

# 90° Angle Torque Attachment ERA - 270

## OPERATION MANUAL OM-K0210E 003

Thank you for purchasing the 90° Angle Torque Attachment ERA-270. This Attachment for Espert 500 Control Unit and Espert 500 motor which has been designed for grinding and processing of cross hole. The Espert 500 Control Unit and Espert 500 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 referred to for reference at any time.

### 1. CAUTIONS FOR HANDLING AND OPERATION

- Read these warnings and 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 to the operator 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 This 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 exceed the " Maximum Allowable Motor Rotation Speed " (Refer to " 2 - 1 Specifications ").
- ③ When sensing that the Attachment and motor are overheated during operation, reduce the working force or the motor rotation speed, or stop the operation until the Attachment cools down before restarting.
- ④ Do not touch the cutting tool while it is rotating. It is very dangerous.
- ⑤ Always wear safety glasses, dust mask and use a protective cover.
- ⑥ When installing a cutting tool, tighten the collet chuck correctly and recheck the collet chuck before use. Do not overtighten the collet chuck. This may cause damage to the spindle.
- ⑦ 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.
- ⑧ Do not use bent, broken, chipped, out of round or sub-standard cutting tools as they may cause shatter or explode. The cutting tool with cracked, bended may cause some injury to operator. When using a new cutting tool, rotate it in a low speed and increase speed gradually for safety.
- ⑨ 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.
- ⑩ 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 (min <sup>-1</sup> )
20	N x 0.5
25	N x 0.3
50	N x 0.1

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

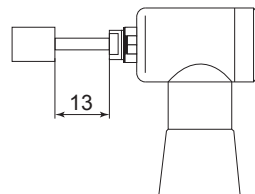


Fig. 1

#### 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, 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 Attachment, 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 cutting tool shank before installing the tool in the spindle.
- ⑤ When sizing the correct collet chuck size to the cutting tool shank diameter, a tolerance of +0 ~ - 0.01mm is strongly recommended. A tool shank within the +0 ~ - 0.1mm range is mountable, however, this may cause poor concentricity and or insufficient cutting tool shank gripping force.
- ⑥ Select suitable products or tools for each application. Do not exceed the capabilities of the Attachment or cutting tools.
- ⑦ Keep everything in order not to place the rag which could be caught near the hand tool.
- ⑧ Stop operating immediately when abnormal rotation or any unusual vibrations are observed. Afterwards, please check the content of section 6 "TROUBLESHOOTING".
- ⑨ Always check if the cutting tool, collet chuck is damaged before and after operating.
- ⑩ If the collet chuck show signs of wear or damage, replace it before a malfunction or additional damage occurs.
- ⑪ No lubrication is required because grease impregnated ball bearings are used.
- ⑫ 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.
- ⑬ 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

#### 2 - 1 Specifications

Model	ERA - 270
Reduction Ratio	1 / 1.5
Maximum Allowable Motor Rotation Speed	Less than 27,000min <sup>-1</sup> (rpm)
Maximum Motor Rotation Speed at the Cutting Tool	Less than 18,000min <sup>-1</sup> (rpm)
Applicable Motor	ENK - 500C • ENK - 500T
Weight	107g
Vibration Level	Less than 2.5m / s <sup>2</sup>
Noise Level at 1m distance	Less than 70dB (A)

#### Standard Accessories

- Collet Chuck  $\phi$  3.0mm (CHS - 3.0) or  $\phi$  3.175mm (CHS - 3.175) • • 1pc.
- Wrench (7 x 5.1) • • 1pc.
- Wrench (8 x 5) • • 1pc.
- Wrench (20 x 24) • • 1pc.
- Operation Manual • • 1set.

\* The collet chuck is attached to the spindle.

<Option>

Collet Chuck (CHS - □□)	$\phi$ 0.8mm - $\phi$ 3.0mm in 0.1mm increments and $\phi$ 2.35mm, $\phi$ 3.175mm
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#### WARNING

- Do not exceed the " Maximum Allowable Motor Rotation Speed ".
- When sensing that the Attachment and motor are overheated during operation, reduce the working force or the motor rotation speed, or stop the operation until the Attachment cools down before restarting.

## 2 - 2 Outside View

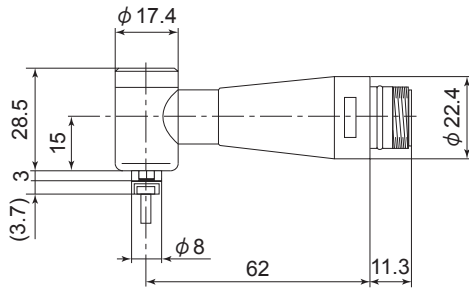


Fig. 2

## 3. CONNECTION OF THE ATTACHMENT TO THE MOTOR

### CAUTION

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

Align the thread 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 properly to the drive dog on the Attachment, it may only turn approximately two threads before stopping. DO NOT FORCE THEM TOGETHER. Loosen the Attachment from the motor, rotate the Attachment shaft by hand then re-try. The drive shaft and the drive dog must be fully engaged. When fully engaged, secure the motor and Attachment using the provided wrench.

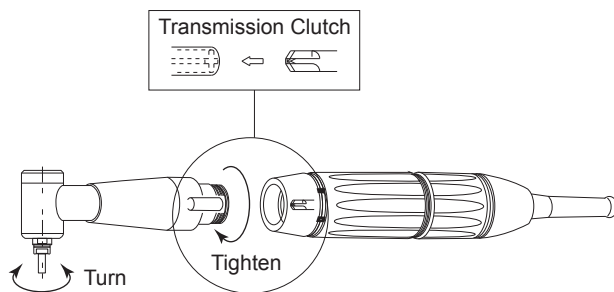


Fig. 3

## 4. CHANGING THE CUTTING TOOL

### CAUTION

Do not tighten the collet chuck without inserting a cutting tool or dummy bur, as this will result in damage to the collet chuck.

- Set the provided 7mm wrench on the spindle.
- Place the provided 5mm wrench on the chuck and turn it counterclockwise to loosen the collet chuck and remove the cutting tool.
- Clean the collet chuck, then insert the new cutting tool and tighten the collet chuck by turning clockwise. Do not over tighten.

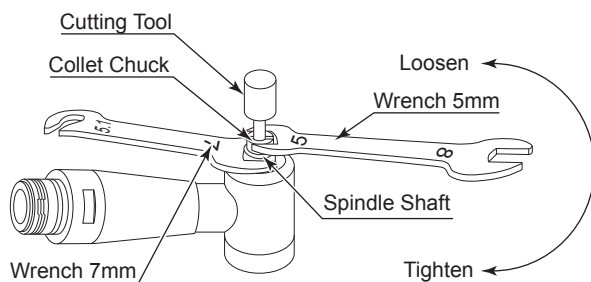


Fig. 4

## 5. REPLACING THE COLLET CHUCK

- Remove the tool according to the section 4. "CHANGING THE CUTTING TOOL" procedure above and remove cutting tool.
- While holding the spindle with a wrench, hold the tip of the collet chuck with your fingers and rotate it counterclockwise to take it off.
- Insert the new collet chuck into the spindle and screw it clockwise with your fingers.

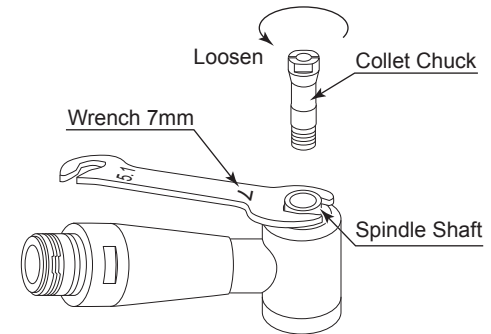


Fig. 5

## 6. TROUBLESHOOTING

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

Trouble	Cause	Inspection / 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.)
	The inner gears are damaged.	Replace the inner gears. (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 tool.	Replace the cutting tool.
	Cutting debris has contaminated the ball bearings.	Replace the ball bearings. (Return to NAKANISHI dealer service.)
	The ball bearings are worn.	Replace the ball bearings. (Return to NAKANISHI dealer service.)
Tool slippage.	The inner gears are worn.	Replace the inner gears. (Return to NAKANISHI dealer service.)
	Collet chuck is not correctly installed.	Check and clean the collet chuck. And, tighten the collet chuck accurately again.
High run-out.	The collet chuck is worn.	Replace the collet chuck.
	The cutting tool is bent.	Change the cutting tool.
	The collet chuck is worn.	Replace the collet chuck.
	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.)

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