

# **TROUBLESHOOTING**



## Troubleshooting for Milling Chuck

Details of the trouble	Cause	Solution / Countermeasures
<b>Tool cannot be held after tightening</b>	Tool shank diameter is too small.	<ul style="list-style-type: none"> <li>• Tool shank diameter should be within h7 tolerance.</li> <li>• Use a tool with a shank diameter tolerance of h7.</li> </ul>
<b>Tool insertion is hard(not possible)</b>	Scratch or dent exists in chuck I.D. or tool shank.	<ul style="list-style-type: none"> <li>• Replacement of chuck or tool.</li> <li>• Touching up of area in question (rubbing off with sand paper #1000 and above) Correction (grinding) by NT TOOL is not possible.</li> </ul>
	Tool diameter is too big.	Use a tool with a shank diameter tolerance of 7h.
	Clamping ring is not fully loosened.	Rotate clamping ring counterclockwise more than one time after a cutting tool is removed.
<b>Clamping ring cannot be loosened.</b>	Deformation of roller guide because clamping ring has not loosened enough after removing tool.	<ul style="list-style-type: none"> <li>• Ask NT for repair. (In some cases, irreparable.)</li> <li>• Rotate clamping ring counterclockwise more than one time after a cutting tool is removed.</li> </ul>
	Rust inside.	Ask NT for repair. (In some cases, irreparable.)
	Flaking on sliding surface.	Ask NT for repair. (In some cases, irreparable.)
<b>Tool cannot be pulled out.</b>	Seizing caused by tool slippage (Seizing caused by impact when tool gets broken)	<ul style="list-style-type: none"> <li>• Ask NT for repair. (In some cases, irreparable.)</li> <li>• Check completion of clamping.</li> </ul>
	<ul style="list-style-type: none"> <li>• Fretting corrosion of I.D. and tool shank. (Seizing caused by rust.)</li> <li>• Insufficient clamping.</li> <li>• Insufficient tool insertion length.</li> <li>• Tool shank diameter is smaller than h7 tolerance.</li> <li>• Cutting resistance is too large. (Pull-out by precession.) →Bending moment is too large.</li> </ul>	<ul style="list-style-type: none"> <li>• Insert shank deeper than the minimum insertion length.</li> <li>• Use a tool with a shank diameter tolerance of 7h.</li> <li>• Cutting resistance should be lowered.                             <ul style="list-style-type: none"> <li>a : Lower feed rate or higher rotation (Approx. 20%)</li> <li>b : Lower cutting depth.</li> </ul> </li> <li>• Bending moment should be lowered.                             <ul style="list-style-type: none"> <li>c : Shorter tool projection length.</li> </ul> </li> </ul>
<b>Rotation of tightening ring is not smooth.</b>	Deformation of needle rollers because tool remained chucked for long time.	<ul style="list-style-type: none"> <li>• First loosening may not feel smooth.</li> <li>• Loosen clamping ring and give it a few more counterclockwise rotations. (Rough touch will not be a problem in practice. If tightening is very difficult, however, return it to NT.)</li> </ul>
<b>Tool is pulled out during cutting.</b>	Insufficient clamping.	Check completion of clamping.
	Insufficient tool insertion length.	Insert shank deeper than the minimum insertion length.
	Tool shank diameter is smaller than h7 tolerance.	Use a tool with a shank diameter tolerance of 7h.
	Cutting resistance is too large. (Pullout by precession.) → Bending moment is too large.	Cutting resistance should be lowered. <ul style="list-style-type: none"> <li>a : Higher rotation or lower feed rate (Approx. 20%).</li> <li>b : Lower cutting depth.</li> <li>c : Shorter tool projection length.</li> </ul>
	Chuck rigidity is too low.	Use another type of tool holder (such as side lock endmill holders).
<b>No click sound is generated (CTA). (Tight-up ring's failure)</b>	<ul style="list-style-type: none"> <li>• Rollers for tight-up ring are worn or broken.</li> <li>• Tight-up ring is worn or broken.</li> </ul>	<ul style="list-style-type: none"> <li>• Ask NT for repair. (In some cases, irreparable.)</li> <li>No over-tightening or additional turn after a click sound is generated.</li> </ul>

Details of the trouble	Cause	Solution / Countermeasures
<b>Chattering</b>	Chattering by chuck's resonance.	Shift rotation speed to vary resonance frequency. (± 10% and above).
	Insufficient clamping.	Check completion of clamping.
	Insufficient tool insertion length.	Insert shank deeper than the minimum insertion length.
	Tool shank diameter is smaller than h7 tolerance .	Use a tool with a shank diameter tolerance of h7.
	Cutting resistance is too small compared with the chuck's rigidity.	Revision of cutting conditions (Higher cutting resistance). a : Higher feed rate or lower rotation (Approx. 20%). b : Higher depth of cut or use a tool with a tolerance of h7.
	Cutting resistance is too high in comparison with the chuck's rigidity.	<ul style="list-style-type: none"> <li>Revision of cutting conditions (Lower cutting resistance). a : Lower feed rate or higher rotation (Approx. 20%). b : Lower depth of cut.</li> <li>Use bigger tool chuck.</li> <li>Shorter tool projection length.</li> <li>Shorter tool chuck length.</li> </ul>
	Insufficient chucking force at nose because of using MC collet (mainly Φ12mm and below).	Trial use of collet chucks recommended.
	Mischoice of retention stud.	Use designated retention stud for M/C.
<b>Falling off of tool chuck during ATC</b>	Expansion of BT shank because of over-tightening retention stud.	Keep recommended torque value for tightening retention stud.
	Interference with ATC arm.	<ul style="list-style-type: none"> <li>Check L0 dimension on our catalog and maximum tool dimension for the M/C.</li> <li>Revision of tool chuck size.</li> </ul>
	Overload for ATC capacity.	Check maximum load for ATC.
	Maximum allowable moment for the M/C is exceeded.	Check maximum allowable moment for M/C.
<b>Deteriorated runout accuracy</b>	Clamp movement of ATC is not synchronized.	Consult with the machine tool builder.
	Rust, damage or deformation of chuck I.D. and collet.	<ul style="list-style-type: none"> <li>Replacement of chuck or tool.</li> <li>Touching up of area in question (rubbing off with sand paper #1000 and above). Correction (grinding) by NT is not possible.</li> </ul>
	Insufficient tool insertion length.	Keep minimum insertion length.
	Scratch or dent on tool shank.	Touching up of scratch or dent.
	Notch or flat on tool shank.	Use tool without notch or flat.
	Expansion of BT shank because of over-tightening retention stud.	Keep recommended torque value for tightening retention stud.
	Poor accuracy of tool.	Replacement of tools.
	Dust seizing in the chucking part.	Cleaning of chuck I.D. and collet.
Deteriorated accuracy of tool interface. <ul style="list-style-type: none"> <li>Large runout (2 micrometers and above) of spindle I.D. or end face (in the case of two-face contact).</li> <li>Dust, scratch or dent on taper area or end face (in the face of two-face contact).</li> </ul>	<ul style="list-style-type: none"> <li>Correction (regrinding) of machine spindle.</li> <li>Cleaning of taper and end face (in the case of two-face contact), touching up of scratch or dent.</li> </ul>	



## Troubleshooting for Hydraulic Chuck

Details of the trouble	Cause	Solution / Countermeasures
<b>Tool clamping is not possible.</b>	Tool shank diameter is too small.	<ul style="list-style-type: none"> <li>• Tool shank diameters should be within h7 tolerance.</li> <li>• Use a tool with a shank diameter tolerance of h7.</li> </ul>
	Oil leakage.	<ul style="list-style-type: none"> <li>• Check clamping function. (No. of revolution of actuating screw).</li> <li>• Ask NT for repair. (In some cases, irreparable.)</li> </ul>
<b>Hard to insert a tool. (unable to insert.)</b>	Scratch or dent in chuck I.D. and tool shank.	<ul style="list-style-type: none"> <li>• Replacement of chuck or tool.</li> <li>• Touching up of area in question (rubbing off with sand paper #1000 and above).</li> <li>• Correction (grinding) by NT is not possible.</li> <li>• Ask NT for repair.(In some cases, irreparable.)</li> </ul>
	Tool shank is too large.	<ul style="list-style-type: none"> <li>• Use a tool with a shank diameter tolerance of h7.</li> </ul>
	Actuating screw is not fully loosened and I.D. of clamping sleeve was deformed with residual pressure.	<ul style="list-style-type: none"> <li>• Insert tool after fully loosening the screw.</li> </ul>
	Notch or flat of tool shank deformed chuck I.D.	Use a tool without notch or flat. The chuck must be returned to NT for repair.
<b>Tool cannot be pulled out.</b>	Insufficient tool insertion length deforms deep area of chuck I.D.	<ul style="list-style-type: none"> <li>• Ask NT for repair.( In some cases, irreparable.)</li> <li>• Insert shank deeper than the minimum insertion length.</li> </ul>
	Seizing from tool slippage (Seizing caused by impact when tool is broken.)	Ask NT for repair.(In some cases, irreparable.)
	Notch or flat of tool shank deforms chuck I.D.	Use a tool without notch or flat.
<b>Tool is pulled out during operation.</b>	Insufficient tool insertion length deforms deep area of chuck I.D.	Insert shank deeper than the minimum insertion length.
	Insufficient clamping force.	Check clamping function (No. of revolution of actuating screw).
	Insufficient tool insertion length.	Insert shank deeper than the minimum insertion length.
	Tool shank diameter is smaller than h7 tolerance.	Use a tool with a shank diameter tolerance of h7.
	Cutting resistance (bending moment) is too large. (Pull out of tool because of precession.)	<ul style="list-style-type: none"> <li>• lower cutting resistance.                             <ol style="list-style-type: none"> <li>a. Higher rotation or lower feed rate (Approx. 20%).</li> <li>b. Lower cutting depth.</li> </ol> </li> <li>• Lower bending moment.</li> <li>• Shorten tool projection length.</li> </ul>
Insufficient rigidity of holder.	<ul style="list-style-type: none"> <li>• Use different chuck (holder).</li> <li>• Trial use of collet holder, milling chuck or shrinker chuck recommended.</li> </ul>	

Milling Chuck

Hydraulic Chuck

Stub Holder

Tapping Chuck

Details of the trouble	Cause	Solution / Countermeasures
<b>Chattering</b>	Chattering by chuck's resonance.	Shift rotation speed to vary resonance frequency. ( $\pm 10\%$ and above)
	Insufficient clamping force.	Check clamping function. (No. of revolution of actuating screw)
	Insufficient tool insertion length.	Insert shank deeper than the minimum insertion length.
	Tool shank diameter is smaller than h7 tolerance.	Use a tool with a shank diameter tolerance of 7h.
	Cutting resistance is too small in comparison with holder's rigidity.	Revision of cutting conditions (Higher cutting resistance). a. Higher feed rate or lower rotation speed (Approx. 20%). b. Higher cutting depth.
	Bending moment is too large.	<ul style="list-style-type: none"> <li>• Shorter tool projection length .</li> <li>• Shorter projection length of chuck.</li> </ul>
	Inappropriate choice of holder (chuck) for the cutting.	<ul style="list-style-type: none"> <li>• Use different chuck (holder).</li> <li>• Trial use of collet holder, milling chuck or shrinker chuck recommended.</li> </ul>
	Mischoice of retention stud.	Use designated retention stud for the machine.
	Expansion of BT shank because of over-tightened retention stud.	Keep recommended torque value for tightening retention stud.
<b>Deteriorated runout accuracy during cutting</b> * Guidelines: 15 micrometers and more at 4d	Rust, scratch or deformation of chuck I.D.	<ul style="list-style-type: none"> <li>• Replacement of chuck or tool .</li> <li>• Touching up of area in question (rubbing off with sand paper #1000 and above). Correction (grinding) by NT is not possible.</li> <li>• Ask NT for repair. (In some cases, irreparable.)</li> </ul>
	Insufficient chucking length.	Insert shank deeper than the minimum insertion length.
	Scratch or dent on tool shank.	Scratch or dent must be removed.
	Notch or flat of tool shank.	Use a tool without notch or flat.
	Expansion of BT shank because of over-tightening retention stud (BT30 in particular).	Keep recommended torque value for tightening retention stud.
	Poor accuracy of tool.	Replacement of tools.
	Dust seizing in chucking area.	Cleaning of chuck I.D.
	Deteriorated accuracy of tool interface <ul style="list-style-type: none"> <li>• Large runout (2 micrometers and above) of spindle I.D. or end face (in the case of two-face contact).</li> <li>• Dust, scratch or dent on taper area or end face (in the face of two-face contact).</li> </ul>	<ul style="list-style-type: none"> <li>• Regrinding or correction of machinespindle</li> <li>• Cleaning of taper and end face (in the case of two-face contact), touching up of scratch or dent.</li> </ul>
<b>Deteriorated runout accuracy (flange type)</b>	Misalignment of installation part	Re-installation into the spindle.
	Burr in the undercut at the deep end of I.D. mouth.	Deburring (Sandpaper #1000 and above).
	Misalignment between flange part and chuck part (2-piece type).	Check runout of I.D. from the flange.



## Troubleshooting for Stub Holder

Details of the trouble	Cause	Solution / Countermeasures
<b>Unable to mount collet.</b>	Wrong choice of collet.	Check collet's type and size.
	Spindle dimension is different from standard dimension.	Check spindle dimension.
<b>Unable to mount to spindle.</b>	Seized or adhered chip and dust to holder shank, spindle I.D.	Cleaning of holder shank, spindle I.D.
	Scratch or dent exists in spindle I.D. or holder shank.	<ul style="list-style-type: none"> <li>• Replace holder or repair spindle.</li> <li>• Touching up of area in question (rubbing off with sand paper #1000 and above)</li> <li>• Correction (grinding) by NT TOOL is not possible.</li> </ul>
	In the case of KD series, end face to end face dimension between spindle and finger bolt is longer than specified dimension.	<ul style="list-style-type: none"> <li>• Check spindle dimension.</li> <li>• Make spacer thicker to specified dimension.</li> </ul>
	In the case of KH series, spindle collar thickness is larger than specified dimension.	Repair spindle.
<b>Excessive play when mounting into spindle.</b>	Spindle dimension is different from standard dimension.	Check spindle dimension.
	In the case of KH series, spindle collar thickness is smaller than specified dimension.	Repair spindle.
	In the case of KH series, spindle mounting is not proper due to functional failure of operating sleeve.	<ul style="list-style-type: none"> <li>• When installing, push operating sleeve down to bring it into position for secure mounting.</li> <li>• Cleaning of operating sleeve I.D.</li> </ul>
	In the cases of KH-A, KH series, rubber damper is deteriorated.	Ask NT for repair. (In some cases, irreparable.)
	In the case of KH-E series, steel ball is worn.	Ask NT for repair. (In some cases, irreparable.)
	In the case of KD series, finger collet taper is worn.	Replacement of finger collet assembly.
	In the case of KD series, finger collets are broken.	Replacement of finger collet assembly.
	In the case of KD series, end face to end face dimension between spindle and finger bolt is shorter than specified dimension.	<ul style="list-style-type: none"> <li>• Check spindle dimension.</li> <li>• Make thickness of a spacer adjust to specified dimension.</li> </ul>
<b>Holder comes off from spindle.</b>	In the case of KH/EC series, coolant pressure is higher than specified pressure.	<ul style="list-style-type: none"> <li>• Reduce coolant pressure.</li> <li>• Check specified coolant pressure.</li> </ul>
	In the case of KH series, spindle mounting is not proper due to functional failure of operating sleeve.	<ul style="list-style-type: none"> <li>• When installing, push operating sleeve down to bring it into position for secure mounting.</li> <li>• Cleaning of operating sleeve I.D.</li> </ul>
<b>Coolant is leaking or there is no coolant output.</b>	KH/EC is not being used. (Stub holders other than KH/EC are not compatible with center-thru coolant.)	Use KH/EC. <ul style="list-style-type: none"> <li>• For high coolant pressure KH/EC1type</li> <li>• For low coolant pressure KH/EC2 type</li> </ul>
	Coolant pressure is higher than specified pressure.	Use coolant at a pressure equal to or lower than maximum pressure allowed.
	Collets compatible with center-thru coolant (OH or C type collets) are not being used.	Use OH or C type collets. <ul style="list-style-type: none"> <li>• OH type . . . Center through</li> <li>• C type . . . Collet through</li> </ul>
	Coolant cap "O" ring is deteriorated or worn.	Replacement of O-ring.

Milling Chuck

Hydraulic Chuck

Stub Holder

Tapping Chuck

Details of the trouble	Cause	Solution / Countermeasures
<b>Cutting tool comes off or slips.</b>	Large cutting resistance to chucking force.	<ul style="list-style-type: none"> <li>Revision of cutting conditions (Decrease cutting resistance.)                             <ul style="list-style-type: none"> <li>a : Higher rotation speed or lower feed rate (Approx. 20%)</li> <li>b : Lower cutting depth</li> </ul> </li> <li>Shorter tool projection length</li> </ul>
	Insufficient tightening of cap nut	<ul style="list-style-type: none"> <li>Keep recommended torque value for tightening cap nut.</li> <li>Use torque wrench.</li> </ul>
	Tightening not sufficient due to cap rotary ring failure.	Replacement of cap nut.
	Insufficient tightening of cap nut because of increased friction in the thread part (Tightening of collets not enough.)	Apply oil (grease) on the thread part after cleaning it.
	Tool tang does not fit into preset driver groove due to dimensional differences.	<ul style="list-style-type: none"> <li>Check tool tang dimension and preset driver groove dimension.</li> <li>Replacement of preset driver.</li> </ul>
<b>Poor accuracy.</b>	Spindle and holder have rattling.	See Problem: "Excessive play when mounting into spindle" in the trouble column and reduce play (clearance) to appropriate level.
	Adhered chip and dust to spindle end surface or holder end surface.	Cleaning of spindle end surface or holder end surface.
	Poor chucking accuracy of collet.	Replacement of collets.
	Dust seizing in collet insertion area.	Cleaning of collet insertion area.
	Scratch or dent in holder I.D.	Replacement of holder.
	Scratch or dent on collet I.D. and O.D.	Replacement of collets.
	Insufficient chucking length.	Keep minimum insertion length. (collet ID length must be filled.)
	Poor accuracy of cutting tool.	Tool replacement.
	Dust seizing in cap nut thread.	Cleaning of thread part, applying grease.
Malfunction of rotor ring of cap nut. (Rotor ring will not rotate smoothly.)	<ul style="list-style-type: none"> <li>Cleaning of cap nut. (so that rotor ring will rotate smoothly.)</li> <li>Replacement of cap nuts.</li> </ul>	
<b>Chattering</b>	Cutting resistance is too high in comparison with chuck's rigidity.	<ul style="list-style-type: none"> <li>Revision of cutting conditions (Decrease cutting resistance.)                             <ul style="list-style-type: none"> <li>a : Higher rotation speed or lower feed rate (Approx. 20%)</li> <li>b : Lower cutting depth</li> </ul> </li> <li>Shorter tool projection.</li> </ul>
	When end-milling with series KH-E, KD-T, cutting pressure is too low against the rigidity of holder.	<ul style="list-style-type: none"> <li>Revision of cutting conditions (Increase cutting resistance.)                             <ul style="list-style-type: none"> <li>a : Higher feed rate or lower rotation (Approx. 20%)</li> <li>b : Higher cutting depth</li> </ul> </li> </ul>
	Bending moment is too large.	Shorter tool projection length
	Spindle and holder have rattling.	See Problem: "Excessive play when mounting into spindle" in the trouble column and reduce play (clearance) to appropriate level.
<b>Holder does not come off from spindle.</b>	Deposition of fretting, rust and/or adhered coolant residual.	Cleaning of spindle and holder shank.
	In the case of KH series, operating sleeve failure.	Cleaning of operating sleeve I.D.



## Troubleshooting for Tapping Chuck

Details of the trouble	Cause	Solution / Countermeasures
<b>Thread gauge (stop) can go through. (Enlarged thread diameter)</b>	Lean threads because of excessive compression (Tapping chuck's compression works.) ※ Reason for lean threads For the compression of tapping chuck, a strong spring is used to resist the pressure when a tap starts to cut. This compression should not be used for normal tapping, but with tap adaptor with safety clutch to prevent tap breakage. Strong compression will result in lean threads.	<ul style="list-style-type: none"> <li>Decrease feed rate more than tap pitch. (85-95% of tap pitch)</li> <li>In case there is no improvement; Feed for forward movement : 85-95% Feed for backward movement : 100%</li> <li>In case feed mechanism of spindle is master feed, → Use tapping chuck with compression zero.</li> <li>In case tapping chuck with compression zero is in use, → Check feed mechanism of the machine.</li> </ul>
	Sharpness of tap is low and compression of tapping chuck works.	<ul style="list-style-type: none"> <li>Larger chamfering for the entrance of prepared hole</li> <li>Use tap with more threads for chamfering. (2.5 threads and more)</li> <li>Weakened compression spring of tapping chuck → Return it to NT TOOL for repair</li> </ul>
	Malfunction of tension/compression	Check if the chuck returns to its original length after pulling and pushing by hand.
	Malfunction of clutching mechanism of tapping chucks with auto-depth control or self-reversing function.	Pull the chuck and turn right by hand to check if the clutch gets disengaged and turn left by hand to see if the clutch gets engaged. → Return it to NT TOOL if malfunction of the clutch is found.
	Mischoice of tap	<ul style="list-style-type: none"> <li>Tapping chuck with length compensation is not suitable for synchro tap (eccentric relief).</li> <li>Use normal tap (concentric relief) which has self-advancing action.</li> </ul>
<b>Thread gauge (through) cannot go through. (Thread diameter is small.)</b>	Warping of burr has been generated at the entrance of tap hole.	<ul style="list-style-type: none"> <li>Return timing is premature (before tap is pulled out) → Revision of approach point Guidelines : maximum tension + 5</li> <li>Too much tension → Increase feed rate. Must be lower than tap pitch.</li> </ul>
	Burr at the entrance of tap hole due to the reaction to compression.	<ul style="list-style-type: none"> <li>Check if the compression of tapping chuck is working during operation. → Decrease feed rate less than tap pitch (85-95% of tap pitch)</li> <li>If the problem is not fixed, Feed for forward movement: 85-95% Feed for backward movement: 100%</li> </ul>
	Damage at the entrance of tap hole	<ul style="list-style-type: none"> <li>Misalignment between tap and prepared hole → Correction of misalignment → Use tapping chuck with radial float</li> <li>Chamfering at the hole entrance is too small. → Larger chamfering diameter</li> </ul>
	Tap wear	Replacement of tap
<b>Tap is pulled out.</b>	Too much drawing force for tap	<ul style="list-style-type: none"> <li>Check if tapping chuck's tension is exceeded → Increase feed per rotation (must be less than tap pitch.)</li> <li>Return timing is premature. → Approach point should be distanced. (Guidelines: Tapping chuck's maximum tension + 5)</li> </ul>
	Deformation or breakage of steel balls in tap adaptor	Tap adaptor should be replaced.
	Ball locking mechanism of tap adaptor does not work (in the case of carbide tap)	Use collet type tap adaptor.



Details of the trouble	Cause	Solution / Countermeasures
<b>Thread is not deep enough.</b> (Variation of thread depth)	Cutting to prepared hole is difficult and compression of tapping chuck works.	<ul style="list-style-type: none"> <li>• Check the diameter of prepared hole. → (Refer to table of prepared holes)</li> <li>• Small chamfering and large cutting resistance → Larger chamfering diameter</li> </ul>
	Torque clutch of tap adaptor (type WES) works.	Accumulated chips or dust at the bottom of the hole → Use spiral tap for evacuating chips. (Point tap tends to push out chips.)
	Variation caused by large inertia of machine spindle	<ul style="list-style-type: none"> <li>• Lower rotation speed (500rpm and below)</li> <li>• Check the "stationary" position of the spindle (Z-axis)</li> </ul>
	Decreased preset length of tap • Malfunction of tapping chuck • Malfunction of tap adaptor with length adjustment (type WEN and WESN)	<ul style="list-style-type: none"> <li>• Tapping chuck will not return to the original length. → Check tension/compression of tapping chuck.</li> <li>• Length adjustment screw is not back to the locking position. → Check that adjustment screw will not turn after adjustment is completed.</li> </ul>
<b>Thread is too deep.</b> (Variation of thread depth)	Increased preset length of tap • Malfunction of tapping chuck • Chucking error of tap adaptor • Malfunction of tap adaptor with length adjustment (WEN and WESN)	<ul style="list-style-type: none"> <li>• Tapping chuck will not return to its original length. → Check tension/compression of tapping chuck.</li> <li>• Tap has been pulled out of tap adaptor. → Check tap adaptor's locking mechanism. (if tap cannot be pulled out by hand.)</li> <li>• Length adjustment screw is not back to the locking position (lowest position). → Check if adjustment screw will not turn after length adjustment</li> </ul>
	Variation caused by large inertia of machine spindle	<ul style="list-style-type: none"> <li>• Lower rotation speed (500rpm and below)</li> <li>• Check machine spindle's stationary position (in Z-axis).</li> </ul>
<b>Breakage of tap at the hole entrance</b>	Cutting by tap is difficult.	<ul style="list-style-type: none"> <li>• Enlarge chamfering diameter of prepared hole.</li> <li>• Use tap with more threads for chamfering</li> </ul>
<b>Breakage of tap in the middle</b>	Diameter of prepared hole is too small and excessive torque is applied.	Optimization of prepared hole diameter
	Incompatibility of tap adaptor	Tap adaptor with torque clutch (type WES) is not suitable for tapping chuck with compression 1mm and below.
	Insufficient compression of tapping chuck when tap adaptor with torque clutch (WES) is in use.	<ul style="list-style-type: none"> <li>• Use tapping chuck with more compression.</li> <li>• Adaptor with torque clutch (type WES) cannot be used. (Type WE or WEN is recommended instead.)</li> </ul>
<b>Breakage of tap at the regular bottom</b>	Tap hits the bottom of prepared hole and excessive torque is applied.	<ul style="list-style-type: none"> <li>• Check NC program</li> <li>• Check the clearance between tap's chamfering threads and prepared hole. → If there is not enough clearance, decrease the number of chamfering threads.</li> <li>• Deepen prepared hole.</li> <li>• Shallow thread depth.</li> </ul>
	Accumulated chip or dust at the bottom of the hole	Use spiral tap to evacuate chips. (Point tap tends to push out chips forward.)
	Increased preset length of tap • Malfunction of tapping chuck • Chucking error of tap adaptor • Malfunction of tap adaptor with length adjustment (WEN and WESN)	<ul style="list-style-type: none"> <li>• Tapping chuck will not return to its original length. → Check tension/compression of tapping chuck.</li> <li>• Tap has been pulled out of tap adaptor. → Check the locking mechanism of tap adaptor. (See if tap cannot be pulled out by hand.)</li> <li>• Length adjustment screw has not been returned to the locking position (lowest position). → Check if adjustment screw will not turn after adjustment is completed.</li> </ul>
	Variation caused by large inertia of machine spindle	<ul style="list-style-type: none"> <li>• Lower rotation speed (500rpm and below)</li> <li>• Check the stationary position of machine spindle (in Z-axis).</li> </ul>