Startup Procedure for a Spindle Motor

If you thought a spindle motor is plug and play, then think again. This document is straight from the motor manufacturer Changzhou Huajiang Electrical co., and it outlines what you should do to maximize the performance of your spindle motor. Much of this is common sense, and some seems excessive, but then you choose the risks you are willing to take. Some of the English and wording was enhanced for clarity.

1、The spindle and the frequency converter should be selected for use together. The specifications and parameters of the frequency converter should match those with the rated parameters of the spindle motor. If the VFD is configured incorrectly, the spindle may be damaged.

2、Before using a water-cooled electric spindle, make sure that the cooling circulatory system is working properly. Using it without proper cooling is prohibited. Calculate the cooling water as per 1L/(kw minute), and the cooling water flow rate should at least 5L/minute, the connection between the cooling water pipe and water inlet must be reliable and without leaks.

3、Coolant liquid must be clean, and not greasy. The environment (room) temperature must be between 5℃ & 30℃. If the environment temperature is higher than 30 ℃, then the coolant must be refrigerated. For precision machine tool use, the coolant temperature should be maintained at 20 ℃ +/- 2 ℃ .

4、After storing or transporting a spindle, the high speed grease in the bearings will need conditioning by running the spindle at the minimum speed for 30 minutes, and then gradually increase the RPM to the operating speed over the next 20 minutes. If the motor is run at high speed immediately without a run-in period, the spindle motor may exhibit foreign noises, and excessive heating in the bearings, etc. This may affect the bearing and motor life. The spindle should be turned on (low speed) for 15-30 minutes weekly for the long term use purpose.

5、When clamping the cutter into the spindle, the tube clamping nut and inner cone shall be cleaned each time to avoid dirt related run-out problems. For proper tool alignment and clamping force, the tool or its holder must be inserted more than 15mm into the clamp.

6、The spindle must be preheated every day, and when the spindle reaches the processing speed, run it for 15-20 minutes before machining. The spindle should not be run continuously for more than 22 hours a day to prolong the use life.

7、It is strictly forbidden to knock (bang, hammer, or use force) on the spindle end cover. During transportation, storage, or in use, knocking the spindle is strictly prohibited, especially the shaft end.

8、The spindle should run according to the assigned direction. A right hand threaded spindle nut indicates that the spindle should rotate clockwise as seen from above (opposite end of spindle).

9、Assemble the spindle according to the drawing.

10、Water-cooled spindles require the water temperature to be within 22-25℃ for proper cooling performance.

11、Forced air cooled spindles require the forced air to be cleaned by using an oil and water separator, and a drying filter. The air pressure should be about 0.2-0.25 MPa (30 - 36 PSI), and filtered with a 5μm or better filter. The bearings can be damaged from rust and dirt.

二、Maintenance

1、When abnormal noise or vibration is especially large in the operation process, check the bearings immediately and replace with new bearings as needed. If there is abnormal smell or motor stops suddenly during operation, immediately turn off the power supply. Test the motor winding resistances, and the breakdown resistance to ground with a megger. If the insulation resistance is too low or the windings resistance is wrong, then the motor is burned out. The spindle should be sent back to the factory to for repair.

2、The spindle grease should be replaced regularly by professionally trained personnel.

3、The spindle should rotate freely when turned by hand, and show no signs of mechanical rubbing.

4、The spindle should only be repaired by professionally trained personnel or sent back to the factory.

三、Maintenance notice

Maintenance personnel must be trained before they are qualified, and the maintenance place must be clean and should be strictly dust-proof. Special tools should be used when disassembling the spindle, it is forbidden to knock hard in order to avoid damage to the parts.

1、 Disassemble the spindle

（1）、Remove the connecting seat and remove the rear cover and rear nut.

（2）、Disassemble the front dust proof shield, take off the nut, and disassemble the front cover.

（3）、Press out the rotor assembly.

（4）、Take out the rear bearing assembly from the housing.

（5）、Press out the front bearing assembly.

（6）、(If only changing the bearing, and not changing the stator, this step can be omitted) remove the front cover (note: the front cover and the housing have the direction relationship on circle), take the stator from the housing, it is strictly prohibited to break off hard.

2、Spindle assembly

（1）、All parts must be cleaned with gasoline of 120 # before assembly to prevent the dirt from being brought into the housing; otherwise it will affect the accuracy and life of the spindle.

（2）、The assembly procedure is opposite to the disassembly procedure.

（3）、Some spindles have a separate bearing ring. The new bearing should come with a new ring. Tighten the ring to the specified tolerance. The parallel difference between the two sides of the ring shall be no more than 0.002 mm.

（4）、The bearing shall be pressed onto the shaft and then pressed into the housing. Press only, never hit the bearing during installation.

（5）、After the spindle assembly has been completed, spin the shaft with your fingers. There should be no play in the bearings or the shaft. There should also be no binding, rubbing, or noise as it spins. Test the spindle from low speed to high speed according to the test program.

四、Common problems and possible solutions

Problem	Reason	Possible solution
Does not try to run	1、No output or wrong setup for the frequency converter	Check the output setup.
	2、 forgot to plug the cable in	Check the plug and cable.
	3、Plug connection cable is defective	
	4、The stator winding is burned up	Change the winding.
Run for seconds then stops running	1、water leaked in and damaged the winding insulation.	Heat the winding to dry it thoroughly. Repair leak.
	2、High temperature caused the winding to fail.	Change the winding.
	3、One Phase missing. Current protection fault.	Check the connect cable. Need 3 phases to run
	4、Startup time is too short.	Extend the acceleration time.
Smoke comes out or housing heating after running for seconds	1、The output voltage and frequency is different between the frequency converter and spindle.	Check the basic frequency setup of the frequency converter.
	2、The frequency converter setup is wrong	Reset the frequency converter
	3、Water circuit problem	Check the water circuit
Nut loosens on startup	1. Motor running in reverse 2. Nut not properly tightened	1. Change the screwing direction as per the label. 2. Properly tighten the nut.
Excessive Noise & vibration	1、The bearing abrasion is serious.	Change bearing
	2、Component precise is damaged and affect the balancing.	Balancing.
	3、Shaft play is big.	Change the shaft.
Nut loosens on stopping	1. Deceleration time is too short. 2. Nut not properly tightened	1. Extend the speed slow down time. 2. Properly tighten the nut.