

Steering

General

Specifications

Torque

Steering column and steering shaft

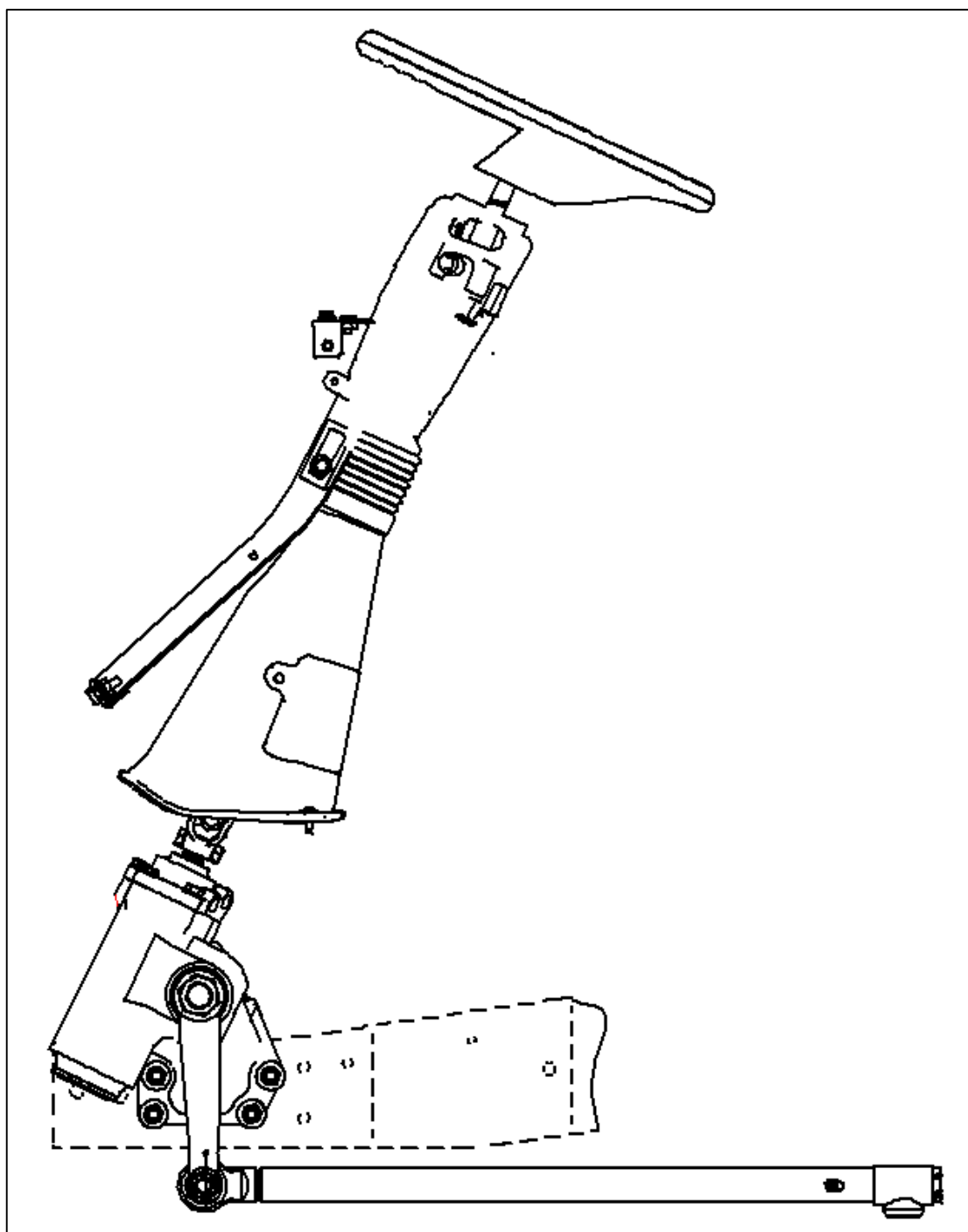
Steering gear disassembling

Power steering fluid filling and attention points

Trouble shooting

Steering

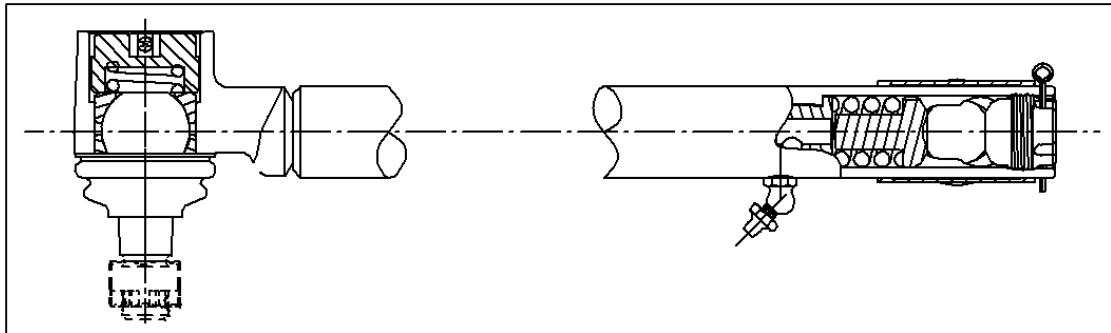
General Steering gear



This model is provided with rotary valve type power steering gear

Steering

Steering linkage



Specifications

Steering column and shaft

		Tiltable steering gear
Steering wheel	Ø mm	430
Back play	°	10~15
Steering shaft type		dual connector
Adjustable range	Back and forth °	11

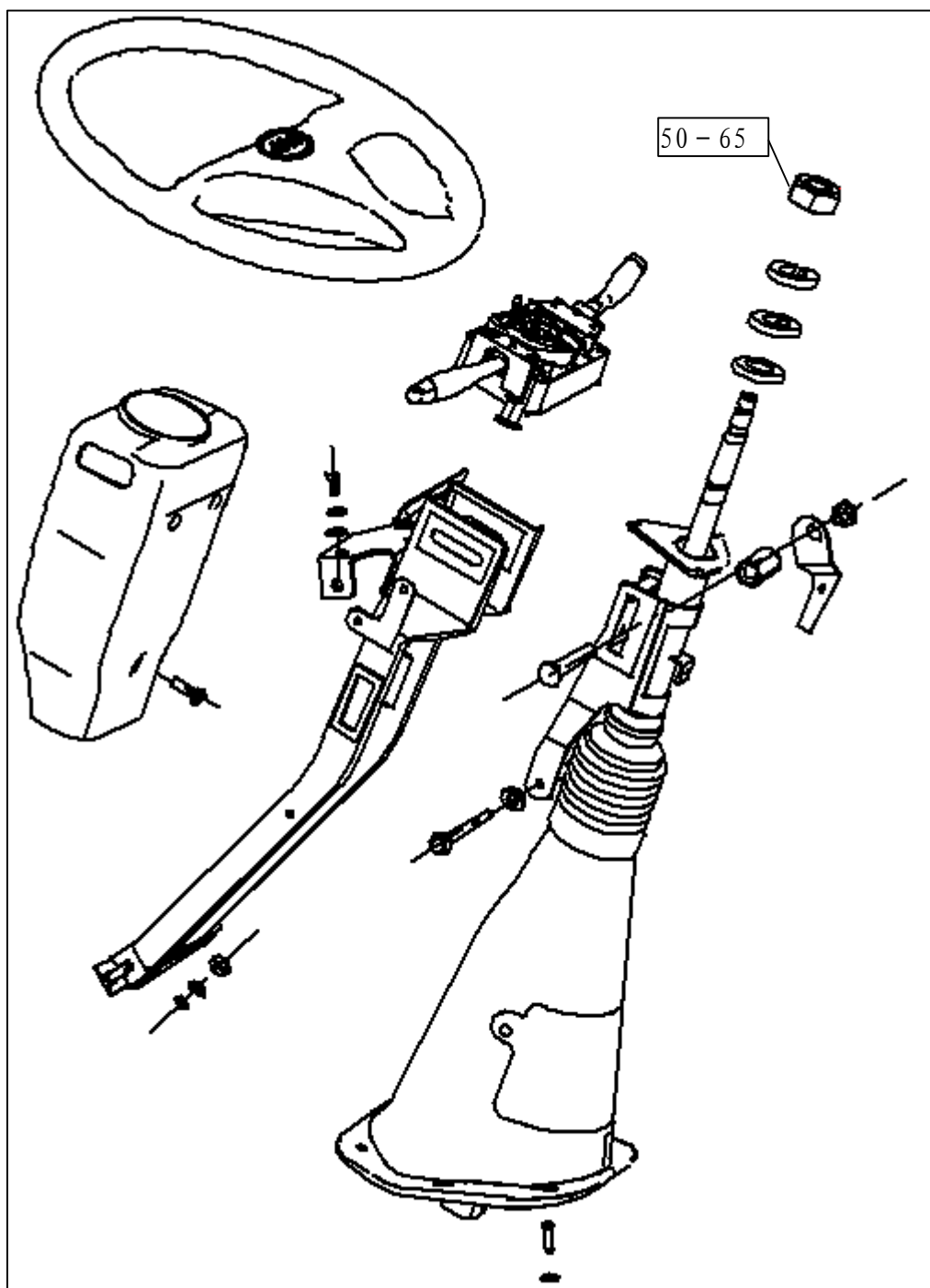
Major specifications of the power steering gear

Max. applicable front shaft load	2500kg
Max. theoretical output torque	1580N.m
Steering round	4.2
Output angle	±46°
Output spline (OD×gear)	Φ17.5×36
Output spline (big end OD×gear)	Φ35×36
Operating pressure	10.3Mpa
Applicable operating temp.	-40℃ ~ 135℃
Rated pump flow	(8-11)L/min
Net weight	18kg

Steering

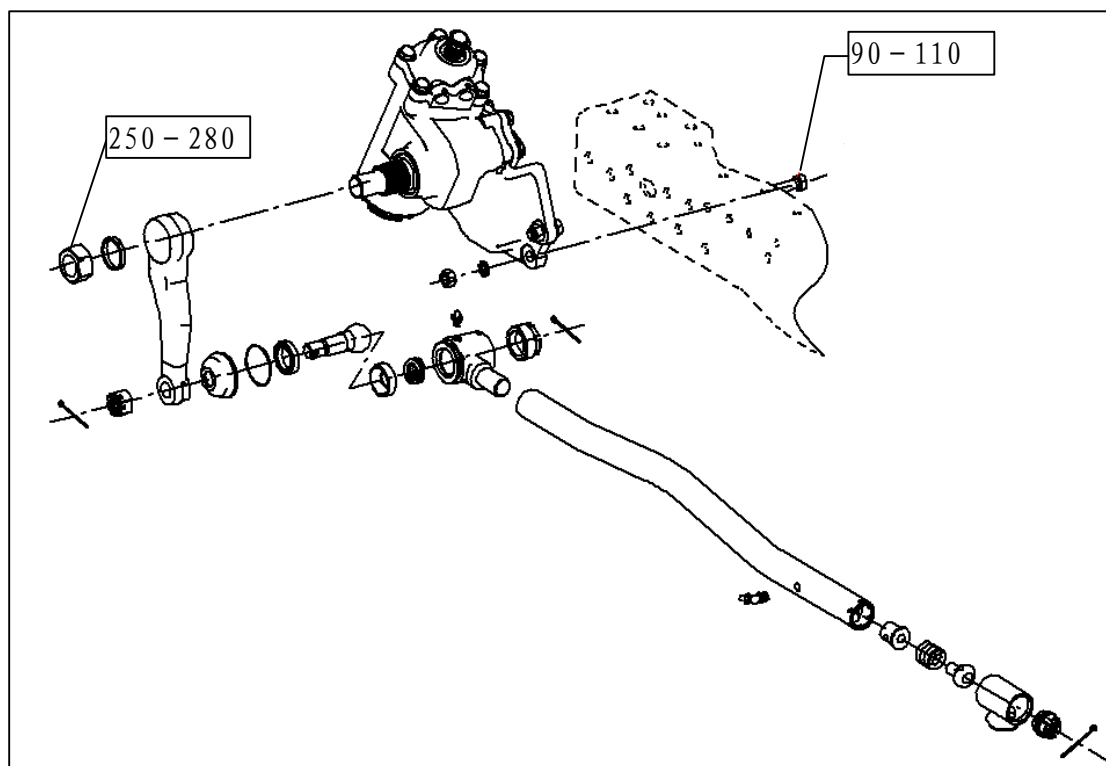
Torque (N·m)

Steering column



Steering

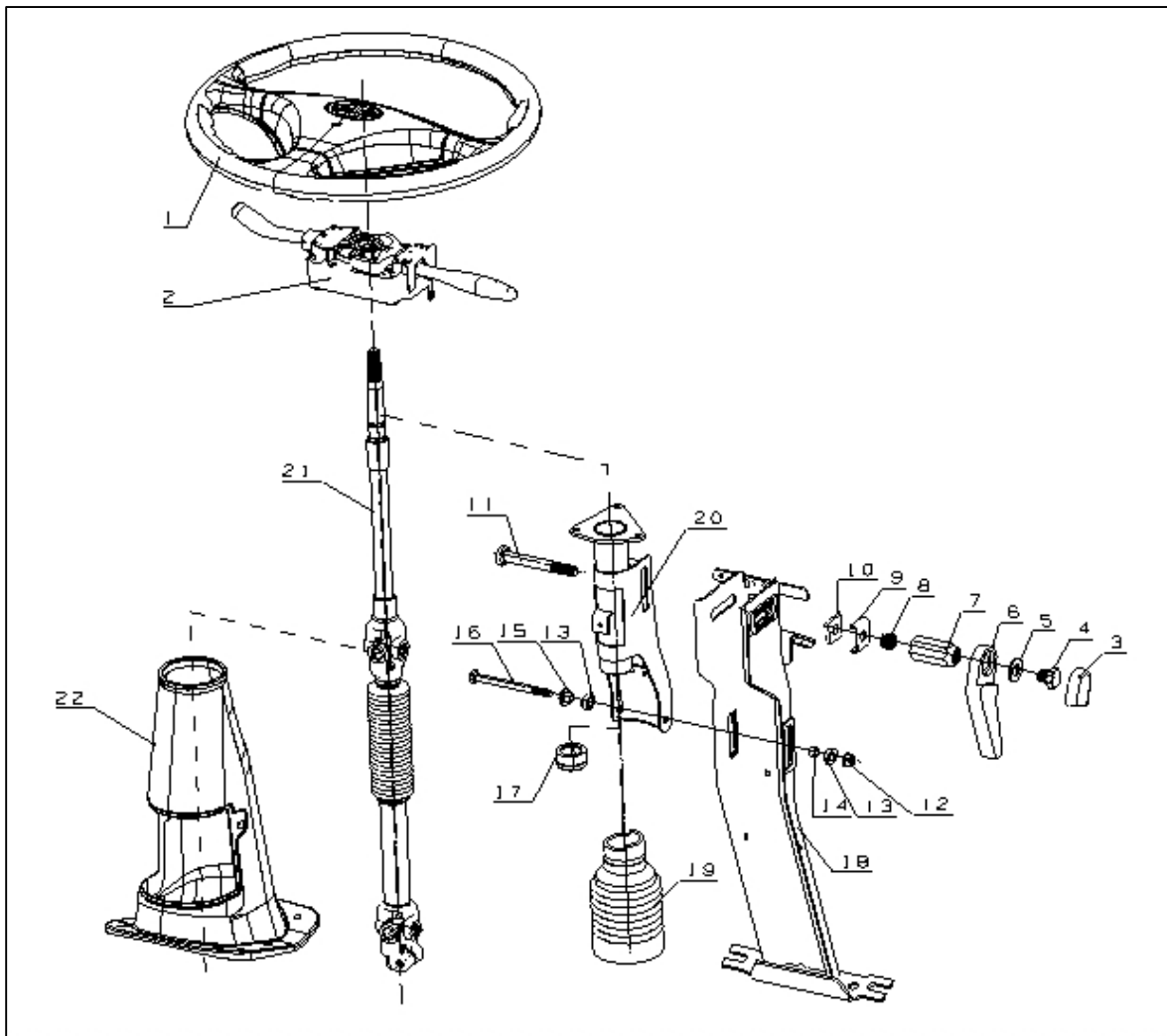
Device and tie rod



Steering column and steering shaft



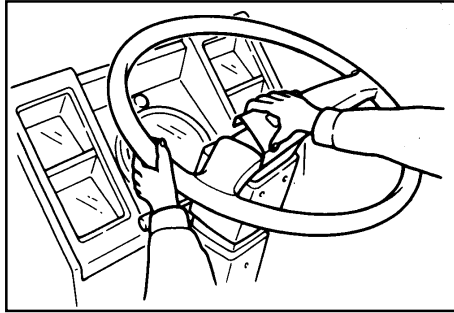
Disassembling and assembling



Disassembling sequence (just contrary to assembly sequence)

- | | |
|--|---|
| 1. Steering wheel assembly | 12. Hex flanged face lock nut |
| 2. Grouped switch assembly | 13. Nylon limit bushing |
| 3. Steering column handle cover | 14. Bushing |
| 4. Hex head bolt | 15. Shaft sleeve |
| 5. Flat gasket | 16. Hex head bolt |
| 6. Steering column handle | 17. Steering column shaft sleeve assembly |
| 7. Steering column adjusting lever nut | 18. Adjustable steering support assembly |
| 8. Spring | 19. Steering column pipe dust cover |
| 9. Limit support | 20. Steering column pipe welding assembly |
| 10. Adjusting piece | 21. Steering drive shaft assembly |
| 11. Adjusting nut | 22. Steering column enclosure assembly |

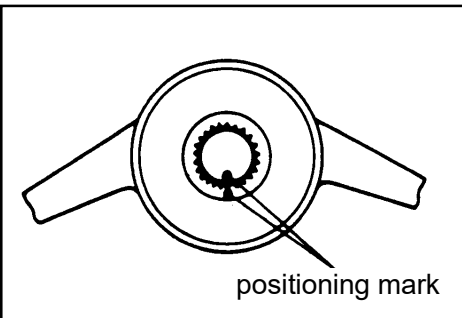
Steering



Important operation--Disassembling

Horn button

Pull out the horn button.



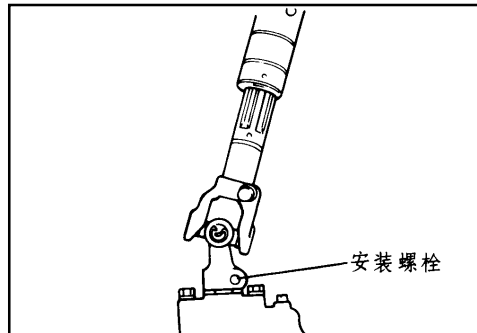
Steering wheel

Turn the steering wheel and steering shaft aside, make the mark, to ensure that parts will be in the original positions during assembly.

Bolt: fix the worm fork

(1) Tilt the cabin up, strut.

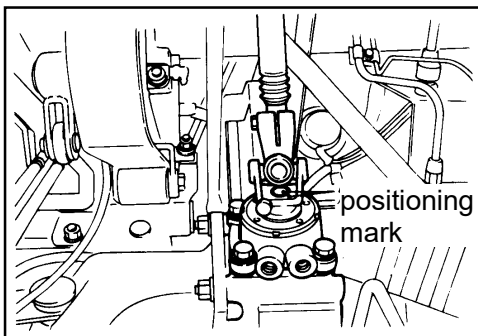
(2) Make positioning and worm.



shaft and steering knuckle

and support the cabin with the

marks on the steering knuckle



(3) Remove the fixing bolts with pneumatic spanner or fixed wrench, and then pull out the flange fork.

(4) Lower down the cabin slowly.



Inspection and repair

Necessary correction or parts replacement shall be made if any abrasion, damage or other abnormalities are found during inspection.

Steering



Reassembling

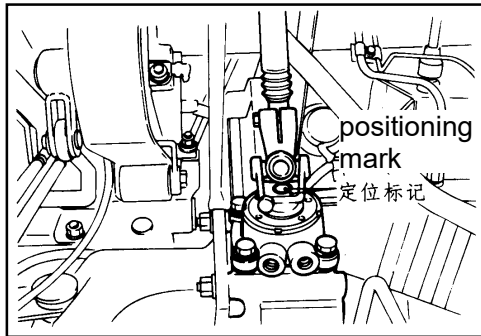
The reassembling sequence is contrary to that of the disassembling.



Important operation--Assembling



Bolt: fix the worm shaft and the steering knuckle fork.

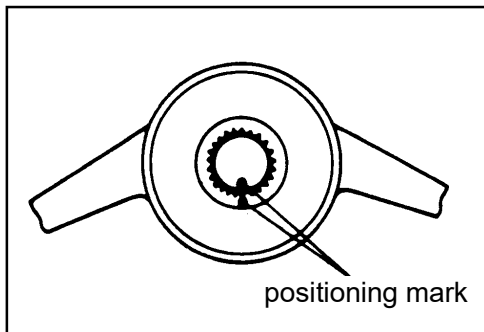


In fixing, alignment shall be made with the positioning marks made



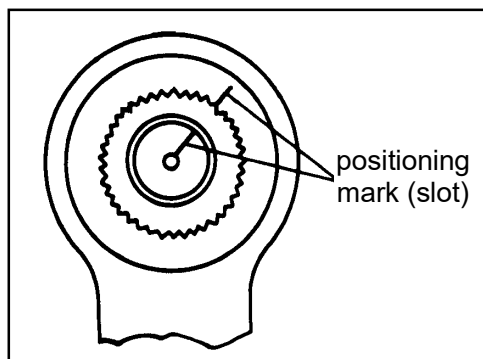
Steering wheel

Turn the steering wheel and steering shaft aside, make the mark, to ensure that parts will be in the original positions during assembly.



Important operation--Disassembling

Note: Before removing the steering gear assembly, take down the inlet/outlet hoses of the power steering pipes first. At this time, pay special attention to the connector and screw plug, or seal the oil injection port with ribbon after the oil pipe is taken down, to prevent dust or other foreign matters getting in.



Important operation--Assembling

Steering vertical arm



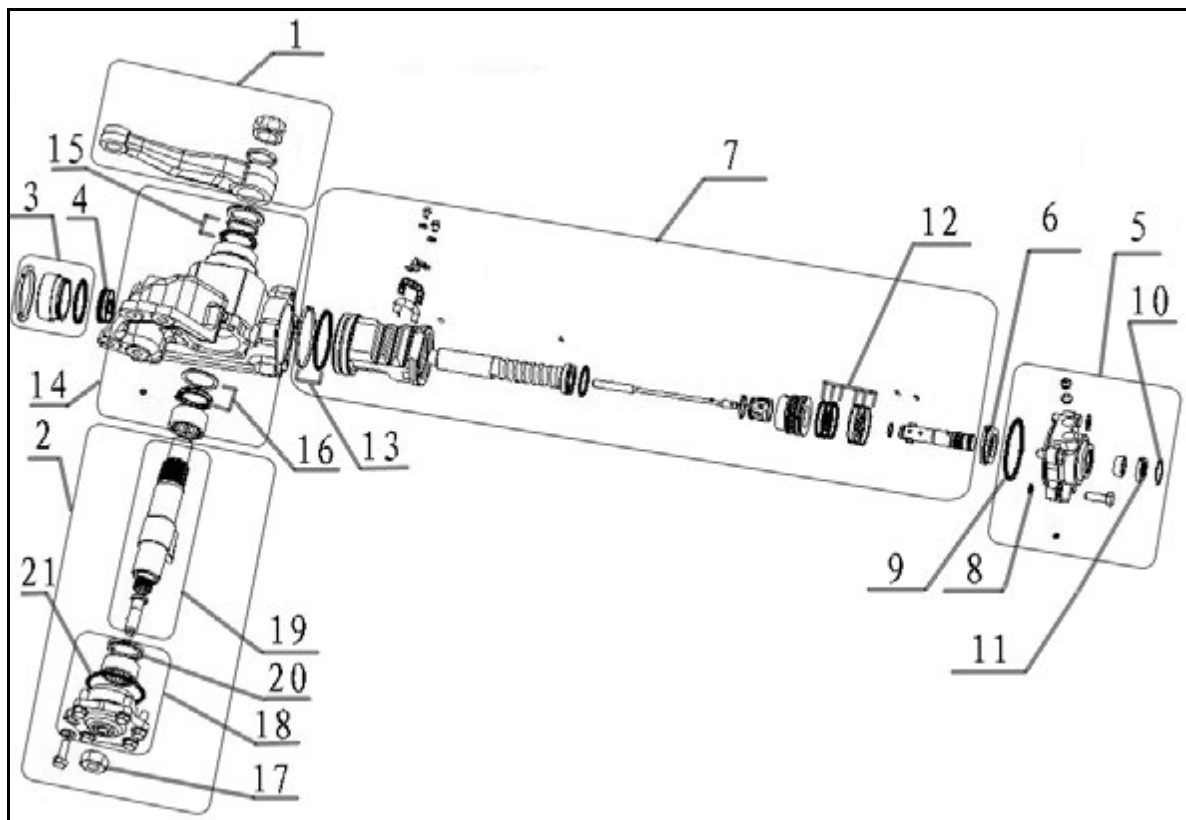
Align with the positioning mark.



Tightening torque range: torque (N.m) 250--270



Steering gear disassembling

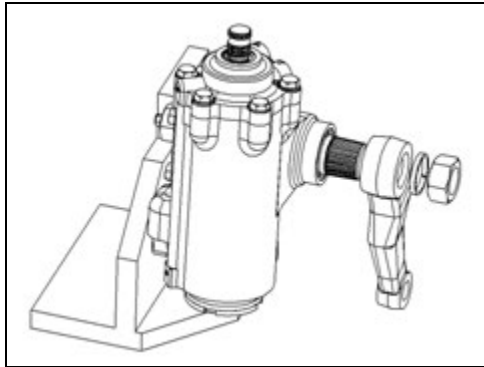


Disassembling sequence

- | | |
|---|---|
| 1、big nut elastic washer + rocker | 2、side cover +rocker-arm shaft assembly |
| 3、locknut + adjusting nut assembly | 4、thrust needle bearing |
| 5、upper casing assembly | 6、thrust ball bearing |
| 7、rotary valve worm nut assembly | 8、valve bush seal ring + valve bush seal washer |
| 9、small O ring | 10、Upper casing O ring |
| 11、elastic retainer ring | 12、input cup |
| 13、steering nut seal washer + seal ring | 14、lower casing assembly |
| 15、output end cup + gasket | 16、output end seal washer + seal ring |
| 17、locknut | 18、side cover assembly |
| 19、rocker-arm shaft assembly | 20、side cover O ring |
| 21、side cover cup | |

Steering

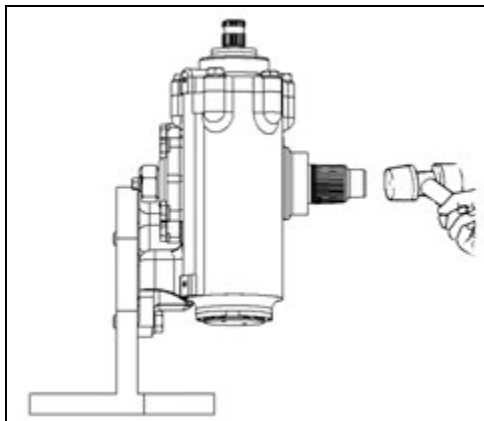
Important disassembling steps:



1. Big nut + elastic washer + rocker

Turn the big nut counterclockwise by a torque wrench, remove the elastic washer, and take down the rocker arm.

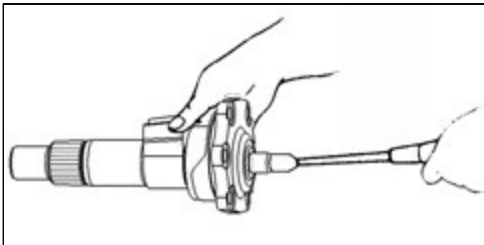
Note: Do not hammer the rocker arm when taking down it, otherwise the side cover and rocker-arm shaft assembly will be damaged; and do not damage the small cone hole in the rocker arm.



2. Side cover assembly + rocker shaft assembly

Turn the input shaft to have the assembly in the middle position (the drawing shows that marked line on small end face of the rocker arm is downward). Remove the fixing screws of the side cover.

Hit the small end face of the rocker arm with a rubber hammer, and take down the side cover assembly and the rocker-arm shaft assembly.



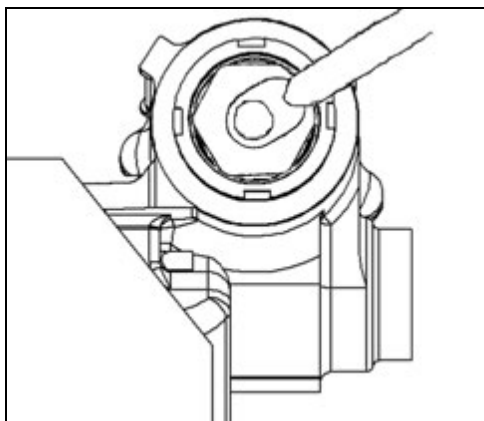
18. Side cover assembly

19. Rocker-arm shaft assembly

Turn the adjusting screw clockwise, and takedown the rocker arm shaft assembly from the side cover assembly.



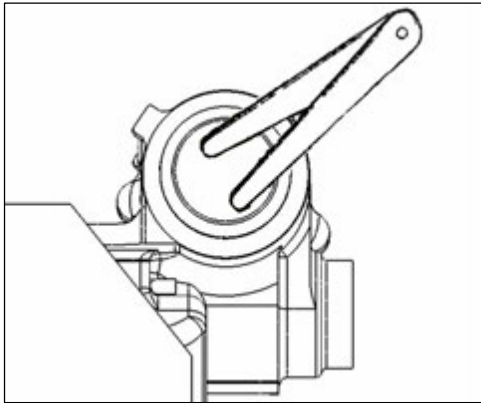
Warning: Further disassembling of rocker arm assembly is not allowed, or it will be damaged; the side cover assembly cannot be further disassembled except the O ring, or it will get damaged.



3. Locknut + adjusting nut assembly

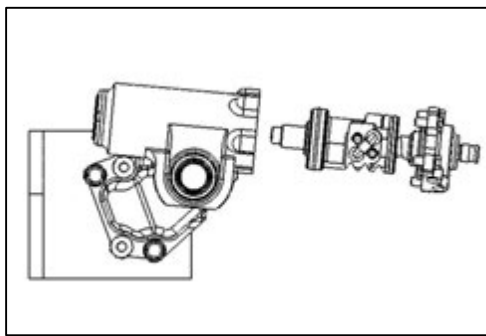
Use the tool shown in the drawing to remove the locknut, take care not to damage the O ring.

Steering



3. Adjusting nut

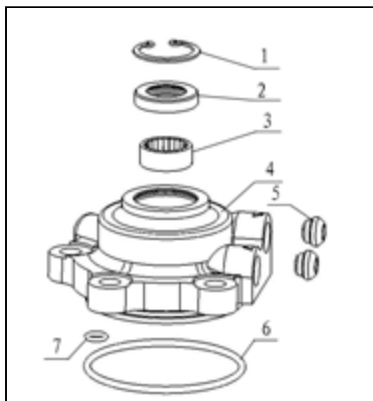
Use the tool shown in the drawing to remove the locknut, take care not to damage the O ring on it.



5. Upper case assembly

7. Rotary valve worm nut assembly

When taking down the above 2 assemblies, take care not to lose the thrust ball bearing (4) and its different parts(6).

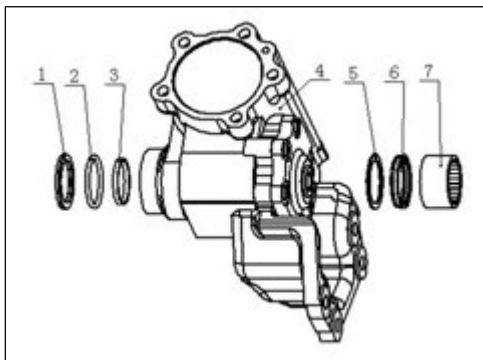


5. Upper case assembly

Disassembly sequence:

- 1、 elastic retainer ring for holes
- 2、 cup on input side
- 4、 upper case
- 6、 upper case O ring
- 7、 small O ring

Note: The needle bearing (3) and the connector(5) shall not be taken down, or they will be damaged.



14.Lower case assembly

Disassembly sequence:

- 1、 Cup on output side
- 2、 Lower case
- 3、 Seal ring on output side
- 4、 Seal washer on output side
- 5、 Dust ring assembly

Note: The needle bearing (7) shall not be taken down, or it will be damaged.

Steering



Inspection and repair

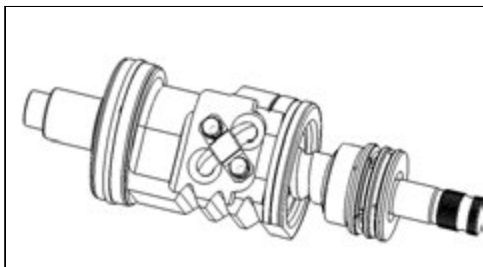
Necessary repair or replacement shall be made if any parts abrasion; damage or other problems are found during inspection.

- lower case
- rocker arm assembly
- rotary worm nut assembly
- oil seal cup
- bearing
- O ring and seal ring



Visual inspection:

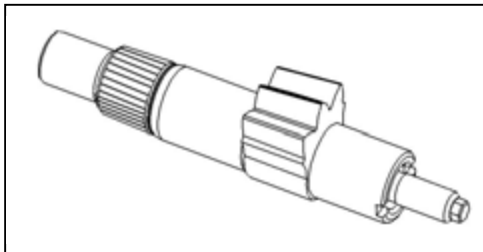
Check for any abrasion, damage or other problems of the following parts.



Turning of the worm nut

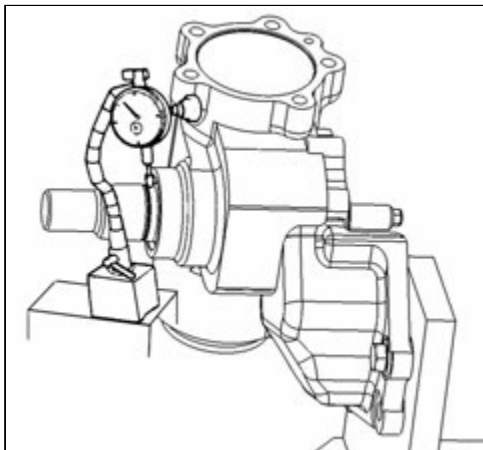
Turn the worm to see if it's smooth. Check the spiral chute, the valve bush seals and the nut seal for any damage.

Note: Do not disassemble the assembly and do not damage the outer round surface of the nut. If the valve bush seal or nut seal is damaged, change them with new ones.



Rocker arm assembly

Check the rocker tooth section and the bearing support for any abnormal wear. If any, have them changed at the authorized service station or manufacturer.



Clearance between rocker shaft and needle bearing on output side

Limit (mm): 0.2

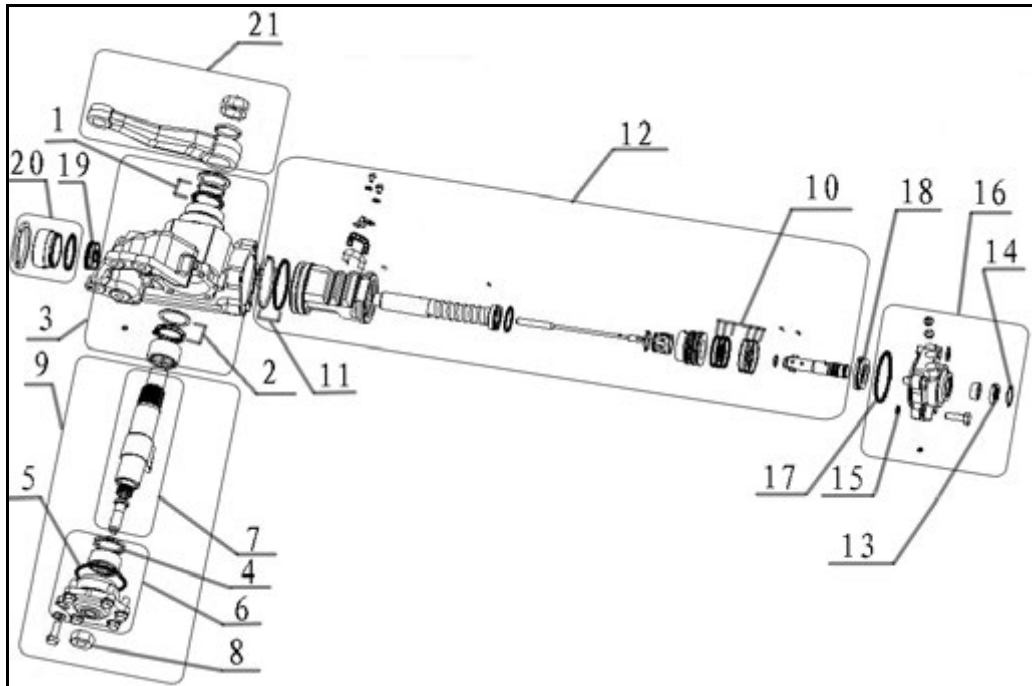


Clearance between nut and lower case piston hole

Limit (mm) :0.15

Steering

Reassembling of steering gear



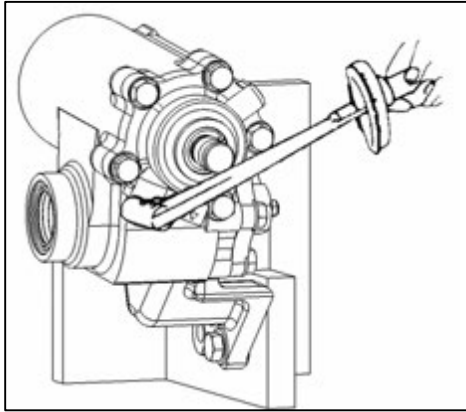
Reassembling sequence:

- | | |
|---|--|
| 1、 output side cup+ gasket | 2、 output side seal washer + seal ring |
| 3、 lower case assembly | 4、 side cover O ring |
| 5、 side cover cup | 6、 side cover assembly |
| 7、 rocker shaft assembly | 8、 locknut |
| 9、 side cover assembly + rocker shaft assembly | 10、 input cup |
| 11、 steering nut seal washer+ seal ring | 12、 rotary valve worm nut assembly |
| 13、 elastic retainer ring for holes | 14、 upper case O ring |
| 15、 valve bush seal ring + valve bush seal washer | 16、 upper case assembly |
| 17、 small O ring | 18、 thrust ball bearing |
| 19、 thrust needle bearing | 20、 locknut+ adjusting nut assembly |
| 21、 big nut +elastic washer +rocker arm | |

Steering



Warning: The worm, nut, steel ball and valve components in the rotary valve worm nut assembly are sophisticated parts that do not allow further disassembling; otherwise, all the assembly will be damaged. And the screwed out length should be controlled between the worm and nut, or the steel balls will fall out of the chute. All the seals must be changed with new ones after disassembling.



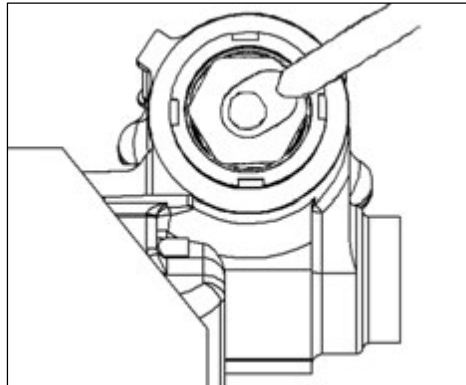
9、upper case assembly

screw tightening torque: 45N·m~55N·m



14、locknut

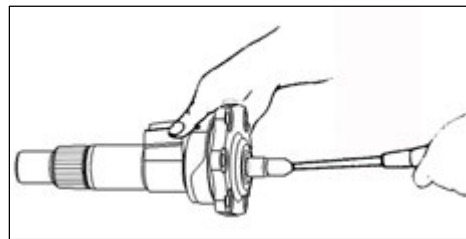
locking torque: 180N·m~210N·m



15、rocker shaft assembly

18、side cover assembly

Turn the adjusting screw of the rocker shaft assembly counterclockwise, until the rocker shaft end gets contact with the side cover bottom, and then turn 3-4 rounds backward.

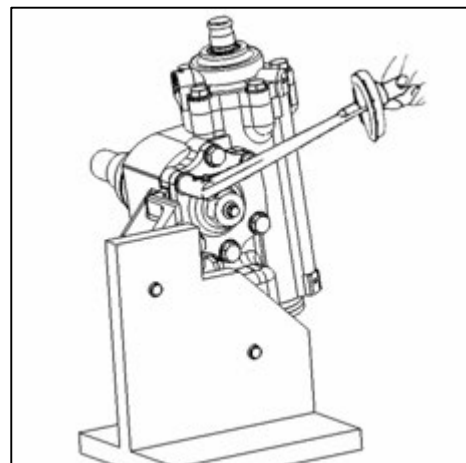


Side cover assembly +rocker shaft assembly

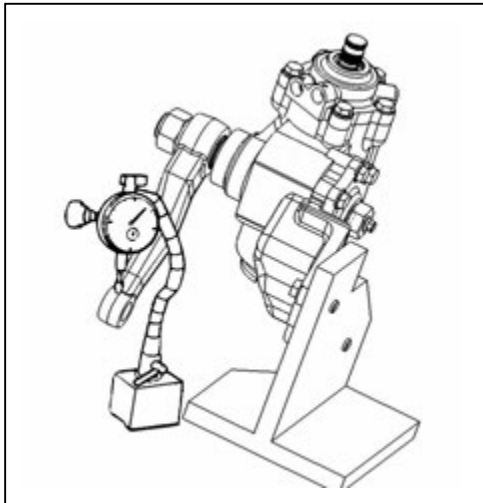
Screw tightening torque: 45N·m~55N·m



Warning: If the teeth are not installed correctly, the steering gear will have insufficient travel in one direction, causing a steering accident. In fixing the gear rack, check the spline for any damage, to avoid scratches in the oil seal of the cup.



Steering



11、locknut (side cover)

Adjust the clearance between the rocker shaft gear rack and nut rack

- (1) Fix the steering rocker arm
- (2) Have the steering gear in straight forward position (middle)

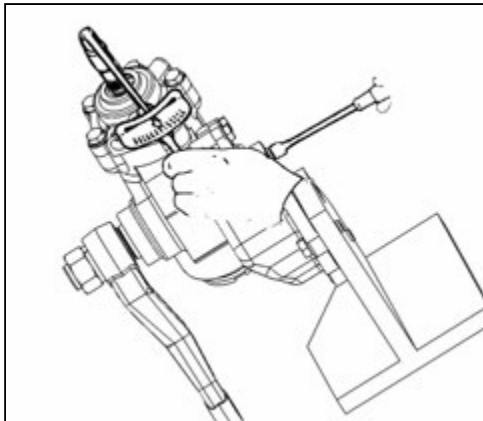


- (3) Adjust the clearance to the specified value

Gear clearance (mm): ≤ 0.33



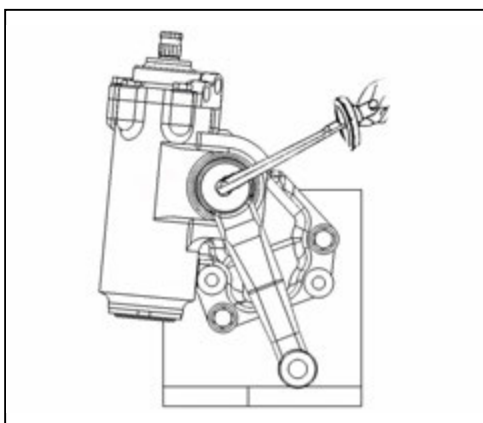
- (4) Tighten the locknut
Tightening torque (N·m): 65~80



- (5) Check the start torque of the input shaft



Start torque (N·m): 0.4~1.2



21、Tighten the rocker arm



In fixing the rocker arm, ensure that the tightening torque of the small end face of the rocker arm is:

250 N·m~280N·m



Warning: ① If non specified power steering fluid is used or two kinds of fluids are mixed, the sealing will fail, which causes no boosting for steering. ② If the steering gear stays too long at a limit position during operation, the steering oil pump will get damaged.

Power steering fluid filling and attention points

Oil filling: Fill the oil tank with oil first, start the engine, operate the drive pump at low speed to fill the hydraulic system with oil. During the engine running, the oil level in the tank will go down continuously, so, oil filling is needed all the time to avoid air suction into the pump. At the same time, turn the steering wheel right and left to its limit positions repeatedly for several times, until the oil in the tank stops going down.

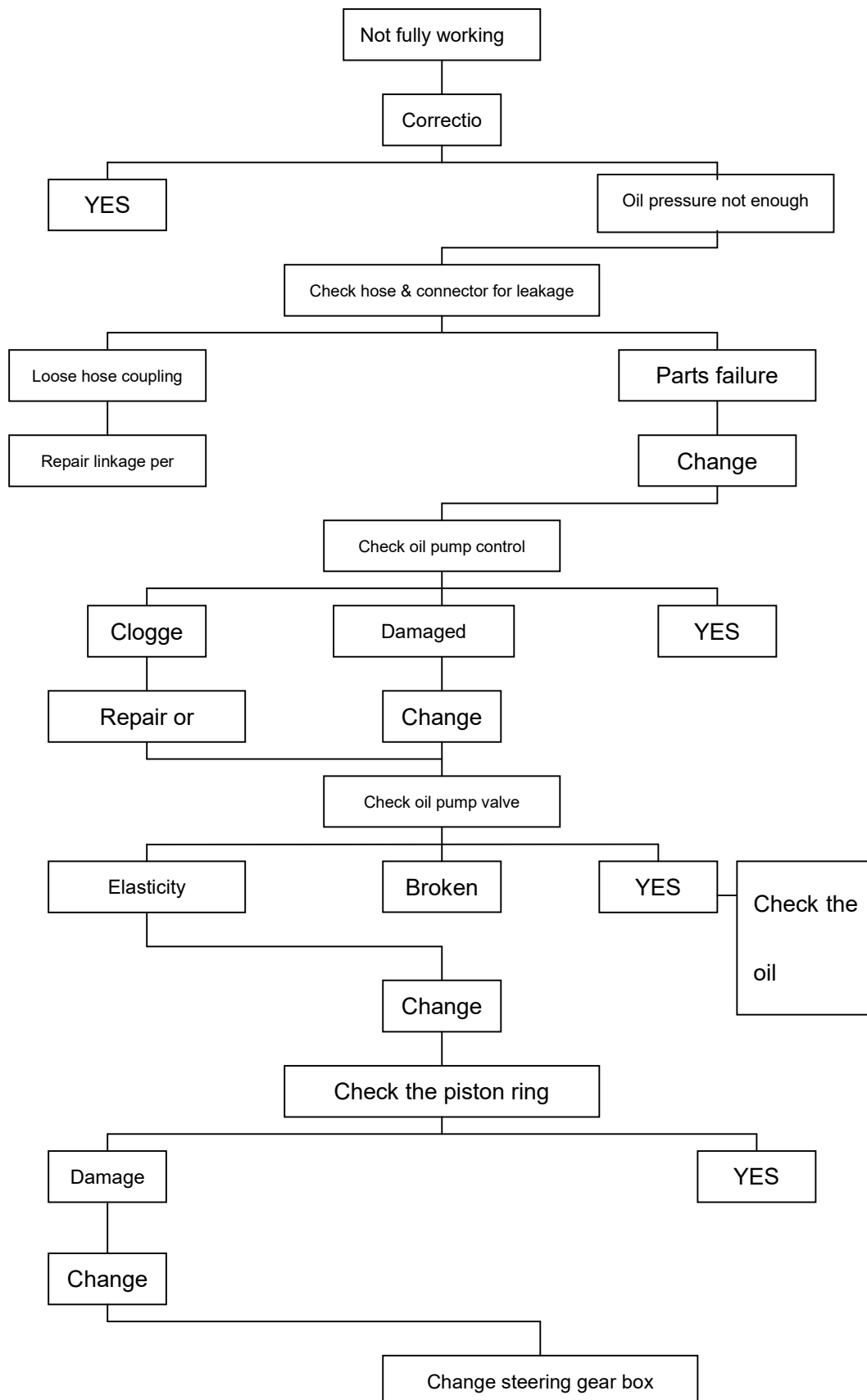
Oil change: jack up the front axle and open the oil reservoir cover. Open the return oil port of the steering gear, and start the engine in short time less than 15 seconds. Turn the steering wheel right and left continuously to its limit positions to drain off all the oil inside, and then fill in oil as per the filling procedure.

Exhaust: jack up the front axle, it will also do to remove the connecting rod, have the engine at idling, and turn the steering wheel right and left to its limit positions for several times drain off the air and vaporized oil. When bubbles are removed, the oil level in the tank will go down, and now oil shall be added from time to time until the oil level gets stable. By now the exhaust process is finished.

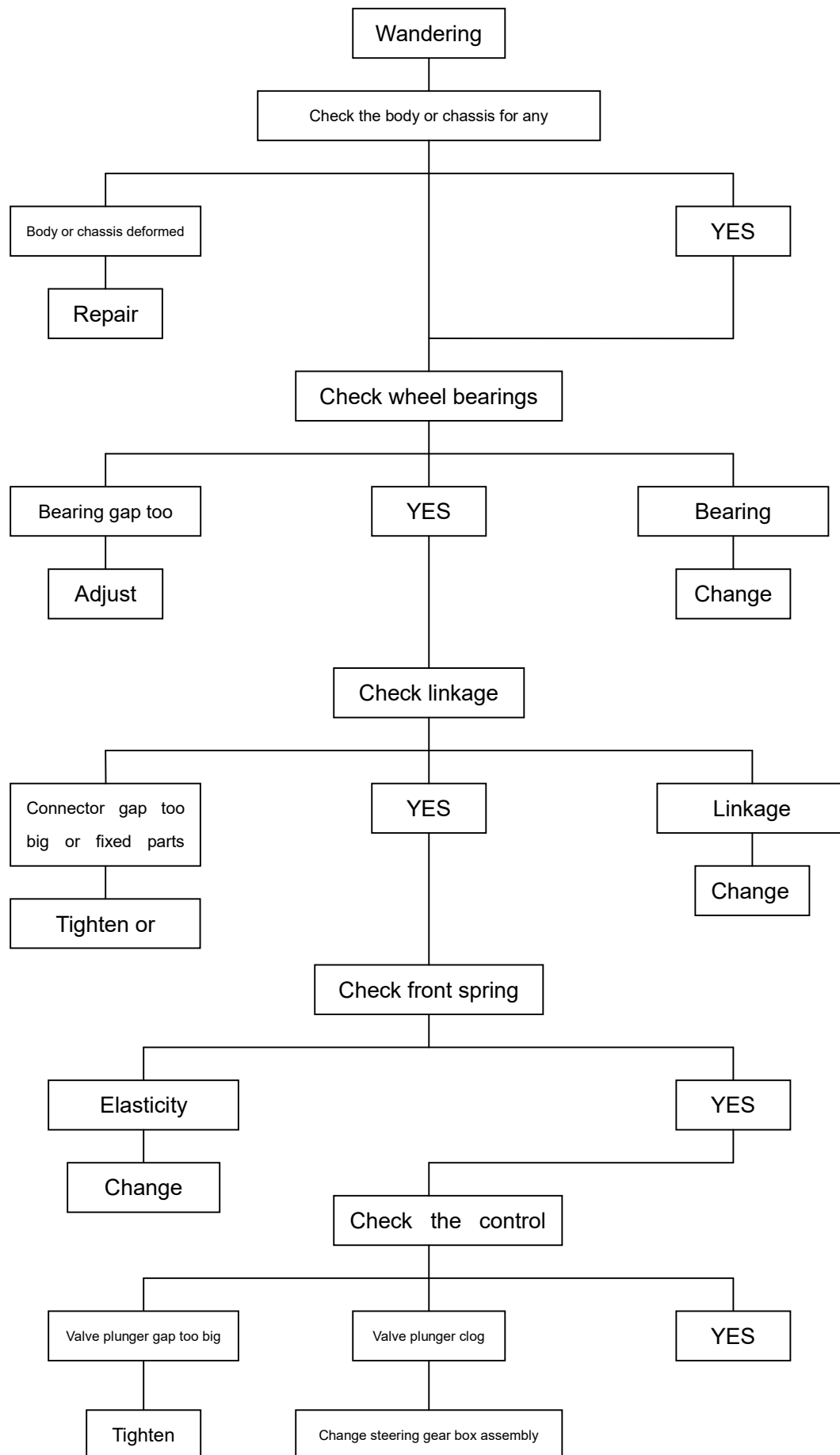
Attention:

1. It is forbidden to mix oils of different types for use.
2. The oil to be filled must pass the filter strainer in the oil reservoir of the steering system.
3. Oil must be added up to between the two specified scale marks on the measuring scale in the oil reservoir (After the engine is started for 3-5 minutes, check the oil filling if it is between the specified scale marks. If over-filled, oil will overflow after the engine is started; if under-filled, the rotary blade pump will get burnt down).
4. In regular oil change, the oil reservoir and filter element inside shall be cleaned and washed, without any foreign matters allowed in. Take special care that no cotton fabric textiles are used (such as cotton yarn and emery cloth, etc) to wipe the parts in order not to have any of them taken into the system and cause failures.

Trouble shooting



Steering



Steering

