Countermeasures against errors caused by excessive load to a tool

If excessive load is applied to a tool because the cutting parameters are not optimal or for other reasons, the following error may occur:

- The spindle experienced excessive current of electricity.
- The tool clamping has slipped out.
- The tool might be broken.

Please confirm the following contents as countermeasures when these above errors occur.

### 1. Setting the CAM Software

#### Checking the Cutting Conditions

This is a general guide for cutting conditions for each material.

<table>
<thead>
<tr>
<th>Material</th>
<th>Tool</th>
<th>Process</th>
<th>X, Y direction cutting speed (mm/min)</th>
<th>Z direction cutting speed (mm/min)</th>
<th>Spindle speed (rpm)</th>
<th>Path interval (mm)</th>
<th>Cut-in amount (mm)</th>
<th>Finish margin (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zirconia</td>
<td>R1 ball</td>
<td>Rough cutting</td>
<td>2100</td>
<td>1200</td>
<td>25000</td>
<td>1</td>
<td>0.8</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>R0.5 ball</td>
<td>Finish cutting</td>
<td>900</td>
<td>900</td>
<td>25000</td>
<td>0.1</td>
<td>0.1</td>
<td>-</td>
</tr>
<tr>
<td>PMMA</td>
<td>R1 ball</td>
<td>Rough cutting</td>
<td>1200</td>
<td>900</td>
<td>25000</td>
<td>1</td>
<td>0.45</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>R0.5 ball</td>
<td>Finish cutting</td>
<td>900</td>
<td>900</td>
<td>25000</td>
<td>0.15</td>
<td>0.15</td>
<td>-</td>
</tr>
<tr>
<td>WAX</td>
<td>R1 ball</td>
<td>Rough cutting</td>
<td>2400</td>
<td>2100</td>
<td>25000</td>
<td>1</td>
<td>0.95</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>R0.5 ball</td>
<td>Finish cutting</td>
<td>900</td>
<td>900</td>
<td>25000</td>
<td>0.15</td>
<td>0.15</td>
<td>-</td>
</tr>
</tbody>
</table>

- If an error occurs with the setting shown in the above table, adjust the cutting speed and cutting-in amount to smaller direction.
- PMMA significantly varies depending on the manufacturers of materials and tools.

#### Setting the Offset

- Make the distance to a wall (offset) wide. Estimated distance (recommended): Approximately 1.5 times of the diameter of the tool to be used (for a tool with a diameter of 2mm, offset of 3mm shall be set).
- Slant the wall. Estimated angle (recommended): 5 degrees.

### 2. Setting the Machine

#### Tool

- **Using a New Tool**
  - General guide for replacing a worn tool is 20 to 40 teeth (1 piece or 2 pieces for a disc shape workpiece)
  - **Using a Tool having a Long Length of Cut**
    - For rough cutting, we recommend using a tool with 2400rpm, offset of 3mm shall be set.
    - Estimated angle (recommended): 5 degrees
    - Estimated distance (recommended): Approximately 1.5 times of the diameter of the tool to be used (for a tool with a diameter of 2mm, offset of 3mm shall be set).

- **Care and Maintenance of a Tool**
  - After use, wipe and clean the shank portion of a tool using a dry cloth.

#### Using Air Blow

- During machining, use air blow.
- For the method for connecting and setting air, see the manual for the machine.

### Confirmation of a Collet

- The collet may become loose. Tighten the collet according to “Confirmation of Tightening of a Collet” on the next page.
- If a collet is damaged or deformed, run-out of a tool may become large or a tool may become loose; therefore the collet needs to be replaced. In such cases, contact your authorized Roland DG Corp. dealer.