
Maintenance Procedure

Spindle Motor for
FP-21T model 60-100

MITS Electronics

MITS ELECTRONICS

Aug 25, 2008

Thank you for purchasing our PCB prototyping machines.

To ensure correct operation, please read this manual carefully to learn how to handle the spindle motor provided with the PCB prototyping machine.

[Before using the spindle motor]

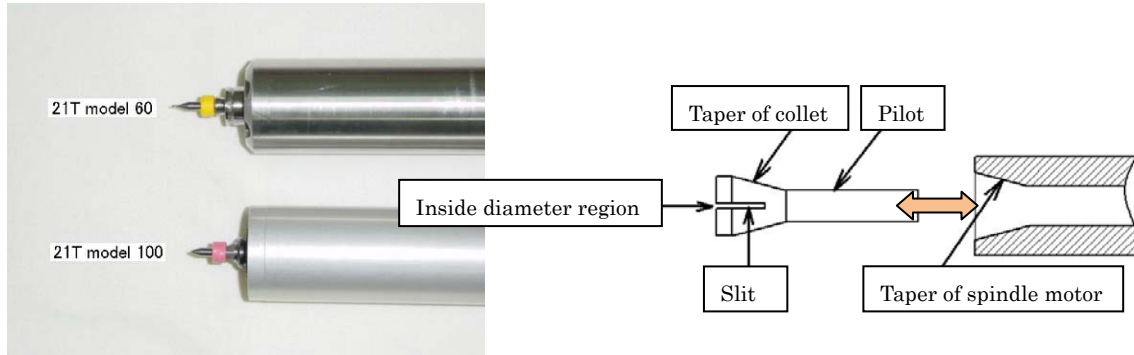
This spindle motor is used for FP-21T model 60, model 100 of our PCB prototyping machines. It has great features of high speed and high precision. This spindle motor is widely used for same types of machines provided by many other companies. From this fact it is obvious that it is the only one spindle motor in the whole world which has advantage of compactness, high velocity revolution, and high precision.

Although it has great features, the spindle motor is such a delicate product that it needs to be handled with great care. We are asking you to use the spindle motor with great care in order that you should take full advantage of the spindle motor without any troubles.

Please ensure to use this spindle motor in accordance with the following instructions.

1. Needs Frequent Cleaning

The initial failure of a spindle motor is mostly caused by scraped particles getting inside a collet chuck.



Scraped particles are generated every time when the spindle motor cuts a board or etc. We have already provided our PCB prototyping machine with vacuum cleaner function. However, it is difficult to completely avoid a small amount of scraped particles getting into the engagement region between the collet and the body of the spindle motor.

The parts shown in the picture above have the structure as shown in the drawing at right. You need to clean these designated parts: the inside diameter region, the slit, the taper, and the pilot of the collet; and the taper region within the spindle motor.

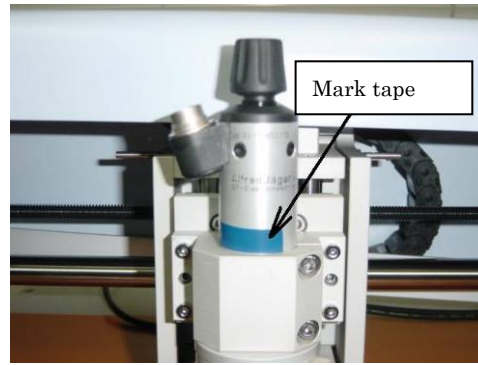
Even a small amount of scraped particles remaining in the engagement region can deteriorate the rotational precision and weaken the holding power of a drill. Gradually the drill may become loose resulting in failure of the spindle motor and finally damage to our PCB prototyping machine.

We highly suggest that you clean the spindle motor with the cleaning set provided every time you finish processing.

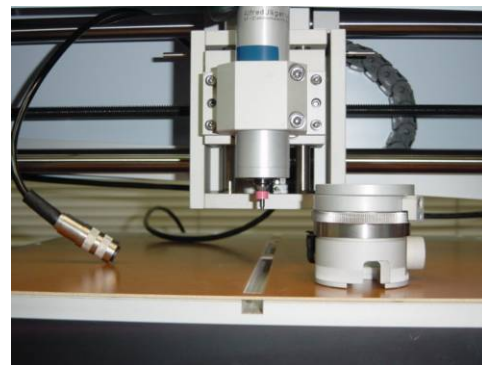
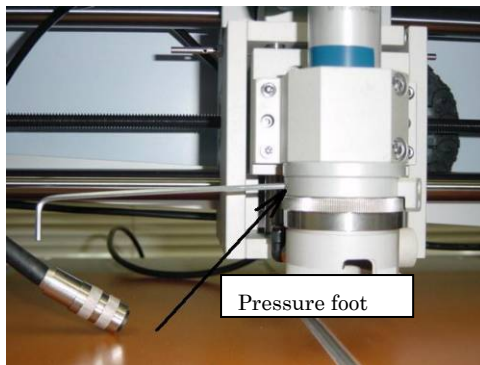
<How to clean the spindle motor>

Clean the inside of the taper with a brush provided with the system.

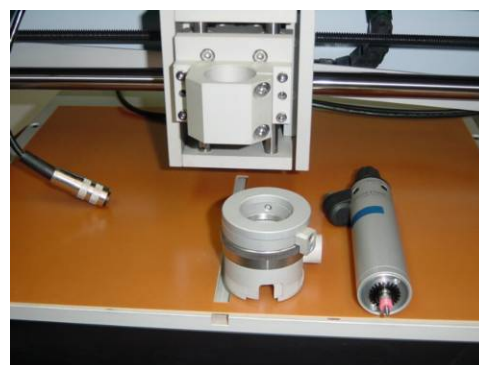
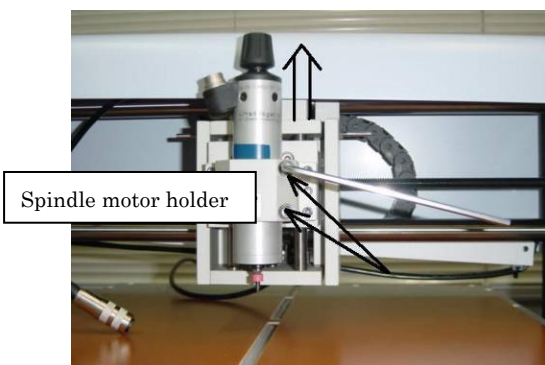
Do not use the air unit while cleaning the spindle motor. If you use the air, scraped particles are more likely to get into the inside of the spindle motor.



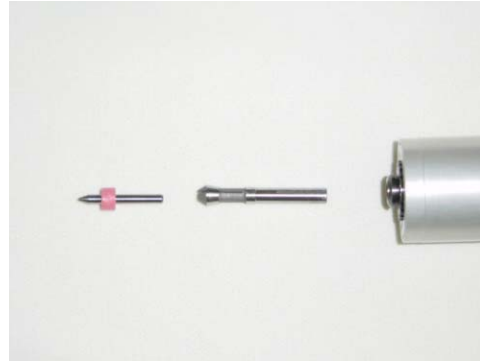
- 1) Remove a connector of the motor.
- 2) Mark the place for the motor to be mounted with a colored tape or etc. as shown in the photograph.



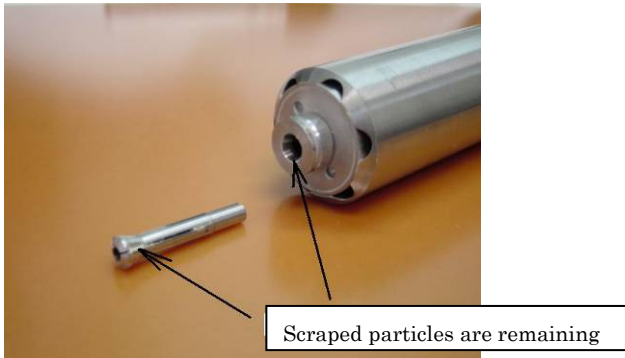
- 3) Loosen the set screws of pressure foot.
- 4) Remove pressure foot.



- 5) While holding the spindle motor, loosen screws of the spindle motor.
*Note: Do not tighten the screws too hard when mounting the spindle motor again.
- 6) Remove the spindle motor through the top.



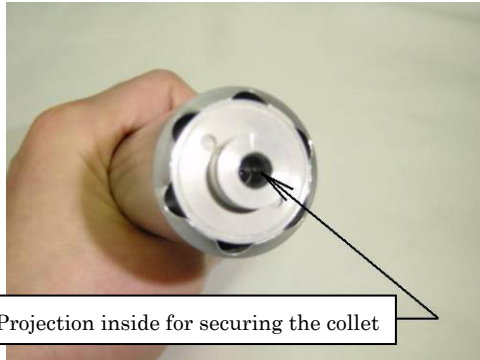
7) Press down a change knob, and then rotate the change knob counterclockwise (as viewed from the top) to remove the collet gradually. The knob should be pressed down firmly while being rotated.



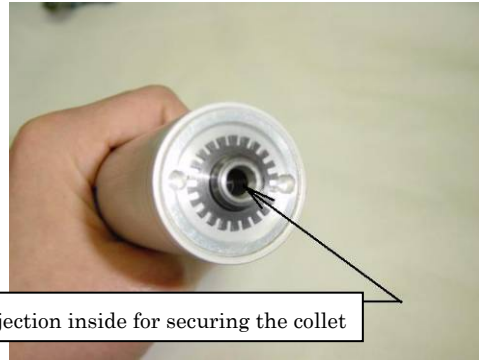
Scraped particles are remaining in the collet, and the taper region inside of the spindle motor.



8) Remove scraped particles from the collet and the taper region. Never use the air when removing scraped particle.



Projection inside for securing the collet



Projection inside for securing the collet

9) Set the collet in the spindle motor after finishing cleaning,
 There is a projection on the inner surface of the spindle motor for securing the
 collet.

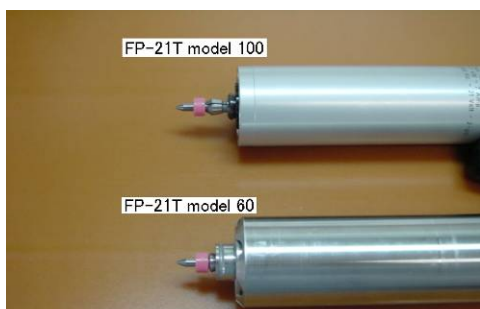


A flat area for securing the collet within
 the spindle motor

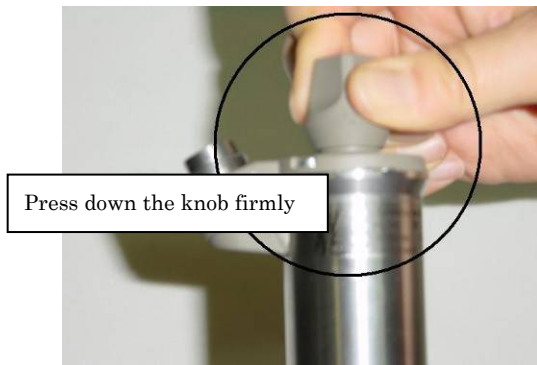


The collet after being inserted into
 the spindle motor completely

Ensure that the flat area of the collet (see the photograph at left) is fitted to this
 projection. Turning the collet little by little in order to fit to this projection. The
 collet can easily go all the way to the end, if it is fitted in the right spot. Do not
 push the collet with excessive force. It will hurt a shaft within the spindle motor.



Be sure to install a dummy tool in the collet after setting the collet.



Do not rotate it unless the knob is pressed down enough. It will cause wear and tear of the engagement inside.

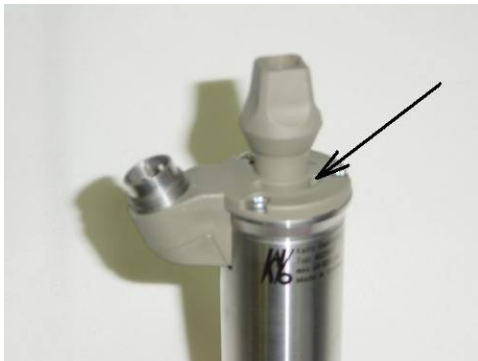
After setting the tool, press down the change knob, and then rotate the knob clockwise as viewed from the top.

Knob should be rotated while being pressed down firmly.

2. Ensure to prevent scraped particle from entering inside through the knob.

For the same reason above, the force of fastening the drill will become weakened if scraped particles get inside through the part designated with an arrow as shown in the photograph below.

Please be sure to use the spindle motor with less dust



3. Handling a Knob

1) Release a Knob lock.

After completing the replacement of a drill, please ensure that the knob is in upward position.

In the operation of spindle motor, do not turn on the power with the knob in downward position. It may cause burnout.

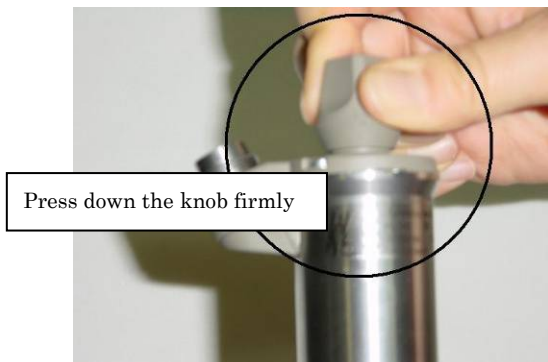


2) Replace the tool after the motor has completely stopped

Never turn the knob to replace the tool before the motor has completely stopped. It is extremely dangerous to do this, and will also lead to damage of the knob engagement.

3) Tightening the drill completely

Ensure that the knob engagement is in proper position. Turning the knob in improper position will damage its engagement tooth.



Do not rotate it unless the knob is pressed down enough. It will cause wear and tear of the engagement inside.

Especially for router cutting, a large torque is needed. For this reason, if you fail to fasten the knob enough, the tool will become loose gradually and coming off from the chuck. You need to tighten the knob more firmly especially for router cutting.

4. Need to install a drill in the collet

Be sure to install a drill or a dummy tool in the collet all the time.

And also, never tighten the collet without installing any drill in it. It will decrease the precision of the collet and cause malfunction.

5. In case something abnormal occurs

If you find something wrong, stop the machine immediately.

Remove the spindle motor referring to the description in the section of “How to clean the spindle motor” above, and then send this spindle motor to our company. Please do not disassemble the motor and nor reassemble it by yourself.

6. Advice to have a spare spindle motor

If you use our prototyping machine too frequently, we encourage you to have a spare spindle motor

7. Warranty for spindle motor

The spindle motor is covered by one year warranty under normal use with appropriate maintenance. However even within one year, if the total operation hours of the spindle motor exceeds 2000 hours, your spindle motor has to be repaired at your own expense. .

One year warranty does not cover damage by improper use as described above. The repair cost is expected to be substantially high as the repair needs the replacement of precision parts and precise assembly

8. Overhaul

Basically, we encourage you to overhaul your spindle motor with more than 2000 operation hours. After the overhaul, you will obtain the spindle motor having the similar features as a new one.

9. Collets are expendables

Collets are expendables and need periodical replacement.

It is time to replace the collet when the surface of the collet become lusterless or the collet is no longer able to chuck the tool bits securely enough.

