NSK

# Varios 170

## iPiezo engine

## OPERATION MANUAL

Please read this Operation Manual carefully
before use, and file for future reference.

Powerful Partners®


MADE IN JAPAN CE 0197

## ◆ *Original Operation Manual*

◆ Classifications of equipment
- Type of protection against electric shock:
  – Class I equipment
- Degree of protection against electric shock:
  – Type B applied part:
- Method of sterilization or disinfection recommended by the manufacture:
  – See 8. Sterilization
- Degree of safety of application in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide:
  – EQUIPMENT not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
- Mode of operation:
  – Continuous operation

## Intended to Use

This product is designed only for dental clinic /dental office use. This device generates ultrasonic waves intended for use in dental applications such as scaling, root canal treatment, periodontal and cavity preparation.

## ⚠ Cautions for handling and operation

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

| Class | Degree of Risk |
|---|---|
| ⚠ WARNING | A hazard that could result in bodily injury or damage to the device if the safety instructions are not 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. |
| ⚠ NOTICE | General information needed to operate the device safely. |

### ⚠ WARNING

- TO PREVENT ELECTRIC SHOCK Do not touch the handpiece backend electrical connections.
- If you feel any abnormality such as vibration, heat generation, abnormal noise, etc., prior or during the use, stop using it immediately.
- This product is Medical Electrical equipment Electromagetic compatable (EMC).As described in the accompanying documentation.
- Portable and mobile RF communications equipment can affect Electrical Medical equipment. Do not use RF equipment in close proximity to the product.
- USE ONLY NSK genuine tips when using NSK Varios Ultrasonic Scaler (Varios 170 or Varios 170 LUX) problems such as damage, failure and accident of Handpieces resulting from use of Non-NSK Tips are not included in the warranty. The following are the possible failure that could happen when using the Non-NSK Tips;
  · Vibration failure caused by using non conforming screws.
  · Patients accidental ingestion of broken tips.
  · Damage of thread ridge of handpiece.
  · You must use the tip within the power range described on the Tip-Power Guide. If you use it out of the power range, the tip might break or damage an operative site.

## ⚠ WARNING

- When operating the product always consider the safety of the patient.
- Use by medical professional, such as doctor or dental hygienist, is intended.
- Check the vibration outside the patient's oral cavity before use. If any abnormalities are found, stop using immediately and contact dealer.
- Do not drop or exsert an excessive shock to the Handpiece and Module.
- To prevent possible tooth plane damage and handpiece overheating, Always use with sufficient water.
- Do not sterilize by ultraviolet light. Handpiece could discolor.
- Sterilize the Tip, Handpiece, and Tip Wrench by autoclaving. Wipe the Handpiece Cord including the cover.
- If chemical, solvent or antiseptic solution is deposited on this product, immediately wipe it away. Discoloration or deformation may occur if left.
- Do not disassemble or alter the Module and handpiece.
- Keep away from patients with cardiac pacemakers.
- Keep away from explosive substances and flammable materials. Do not use for patients anesthetized under laughter gas. (Nitrus Oxide)
- This product needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information.
- The use of ACCESSORIES, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of this product as replacement parts for internal components, may result in increased EMISSIONS or decreased IMMUNITY of this product.
- If any water drops remain on the handpiece after autoclaving, wipe them off. Staining may result if left.
- There is the judgment that applies this product to a patient in the user side.

## ⚠ CAUTION

- During operation, high frequency oscillations in the handpiece and handpiece cord may affect computer and LAN Noise may be heard during operation near a radio receiver.
- Users are responsible for operational control, maintenance and inspection.
- Clean/sterilize the product immediately after using it. Then store it. Leaving it non-sterile might lead to failure.
- When you have not used the product for long time and use it again, check the operation before use.
- Eye damage may result if the LED is stared directly into, Do not look into or turn it to the eyes of the patient.
- This product does not consider patient's age (except infants), gender, weight or nationality.
- No special training is required for this device.

# 1. Specification

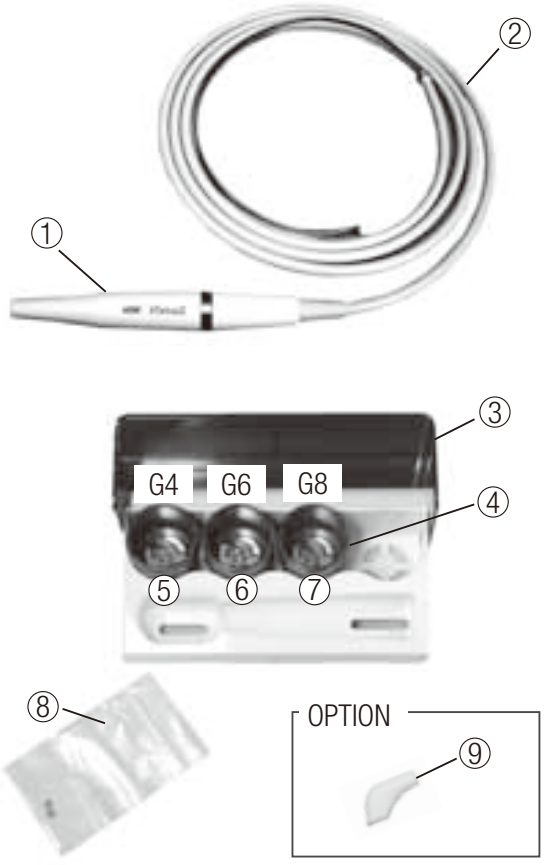
## Varios 170

| | |
|---|---|
| Input Voltage | AC 24 V ± 10% (or DC 36V Max.) |
| Power Supply Frequency | 50 / 60 Hz (or DC) |
| Vibration Frequency | 28 - 32 kHz |
| Maximum Output | 11 W |
| Lighting | Varios2 : No |
| | Varios2 LUX : Yes |

| | |
|---|---|
| Use Environment | Temperature : + 10 - 40 °C<br>Humidity : 30 - 75 %<br>Atmospheric pressure : 700 - 1060 hPa |
| Store Environment | Temperature : - 10 - 60 °C<br>Humidity : 10 - 85 %<br>Atmospheric pressure : 500 - 1060 hPa |

# 2. Component Names

Varios 170 (Non-Optic)




Varios 170 LUX (Optic)


| No. | Parts Name | Quantity |
|---|---|---|
| 1 | Varios2 Handpiece (Non-Optic)<br>Varios2 LUX Handpiece (Optic) | 1 |
| 2 | Handpiece Cord (Optic or Non-Optic) | 1 |
| 3 | Sterilization Case | 1 |
| 4 | Tip Wrench | 3 |
| 5 | Tip G4 | 1 |
| 6 | Tip G6 | 1 |
| 7 | Tip G8 | 1 |
| 8 | O-Ring | 2 |
| 9 | Tip Cover S (Option) | 1 |

*** Operation Principle**

A sinusoidal electrical signal, at ultrasonic frequency ( f > 20kHz ), is delivered by the generator. This signal is applied to the 'piezoelectric ceramic' located inside the transducer. Piezoelectric ceramic converts this signal into mechanical vibrations. These vibrations are at the same ultrasonic frequency as the electrical signal. The mechanical vibrations are propagated towards the distal end of the transducer. The "TIP" insert, which is attached at the distal end of the transducer, vibrates at ultrasonic frequencies and makes it possible to achieve the aimed purpose.

## 3. Mounting and Removing the Handpiece

Align the Dots on the Handpiece and the Handpiece Cord. Push handpiece into connector.

To remove the handpiece, grip the Handpiece and Handpiece Cord and pull to part handpiece and cord. (Fig. 1)

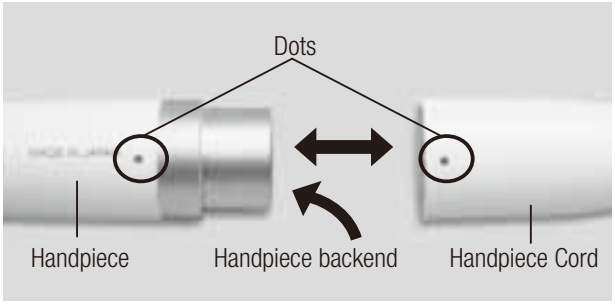



Fig.1

### ⚠ WARNING

To avoid Electrical Shock Do not touch the handpiece backend electrical contacts.

### ⚠ CAUTION

- Always confirm that the handpiece is correctly seated and locked into place.
- Do not connect or use Handpiece other than included one (Varios2 handpiece).

## 4. Mounting and Removing Tip

1) The Tip was installed to a Tip Wrench. Put Tip Wrench bottom and handpiece tip together.
2) Turn it clockwise until the Wrench clicks. (Fig. 3) Do not turn the handpiece cord.
   ✻ Attention for the top of Tip (Some of those are longer than Tip Wrench length), it may cause injury.

To remove the Tip, turn counterclockwise with the Tip Wrench.

**Tip Wrench**

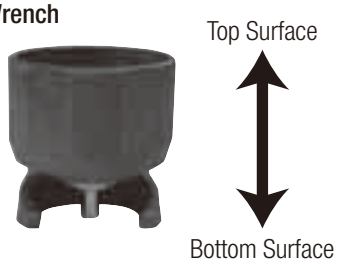
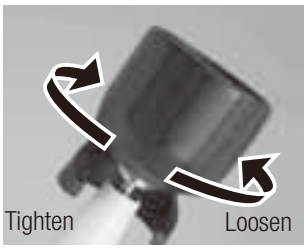



Fig.2



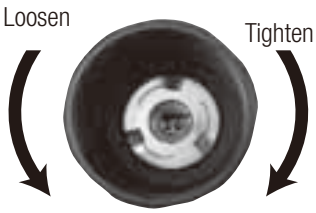




Fig.3

### ⚠ Caution for Tip Usage

- Check the Tip before use. (Flush, Damage, Bending or Rust)
- Do not exceed Maximum Power Level for Tip. Damage to tooth structure and Tip may result.
- Do not hit ceramic prosthesis with Tip during scaling. Tip Damage may result.
- Do not hit metal or prosthetic crown except for removing them. Tip could break and fall into mouth.
- Do not hit gingival, mucosa and/or skin. It could cause damage and/or burn injury.
- Do not sharpen and/or bend the Tip. Tip may damage and not generate enough vibration during scaling.
- During cutting, Tip will gradually wear away, as the Tip wears the stroke will get smaller and decrease cutting efficiancy when level drops too far, change the Tip.(Tip card check)
- DO ENSURE when securing Tip to use the Tip Wrench as supplied, inefficient cutting will result.
- DO ENSURE before attaching Tip, Cleanliness of the Tip Screw, inefficient cutting will result.
- To avid personal injury DO ENSURE Tip is removed prior to disconnecting the handpiece.
- If you feel the Tip is not vibrating, remove it from an operative site, and press the Foot Control of Unit Chair again. If this does not improve the condition, Ensure the Tip is secure, turn the power off and restart it.
- When mounting the Tip, always use groves and Tip Wrench as supplied.
- Ensure that water volume of Unit Chair must be “0”, when you use Tip which does not appear of water.
- Tip Wrench is consumable For reliable operation replace annually.

## 5. Provided Scaler Tips

### G4

The end of the Tip is thin and for supragingival fine scaling and interdental scaling. The round cross-section allows tooth surfaces to be finished without causing damage. Set the level less than “Power 5” at G mode.

Apply the top of the Tip on the tooth plane and move it sideways finely in the same way as G8 Tip. (Fig.4)

Fig.4

### G6

Removal of supra and subgingival calculus. It provides easy access to interdental spaces and narrow pockets. Set the level less than “Power 5” at G mode.

Insert the top of the Tip into the periodontal pocket and move it slowly. The top of the Tip is sharp so that it could remove tartar on long coroner and retracted gingival. (Fig.5)
Clean periodontal pocket at low power. (Set the level less than “Power 5” at P mode.)

Fig.5

### G8

Removal of supragingival and interdental calculus. This Tip can be used in all quadrants and is very useful for the removal of hard calculus. Set the level less than “Power 7” at G mode.

Apply the top of the Tip on the tooth plane and move it sideways finely along the neck of tooth. (Fig.6)

Fig.6

### ⚠ CAUTION

Tip is article of consumption. We recommend periodical replacement. About time of replacement, check the Tip Card.

## ◆ How to use the Tip Card

1) Place the neck of the Tip in the cut out.
2) Check wear of the Tip.
3) See the green, yellow and red line to check wear of the Tip. *See below what each color means. At NSK we recommend to replace a Tip when the Tip meets the yellow line (wear of 1mm) to guarantee safe and effective use.

Tip Card

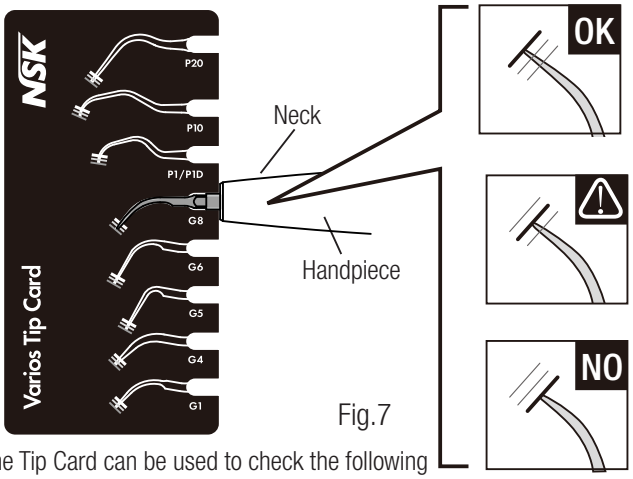



Fig.7

* The Tip Card can be used to check the following tips : G1, G4, G5, G6, G8, P1/P1D, P10, and P20

**Green: No wear - Tip is OK**
Tip replacement is not necessary.

**Yellow: Wear of 1mm - Tip is showing some wear**
Tip replacement is recommended.

**Red: Wear of 2mm - Tip is badly worn**
Tip replacement is necessary.

### ⚠ CAUTION

Tips are consumables. The efficiency of dental scaling decreases approximately 25% when the top of the Tip wears 1 mm and approximately 50% when it wears 2 mm. In addition, the vibration condition changes owing to the wear, which may damage a patient's tooth surface. Check the Tip wear condition with the Tip Card periodically, and replace the Tip with a new one in good time.

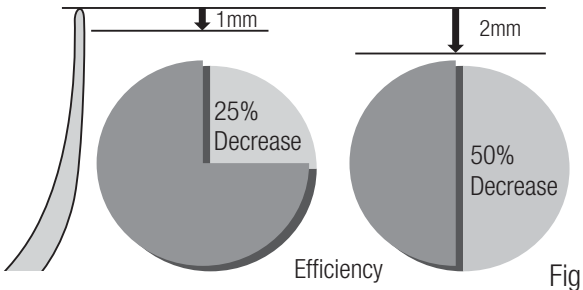



Fig.8

# 6. Care and Maintenance

## 6-1 Cleaning of Optic Fiber (Varios 170 LUX)

Wipe the debris off the end of the Optic Fibers at the handpiece with alcohol soaked cotton swab. (Fig. 9)

### ⚠ CAUTION

Do not use any sharp pointed tools to clean the Optic Fiber End Face. In case the light degridation, contact your dealer.

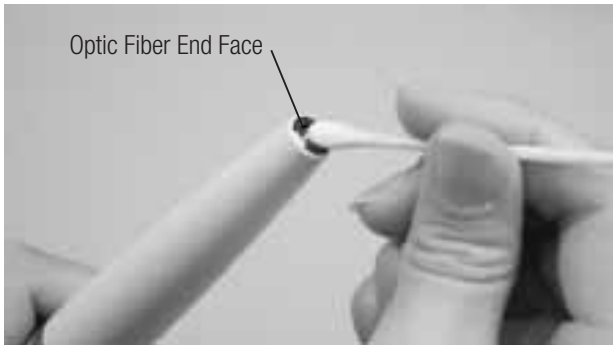



Fig.9

## 6-2 Changing O-Ring

An O-Ring is located in the Handpiece Cord Connector. Use a pointed tool to remove, and mount new O-Ring into the groove. (Fig. 10)

* Optional O-Ring: Order No. 0311020080

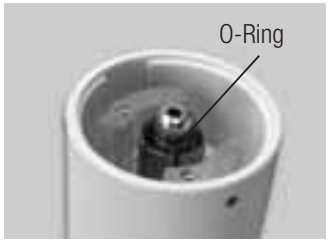



Fig.10

## 7. How to Use Tip Cover S (Option)

Grip the Tip Cover S and insert it to the Tip.
To remove, grip the Tip Cover S and the handpiece & pull. (Fig. 11)

✻ The Tip Cover S is not designed for use as a Tip changing tool.

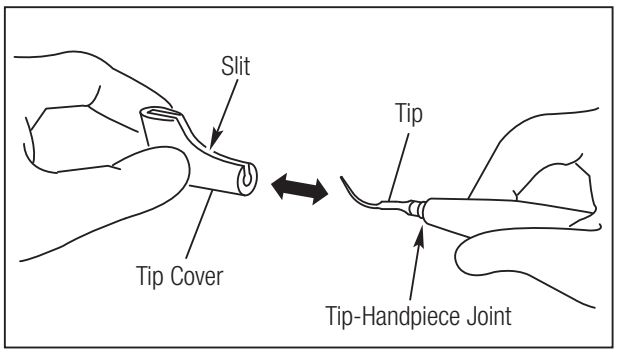



Fig.11

**⚠ CAUTION**

Carefully insert the Tip into the Tip Cover S. Avoid injuring the fingers.

## 8. Sterilization

- Autoclave sterilization is recommended.
- Autoclave sterilization required first time you use and after each patient as noted below. Take handpiece out of the packing bag before sterilization.
- ONLY the Tip, Handpiece and Tip Wrench can be autoclaved.

### ■ Autoclave Procedure

1) Clean and Remove the Tip after use. (Refer to 4)
2) Wipe dirt and debris from the products, and wipe clean with alcohol-immersed cotton swab or cloth. Do not use a wire brush.
3) Insert those into the Sterilization Case or an autoclave pouch. Seal the pouch.
4) Autoclavable up to max. 135˚C.
   Ex.) Autoclave for 20 min. at 121˚C, or 15 min. at 132˚C.
5) Keep the products in the Sterilization Case or autoclave pouch to keep it clean until you use it.

* Sterilization at 121°C for more than 15 minutes is recommended by ISO17664 and ISO17665-1.

**⚠ CAUTION**

- This product can not be cleaned and disinfected with a Thermo-Disinfector.
- Do not sterilize by ultraviolet ray. The handpiece could discolor.
- If autoclaved with other instruments stained with chemical solution, it could strip the plating and make the surface black.
- Alcohol disinfect the handpiece cord after every treatment.
- Do not wipe with, or clean or immerse in, high acid water or sterilizing solutions.

### ※ Sterilization Case

The Handpiece, Tip and Tip Wrench can be sterilized together using Sterilization Case.

Fig.12

1) Remove the Tip from the handpiece by using Tip Wrench.
2) Set the Tip Wrench with Tip into the Sterilization Case. (You can set four Tip Wrenches and Tips at once).
3) Remove handpiece from the Handpiece Cord, and clean. (Refer to 3))
4) Set the handpiece into the Sterilization Case.
5) Autoclavable up to max. 135˚C.
   ex.) Autoclave for 20 min. at 121˚C, or 15 min. at 132˚C.
6) Keep the products in the Sterilization Case or autoclave pouch to keep it clean until you use it.

# 9. Troubleshooting

When trouble is found, please check the followings prior to consulting your dealer.

| Problem | Item to Check | Cause | Solution |
|---|---|---|---|
| No / Poor vibration. | The Tip does not generate vibration, in spite of depressing the Foot Control. | The Tip is not tightened firmly. | Tighten the Tip until the Tip Wrench clicks. |
| | | Worn Tip. | Replace the Tip. |
| | | Power has not been correctly adjusted for the Tip. | Adjust the power on the Power Guide or Tip case label. Do not exceed. |
| | | Failure of vibrator in the handpiece. | Contact dealer. |
| The Tip is bent or broken. | — | Power has not been properly adjusted for the Tip. | Adjust the power level the Power Guide or Tip case label. Do not exceed. |
| The Tip is flying away. | — | The Tip is not tightened firmly. | Tighten the Tip until the Tip Wrench clicks. |
| Noise from the handpiece. | — | Power has not been properly adjusted for the Tip. | Adjust the power level on the Power Guide or Tip case label. Do not exceed. |
| | | The Tip is not tightened firmly. | Tighten the Tip until the Tip Wrench clicks. |
| | | Failure of vibration in the handpiece or the Module. | Contact dealer. |
| The handpiece is overheating. | — | Power has not been properly adjusted for the Tip. | Adjust the power level on the Power Guide or Tip case label. Do not exceed. |
| | | The Tip is not tightened firmly. | Tighten the Tip until the Tip Wrench clicks. |
| | | Failure of vibration in the handpiece or the Module. | Contact dealer. |
| No / Weak water. | The water does not reach to the handpiece. | — | Check the water circuitry and supply to the Unit Chair. Water pressure : 0.1-0.5MPa (1-5kgf/cm$^2$) |
| | Remove the hadpiece from the handpiece cord. Water does not comes out or weak from it. | The water adjustment dial is closed. | Turn the water adjustment dial and set it to an appropriate water colume. |
| | | The water filter is clogged. | Contact dealer. |
| | No / Weak water form the handpiece. | There may be exogenous material in the irrigation hole. | - Contact dealer<br>- Air it with the appliances such as syringes from the rear of the handpiece |
| Water leakage. | Water is leaking from the joint between the handpiece and the cord. | O-Ring at the handpiece cord is worn or damaged. | Replace with new O-Ring (Refer to 6 6-2 Changing O-Ring). |
| Handpiece LED does not illuminate. (Varios 170 LUX) | Tip oscillate, but Handpiece LED turns on and off. | The handpiece is not connected into the Handpiece Cord correctly. | Firmly insert the handpiece into the Hadpiece Cord inmost. |
| | Tip oscillate, but Handpiece LED does not turn on. | Disconnection in the Handpiece Cord, or failure in Module. | Contact dealer. |

## 10. Spare Parts

| Model | Products | Order code |
|---|---|---|
| Sterilization Case |  | Z1035001 |
| Tip Wrench (CR-10) |  | Z221076 |
| Tip Holder |  | Z221080 |

| Model | Products | Order code |
|---|---|---|
| O-Ring |  | 0311020080 |
| Tip Cover S |  | Z217851 |

135°C Autoclavable at 135°C max.

## 11. Disposing product

Consult with dealer from whom you purchased it about waste disposal.

## 12. Warranty

Manufacturer warrants its products to the original purchaser against defects in material and workmanship under normal practices of installation, use and servicing. Such expendable items as O-Rings is not covered by this warranty.

## Symbols

 Manufacturer.

 This conforms to CE European Directive of “Medical equipment directive 93/42/EEC.”

 Follow the waste of electric and electronic equipment (WEEE) Directive (2002/96/EC) to dispose of the product and accessories.

 Type B applied part.

 Authorised representative in the European community.

 Autoclavable up to Max.135°C. *for detail see Sterilization.