×10-1 (31.89×1.97×0.39-1)
				460×50×10-1 (18.11×1.97×0.39-1)
	Shock absorber type			Double-acting telescopic type

LAMP

Item	Specification(W)-quantity
Head lamps(semi-sealed beam)	60/55×2
Clearance lamps	5×2
Turn signal lamps/Hazard beam	21×2
Side turn signal Lamps	5×2
Tail lamps/Stop lamps	5/21×2
Back-up lamp	21×2(Truck) 21×1(Van, coach)
Room lamp	10×1(Truck) 10×2(Van, coach)
Licence plate lamp	5×1(Truck) 5×2(Van, coach)
Fog lamps(OptioN)	35×2

SERVICE SPECIFICATIONS

ENGINE

CYLINDER HEAD

Item			Specified value	Allowable limit
Cylinder head lower gasket surface distortion ㎜(inch)			—	0.10 (0.0039)
Manifold gasket surface distortion ㎜(inch)			—	0.10 (0.0039)
Valve seat	Seat width ㎜(inch)	Intake	0.9 to 1.9 (0.035 to 0.075)	—
		Exhaust	0.9 to 1.9 (0.035 to 0.075)	—
	Seat angle		45°	—
	Recession allowable limit ㎜(inch)		—	0.5 (0.020)

VALVE GUIDE BUSH

Item		Specified value	Allowable limit
Valve stem-to-bush clearance ㎜(inch)	Intake	0.040 to 0.075 (0.0016 to 0.0030)	0.09 (0.0035)
	Exhaust	0.045 to 0.080 (0.0018 to 0.0031)	0.10 (0.0039)

VALVE

Item		Specified value	Allowable limit
Seat width ㎜(inch)	Intake	0.9 to 1.9 (0.035 to 0.075)	—
	Exhaust	0.9 to 1.9 (0.035 to 0.075)	—
Seat angle		45°	—
Valve head stock thickness ㎜(inch)	Intake	0.9 to 1.5 (0.035 to 0.059)	0.8 (0.031)
	Exhaust	1.2 to 1.8 (0.047 to 0.071)	1.0 (0.039)
Valve stem outer diameter ㎜(inch)	Intake	6.945 to 6.960 (0.2734 to 0.2740)	6.920 (0.2724)
	Exhaust	6.940 to 6.955 (0.2732 to 0.2738)	6.910 (0.2720)

VALVE SPRING

Item	Specified value	Allowable limit
Free length ㎜(inch)	43.3 (1.7047)	42.0 (1.6535)
Length as installed ㎜(inch)	34.9 (1.3740)	—
Tension as installed kg(lb)	29.9 (65.9)	25.7 (56.7)
Out-of-squareness ㎜(inch)	—	1.5 (0.059)

VALVE ROCKER SHAFT & ROCKER ARM

Item	Specified value	Allowable limit
Rocker shaft-to-rocker arm clearance ㎜(inch)	0.016 to 0.060 (0.0006 to 0.0024)	0.09 (0.0035)

CYLINDER BLOCK

Item		Specified value	Allowable limit
Top gasket surface distortion ㎜(inch)		—	0.05 (0.0020)
Cylinder bore	Wear ㎜(inch)	—	0.10 (0.0039)
	Out-of roundness, taper ㎜(inch)	—	0.10 (0.0039)

PISTON, PISTON PIN & PISTON RING

Item			Specified value	Allowable limit
Piston-to-cylinder clearance ㎜(inch)			0.045 to 0.065 (0.0018 to 0.0026)	0.12 (0.0047)
Piston ring	End gap ㎜(inch)	Compression No. 1 and No. 2	0.2 to 0.4 (0.0079 to 0.0157)	0.70 (0.0276)
		Oil	0.2 to 0.8 (0.0079 to 0.0314)	1.30 (0.0512)
	Side clearance ㎜(inch)	Compression No. 1	0.03 to 0.07 (0.0012 to 0.0026)	0.12 (0.0047)
		Compression No. 2	0.02 to 0.06 (0.0008 to 0.0024)	0.12 (0.0047)
Piston outer diameter ㎜(inch)			70(2.7559)	—
Piston-to piston pin clearance ㎜(inch)			0.005 to 0.011 (0.0002 to 0.0004)	—

CRANKSHAFT

Item	Specified value	Allowable limit
Crankshaft run-out ㎜(inch)	—	0.03 (0.0012)
Uneven wear journal section ㎜(inch)	—	0.02 (0.0008)
Crankshaft bearing oil clearnace ㎜(inch)	0.020 to 0.044 (0.0008 to 0.0017)	0.07 (0.0028)
Side clearance ㎜(inch)	0.020 to 0.220 (0.0008 to 0.0087)	0.05 (0.0002)

CONNECTING ROD

Item	Specified value	Allowable limit
Bend of rod per 100㎜(3.94 inches) ㎜(inch)	—	0.05 (0.0020)
Twist of per 100㎜(3.94inches) ㎜(inch)	—	0.05 (0.0020)
Connecting rod bearing oil clearance ㎜(inch)	0.020 to 0.044 (0.0008 to 0.0017)	0.07 (0.0028)
Big end thrust clearance ㎜(inch)	0.150 (0.0059 to 0.0087)	0.30 (0.0118)

BALANCE SHAFT

Item	Specified value	Allowable limit
Thrust clearance ㎜(inch)	0.03 to 0.13 (0.0012 to 0.0051)	0.20 (0.0079)
Balance shaft bearing oil clearance ㎜(inch)	0.0025 to 0.066 (0.0010 to 0.0026)	0.10 (0.0039)

CAMSHAFT

Item		Specified value	Allowable limit
Thrust clearance ㎜(inch)		0.050 to 0.290 (0.0020 to 0.0114)	0.40 (0.157)
Cam lobe height ㎜(inch)		40.087±0.1 (1.5782±0.004)	39.80 (1.567)
Camshaft journal uneven wear ㎜(inch)		—	0.04 (0.0016)
Camshaft bearing oil clearance ㎜(inch)	Front	0.04 to 0.085 (0.0016 to 0.0033)	0.14 (0.0055)
	Center	0.09 to 0.14 (0.0035 to 0.0055)	0.19 (0.0075)
	Rear	0.06 to 0.11 (0.0024 to 0.0043)	0.16 (0.0063)

TIMING BELT PULLEY

Item		Specified value	Allowable limit
Pulley outer diameter ㎜(inch)	Camshaft pully	119.86 to 120.04 (4.7189 to 4.7260)	119.80 (4.7165)
	Crankshaft pulley	59.26 to 59.36 (2.3331 to 2.3370)	59.20 (2.3307)

MANIFOLD

Item	Specified value	Allowable limit
Intake manifold gasket surface distortion ㎜(inch)	—	0.10 (0.0039)
Exhaust manifold gasket surface distortion ㎜(inch)	—	0.10 (0.0039)

FLYWHEEL

Item	Specified value	Allowable limit
Flywheel run-out ㎜(inch)	—	0.10 (0.0039)

CLUTCH

Unit: mm(inch)

Item		Specified value	Allowable limit
Clutch pedal	Height (Distance from upper surface of pedal to floor)	125 to 135	—
	Free travel	25 to 35	—
Clutch disc	Run-out	—	10 (0.039)
	Lining wear	—	0.3 (0.0118)

TRANSMISSION

Unit: mm(inch)

Item		Specified value	Allowable limit
Gear backlash	1st, 2nd	0.06 to 0.19 (0.0024 to 0.0075)	—
	3rd	0.07 to 0.21 (0.0024 to 0.0083)	—
	4th	0.06 to 0.19 (0.024 to 0.0075)	—
	Reverse	0.06 to 0.23 (0.024 to 0.0091)	—
Output shaft runout		—	0.02 (0.0008)
Gear end play	3rd	0.10 to 0.31 (0.0039 to 0.0122)	—
	2nd	0.10 to 0.48 (0.0039 to 0.0189)	—
	1st	0.20 to 0.46 (0.0079 to 0.0169)	—
Wear of synchronizer ring (between gear and ring)	1st gear	0.85 to 1.45 (0.0334 to 0.057)	0.5 (0.0199)
	2nd gear	0.85 to 1.45 (0.0334 to 0.057)	0.5 (0.0199)
	3rd gear	0.85 to 1.45 (0.0334 to 0.057)	0.5 (0.0199)
	4th gear	0.85 to 1.45 (0.0334 to 0.057)	0.5 (0.0199)
Clutch hub No.2 end play		Not to exceed 0.1(0.0039)	—
Backlash of each gear		0.06 to 0.19 (0.0024 to 0.0075)	—
Output shaft runout		—	0.02 (0.0008)
Gear end play	3rd	0.10 to 0.37 (0.0039 to 0.0146)	—
	2nd	0.10 to 0.37 (0.0039 to 0.0146)	—
	1st	0.17 to 0.30 (0.0067 to 0.0118)	—
Wear of synchronizer ring (between gear and ring)	1st gear	0.85 to 1.45 (0.0334 to 0.057)	0.5 (0.0199)
	2nd gear	0.85 to 1.45 (0.0334 to 0.057)	0.5 (0.0199)
	3rd geat	0.85 to 1.45 (0.0334 to 0.057)	0.5 (0.0199)
	4th gear	0.85 to 1.45 (0.0334 to 0.057)	0.5 (0.0199)
Clutch hub No.2 end play		Not to exceed 0.1(0.0039)	—

PROPELLER SHAFT

Unit: mm(inch)

Item	Specified value	Allowable limit
Propeller shaft runout	—	1.0(0.0393)

REAR DIFFERENTIAL

Unit: mm(inch)

Item		Specified value	Allowable limit
Drive pinion starting torque kg-cm(inch-lb)		8 to 12 (6.9 to 10.4)	—
Drive pinion-ring gear backlash mm(inch)	Truck(Rear) Van · Coach(Front)	0.08 to 0.15 (0.0031 to 0.0059)	—
	Van · Coach(Rear)	0.1 to 0.2 (0.0039 to 0.0079)	—

REAR AXLE SHAFT

Unit: mm(inch)

Item		Specified value	Allowable limit
Rear axle shaft runout	Truck	—	0.8(0.031)
	Van, Coach	—	0.8(0.031)

SUSPENSION

Unit: mm(inch)

Item		Specified value	Allowable limit
Camber		$1°35' {}^{+40'}_{-50'}$	—
Caster		$3°2' \pm 1°$	—
King pin angle		$11°14' \pm 1°$	—
Side slip	mm(inch)	IN 3(0.118) to OUT 3(0.118)	—
Turning Angle	Inside	$42.2° {}^{0}_{-3°}$	—
	Outside	$31.3° {}^{0}_{-3°}$	—
Toe-in		5.5±1.5 (0.2165±0.0591)	—

BRAKE

BRAKE PEDAL

Unit: mm(inch)

Item	Specified value	Allowable limit
Installation height mm(inch)	139(5.4724)	—
Free travel	2 to 7 (0.078 to 0.276)	—
Reserve travel	90(3.54)	—

FRONT BRAKE

Item			Specified value	Allowable limit
Brake drum	inner diameter ㎜(inch)		ø200(7.87)	ø201.5(7.87)
Brake lining	Thickness ㎜(inch)		5.0(0.20)	1.0(0.0394)
Disc brake ㎜(inch)	Wheel cylinder inner dia.		51.1(2.012)	—
	Pad thickness		9.0(0.354)	1.0(0.0394)
	Disc	Thickness	10.0(0.394)	9.0(0.354)
		Run-out	0.08	ø201.5(7.87)

REAR BRAKE

Unit : ㎜(inch)

Item		Specified value	Allowable limit
Brake drum	Inner diameter	ø200(7.87)	ø201.5(7.87)
Brake lining	Thickness	5(0.197)	—

TIGHTENING TORQUE

ENGINE

Unit: kg-m(ft-1b)

Tightening component	Tightening torque kg-m
Cylinder block×cylinder head	5.5 to 6.5(39.8 to 47.0)
Cylinder block×crankshaft bearing cap	5.4 to 6.6(39.1 to 47.7)
Cylinder block×balance shaft thrust plate	1.0 to 1.5(7.2 to 10.8)
Cylinder head×manifold IN and EX	1.0 to 1.6(7.2 to 11.6)
Cylinder head×spark plug	1.5 to 2.2(10.8 to 15.9)
Crankshaft×flywheel	4.0 to 5.0(28.9 to 36.2)
Crankshaft×crankshaft pully	9.0 to 10.0(65.1 to 72.3)
Connecting rod×connecting rod cap	2.1 to 2.9(15.2 to 21.0)
Camshaft×camshaft timing belt pully	3.0 to 4.5(21.7 to 32.5)
Camshaft×fuel pump drive cam	1.0 to 1.5(7.2 to 10.8)
Timing belt tensioner×balance gear cover	3.0 to 4.5(21.7 to 32.5)
Oil pan×cylinder block	0.4 to 0.7(2.9 to 5.1)
Oil pan×drain plug	2.5 to 3.5(18.1 to 25.3)
Oil pump×cylinder block	1.5 to 2.2(10.8 to 15.9)
Oil pump drive shaft sprocket×oil pump rotor	1.0 to 1.6(7.2 to 11.6)
Balance shaft gear cover×cylinder block	1.0 to 1.6(7.2 to 11.6)
Distributor housing×cylinder head	0.4 to 0.7(2.9 to 5.1)
Oil seal retainer×cylinder block	1.0 to 1.6(7.2 to 11.6)

CLUTCH

Unit : kg-m(ft1b)

Tightening component	Tightening torque
Clutch cover×Flywheel	1.5 to 2.2(10.8 to 15.9)
Clutch release lever×Release lever yoke	3.0 to 4.0(21.7 to 32.5)

TRANSMISSION

Unit : kg-m(ft1b)

Tightening component		Tightening torque
Transmission case	Transmission case cover	0.7 to 1.0(5.1 to 7.2)
	Extension housing	3.0 to 4.5(21.7 to 32.5)
	Drain plug	3.0 to 5.0(21.7 to 36.2)
	Speedometer sleeve lock plate	0.7 to 1.0(5.1 to 7.2)

PROPELLER SHAFT

Unit : kg-m(ft1b)

Tightening component	Tightening torque
Universal joint flange yoke×Universal joint flange	1.5 to 2.2(10.8 to 15.9)

FRONT AXLE

Unit : kg-m(ft1b)

Tightening component	Tightening torque
Front brake backing plate×Knuckle	4.0 to 5.5(28.9 to 39.8)
Disc wheel×Brake drum	9.0 to 12.0(65.1 to 86.8)

FRONT SUSPENSION

Unit : kg-m(ft1b)

Tightening component	Tightening torque
Suspension support×Body	3.5 to 4.5(25.3 to 32.5)
Lower arm ball joint × Knuckle	3.0 to 4.5(21.7 to 32.5)
Lower arm×Front suspension cross member	8.0 to 10.0(57.9 to 72.3)
Strut bar×Bracket	7.0 to 9.9(50.6 to 65.1)
Strut bar bracket×Body	4.0 to 5.5(28.9 to 39.8)
Front suspension cross member×Body	8.0 to 10.0(57.9 to 72.3)

REAR AXLE AND REAR SUSPENSION

Unit : kg-m(ft1b)

Tightening component		Tightening torque
Differential case×Ring gear		7.0 to 8.0(50.6 to 57.9)
Differential carrier×Rear axle housing		2.5 to 4.0(18.1 to 28.9)
Differential bearing cap×Differential carrier		3.0 to 5.0(21.7 to 36.2)
Drive pinion×Universal joint diff companion flange	S84	10.0 to 14.0(72.3 to 101.3)
	S85, S86	14.0 to 18.0(101.3 to 130.2)
Rear axle housing×Drain plug		4.0 to 6.0(28.9 to 43.4)
Rear axle housing end×Backing plate		3.0 to 5.0(21.7 to 36.2)
Rear axle housing end×Oil deflector		3.0 to 5.0(21.7 to 36.2)
Nut for U-bolt		3.5 to 5.0(25.3 to 36.2)
Shock absorber attaching nut		3.5 to 5.5(25.3 to 39.8)
Spring pin×Bracket		7.0 to 9.0(50.6 to 65.1)
Shackle pin×Shackle plate		3.0 to 5.0(21.7 to 36.2)
Disc wheel×Brake drum		9.0 to 12.0(65.1 to 86.8)

STEERING

Unit: kg-m(ft-1b)

Tightening component	Tightening torque
Steering wheel×Steering shaft	3.0 to 4.0(25.3 to 28.9)
Universal joint	2.0 to 3.0(14.5 to 21.7)
Flexible coupling×Intermediate shaft	1.0 to 1.6(7.2 to 11.6)
Flexible couping×Steering pinion flange	1.0 to 1.6(7.2 to 11.6)
Steering lac housing×Body	3.0 to 4.5(21.7 to 32.5)
Steering lac×Drive ring No. 1 end	5.0 to 7.0(36.2 to 50.6)
Lac guide cap lock nut×Steering lac housing	3.5 to 4.5(25.3 to 32.5)
Drag link end×Drag link	6.0 to 8.0(43.4 to 50.6)
Drag link No. 2 end×Center arm	5.0 to 7.0(36.2 to 50.6)
Center arm×Tie rod end	4.0 to 5.5(25.3 to 39.8)
Tie rod end ×Tie rod end lock nut	3.5 to 5.5(25.3 to 39.8)
Tie rod end×Knuckle arm	4.0 to 5.5(28.9 to 39.8)

BODY

Unit: kg-m(ft-1b)

Tightening component	Tightening torque
Front seat×Body	1.0 to 1.6(7.2 to 11.6)
Rear seat×Body	1.0 to 1.6(7.2 to 11.6)

BRAKES

Unit: kg-m(ft-1b)

Tightening component	Tightening torque
Master cylinder×Pedal bracket	3.0 to 4.5(21.7 to 32.5)
Backing plate×Front wheel cylinder	M10 3.0 to 4.5(21.7 to 32.5) M6 0.5 to 0.9(3.6 to 6.5)
Front wheel cylinder×Bleeder plug	0.7 to 1.0(5.1 to 7.2)
Rear wheel cylinder×Bleeder plug	0.7 to 1.0(5.1 to 7.2)
Brake tube×Wheel cylinder	1.3 to 1.8(9.4 to 13.0)
Brake tube flare nut	1.3 to 1.8(9.4 to 13.0)

SPECIAL TOOLS 23

ENGINE

Configuration	Part number & part name
	09201-87703-000 Valve stem oil seal replacer
	09202-87701-000 Valve spring replacer
	09204-87705-000 Valve rocker shaft puller
	09210-87701-000 Flywheel holder
	09215-87701-000 Balance shaft bearing remover & replacer
	09214-87701-000 Balance shaft gear anvil
	09217-87001-000 Piston replacing guide
	09219-87202-000 Engine overhaul stand

Configuration	Part number & part name
	09219-87701-000 Engine overhaul attachment
	09219-87703-000 Cylinder head holder
	09221-25018-000 Piston pin remover & replacer
	09221-87702-000 Piston pin remover & replacer
	09223-87702-000 Oil seal remover & replacer set
	09253-87202-000 Crankshaft center bearing anvil
	09301-87701-000 Clutch guide tool
	09506-87303-000 Differential drive pinion bearing cone replacer

Configuration	Part number & part name
	09515-87202-000 Rear axle inner bearing replacer
	09608-12010-000 Front hub & drive pinion bearing tool set
	09608-87302-000 Axle hub & pinion bearing tool set

COOLING SYSTEM

Configuration	Part number & part name
	09237-87201-000 Water pump seal set remover & replacer
	09238-87201-000 Water pump bearing remover & replacer
	09238-87701-000 Water pump rotor puller
	09253-87201-000 Water pump bearing anvil

FUEL SYSTEM

Configuration	Part number & part name
	09254-87201-000 Water pump bearing receiver
	09240-00020-000 Gauge set wire
	09240-00014-000 Carburetor adjusting gauge set
	09243-00020 Idle adjust wrench
	09860-11011-000 Carbulator drive set

CLUTCH

Configuration	Part number & part name
	09238-87201-000 Water pump bearing remover & replacer
	09301-00012-000 Clutch diaphragm spring aligner tool set

Configuration	Part number & part name
	09301-87701-000 Clutch guide tool
	09302-87701-000 Clutch diaphragm height gauge No. 4

◇ TRANSMISSION

Configuration	Part number & part name
	09219-87202-000 Engine overhaul stand
	09219-87203-000 Engine overhaul attachment
	09912-87501-000 Puller slide hammer
	09913-87501-000 Main drive gear puller attachment
	09334-87201-000 Counter gear bearing puller

Configuration	Part number & part name
	09310-87301-000 Transmission bearing replacer
	09339-87501-000 Shift folk shaft guide
	09612-87301-000 Counter gear bearing puller
	09336-87502-000 Output shaft puller
	09308-10010-000 Oil seal puller
	09308-00010-000 Oil seal puller
	09304-87101-000 Input shaft bearing replacer
	09950-20014-000 Universal puller

Configuration	Part number & part name
	09515-87201-000 Rear axle bearing outer replacer
	09309-87502-000 09309-87503-000 09309-87504-000 09309-87505-000 09309-87501-000 Friction damper replacer
	09608-20011-000 Front hub & drive pinion bearing tool set

◇ REAR AXLE

Configuration	Part number & part name
	09219-87202-000 Engine overhaul stand
	09253-87202-000 Water pump bearing anvil
	09308-00010-000 Oil seal puller
	09308-10010-000 Oil seal puller

Configuration	Part number & part name
	09309-87201-000 Transmission Bearing replacer
	09302-10012-000 Drive pinion flange holding tool
	09502-10012-000 Differential side bearing puller
	09504-00010-000 Differential side bearing adjust nut wrench
	09510-87301-000 Front hub & drum puller
	09511-87202-000 Brake drum stopper
	09515-87201-000 Rear axle bearing outer replacer
	09515-87501-000 Rear axle bearing replacer

Configuration	Part number & part name
	09520-00031-000 Rear axle shaft puller
	09521-87502-000 Rear wheel bearing puller
	09530-87501-000 Differential drive pinion adjust gauge
	09530-87502-000 Differential drive pinion adjust gauge
	09548-87201-000 Differential overhaul attachment
	09608-12010-000 Front hub & drive pinion bearing replacer set
	09608-87501-000 Axle hub & drive pinion bearing tool set
	09608-87502-000 Axle hub & drive pinion bearing tool set

Configuration	Part number & part name
	09635-20010-000 Lower ball joint dust cover replacer
	09726-87201-000 Lower arm bushing replacer
	09912-87501-000 Puller slide hammer
	09950-20014-000 Universal puller
	09956-00010-000 Tightening piece
	09521-87301-000 Rear wheel bearing pull
	09238-87202-000 Water pump bearing remover & replacer

FRONT AXLE

Configuration	Part number & part name
	09219-87202-000 Engine overhaul stand
	09219-87201-000 Engine overhaul attachment
	09308-00010-000 Oil seal puller
	09309-87201-000 Transmission bearing replacer
	09310-87301-000 Counter shaft front bearing replacer
	09330-87301-000 Drive pinion flange holding tool
	09502-10012-000 Differential side bearing puller
	09510-87301-000 Front hub & drum puller

Configuration	Part number & part name
	09511-87202-000 Brake drum stopper
	09515-87201-000 Rear axle bearing outer replacer
	09515-87202-000 Rear axle bearing inner replacer
	09530-87501-000 Differential drive pinion adjust gauge
	09602-87301-000 Counter gear bearing puller
	09608-12010-000 Front hub & drive pinion bearing replacer set
	09608-87302-000 Axle hub & pinion bearing tool set
	09608-87501-000 Axle hub & pinion bearing tool set

Configuration	Part number & part name
	09611-87701-000 Tie rod end puller
	09612-10061-000 Steering pinion bearing replacer
	09618-87301-000 Transmission bearing replacer
	09635-20010-000 Lower ball joint dust cover replacer
	09648-87201-000 Drive shaft replacer
	09726-27019-000 Lower suspension arm bush remover & replacer
	09950-20014-000 Universal puller

SUSPENSION

Configuration	Part number & part name
	09611-87701-000 Tie rod end puller
	09618-87301-000 Transmission bearing replacer
	09727-87701-000 Front coil spring compressor

STEERING

Configuration	Part number & part name
	09250-10011-000 Replacer set "A"
	09301-87201-000 Clutch guide tool
	09934-87301-000 Transmission rear bearing anvil
	09506-87301-000 Differential drive pinion bearing cone rear replacer
	09506-87302-000 Differential drive pinion bearing cone rear replacer
	09515-21010-000 Rear axle shaft bearing replacer

Configuration	Part number & part name
	09515-87202-000 Rear axle bearing inner replacer
	09611-87701-000 Tie rod end puller
	09617-22030-000 Worm bearing adjusting screw lock nut wrench

BRAKE

Configuration	Part number & part name
	09304-12012-000 Input shaft front bearing replacer
	09510-87301-000 Front hub & drum puller
	09511-87202-000 Brake drum stopper
	09512-87201-000 Brake drum replacer nut

Configuration	Part number & part name
	09515-87301-000 Rear axle shaft bearing replacer
	09517-12010-000 Rear axle shaft oil seal replacer
	09527-87301-000 Rear axle shaft bearing remover
	09737-87001-000 Brake booster push rod gauge
	09753-87701-000 Brake booster overhaul tool