<table>
<thead>
<tr>
<th>Contents of the trouble</th>
<th>Causes</th>
<th>Pulled out of holder. Unable to attach fast to spindle or holder in case of MT shank.</th>
</tr>
</thead>
</table>
| 1 Tool insertion is hard (not possible). | ① Scratch or dent in chuck ID | ① Replacement of chuck or tool  
  - Touching up of area in question (rubbing off with sand paper # 1000 and above)  
  - Correction (grinding) by NT TOOL is not possible.  
  ② Check if h6 tool shank is used. |
|                        | ② Tool shank diameter is too big. | ③ Hot air type  
  - Increase heating time  
  - Magnetic induction heating device  
  - Follow the instruction manual and heat up with optimal parameters for the chuck.  
  - If the above measures don't work, consult with NT TOOL. |
|                        | ③ Insufficient heating temperature | ④ Deformed chuck cannot be restored.  
  - Duplicated heating with induction heater is strictly prohibited.  
  - Duplicated heating: Heat a chuck that is still hot (40 °C) after first heating is finished.  
  - Overheating will destroy material quality. |
|                        | ④ Deformation of chuck ID from overheating (duplicated heating) | ⑤ - 2-piece type uses austenitic stainless steel that is non-magnetic.  
  - Therefore induction heater cannot be used.  
  - Use hot-air type heater. |
|                        | ⑤ Heating 2-piece type (mainly dia. 6mm and below) with magnetic induction heating device. | |
| 2 Tool insertion is hindered in the middle. | ① Temperature of chuck goes down during insertion  
  - Heat conducted to tool shank and made it expanded. | ① Heat up the chuck after designated time and insert a tool promptly.  
  - In the case of hot-air type heater, heating time should be prolonged.  
  (Longer heating time.)  
  - In the case of induction heating device, heated chuck must be cooled down to room temperature, then heated again.  
  - Duplicated heating with induction heating device is strictly prohibited.  
  (Duplicated heating: Heat a chuck that is still hot (40 °C) after first heating is finished.  
  - Overheating will destroy material quality. ) |
| 3 Tool cannot be pulled out. | ① Insufficient heating temperature | ① Hot air type  
  - Increase heating time  
  - Magnetic induction oven  
  - Follow the instruction manual and heat up with optimal parameters for the chuck.  
  - In case these measures will not work, consult with NT TOOL. |
|                        | ② Deformation of chuck ID from overheating (duplicated heating) | ② Tool holder cannot be restored.  
  - Duplicated heating is strictly prohibited. Duplicated heating: Heat a chuck that is still hot (40 °C) after first heating is finished.  
  - Overheating will destroy material quality. |
|                        | ③ Attempt to remove HSS tool with hot-air type heater. | ③ Since hot-air type heater has relatively lower power and heating time tends to be long. Therefore, heat will conduct to whole chuck body and tool, which makes removing a tool very difficult.  
  - Use magnetic induction heater instead.  
  - Some sizes cannot be used for induction heater. |
| 4 Deteriorated runout accuracy during operation (Guideline for accuracy: 10μm and above at 4xd) | ① Damage on tool shank or chuck ID | ① Replacement of chuck or tool  
  - Touching up of area in question (rubbing off with sand paper # 1000 and above)  
  - Correction (grinding) by NT TOOL is not possible.  
  ② Chuck a tool with its end detaching from tool chuck’s ID bottom. |
|                        | ② Tool shank end touches the bottom of chuck ID. | |

(Shrink Fit Chuck)
## Tool Pullout during Cutting

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient tool insertion length (Chucking length is too short.)</td>
<td>Keep minimum insertion length.</td>
</tr>
<tr>
<td>Notch or flat on tool shank</td>
<td>Use a tool without notch or flat on its shank.</td>
</tr>
<tr>
<td>Expansion of BT shank because of overtightening retention stud</td>
<td>Keep recommended tightening torque.</td>
</tr>
<tr>
<td>Poor accuracy of tool</td>
<td>Replacement of tools.</td>
</tr>
</tbody>
</table>
| Deteriorated accuracy of tool interface                                  | - Regrinding or correction of machine spindle  
|                                                                           | - Cleaning of taper and end face (in the case of two-face contact), touching up of scratch or dent |
| Lower chucking force (tool shank diameter is too small.)                  | Confirm tool shank diameter is h6.                                                        |
| Cutting bending resistance (bending moment) is large. (Pullout by pestle-like movement) | - Lower cutting resistance  
|                                                                           | a. Shorter tool projection length  
|                                                                           | b. Higher rotation or lower feed rate  
|                                                                           | (Guidelines: approx. 20%)  
|                                                                           | c. Lower depth of cut  
|                                                                           | - Use shrinker chuck with higher rigidity.  
|                                                                           | SRS < SRD = SRK  

## Chattering

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chattering by chuck's resonance</td>
<td>Shift rotation (more than 10%)</td>
</tr>
</tbody>
</table>
| Cutting resistance is too low in comparison with chuck's rigidity.         | Revision of cutting conditions (higher cutting resistance)  
|                                                                           | a. Higher feed rate or lower rotation  
|                                                                           | (Guidelines: approx. 20%)  
|                                                                           | b. Higher cutting depth                                                                     |
| Cutting resistance is too high in comparison with chuck's rigidity.        | Revision of cutting conditions (lower cutting resistance)  
|                                                                           | a. Higher rotation or lower feed rate  
|                                                                           | (Guidelines: approx. 20%)  
|                                                                           | b. Lower depth of cut                                                                       |
| Bending moment is too large.                                               | - Shorter tool projection length  
|                                                                           | - Shorter chuck's projection length                                                           |
| Low taper contact of interface                                            | - Regrinding and correction of machine spindle  
|                                                                           | - Cleaning of taper and end face (in the case of two-face contact), touching up of scratch or dent |
|                                                                           | - Use designated retention stud for M/C.                                                     |
| Mischoice of retention stud                                               | - Keep recommended torque value for retention stud.                                          |