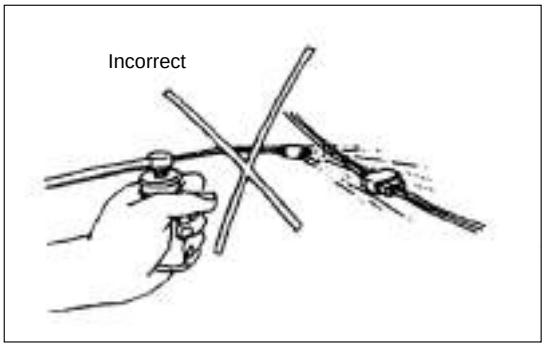
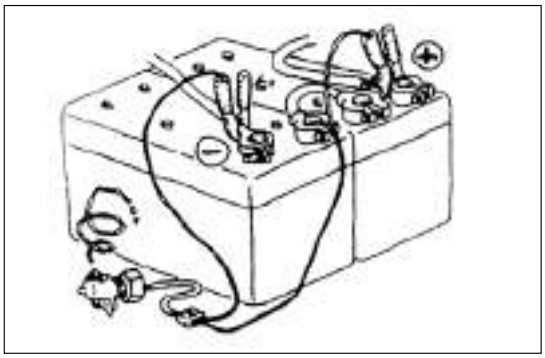
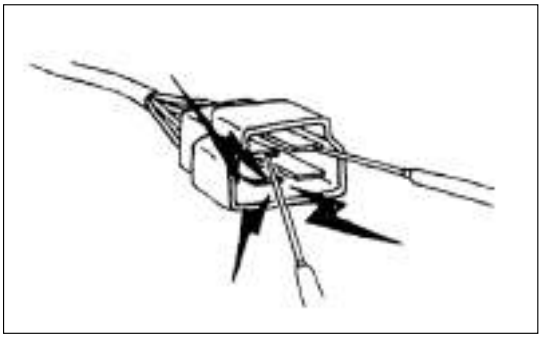


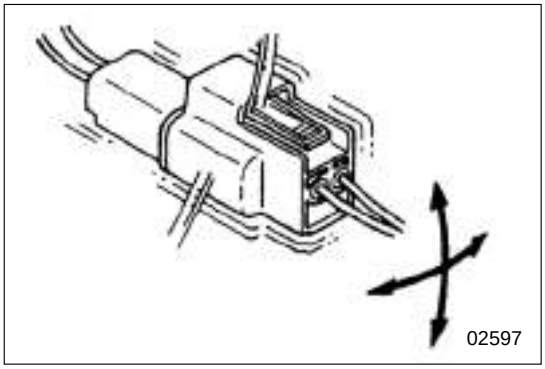
- To wash the vehicle, first cover parts and instruments of electrical system with waterproof material (cloth coated with ethylene or similar). Do not leave wiring connector and transducer in touch with water. If these devices are wet, wipe dry at once.



- To apply voltage for the purpose of testing, check for correct connection of positive pole and negative pole cables. Then, gradually increase voltage from 0V. Never apply a voltage higher than specified value.
- Above all things, pay close attention to controllers and transducer, as these devices cannot always withstand battery voltage (24V).



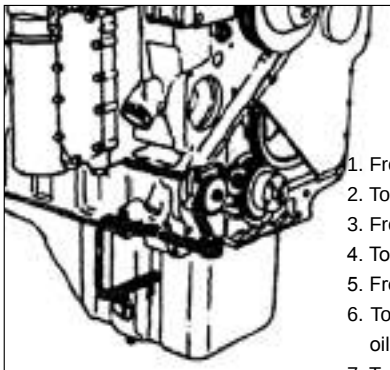
- When using multimeter to test for conduction, take care not to connect the wrong terminal by the measuring bar.



►Intermittent failure

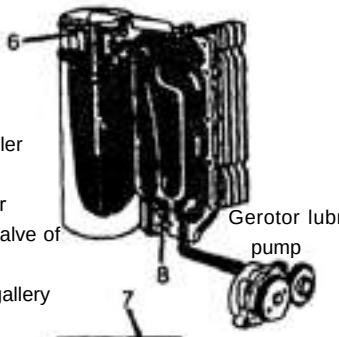
Normally, intermittent failure only occurs under some operating conditions. Once such conditions are identified, the causes of such failure can be easily found. First of all, ask user such failure occurs under what vehicle running conditions and climate conditions, and what frequency and symptoms. Later, enable reappearance of the failure according to such information. This can determine conditions of failure and if the failure is due to vibration and high temperature or other causes. If it is due to vibration, check if it can appear again via the following inspections of each connector and other parts:

Lubrication System



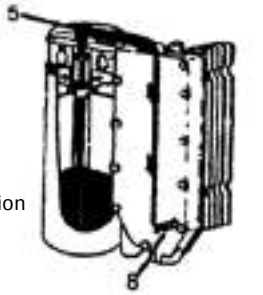
1. From pump
2. To oil cooler
3. From oil cooler
4. To oil filter
5. From oil filter
6. To bypass valve of oil filter
7. To main oil gallery
8. To oil sump

Oil cooler combined full flow and bypass filter

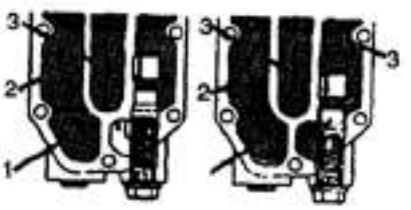


Gerotor lubrication pump

Bypass filter flow chart

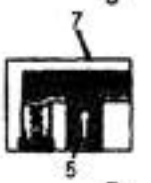


Off On

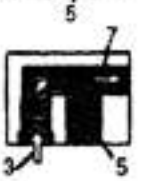


Pressure regulation valve

Valve off

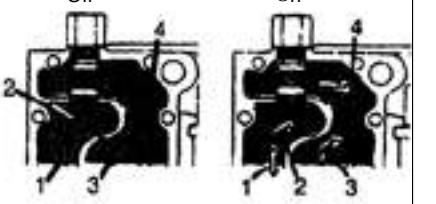


Valve on



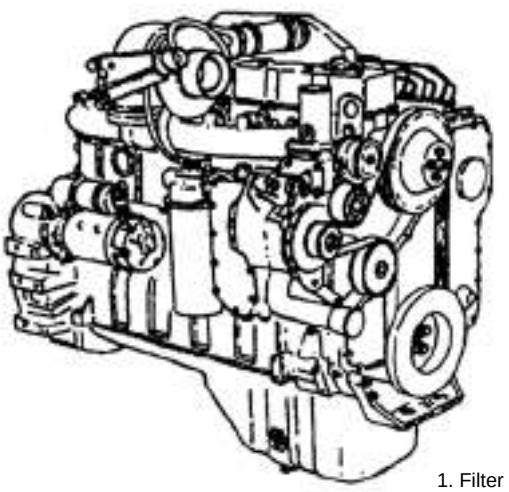
Bypass valve of oil filter

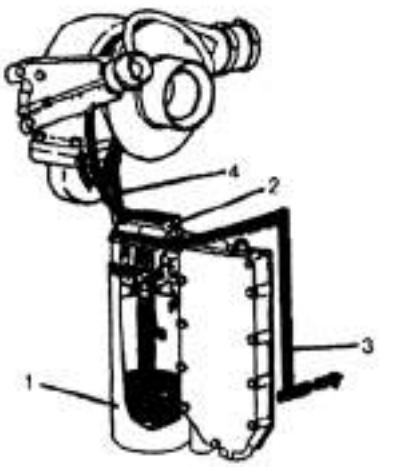
Off On



Oil cooler to bypass thermostat

Turbocharger Lubrication

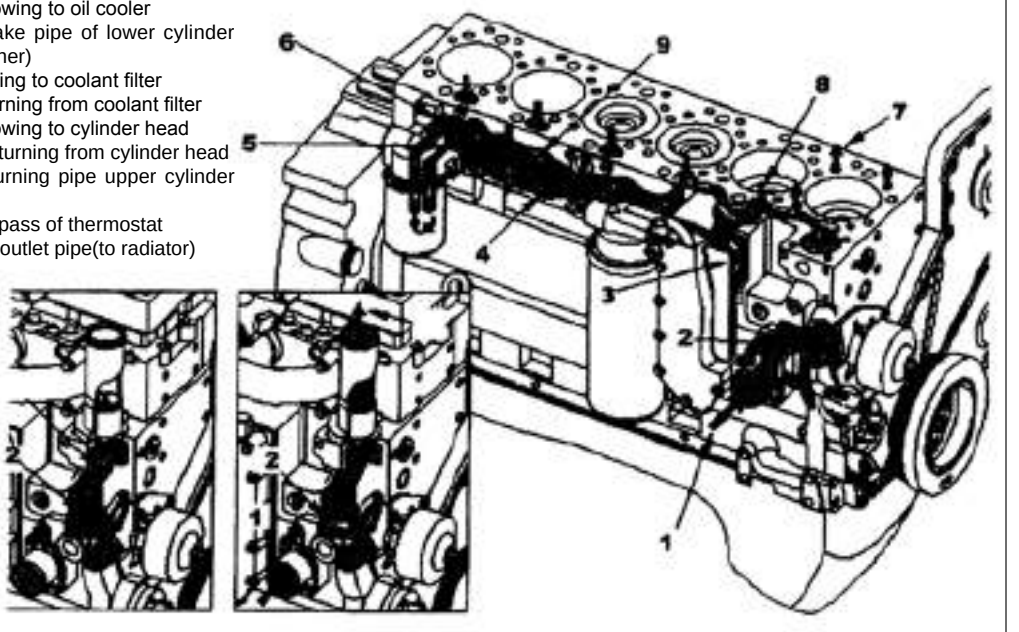




1. Filter
2. Turbocharger supply oil
3. To main oil gallery
4. To sump

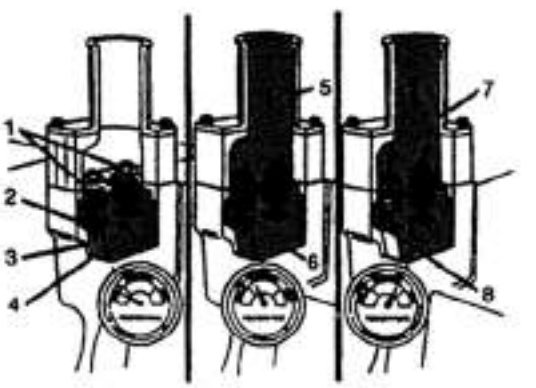
Cooling System

1. Coolant from radiator to water pump
2. Water pump
3. Coolant flowing to oil cooler
4. Water intake pipe of lower cylinder block (to liner)
5. Water flowing to coolant filter
6. Water returning from coolant filter
7. Coolant flowing to cylinder head
8. Coolant returning from cylinder head
9. Water returning pipe upper cylinder block
10. Lower bypass of thermostat
11. Ccoolant outlet pipe(to radiator)

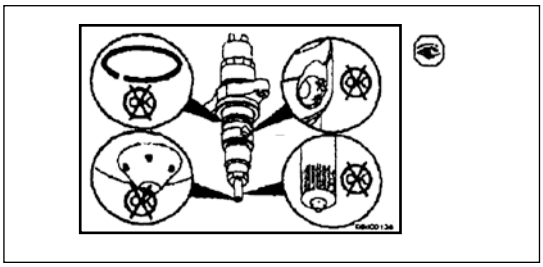


Cooling System

Thermostat



1. Tthermostat
2. Coolant flowing to pump
3. Bypass
4. Coolant from cooling pipe
5. Partial coolant flowing to water tank
6. Restricted coolant flowing to bypass valve
7. Coolant flowing to water tank
8. Bbypass valve off

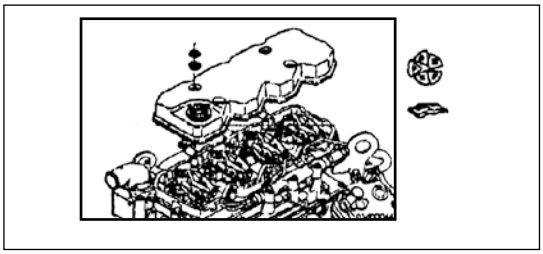


Check if it can be used continuously.

Check the end of injector for corrosion or carbonization

Check solenoid terminal for damage.

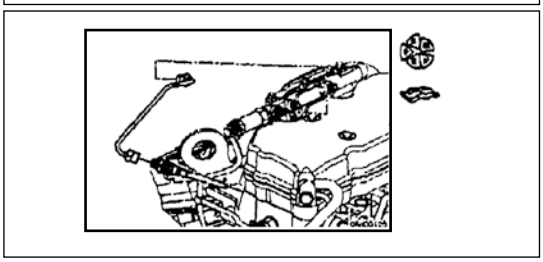
Check the inlet of injector, the high-pressure connecting ends and inlet for damage.



Note:

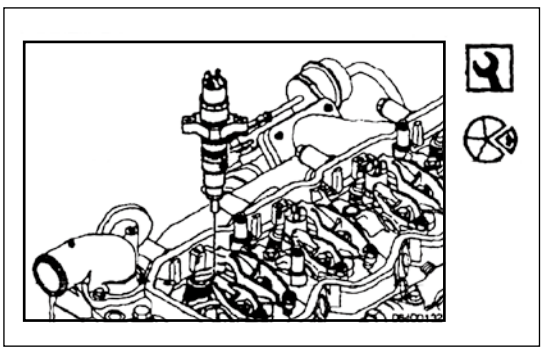
The injector will turn into dark yellow or brown due to overheat that the color varies with the degree of heating.

Check O ring of the injector for damage.



Assemble fuel oil connector

Assemble high-pressure fuel pipe of injector.

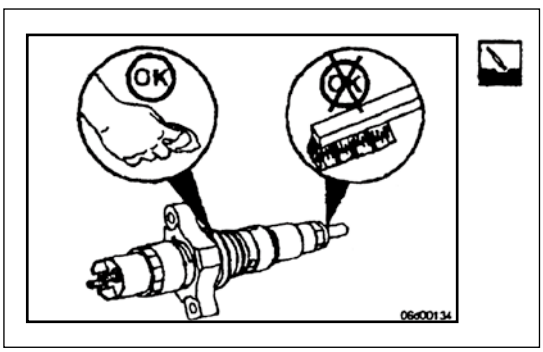


Disassemble the injector from cylinder head with specific tool.

Flushing

Warning ⚠

Follow the instruction recommended by the manufacture when flushing with solvent, acidoid or basic substance. Put on the protection uniform and wear the protection glasses for preventing from hurt the human body.



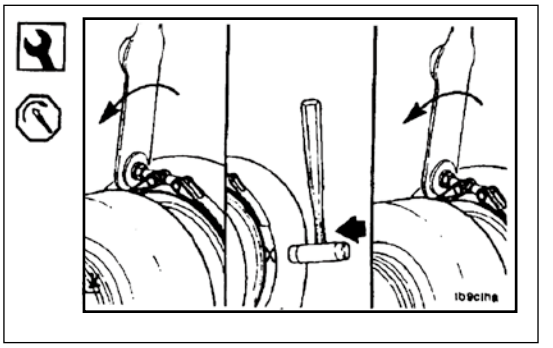
Caution ⚠

Does not clean injector with steel brush or glass shot blasting or the injector will be damaged.

Clean injector ends and injector with safe solvent or soft cloth.

Note:

Delete carbon deposition with bronze brush if necessary.



11mm， Plastic Hammer

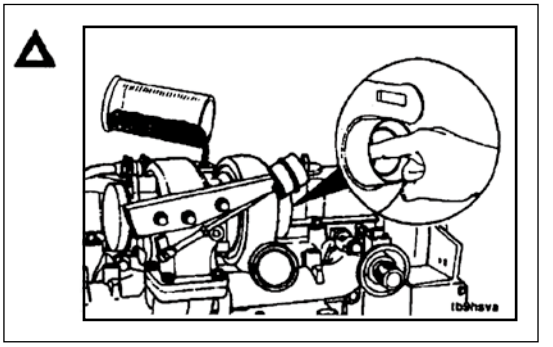
Secure strip clamp. Knock around the clamp with a plastic hammer and secure it again.

Torque Value: 8 N•M [71 F-P]

Caution ⚠

Silver-plated nut should be used on V type strip clamp for all Holset turbochargers since Dec.1st,1990.

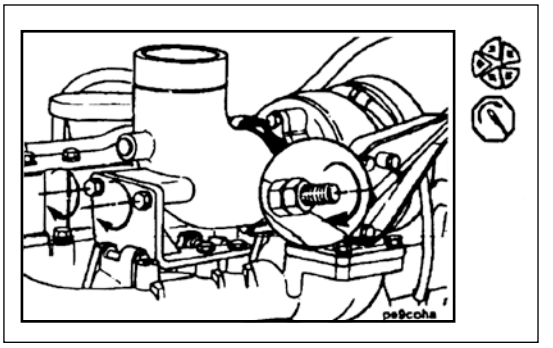
Torque of Silver-plated nut is less than that of satinless steel nut under the same load.



Caution ⚠

New turbocharger should be pre-lubricated before starting to prevent from damage.

Fill clean engine oil 15W-40 of 50 to 60ml (2-3ounce) into supply pipe joint. Rotate turbine and flow oil into bearing housing.

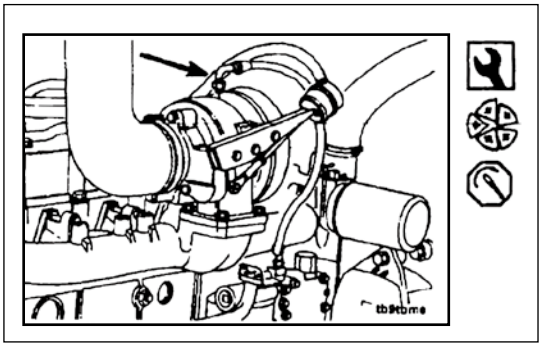


Assemble exhaust outlet joint.

NOT secure the second retaining screw before securing strip clamp.

Torque Value: Strip Clamp -8 N•M [71F-P]

Torque Value: Retaining Screw-43 N•M [71 F-P]



16mm

Assemble oil supply passage.

Torque Value: 15 N•M [11 F-P]

Caution ⚠

Not touch oil supply pipe with the turbine or the oil pipe will burn and cause damage of vehicle and equipment and hurt human body.

Pressure in expansion water tank should be kept at 50 kPa. Position of expansion water tank should be 400 mm higher than diesel engine and radiator. (When cooling water tank leaves company, it is not equipped this part.)

All water tank covers in cooling system should be in good condition. Do not open the covers. Keeping inner pressure of cooling system at 50 kPa will increase cooling efficiency of cooling system. Hence, it is not easy to open the boiler. For cooling system and its parts, please see figure 7-13 and 7-14.

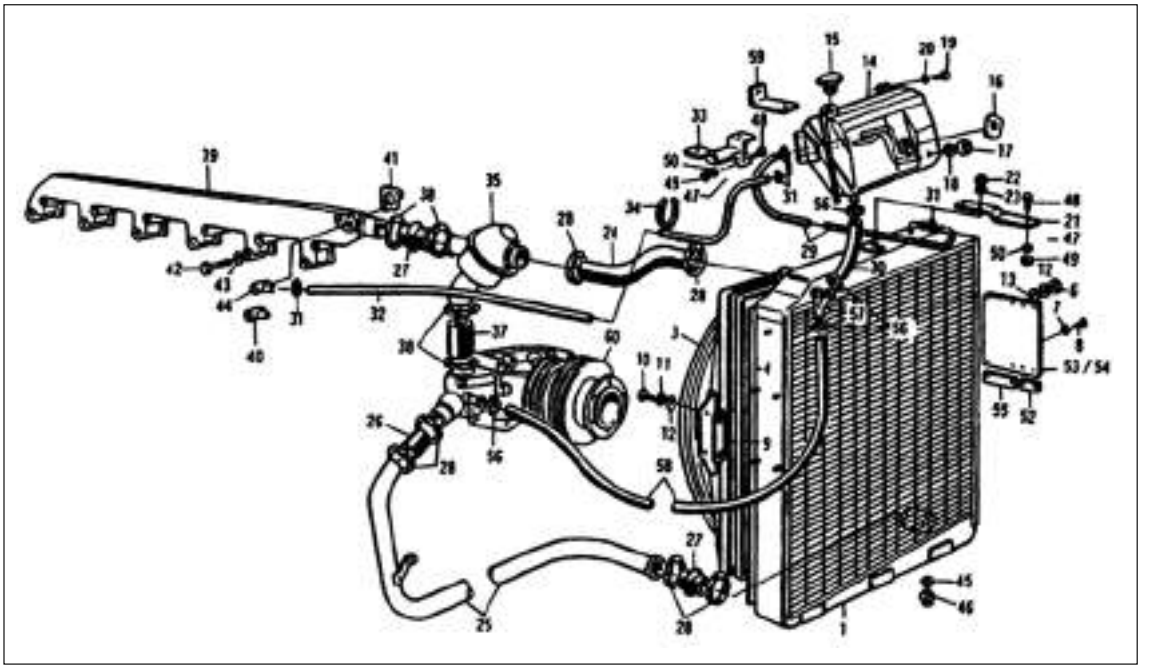


Figure 7-14 cooling system and its parts

Main parts:

1. Radiator
3. Guard ring
4. Rubber sealing tape
6、7、8、10、11、12、13. Bolt, washer, etc
14. Expansion water tank
15 Relief valve cover
16 Adding cover of water tank
17. Water level indicator
18. Gasket
19、20. Fixing bolt
25. Intake pipe
26. Rubber pipe
35. Thermostat
39. Outlet pipe
60. Water pump

Fan:

Plastic fan is died by glass fiber reinforcing PA6. It has two kinds of diameter, Φ570 and Φ620. With regard to fan transmission, there are two forms, that is, rigid transmission and silicone oil clutch transmission (viscous transmission).

Viscous fan is such a fan that adopts bimetallic temperature sensing unit to realize temperature control. Hence, it is not only can save energy, but also can ensure the diesel engine has good hot condition. It has obvious advantage on diesel engine's operation and lifetime. Main principle of this fan is that diesel engine drives driving wheel in clutch hub, and fan vane is hub rotating. When this space looses silicone

►Operation instructions and maintenance of power steering gear:

To make the power steering gear work safely and reliably, the driver shall fully understand the structural principle, operation methods and maintenance regulations of the steering gear.

- This integral power steering gear belongs to the constant flow structure, which drives the oil pump by the automobile engine. Therefore, the automobile shall not slide with power off to prevent from the driver not accommodating the heavy steering caused by the engine power off, resulting in accidents.
- The power steering gear can work as the mechanical steering gear, if the failures of the oil pumps or the oil circuits appear in the steering system, forcing the steering to drive the automobile to reach the repair point, however, it is not allowable to perform the long time forced steering. Prohibit the over-load of the vehicle so as to ensure the safe driving.
- The inside of the power steering system shall be kept clean. It is not allowable to apply the unclean container to receive the oils during oil filling process. The parts shall not be randomly placed during disassembly process. No any sundries shall be entered into the system during assembly process. The operation oil level shall not be less than the specified standard.
- The users shall not randomly disassemble the control valve of the steering gear.
- When the steering pitman arm is assembled, the alignment shall be ensured for the wheel, the mark line on the pitman arm shall be aligned to the mark line of the output end surface of the rocker shaft. When the automobile runs in the straight direction, if any too big or too small free clearances are found in the steering wheel, the steering universal joints and tie rod system shall be checked.
- During the steering process, it is allowable to rotate the steering wheel to the limit position. However, the time shall not be too long, preventing from influencing the service life of the oil pump.
- The oil inlet and outlet shall not be connected oppositely in the power steering gear. The oil inlet and outlet shall be connected according to the arrow direction of the front cover for the power steering gear, the inlet oil is the high pressure oil of the oil pump, and the outlet oil is low pressure oil of the oil return tank.
- The oils shall be duly changed after 3000km of running-in for the new steering gear and subsequent running every 5000km, meanwhile, the filter element shall be changed in the oil tank. The filtering accuracy shall not be less than 30um for the filter element. Frequently check whether the oil amounts in the oil tank are lacked, whether the oils are deteriorated, whether the impurities are excessive, duly add or change oils in case of any bad states are found.

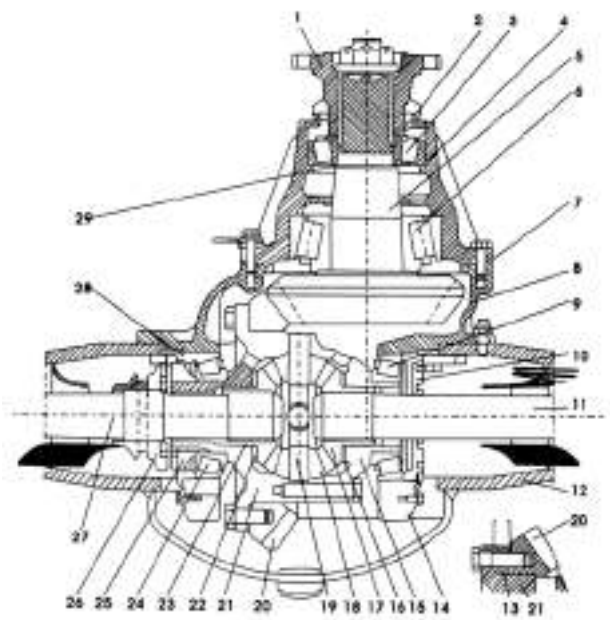
Warning ⚠

To prevent from any damages of the power steering gear and steering oil pump, strictly prohibit the pivot steering of the vehicles, whatever with double front axle or single front axle, with idle load or full load. The holding time shall not exceed 10 seconds when the wheels turn to the left and right limit position during running process.

►Structure and working principle of STEYR drive rear axle

Fig. 2-2 is the structure of STEYR drive rear axle central reductor, Fig. 2-3 is exploded view of the central reductor, Fig. 2-6 is the structure of wheel reductor of STEYR drive rear axle, and Fig. 2-7 is exploded view of the wheel reductor.

As shown in Figs. 2-2 and 2-3, power transferred by propeller shaft is transferred to drive conic gear 5 through flange assembly 1, and then is transferred to differential through driven conic gear 20. Coupling bolt connects the two differential half housings 15 and 21 into one, therefore, when the differential housing is rotating, the cross shaft rotates as well, the planetary gears produce revolution, and drive the left, right side gear 17 and 23 to rotate, as a result, torque is transferred to the left, right side gear by the left, right half axles. When vehicle is turning, the steering inner wheels must have less rotating turns than the outer wheels; because of the equilibrium relationship of the torque, the planetary gears not only revolve, but also turn around the cross shaft, thus, make the two side gears rotate differentially, i.e., the number of fewer rotation of the steering inner wheel is just the number of more rotation of the steering outer wheel synchronically; in this way, the differential function obtained, and stability of the vehicle during turning is ensured.



1. Flange assembly
2. Shaft seal ring
3. Tapered roller bearing 30312
4. Bearing pedestal
5. Driving conic gear
6. Tapered roller bearing 32315
7. Adjusting shim
8. Final drive casing
9. Tapered roller bearing
10. Differential adjusting nut
11. Half-axle (right)
12. Axle casing
13. Differential housing washer
14. Differential bearing cover
15. Differential housing (right)
16. Adjusting shim 17. Half-axle gear
18. Planetary gear and gasket
19. Differential cross shaft
20. Driven conic gear
21. Differential housing (left)
22. Adjusting shim
23. Half-axle gear
24. Tapered roller bearing
25. Fixed engagement sleeve
26. Sliding engagement sleeve
27. Half axle (left)
28. Differential bearing adjusting nut
29. Adjusting shim

Fig. 2-2 Structure of STEYR drive axle central reductor

Main Technical Data

Rated axle load:	13000Kg	Dead load:	900Kg
Applicable tyre type:	11.0-20	Brake size:	Φ4000×200mm
Applicable wheel track:	1847mm	Broadened brake size:	Φ410×220mm
Applicable rim type:	8.0-20	Min. ground clearance:	241mm
Available gear ratio:	4.444 4.875 5.286 5.833	Max. output torque:	40000Nm

Outline Drawing and Connection Dimensions

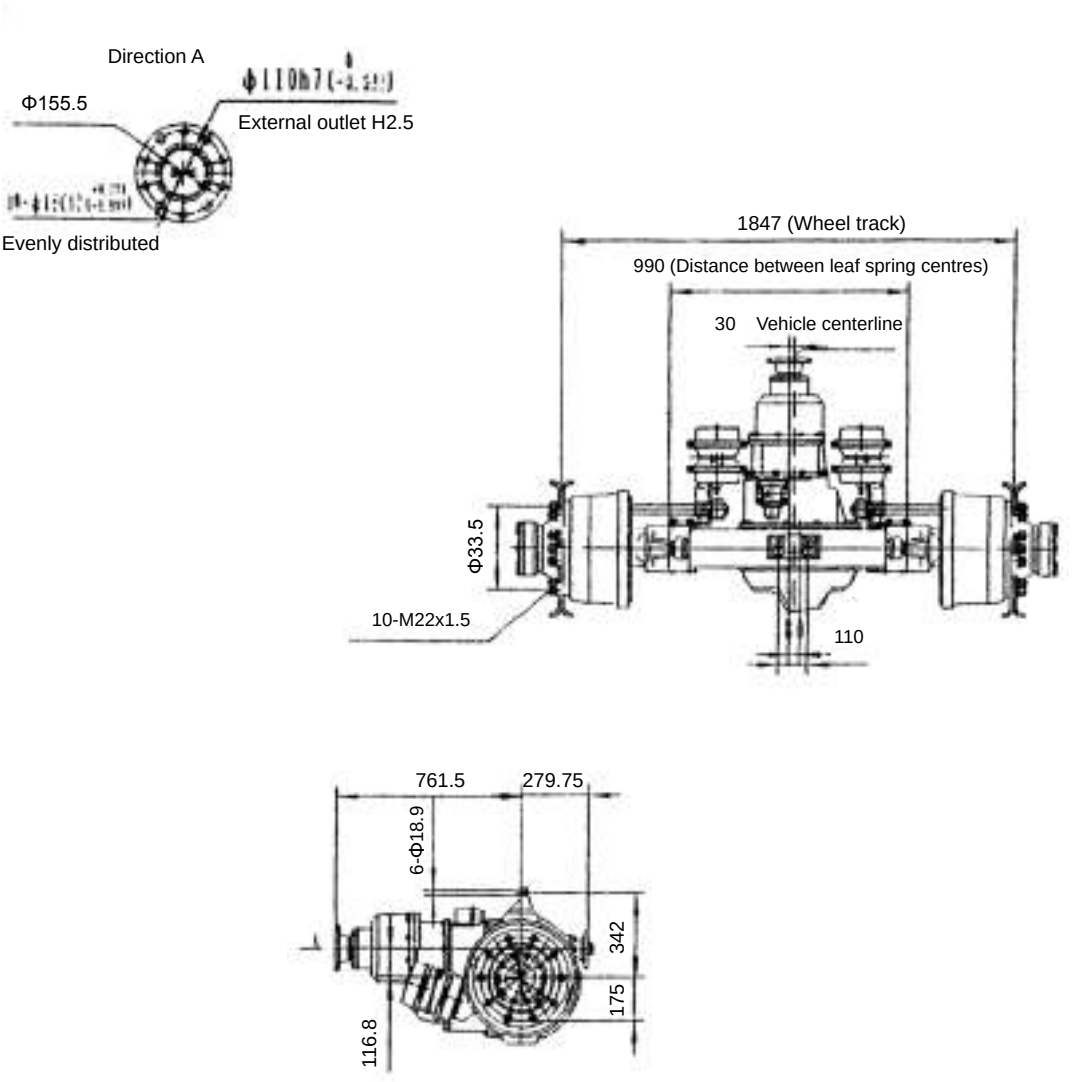
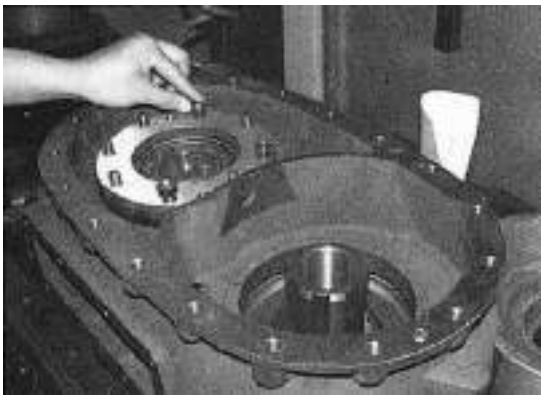
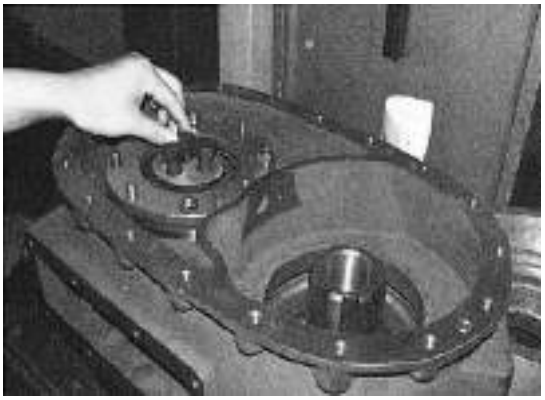


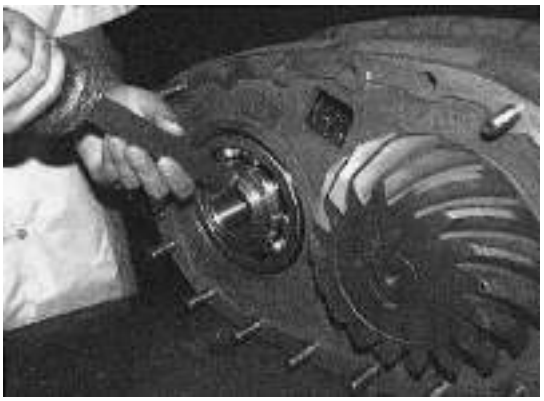
Fig.1



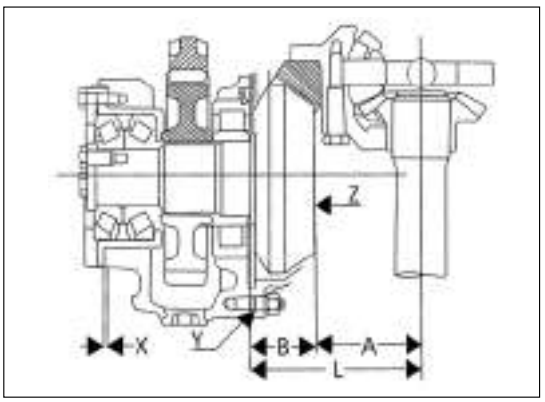
12. Reinstall adjust gasket and cover plate into bearing shell, and tighten fixing bolt of bearing shell.



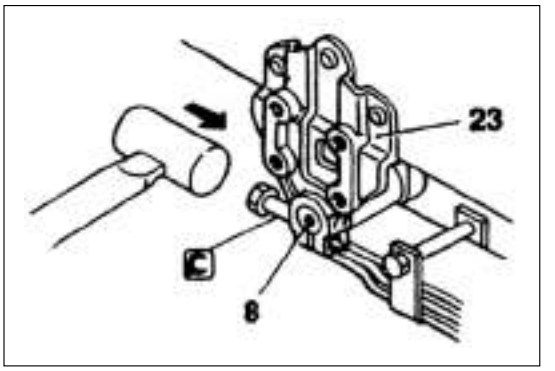
13. Install baffle plate into gear shaft. Tighten fixing bolt of baffle plate of driving shaft with 180 N•m.



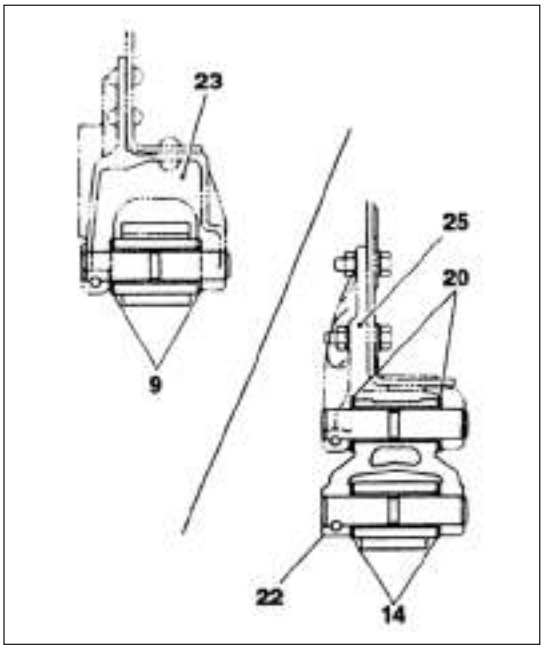
14. Use drift to lock nut.



Thickness of adjust gasket X for driving gear bearing seat and intermediate gear case is as:
X=(A±Z)+B—(L±Y)
where
A—theoretical value of distance between end face of driving gear and axes of driven gear
B—measured value of distance between end face of driving gear and linking face of intermediate gear case (before install adjust gasket)
L—theoretical value of distance between linking face of main decelerator housing and axes of



Align C the bolthole on front spring front bracket 23 with bolt groove on shackle pin 8 with shackle pin stop rod.

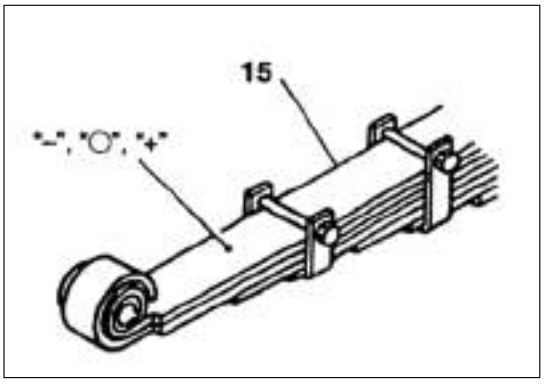


►Side washer (for adjustment)

- Adjust with washer to keep the clearance between side washer 9 and front spring front bracket 23 in accordance with standard value.
- Adjust with washer to keep the clearance between side washer 14 and shackle 22 in accordance with standard value.
- Adjust with washer to keep the clearance between side washer 20 and front spring rear bracket 25 in accordance with standard value.
- Side washers 9, 14, 20 have three thicknesses: 3.0, 3.5, 4.0mm.

[Assembling]

Align C the bolthole on shackle 22 with bolt groove on shackle pin 13 with shackle pin stop rod.



►Leaf spring assembly left and right height combination

When replacing leaf spring assembly 15, parts that we choose should make the combination of right height marks "-", "○", "+" as shown.

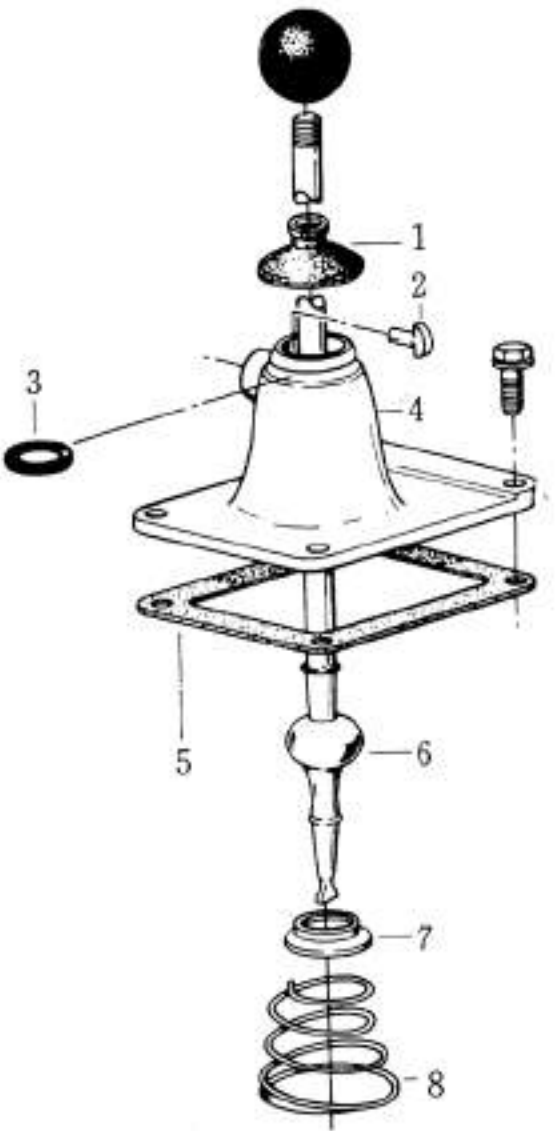
Item	Combination						
	1	2	3	4	5	6	7
Assist seat side leaf spring assembly	-	-	○	○	+	○	+
Driver seat side leaf spring assembly	-	○	○	+	+	-	○

Note ⚠

The camber of assist seat side leaf spring assembly differs from that of driver side leaf spring assembly. Don't mix them, or it will lead to the vehicle titling.

Dismantling and Assembly of Shanxi FAST Twin Countershaft Transmission

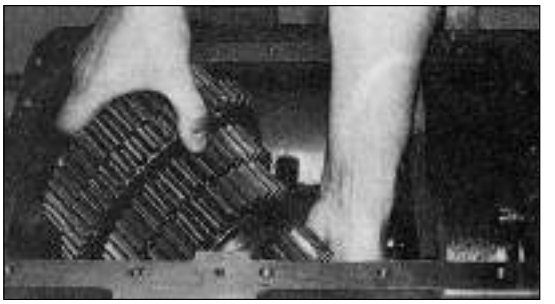
►Control Mechanism of Shifting



Disassembling and Assembling of Direct Controlled Shifting Lever

1. Guard cover	2. Pin	3. O Type Ring	4. Housing
5. Gasket	6. Rod 7.Washer	8. Spring	

Fig. 7-1 Direct Controlled Shifting Lever



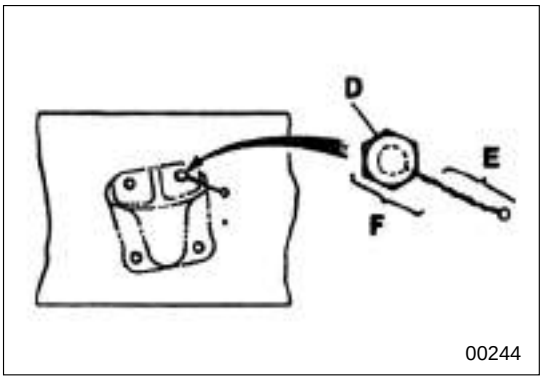
8. Install the countershaft at the bottom into the hole of transmission, and then place the countershaft at the top side to the transmission. Big power take-off gear should be installed on the bottom (left) countershaft. Do not install the bearing at this time.

C. Assembling of Shaft One

1. If it has been dismantled, install one split ring inside the gears of shaft one, and install the gear of shaft one to the spline shaft, the side with split ring is forward.

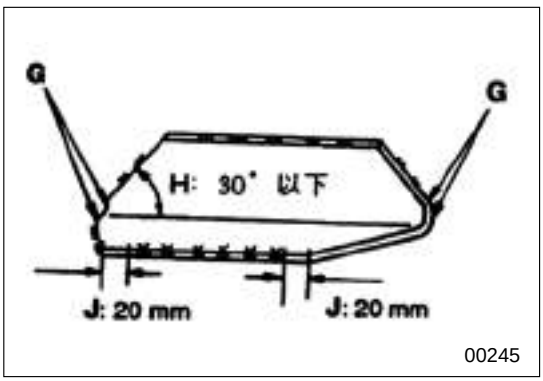
2. Install one spacer in the shaft, making it against the split ring.

3. Press the bearing of shaft one to the shaft, and apply the guard board to block the front side.



►Repair splits caused by rivets or bolts

- In order to align the edge of the hole in the cracked part, tighten bolt D in the hole temporarily.
- Weld splits on Part E which are more than 20mm away form the center of the bolt. For the welding methods, please refer to the methods of repairing the above cracks.
- Remove the bolt and align the edge, weld the remaining Part F and fill the hole.
- After drilling a hole at the filling part, install a rivet or a bolt.

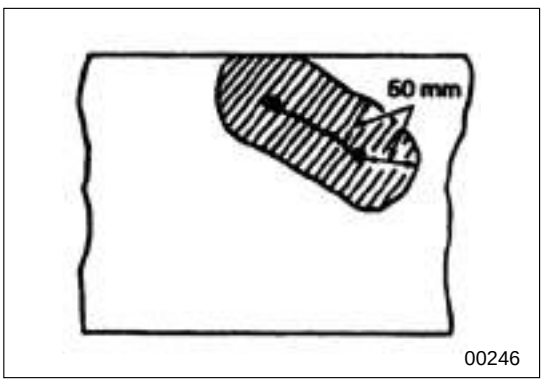


►Repair with reinforced plate

- In order to prevent stress concentration on reinforced plate G end, two ends of the plate to be welded should have a inclination H of 30°. Don't weld Part J.
- Reinforced plate must ensure enough strength on the cracking part.

Remark

- The thickness of reinforced plate: thick as the frame
- Material of reinforced plate:SAPH55 (hot-rolled steel plate for cars), KFP55 (high tensile strength steel) or products of similar strength.
- After welding, heat section line to 600~700℃.



Caution ⚠

Always protect trim against high temperature with insulation materials, etc., such as main threshold.

Precautions of Maintenance and Operations

- To truly understand status of the vehicle, before start of maintenance, check and record accumulated mileage, operation conditions, user's requirements on the vehicle, and other information necessary for maintenance operations. Operation steps shall be planned for highly efficient maintenance and avoid waste of labor and materials.

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- Locate faulty position, identify causes of the problem, so as to decide replacement of parts. Later, perform operations specified in this manual.

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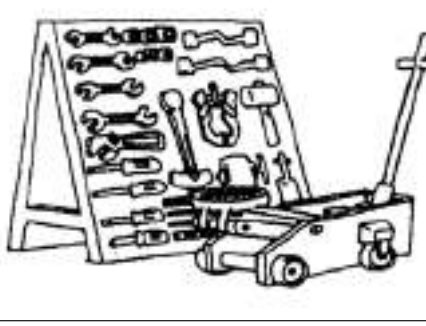
Carry out maintenance on horizontal ground.

Preparations are as follows:

- Cover cab seats, trims, floor, and paint on vehicle body with protective hood to prevent contamination and damage.



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- Prepare general purpose tools and special tools necessary for maintenance.

Warning ⚠

When the use of special tool is specified in this manual, never try to use other tools; otherwise parts may be damaged and it will cause personnel injury.