

NT Hyper Spindle

Instruction Manual

HP HP-H



Thank you very much for purchasing our NT Hyper Spindle.






This instruction manual provides the description of the correct usage and precautionary remarks on handling.







Read this manual thoroughly and use the product in the correct manner.

Safety Instructions



To use the product correctly for your safety and to avoid hazardous conditions and property damages, this instruction manual provides various safety information and warning.

| | |
|--|--|
|  WARNING | Indicates hazardous conditions that, if not faithfully followed, could result in death or serious injury. |
|  CAUTION | Indicates hazardous conditions that, if not faithfully followed, may result in injury or property damages. |

|  WARNING | |
|---|--|
|  Attach tools and collets correctly. Failure to do so may cause drop or fly out cutting tool or collet during machine operation, and may consequently result in injury. |  If any trouble occurs, stop use immediately. Failure to do so may cause drop or fly out of tools or collets during machine operation, and may consequently result in injury. |
|  Mount Hyper Spindle on the machine tool correctly. Follow the description in the instruction manual of the machine tool. Failure to do so may cause hyper spindle drop or fly out during machine operation, and may consequently result in injury. |  Do not disassemble or modify hyper spindle. Hyper spindles are designed to the specifications of the corresponding tools and machine. Disassembling or modification may result in tool damage or hyper spindle failure. |

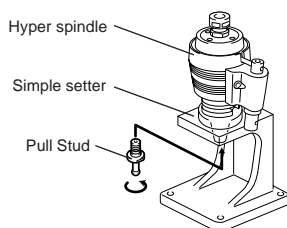
|  CAUTION | |
|---|--|
|  Do not touch tool with bare hands. When attaching or removing your cutting tool, use a waste cloth or wear gloves. Failure to do so may result in injury when touching the cutting edges. |  Do not touch tools or hyper spindles on completion of continuous operation. You may suffer burns because tools or hype spindles are heated to high temperatures during operation. |
|  Do not touch the rotating tool or hyper spindle. When replacing a tool or attaching/removing a collet, make sure that it is stopped completely. Touching a rotating tool or hyper spindle may trap your hand and result in injury. |  Use our products. Use the NT hyper spindles and collets. To avoid tool damage or failure, do not use different manufacturers' products. |
|  Use a protective cover or wear goggles during cutting to avoid injury resulting from chip fly out. | NOTE NT Tool Corp. assumes no responsibility for any machine trouble while NT products are used. After workpieces are machined with out NT products, be sure to measure the accuracy. |

About Maintenance

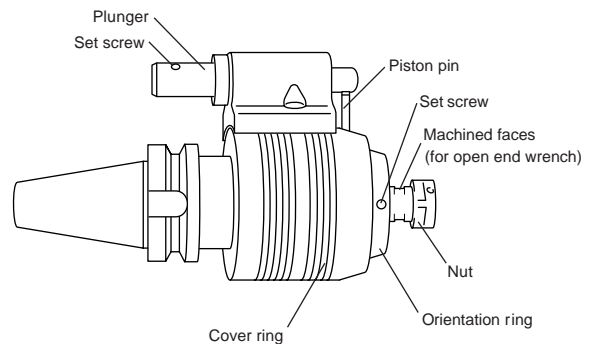
- When Hyper spindles are not used over a prolonged period, wipe them clean and dry, and apply rust inhibitor.
 -  Water-soluble coolant, rust, oil film, dust, etc. remaining on the hyper spindles may stick and result in operation failure.
- If any trouble occurs, stop use immediately.
 -  Failure to do so may cause tool drop or fly out during machine operation, and may consequently result in injury. If repair is necessary, contact your local distributor.

Attaching the Pull Stud

- Firmly fix hyper spindle to NT simple setter or a fixing jig.
- Attach the pull stud to hyper spindle.
Choose a pull stud to match with the machine spindle.
For details on attaching, refer to the Pull Stud instruction manual.



Nomenclature



How to check the plunger's projection length

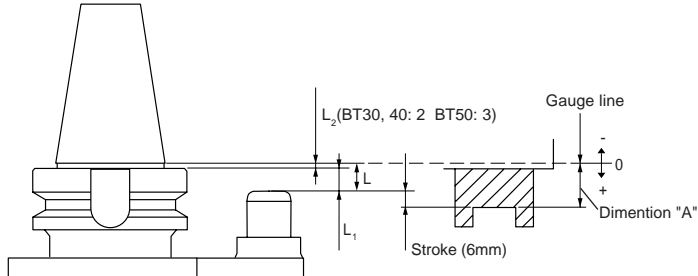
! Plunger's projection length is not factory-set. Adjust the end of hyper spindle plunger to Dimension "A" of the positioning block mounted on the machining center for which the hyper spindle is to be used.

L : "Dimension A" - Stroke (6mm)

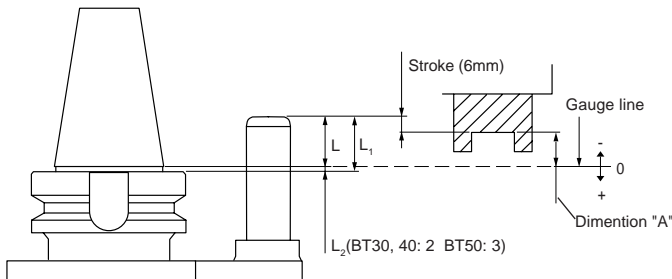
L₁ : Distance from the flange end face to the plunger end face

L₂ : Distance from the flange end face to the gauge line
("2mm" for BT30 & BT40, "3mm" for BT50)

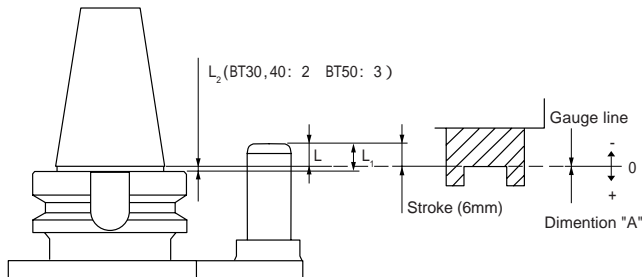
- When "Dimension A" is + (plus)



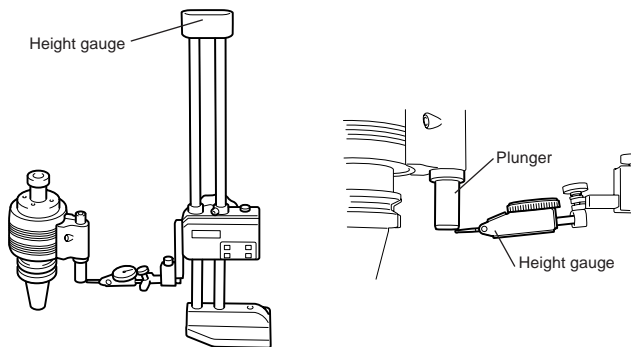
- When "Dimension A" is - (minus)



- When "Dimension A" is 0 (zero)

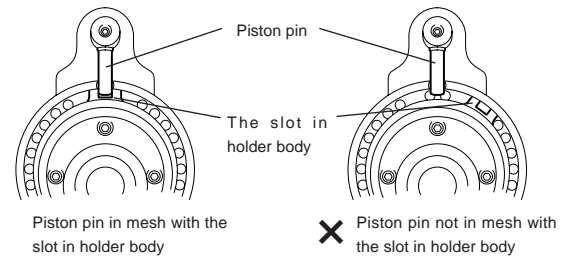


1. Using height gauge, measure Dimension L₁ (distance between the flange end face and the plunger end face).



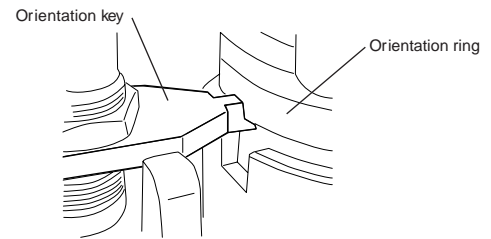
HP07, HP09, HP12, HP25, HP07H, HP09H, HP12H

! Measure Dimension L₁ with piston pin in mesh with the slot in holder body.



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! When measuring the dimension L₁, the orientation key must be set in the R groove portion of orientation ring.



2. Obtain Dimension L₁ from the following equations:

$$L = \text{Dimension "A"} - \text{Stroke (6mm)}$$

$$L_1 + L_2 = L$$

! When the actual Dimension "A", as measured from the gauge line or reference line, is off toward the NT taper from the theoretical or designed

Dimension "A", it is defined to be on the minus (-) side; When the actual

Dimension "A", is off toward the head from the theoretical or designed

Dimension "A", it is defined to be on the plus (+) side.

! Stroke and Dimension "L₂" should ALWAYS be of plus (+) value.

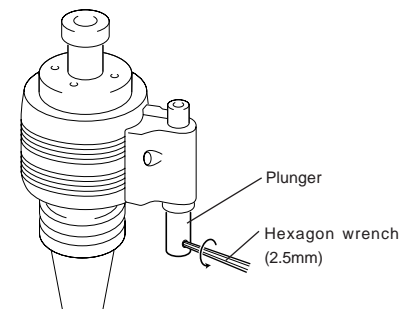
3. Plunger position setting is correct when the measured Dimension L₁ is the same as the calculated Dimension L₁.
4. When plunger's projection length setting is correct, adjust plunger angle as required, mount tooling on the machine, and check to see that ATC takes place without a glitch.
When the plunger position setting is not correct, readjust the plunger for correct positioning in accordance with the "Adjusting the plunger's projection length" procedure.

Adjusting the plunger's projection length

When the plunger's projection length setting is not appropriate to the "A" dimension of the machine on which it is to be used, adjust it in accordance with the procedure as set forth below:

HP07, HP09, HP12, HP25, HP07H, HP09H, HP12H

1. Loosen the plunger setting screw with a hexagon wrench (2.5mm).



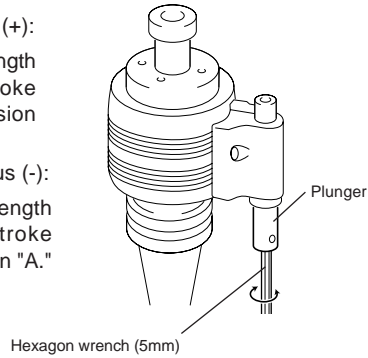
2. Insert a hexagon wrench (5mm) from the end of plunger and, with the gauge line as datum, turn it to adjust plunger's projection length as follows:

When Dimension "A" is plus (+):

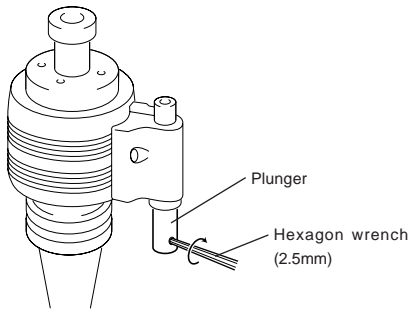
Adjust plunger's projection length so that it will be 6mm (stroke length) shorter than Dimension "A."

When Dimension "A" is minus (-):

Adjust plunger's projection length so that it will be 6mm (stroke length) longer than Dimension "A."

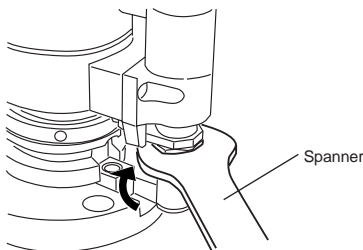


3. Once adjustment is done, tighten the plunger setting screw with a 2.5mm hexagon wrench to secure the plunger in position.



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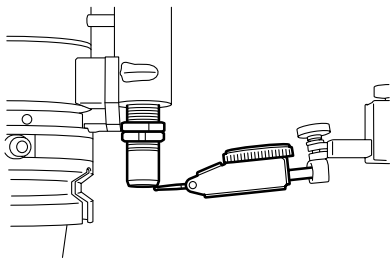
1. Loosen the nut at the plunger portion with a spanner (24 mm width, a commercial item).



2. When the Dimension "A" is on the plus (+) side, turn the plunger for adjustment so that its stroke may be reduced by 6mm;

When the Dimension "A" is on the minus (-) side, turn the plunger for adjustment so that its stroke may be increased by 6mm.

! When turning the plunger, if the screw portion is tight, please turn it by the use of a pair of pliers and so forth.



3. Tighten the nut with a spanner (24 mm width, a commercial item) on order to fix.

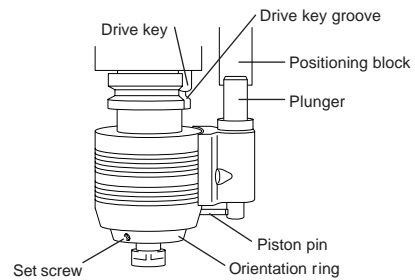
! Please check its smooth operation of by pressing the plunger with fingers.



Adjusting the plunger angle

The drive key of the spindle of the machining center will be fit into the key groove of the hyper spindle and also the position of the plunger will be fit to the position of the positioning block.

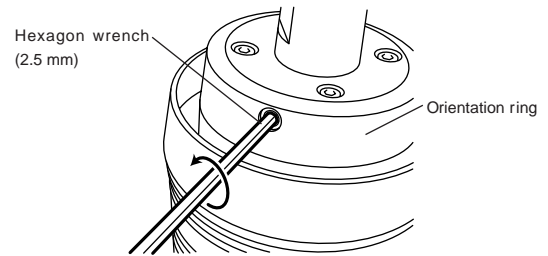
HP07, HP09, HP12, HP25, HP07H, HP09H, HP12H



1. Loosen the orientation ring mounting screws (2 places) with a hexagon wrench (2.5mm) off the machine.



Do not draw out the screws. Otherwise they will be lost.

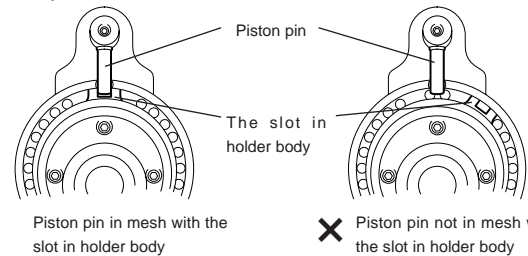


2. Clean the inner diameter taper portion of the spindle of the machining center and also the shank taper portion of the hyper spindle with waste cloth.



If dust and oil adhere, the hyper spindle may come off.

3. Check to see that the piston pin is securely in mesh with the slot in holder body.



4. Initiate the MC spindle orientation so that the spindle may be oriented to the tool change position (ATC position).



If you fail to do so, the hyper spindle may come off because of misalignment between the drive key and the positioning block.

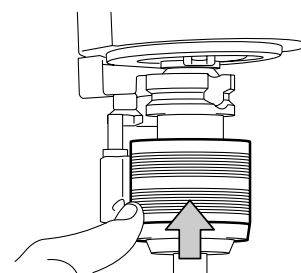
5. Fit the position of the plunger to the position of the positioning block and then, insert the hyper spindle to the spindle manually.



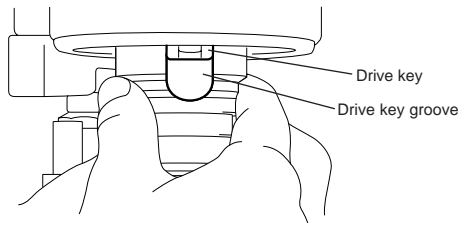
At this time, do not pull the pull stud.



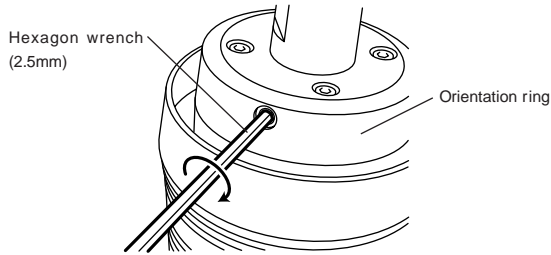
When attaching the hyper spindle to the spindle, please be careful not to drop it.



6. Fine-adjust it by turning the flange portion manually in order that the drive key of the spindle may fit into the key groove of the hyper spindle.



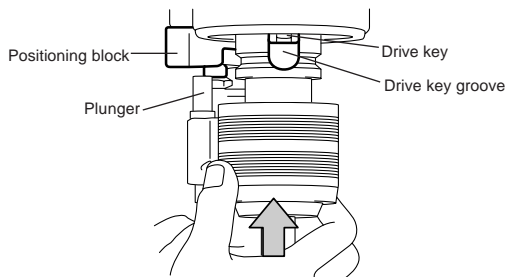
7. Remove the hyper spindle from the machine, and then tighten the setting screws (2 places) for the orientation ring to fix it in position.



8. Insert the hyper spindle to the spindle manually once again, and then pull it into with the pull stud.

⚠ At this time, check whether the drive key may fit into the key groove smoothly or not, and also check whether the plunger may fit into the positioning block properly or not.

⚠ When attaching the hyper spindle to the spindle, please be careful not to drop it.

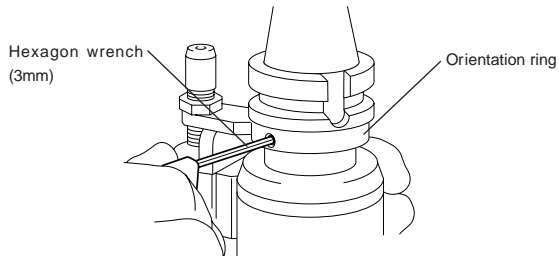


9. If the hyper spindle is set properly, fix it to the machining center. Then check whether it is possible to replace it smoothly with ATC.

HP20

1. Loosen the orientation ring mounting screws (2 places) with a hexagon wrench (3mm) off the machine.

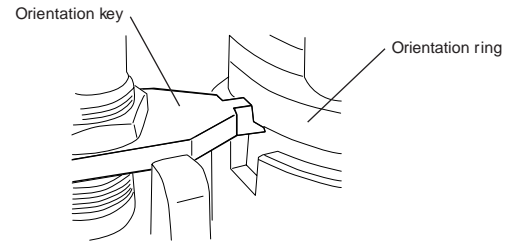
⚠ Do not draw out the screws. Otherwise they will be lost.



2. Clean the inner diameter taper portion of the spindle of the machining center and also the shank taper portion of the hyper spindle with waste cloth.

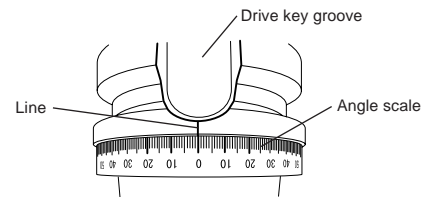
⚠ If dust and oil adhere, the hyper spindle may come off.

3. Fit the salient (height) portion of the orientation key into the R groove portion of the orientation ring.



4. Fit the angle scale of the orientation ring with a certain angle to the line of the drive key groove.

⚠ The angle scale is just a guideline. So before attaching it to a machine, be sure to fine-adjust it and check whether it can be attached accurately or not.



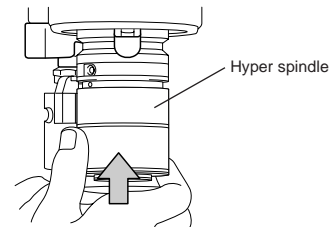
5. Initiate the MC spindle orientation so that the spindle may be oriented to the tool change position (ATC position).

⚠ If you fail to do so, the hyper spindle may come off because of misalignment between the drive key and the positioning block.

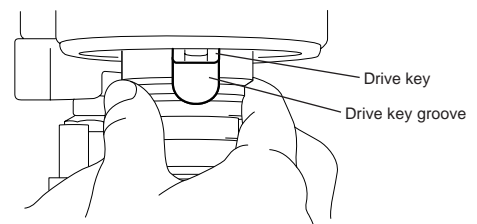
6. Fit the position of the plunger to the position of the positioning block and then, insert the hyper spindle to the spindle manually.

⚠ At this time, do not pull the pull stud.

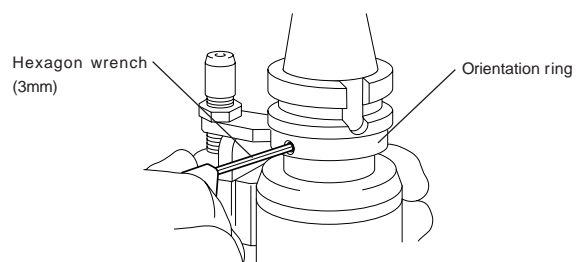
⚠ When attaching the hyper spindle to the spindle, please be careful not to drop it.



7. Fine-adjust it by turning the flange portion manually in order that the drive key of the spindle may fit into the key groove of the hyper spindle.



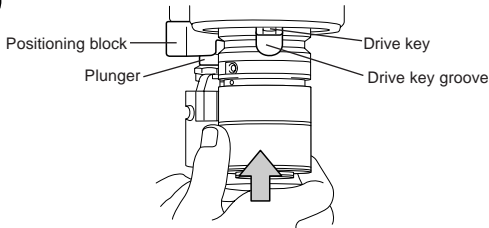
8. After adjustment, remove the hyper spindle from the spindle, and then tighten the orientation ring mounting screws (2 places) with a hexagon wrench (3mm).



9. Insert the hyper spindle to the spindle manually once again, and then pull it into with the pull stud.

! At this time, check whether the drive key may fit into the key groove smoothly or not, and also check whether the plunger may fit into the positioning block properly or not.

! When attaching the hyper spindle to the spindle, please be careful not to drop it.



10. If the hyper spindle is set properly, fix it to the machining center. Then check whether it is possible to replace it smoothly with ATC.

Attaching and Removing the cutting tool

1. Firmly fix hyper spindle to NT simple setter or a fixing jig.
2. Remove the nut from the hyper spindle.
3. Choose a FDC collet to match with your tool shank.

! Use Class FDC-AA collets.

4. Clean the tool shank, collet and inner diameter taper portions of the hyper spindle with a waste cloth.

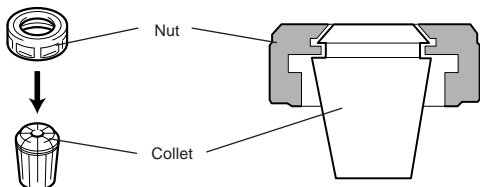
! If dust or oil remains on the tool shank, collet or inner taper area of hyper spindle, the cutting tool may not turn or may come off.

! Do not touch tools with bare hands.

When attaching or removing your cutting tool, use a waste cloth or wear gloves. Failure to do so may result in injury when touching the cutting edges.

5. Attach a collet to the nut.

Placing a collet on a table, put a nut on it, pressing straight down. Check that the inner groove of the nut firmly fits into the outer groove of the collet.



6. Attach the nut to the hyper spindle.

Slightly tighten the nut by hand.

7. Insert a cutting tool into collet.

! Insert a cutter shank into hyper spindle by over the length of collet internal diameter. Do not clamp the cutter's edge with collet.

! Do not touch tools with bare hand.

When attaching or removing you cutting tool, use a waste cloth or wear gloves. Failure to do so may result in injury when touching the cutting edges.



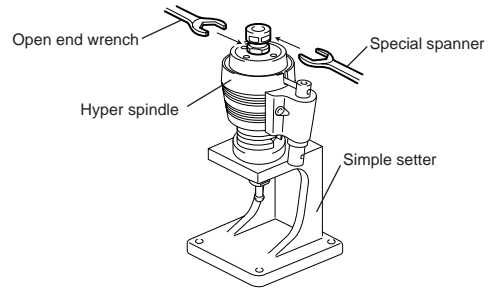
8. When tightening the cap nut with a special spanner (sold separately), the flats in the head shank of the tool holder body must be fixed with a designated wrench. (See the Standard Tightening Torque Chart.)

! Tightening the cap nut without holding the head shank part may result in poor accuracy of the Hyper Spindle. ALWAYS uses two spanners, one on the cap and the other on the body.

! In the case of HP25, two hook spanners are required for the head shank as well as the cap nut. NT designated hook spanners must be purchased.

! In case conventional spanner is used, nut, collet or hyper spindle may be damaged.

! For your safety, make the tightening (loosening) slowly.



[Standard Tightening Torque Chart]

| Holder size | Open end wrench size | Special spanner size | Standard Tightening Torque |
|-------------|----------------------|----------------------|----------------------------|
| HP07, HP07H | 16" | S-0 | 10 ~ 15N•m |
| HP09, HP09H | 21" | S-1L | 30 ~ 35N•m |
| HP12, HP12H | 21" | S-3L | 35 ~ 40N•m |
| HP20 | S-5L | HS-2-20 | 65 ~ 70N•m |
| HP25 | HS-2.5-25 | HS-2.5-25 | 75 ~ 80N•m |

*: Commercially available

9. Remove your cutting tool by following this procedure reversely.

Test run

DO NOT start with high speed. Start with low speed to warn up the spindle for a minute or two, then step up speed to the operating speed.

Usage Note

Hyper Spindle's surface temperature can raise up to 30 above the ambient temperature. It is not abnormal: there is nothing to worry about.

How to keep tools in good condition

- Grease needs to be replaced after 1000 hours in serve. Please contact our agency near you for consultation.
- Stop spindle operation immediately - if it fails with symptom such as revolution failure, excessive heating, or run-out, etc. Please contact our agency near you or NT Tool directly for consultation.

! NEVER attempt to repair spindle yourself: Repair by unqualified personnel may impair the safe operation of spindle.

Max Rotation Speed

| Holder size | Max rotation speed |
|---------------------|--------------------------|
| HP07, HP09, HP12 | 20,000 min ⁻¹ |
| HP20 | 15,000 min ⁻¹ |
| HP25 | 10,000 min ⁻¹ |
| HP07H, HP09H, HP12H | 30,000 min ⁻¹ |

TECHNOMAIL

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For technical question, contact us by technomail.
Our engineers are always happy to answer you.

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