

# Straight Attachment IG - 400

## OPERATION MANUAL

OM-K0612E

Thank you for purchasing Straight Attachment "IG - 400". This Attachment is designed for strong retention and high precision performance. The Emax EVolution Motor or the ROTUS Air Motor are required to drive this Attachment. Read this and all the associated component Operation Manuals carefully before use. Always keep this Operation Manual in a place where a user can refer to for reference at any time.

### 1. CAUTIONS FOR HANDLING AND OPERATION

- Read these cautions carefully and only use in the manner intended.
- These warnings and cautions are intended to avoid potential hazards that could result in personal injury or damage to the device. These are classified as follows in accordance with the seriousness of the risk.

Class	Degree of Risk
⚠ WARNING	A safety hazard could result in bodily injury or damage to the device if the safety instructions are not properly followed.
⚠ CAUTION	A hazard that could result in light or moderate bodily injury or damage to the device if the safety instructions are not followed.

#### ⚠ WARNING

- ① The Attachment is designed for hand use. Never install this Attachment or any hand tool on a machine such as a special purpose machine, NC lathe or mill.
- ② Do not touch the cutting tool while it is rotating. It is very dangerous.
- ③ Always wear safety glasses, dust mask and hearing protection.
- ④ When installing a cutting tool, tighten the collet chuck correctly and recheck the collet chuck and chuck nut before use. Do not over tighten the collet chuck. This may cause damage to the spindle.
- ⑤ Do not use grindstones with an outside diameter over  $\phi 15\text{mm}$ .
- ⑥ Do not exceed 13mm of overhang for mounted grindstones as shown in Fig. 1.  
If the overhang must exceed 13mm, reduce the motor speed in accordance with Table 1.
- ⑦ Do not use bent, broken, chipped, out of round or sub-standard tools, as they can shatter or explode.  
A sudden speed increase when using a large cutting tool can cause the shank to bend or break. When using a new tool or a large tool, rotate it in a low speed and increase speed gradually for safety.
- ⑧ Always operate cutting tools within the cutting tool manufacturer's recommended speed limits. Use of a cutting tool higher than the manufacturer's recommended speed limits could cause damage to the spindle and injury to the operator.
- ⑨ Do not apply excessive force. This may cause tool slippage, tool damage, injury to the operator, loss of concentricity and precision.

Table 1. Overhang and Speed

Overhang (mm)	Max. Speed ( $\text{min}^{-1}$ )
20	$N \times 0.5$
25	$N \times 0.3$
50	$N \times 0.1$

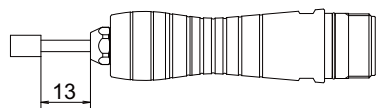


Fig. 1

\*N = Max. Operating Speed with 13mm overhang.

#### ⚠ CAUTION

- ① Do not drop or hit this Attachment, as shock can cause damage to the internal components.
- ② Be sure to clean the collet chuck, chuck nut and the spindle taper and threads before replacing the cutting tool. If ground particles or metal chips stick to the inside of spindle or the collet chuck, damage to the collet chuck or spindle can occur due to the loss of precision.
- ③ When cleaning a spindle, stop the motor and remove dirt with a brush or a cloth. Do not blow compressed air into the Attachment. Foreign particles or cutting chips may get into the ball bearings.
- ④ Always clean the tool shank before installing the tool in the spindle.
- ⑤ Use only tools with shank diameters within the tolerance of the selected collet chuck.
- ⑥ Select suitable products or tools for each application. Do not exceed the capabilities of the Attachment or cutting tools.

#### ⚠ CAUTION

- ⑦ Stop operating immediately when abnormal rotation or any unusual vibrations are observed. Afterwards, please check the content of Section 7 "TROUBLESHOOTING".
- ⑧ Always check if the tool, collet chuck is damaged before and after operating.
- ⑨ If the collet chuck show signs of wear or damage, replace it before a malfunction or additional damage occurs.
- ⑩ No lubrication is required because grease impregnated ball bearings are used.
- ⑪ After repair, initial operation, or long periods of non operational time, please use the following break-in procedure. Start rotating slowly and over a short period of time, then increase the speed gradually until reaching the maximum allowable speed.
- ⑫ Do not disassemble, modify or attempt to repair the Attachment. Additional damage will occur to the internal components. Service must be performed by NSK NAKANISHI or an authorized service center.

### 2. FEATURES

- ① High precision NK Micron Collet Chuck system. Strong tool retention strength and highly precision metal removal are achieved.
- ② Prolonged use is possible due the Attachments light weight and minimal vibration.

### 3. SPECIFICATIONS AND DIMENSIONS

#### 3 - 1 Specifications

Model	IG - 400
Maximum Motor Rotation Speed	Less than $40,000\text{min}^{-1}$
Applicable Motor	ENK - 410S · ENK - 250T (Emax EVolution) IM - 301 (ROTUS)
Vibration Level	Less than $2.5\text{m} / \text{s}^2$
Weight	55g
Noise Level at 1m distance	Less than 70dB (A)

	Temperature	Humidity	Atmospheric Pressure
Operation Environment	0 - $40^{\circ}\text{C}$	MAX.75% (No condensation)	700 - 1,060hPa
Transportation and Storage Environment	-10 - + $50^{\circ}\text{C}$	10 - 85%	500 - 1,060hPa

#### Standard Accessories

- Collet Chuck  $\phi 3.0\text{mm}$  (NKM6 - 3.0) or  $\phi 3.175\text{mm}$  (NKM6 - 3.175) ·· 1pc.
- Chuck Nut (CHN - 06) ·· 1pc.
- Wrench (15 x 17) ·· 1pc.
- Wrench (9 x 9) ·· 1pc.
- Bar Wrench ·· 1pc.

\*The collet chuck and the chuck nut are attached to the spindle when shipped from the factory.

< Options >

Collet Chuck (NKM6 - □□)	$\phi 2.35\text{mm}$ , $\phi 3.0\text{mm}$ , $\phi 3.175\text{mm}$
Chuck Nut	CHN - 06

#### 3 - 2 Outside View

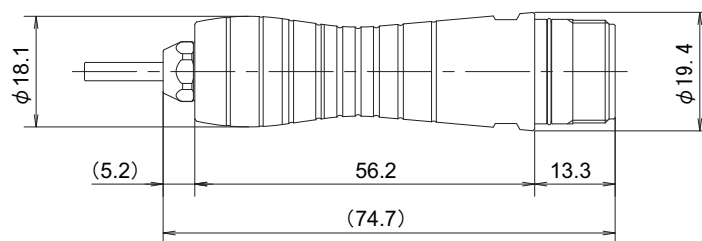


Fig. 2

#### 4. CONNECTING THE ATTACHMENT TO THE MOTOR

##### CAUTION

Make sure your hands and all interlocking parts of the spindle and motor are clean before connecting the motor to the spindle. This is critical to prevent contaminants from entering the motor or spindle.

Align the threads on the front end of the motor and the rear end Attachment, and turn the Attachment clockwise. If the drive shaft of the motor does not engage the drive dog on the Attachment, you may only be able to turn it about 2 turns. DO NOT FORCE IT. Turn the Attachment back a few threads, rotate the Attachment by hand to engage the drive shaft and the drive dog, and screw them together with the provided wrench.

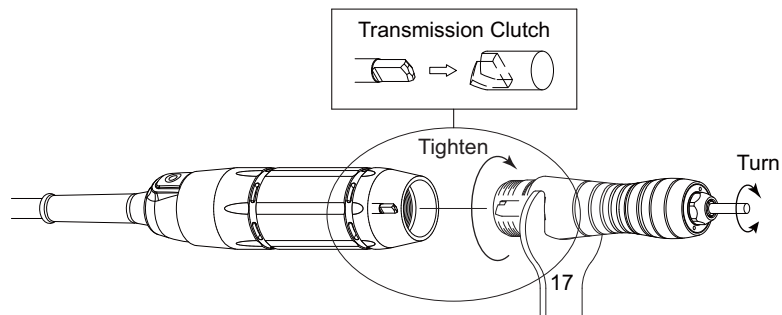


Fig. 3

#### 5. CHANGING THE CUTTING TOOL

##### CAUTION

Do not tighten the collet chuck without inserting a cutting tool or dummy bur, as this will damage the collet chuck, spindle or chuck nut, causing difficulty in removing the collet chuck.

- Align the hole in the head with the hole in the spindle and insert the provided bar wrench.
- Place the provided 9mm wrench on the chuck nut and turn counter-clockwise to open the chuck nut and remove the cutting tool.
- Clean the collet chuck of any debris.
- Insert the new cutting tool with the overhang as shortly as possible.
- Turn the chuck nut clockwise to tighten.

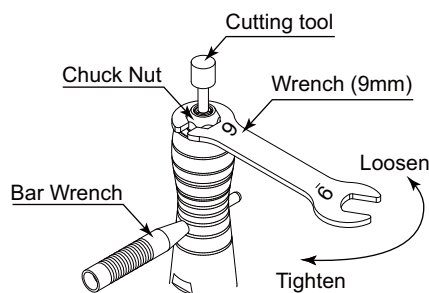


Fig. 4

#### 6. REPLACING THE COLLET CHUCK

- Remove the tool as detailed in Section 5. "CHANGING THE CUTTING TOOL" procedure and remove chuck nut assembly (Fig. 5).
- Insert the bar wrench firmly into the taper of the collet chuck from the back of the chuck nut (Fig. 6).
- Pull out the bar wrench and remove the collet chuck with the bar wrench. Remove the collet chuck from the bar wrench by pulling it off of the bar wrench (Fig.7).

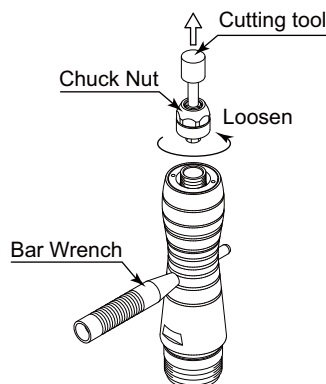


Fig. 5

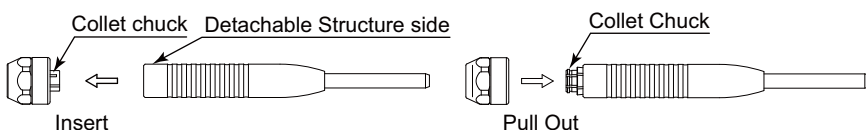


Fig. 6

Fig. 7

- Push the collet chuck manually straight into the chuck nut or by using the bar wrench. When hard to attach, push the collet chuck slightly into the chuck nut after placing the collet chuck in the bar wrench (Fig. 8).
- After pushing the collet chuck in, check that the collet chuck is secure 360 degrees around the chuck nut (Fig. 9).

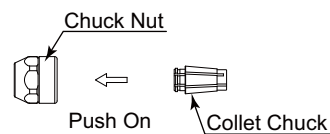


Fig. 8

Push the collet chuck until the collet chuck is securely inserted into the chuck nut.

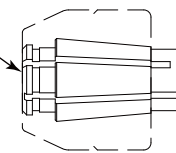


Fig. 9

#### 7. TROUBLESHOOTING

If a problem or concern occurs, please check the following prior to consulting your dealer.

Trouble	Cause	Inspect / Corrective Action
Spindle does not run.	The ball bearings are damaged.	Replace the ball bearings. (Return to NAKANISHI dealer service.)
	Motor is broken.	Replace the motor. (Return to NAKANISHI dealer service.)
Overheating during rotation.	Cutting debris has contaminated the ball bearing, and the ball bearings are damaged.	Replace the ball bearings. (Return to NAKANISHI dealer service.)
Abnormal vibration or noise during rotation.	Using bent cutting tool.	Replace the cutting tool.
	Cutting debris has contaminated the ball bearings. The ball bearings are worn.	Replace the ball bearings. (Return to NAKANISHI dealer service.)
Cutting tool slippage.	Collet chuck or chuck nut are not correctly installed. The collet chuck is worn or damaged.	Check and clean the collet chuck and chuck nut. Reinstall the collet chuck and re-tighten. Check the accuracy.
	Collet chuck is worn.	Replace the collet chuck.
High run-out.	The cutting tool is bent.	Replace the cutting tool
	Chuck nut is not correctly installed.	Re-install the collet chuck and the chuck nut correctly.
	Chuck nut is worn.	Replace the chuck nut.
	Inside of the spindle is worn.	Replace the spindle shaft. (Return to NAKANISHI dealer service.)
	Contaminants inside the collet chuck or the spindle.	Clean the collet chuck and the inside of the spindle.
	The ball bearings are worn.	Replace the ball bearings. (Return to NAKANISHI dealer service.)

#### 8. DISPOSAL OF THE ATTACHMENT

When disposal of an Attachment is necessary, follow the instructions from your local government agency for proper disposal of industrial components.