Power Steering Pump Installation & Maintenance

1, Professional installation at qualified maintenance store is highly recommended!

2, Before the power steering pump installation, please empty the original steering hydraulic oil, and clean the steering lines to make sure the steering system is clean.

3, Components of steering hydraulic system and joint of pipes should be reliable and no leaking, and make sure the high-pressure oil pipes are not bent or flattened seriously.

4, Starting the engine without oil is prohibited, and duration of staying in the extreme position should be less than 5 seconds.

5,The provisions of the steering system should be filled in with the special hydraulic oil based on provision of vehicle manufacturer to .

6, After power steering pump installation, the tank should be filled up in the first time, and then start the engine, driving steering pump in low-speed to make steering hydraulic oil can flow through the whole steering system. Because to the oil level of oil tank may decline rapidly during the entire refueling process, it must be

refueled continuously to avoid the air running into the steering pump.

7, Please check and adjust the tension of the steering booster pump drive belt regularly according to regulation of original manufacturer. It requires a recheck and readjustment of the tension after a 5000 -km drive for the new power steering pump, and the purity of the hydraulic oil should be examined.

8, Please check and adjust the rotation, clearance and lubrication situation of the joints of moving parts . It’s needed to regulate or change the attrited parts while the gap is getting bigger, and also keeps it lubricant.

9, If the purity of the system is worse, replacing the steering hydraulic oil per 10000 km is recommended, as well as replacing the tank filter and cleaning the pipes .

The steering oil replacement method and attentive notes

The reduction of the steering oil, air admission and abrasive contamination will directly influence the working performance of the power steering device, and also the service life of it. Therefore, checking, supplement, replacing steering oil and exhausting are not only the preconditions of power steering device performance checking, but also an important routine maintenance work. Let's see how to inspect and replace the power steering oil.

1) **Inspection of the steering oil**

Running the engine at idle speed and turning the steering wheel to the end repeatedly to make sure the steering oil temperature is among 40 ~ 80 ° C. After that, if the steering oil is foaming or changing into white, which means the oil should be replaced. (oil level should be among the prescribed scope, if the oil is insufficient, special and prescriptive steering oil should be supplemented after checking every part to make sure there is no leakage.

2) **Replacement of the steering oil**

Apart from replacing the hydraulic oil when it goes bad, it should be replaced regularly.

Method:

First, set up the front wheels and loosen the oil drain plug or return pipe under the power steering gear to let oil into the container.

Second, start the engine at idle speed and keep turning the steering wheel to the end repeatedly to drain the oil until it is empty. Please use the special and prescriptive steering oil and filter it with strainer in order to prevent the impurities getting into the oil when adding the steering oil into oil tank until it reaches the specified level. When the engine is running at idle speed, turning the steering wheel from left to right until there is no air in the the oil and the oil becomes milky white.

Then recover the steering wheel to the original position(straight direction) and keep the engine running for 2 ~ 3 minutes to see whether the oil becomes white again and stop the engine when it is normal. Check the oil level to see whether it is up to the standard after the road test. Oil level should be confirmed under the thermal state for the reasons that the pipe for oil circulation in the power steering gear is bend and tiny, and the temperature of working has a great difference with that in cold state.

3) **Exhaust of the steering oil**

During the using and adding oil, the air is not allow to exist in the power steering gear, especially after overhauling the gear, it is

necessary to conduct a exhaust to make sure the gear works normally. Set up the steering wheels and let the engine running at idle speed. Then use a plastic hose to connect the air bleed plug of the power steering device and the container, and turn the steering wheel to the extreme position repeatedly. Wait until the power steering gear is mainly full of hydraulic oil and put down the wheels. After unscrewing the air bleed plug to make the system let out the air through the air bleed plug under the high pressure. Turning the steering wheel to the extreme position repeatedly again and letting out the air until the container has no more bubbles or emulsion. If the liquid level shows little change after the engine stalls, which means the air has been let out completely.

During the air bleeding process, air may get into the container again if the oil level is too low, thus adding steering oil to maintain the level is necessary.

After finishing the above procedures, run a sealing inspection of the power steering gear(more details please read the maintenance of power steering gear) to ensure that there are no pipeline leak.

So far the replacement of the steering oil is completed.

Installation requirements:

1,Before installation, carefully examine and clean the inlet and outlet joints, storage tanks, piping system to ensure smooth flow and free of impurities to prevent dirt in the oil causing premature wear, strain, and noise or even causing damage to the steering pump.

2,Remove inlet and outlet hose lines from the reservoir and drain the fluid into a container

3,Remove outlet hose from steering pump and drain the fluid into a container.

4,Steer the steering wheel left and right to extreme position several times to drain the fluid on both sides of the steering pump (where the oil will be drained from the return port).

5,Remove all the hose lines; drain out fluid residual.

6,Assemble each hose according to original assembling stage, add qualified hydraulic fluid into reservoir. When assembling the hoses to steering pump, inlet hose should be assemble first until fluid flowing out from outlet port (can be aided by turning the steering wheel without starting the engine), then assemble the high pressure outlet hose.

7,Bleeding method: After steering pump is completely assembled, turn the steering wheel right and left to the extreme a few times, start the engine maintain the idle speed to 1000rpm then turn the steering wheel right and

left to the extreme and stay for 2~3 seconds, repeat it for few times, then turn the steering wheel to center position, keep the engine running for 3~5 minutes in idle stage, check the reservoir to see if the bubble has disappeared. If bubble is still visible, then repeat the above method and check again, if the bubble problem is not solved, then system leakage inspection should be carry out.

8,According to the product installation size requirements, direction for connecting inlet & outlet hose to steering pump should be carried out correctly.

9,Standardized operation should be imposed during installation of steering pump, gently insert into the mounting position, in order to avoid excessive pump radial force, causing abnormal wear resulting in abnormal sound, thus force is strictly prohibited.

10,Check the filter gauge inside the fluid reservoir for blockage caused by dirt.

11,Belt tension should be appropriate, 800-900N is recommended.

Maintenance

1,Hydraulic fluid should be changed every 2500 Kilometer for new car. Carry out cleaning process on reservoir, hose lines before changing to ensure the steering system is clean.

2,Maintenance and checking for harmful sludge, debris in steering hydraulic system should carry out on vehicle after travelling for 20,000 kilometers and replace hydraulic fluid.

3,Regular check on fluid reservoir and replace filter.

4,When reaching the steering extreme position, the duration should not exceed 5 to 10 seconds, due to the pump outlet flow is zero, fluid in the pump overflow from safety valve returned to inlet port and circulate internally., therefore all the mechanical energy is converted into heat, thus overheating will cause excessive wear and shorten the life of the pump, or even resulting in stuck, broken shaft and so on.

Fault & solution for noise and vibration

Fault location	Cause	Solution
Hydraulic pump	Air enter through bad shaft seal.	Replace seal
	Hydraulic pump and motor mounting surface coupling misalignment	Installation coaxial requirement should be less than 0.1mm.
Air enter into hydraulic system	Inlet hose sealing not tight causing air intake.	Tighten nuts on joints, ensure good sealing.
	Insufficient fluid in reservoir	Refuel fluid to maximum level.
	Suction pipe blockage or inlet pipe small in diameter	Clean suction pipe or replace larger diameter inlet pipe.
Relief valve	Function failure leads to system pressure fluctuations and noise. The causes: 1. Impurities in reservoir causing orifice blockage. 2.Gap between the valve and the valve hole is too large 3, spring fatigue or damage, the spool does not move freely. 4, due to glitch or dirt, etc. limiting the flexibility and free movement of the spool .	Take appropriate measures as following: 1, clean and dredge orifice. 2, grind the valve hole, replace new valve, readjust the gap. 3, replace the spring. 4, debarring, cleaning the dirt in pump body, thus allowing the spool movement flexible without blocking
Fluid hose arrangement	Fluid hose too long and without hose clamp will cause the pipeline to vibrate when hydraulic fluid passing through.	Long hose should be separated from each other and appropriate additional hose clamp should be used.

Fault & solution for insufficient pressure and no pressure

Fault location	Cause	Solution
Hydraulic pump	Relative motion surface wear, the gap is too large, serious leaks.	Replace pump
	Parts damage	Replace pump
	Poor pump core quality (tiny spores in core) causing internal oil bleed.	Replace pump
	Air suck in during intake, fluid leaking when discharged.	Tighten the joints to ensure maximum sealing, if the problem is not solved, replace the seals or relevant parts.
Overflow Valve	Valve opening is stuck, pressure unable to build up.	Repair the valve enabling the valve body move flexibly.
	Orifice blockage.	Clean orifice.
	Ball valve and valve seat seal is not tight.	Replace the ball or repair the seat.
Hydraulic Cylinder	Gap is too large or seal ring damage, causing high-low level interoperability.	Repair piston, replace seal, if excessive wear or glitch occurred, it can be repair or replace.
Hose line	Leakage	Tighten all joints to prevent leakage.

Fault & solution for insufficient flow or no flow

Fault location	Cause	Solution
Hydraulic pump	Interior parts badly worn or damaged.	Replace pump.
	Pump shaft does not rotate(belt slipping or disconnect)	Make adjustment and install properly.
	No suction in pump: (1) Clogging in suction pipe or suction strainer. (2) Bad sealing on suction pipes. (3) Low oil level in pipelines.	Take the following corresponding measures: (1) Clean and remove clog. (2) Check the pipe connections, replace sealing gasket. (3) Add fluid till the inlet pipe is completely immersed.
	Fluid viscosity does not meet the requirements.	Replace fluid with appropriate viscosity
Hydraulic valve	Relief valve not adjusted properly (too high will cause stuffy fluid, too low will result in less flow)	Adjust correctly as require.
Fluid hose	Leakage due to busting hose.	Replace fluid hose.

Fault & solution for high fluid temperature:

Fault location	Cause	Solution
Hydraulic pump	Badly worn pump parts damage the membrane during pump exercise, creating large internal leakage and volume damage resulting in over heating	Replace new parts.
Hydraulic valve	Relief valve, unloading valve regulating pressure too high.	Adjust to appropriate desire value
Operating parts	Spool valve and valve body, piston rod and oil seal fitting too tight, causing mechanical friction and heat between parts during operating motion	During repair, note that higher attention should be taken on precision machining of the relative moving parts(like slide valve)and precision assembling on various hydraulic parts, etc.
Fluid hose	Fluid hose diameter too small, too long and too many bends causing loss in pressure thus building up heat.	Make sure the main return fluid hose properly install to ensure smooth flow, reduce unnecessary bends, and hose length.
Fluid reservoir	Not enough cooling surface.	Increase capacity, improve cooling conditions.
Oil cooler		Increase the cooling area, improve the cooling effect

Heavy in turning

Fault	Cause	Solution
Heavy in turning	High fluid viscosity causing poor suction of hydraulic fluid.	Use correct hydraulic fluid.
	Low fluid volume in reservoir.	Refuel hydraulic fluid promptly.
	Reservoir or filter blockage.	Clean hose and filter
	Joints in hydraulic system not properly tighten	Tighten all joints.
	Bending radial of fluid hose too small or crack on hose.	Replace hose.
	Pump steady flow valve stuck in fully open state, the amount of oil spilled internally causing insufficient pressure	Dissemble the valve, clean oil valve and valve hole and damping valve
	Low tire pressure	Inflate air.
	Steering rack faulty	Repair or replace steering rack
	Low fluid volume in reservoir	Refuel hydraulic fluid promptly