

Lever Type Attachment EHL - 401

OPERATION MANUAL

OM-K0631E 004

Thank you for purchasing Lever Type Attachment " EHL - 401 ". This Attachment is Lever Type Attachment. The Espert 500 Motor and Control Unit 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 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 cutting 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 Wear safety glasses, dust mask, and use a protective cover around the Attachment whenever the Attachment is rotating.
- ④ When installing a cutting tool, tighten the collet correctly and check again the collet before use. Do not over-tighten the collet. This may cause damage to the spindle.
- ⑤ Do not use grindstones with an outside diameter over $\phi 12\text{mm}$.
- 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 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.
- 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 cutting tool slippage, cutting tool damage, injury to the operator, loss of concentricity and precision.

Table. 1 Overhang and Speed

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

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

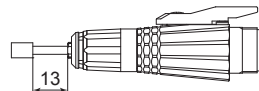


Fig. 1

CAUTION

- ① Use less than the maximum allowable motor speed $40,000\text{min}^{-1}$ (rpm).
- ② Do not drop or hit this Attachment, as shock can damage to the internal components.
- ③ Be sure to clean the collet, 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, damage to the collet or spindle can occur due to the loss of precision.
- ④ When cleaning an Attachment, stop the Attachment and remove debris with a soft brush or a cloth. Do not blow air into the Attachment with compressed air as foreign particles or cutting debris may get into the ball bearing.
- ⑤ Always clean the cutting tool shank before installing the cutting tool in the spindle.
- ⑥ When sizing the correct collet size to the cutting tool shank diameter, a tolerance of $+0 \sim -0.01\text{mm}$ is strongly recommended. A cutting tool shank within the $+0 \sim -0.1\text{mm}$ range is mountable, however, this may cause poor concentricity and or insufficient cutting tool shank gripping force.
- ⑦ Select suitable products or cutting tools for each application. Do not exceed the capabilities of the Attachment or cutting tools.

CAUTION

- ⑧ Keep everything in order not to place the rag which could be caught near the hand tool.
- ⑨ Stop operating immediately when abnormal rotation or unusual vibrations are observed. Immediately, please check the content of section " 10. TROUBLESHOOTING ".
- ⑩ Always check if the cutting tool, collet is damaged before and after operating.
- ⑪ If the collet show signs of wear or damage, replace it before a malfunction or additional damage occurs.
- ⑫ No lubrication is required because grease impregnated ball bearings are used.
- ⑬ After installation, repair, initial operation, or long periods of non operation, please carry out break-in as follow. Start rotating slowly and over a short period of 5 - 10 minutes, increase speed gradually until Maximum Allowable Motor Rotation Speed.
- ⑭ 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. BASIC PACKAGE

When opening the package, check if it includes all items listed in " Table. 2 Packing List Contents ".

In the event of any shortage, please contact either NAKANISHI (see the " 4. CONTACT US " section) or your local dealer.

Table. 2 Packing List Contents

| | | |
|--------------------------------------|---|------------------------------|
| EHL - 401 Attachment • • 1pc. | Collet $\phi 3.0\text{mm}$ (CHH - 3.0)* or $\phi 3.175\text{mm}$ (CHH - 3.175) (For U.S. market $\phi 3.175\text{mm}$ (CHH - 3.175)) and $\phi 2.35\text{mm}$ (CHH - 2.35) • • 1pc. Each. | |
| Wrench (7 x 5.1) • • 1pc. | Pin Wrench (K - 233) • • 1pc. | L Shaped Wrench • • 1pc. |
| Operation Manual • • 1set | | |

* The collet ($\phi 3.0\text{mm}$ or $\phi 3.175\text{mm}$) is attached to the Attachment.

3. WARRANTY

We provide a limited warranty for our products. We will repair or replace the products if the cause of failure is due to the following manufactures defects. Please contact us or your local distributor for details.

- ① Defect in manufacturing.
- ② Any shortage of components in the package.
- ③ Where damaged components are found when initially opening the package. (This shall not apply if the damage was caused by the negligence of a customer.)

4. CONTACT US

For your safety and convenience when purchasing our products, we welcome your questions.

If you have any questions about operation, maintenance and repair of the product, please contact us.

Contact Us

● For U.S. Market

| | |
|--------------------|--|
| Company Name | : NSK America Corp. Industrial Div. |
| Business Hours | : 8:00 to 17:00 (CST) (closed Saturday, Sunday and Public Holidays) |
| U.S. Toll Free No. | : +1 800 585 4675 |
| Telephone No. | : +1 847 843 7664 |
| Fax No. | : +1 847 843 7622 |
| Website | : www.nskamericacorp.com |

● For Other Markets

| | |
|----------------|--|
| Company Name | : NAKANISHI INC. |
| Business Hours | : 8:00 to 17:00 (JST) (closed Saturday, Sunday and Public Holidays) |
| Telephone No. | : +81 289 64 3520 |
| e-mail | : webmaster-ie@nsk-nakanishi.co.jp |

5. FEATURES

- ① The cutting tools can be surely replaced by " Lever Type Chucking ".
- ② This Attachment is a slim, light weight and best for micro-drilling or micromilling.

6. SPECIFICATIONS AND DIMENSIONS

6 - 1 Specifications

| | | | |
|------------------------------|---|--|--|
| Model | EHL - 401 | | |
| Maximum Motor Rotation Speed | Less than 40,000min ⁻¹ (rpm) | | |
| Applicable motor | ENK - 500C, ENK - 500T | | |
| Vibration Level | Less than 2.5m / s ² | | |
| Weight | 70g | | |
| Noise Level at 1m distance | Less than 70dB (A) | | |

| | | | |
|--|-------------|------------------------------|----------------------|
| | Temperature | Humidity | Atmospheric Pressure |
| Operation Environment | 0 - 40°C | MAX.75% (No condensation) | 800 - 1,060hPa |
| Transportation and Storage Environment | -10 - 50°C | 10 - 85% | 500 - 1,060hPa |

< Option >

| | |
|--------------------|--|
| Collet (CHH - □□) | φ 1.0mm, φ 1.5mm, φ 1.6mm, φ 2.0mm, φ 2.35mm, φ 2.5mm, φ 3.0mm, φ 3.175mm |
|--------------------|--|

6 - 2 Outside View

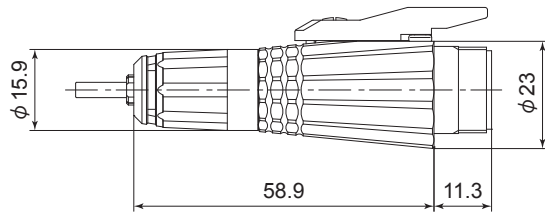


Fig. 2

7. 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 to preventing contaminants from entering the motor or Attachment.

Align the thread on the front end of the motor and the rear of the 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 pin wrench (K - 233) (Fig. 3).

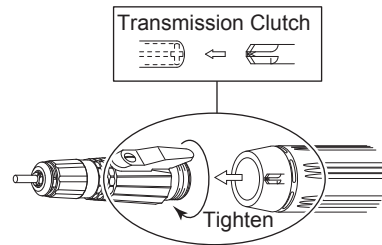


Fig. 3

8. CHANGING THE CUTTING TOOL

⚠ CAUTION

- Do not open and close the collet without cutting tools.
- Do not rotate the motor when replacing the cutting tools (when turning the lever vertically toward a arrow in Fig. 4). This will cause damage to the motor or the Attachment.

- ① Turning the lever vertically toward a arrow in Fig. 4 (counterclockwise) to loosen the collet, the cutting tools can be replaced.
- ② Return the lever vertically to close the collet.

* If it is hard to remove the collet or the cutting tools, use the provided wrench. When putting high torque by cutting tools with the large cutting tool diameter, or when turning toward closing the collet, there is a case where the collet or cutting tools can not be put off by hand. If so, align the nose's slit and spindle's wrench position, and put a L shaped wrench to fix the spindle. Set the provided wrench (5.1mm) to the collet, turning the lever vertically. And turn the wrench counterclockwise to release the collet or the cutting tools (Fig. 5).

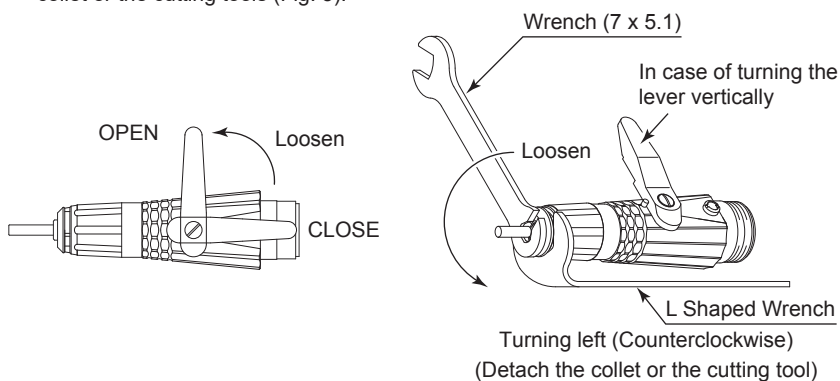


Fig. 4

Fig. 5

9. REPLACING AND CLEANING OF THE COLLET

- ① Replacing of the collet.

Turning the collet left to detach the collet, turning the lever vertically (Fig. 6). Can usually attach and detach the collet by hand. If the attach or detach of the cutting tool is difficult, refer to " 8 CHANGING THE CUTTING TOOL <If it is hard to remove the collet or the cutting tools, use the provided wrench > " section.

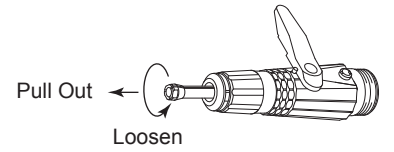


Fig. 6

- ② Cleaning of the collet.

Release and clean the collet at least once a week not to loss it is precision. Coat oil lightly on the collet before putting the collet back into Attachment.

- ③ Attachment and Adjustment of the collet.

- (1) Turning the lever vertically. And turning the collet clockwise by finger to the end to attach, while clutching the test bur or the using cutting tools into the collet.
- (2) And turn the collet about 1 / 5 counterclockwise to adjust the cutting tool to pull out easily. In this case, about 0.1mm thinner of cutting tool can be used (Fig. 7).

* The clutching of collet can be adjusted according to the above. When loosing the cutting tools, or not pulling it out, can be adjusted according to the above.

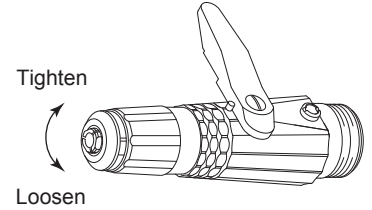


Fig. 7

10. 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 rotate or rotate smoothly. | The spindle ball bearings have been damaged. | Replace the ball bearings (Return to NAKANISHI dealer service). |
| | The motor has been damaged. | Replace the motor (Return to NAKANISHI dealer service). |
| | The lever is OPEN position (Fig. 4). | Turn the lever position to CLOSE (Fig. 4). |
| Spindle does not run with the collet tightened. (Lever is CLOSE position) | Cutting debris has contaminated the ball bearing, or the ball bearing is out burned. | Replace the ball bearings (Return to NAKANISHI dealer service). |
| Overheating during rotation. | Cutting debris has contaminated the ball bearing, and the ball bearings are damaged. | |
| Abnormal vibration or noise during rotation. | Using bent cutting tool. | Replace the cutting tool. |
| | Cutting debris has contaminated the ball bearings. | Replace the ball bearings (Return to NAKANISHI dealer service). |
| Cutting tool slippage. | The spindle ball bearings have been damaged. | |
| | Collet is not correctly installed. | Check and clean the collet. Reinstall the collet and re-tighten. Check the accuracy. |
| High run-out. | The collet chuck is worn. | Replace the collet. |
| | Cutting tool is bent. | Replace the cutting tool |
| | The collet is worn. | Replace the collet. |
| | Inside of the spindle is worn. | Replace the spindle shaft (Return to NAKANISHI dealer service). |
| | Contaminants inside the collet or the spindle. | Clean the collet and the inside of the spindle. |
| Collet is not OPEN or CLOSE. | The spindle ball bearings have been damaged. | Replace the ball bearings (Return to NAKANISHI dealer service). |
| | Chucking system is broken. | Repair the chucking system (Return to NAKANISHI dealer service). |
| | The lever is not turned until OPEN or CLOSE position. | Turn the lever to OPEN or CLOSE position. |

11. 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.

NAKANISHI INC. www.nakanishi-inc.com
700 Shimohinata, Kanuma, Tochigi 322-8666, Japan
NSK America Corp. www.nskamericacorp.com
1800 Global Parkway, Hoffman Estates, IL 60192, USA
NSK Europe GmbH
Elly-Beinhorn-Strasse 8, 65760 Eschborn, Germany
NSK United Kingdom Ltd. UK Responsible Person
Office 4, Gateway 1000, Arlington Business Park
Whittle Way, Stevenage, SG1 2FP, UK