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NSK

Multi Function Ultrasonic Scaler

Varios 370

Varios 370

iPiezo engine

OPERATION MANUAL

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

Powerful Partners®



OM-E0506E

MADE IN JAPAN CE 0197

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◆ Original Operation Manual

ENGLISH

◆ Classifications of equipment

- Type of protection against electric shock:
  – Class II equipment ⧈
- Degree of protection against electric shock:
  – Type BF applied part: 🚹
- Method of sterilization or disinfection recommended by the manufacture:
  – See 11. Sterilization
- Degree of protection against ingress of water as detailed in the current edition of IEC 60529:
  – Foot Control: IPX1 (Protected against vertically falling water drops)
- 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 intended 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 unplug the AC Adaptor with wet hands.
- TO PREVENT ELECTRIC SHOCK Be sure to prevent water on the Control Unit.
- TO PREVENT ELECTRIC SHOCK Do not touch the handpiece backend electrical connections.
- TO PREVENT ELECTRIC SHOCK Use an electrical outlet that is grounded.
- If you feel any abnormality such as vibration, heat generation, abnormal noise, etc., prior or during the use of the unit, 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.
- When installing the product, provide space of approximately 10cm around the Control Unit for easy access to the inlet and the AC Adaptor.

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- USE ONLY NSK genuine Tips when using NSK Varios Ultrasonic Scaler (Varios 370 or Varios 370 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.
- 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 Control Unit/Handpiece.
- 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,Tip Holder, Tip Cover S and Tip Wrench by autoclaving. Wipe the Control Unit,Tip Holder, Tip Cover S, AC Adaptor, Foot Control, and 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 handpiece/Control Unit.
- 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.
- This product should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, this product should be observed to verify normal operation in the configuration in which it will be used.
- If any water drops remain on the handpiece or handpiece cord 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.
- Be sure to turn off the Power/Volume Knob after use. Remove the AC Adaptor and water inside of the Control Unit before storage.
- 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.
- Applied parts for patient and/or operator are/is Tip and Handpiece.

* 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.

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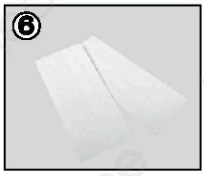
1. Component Names



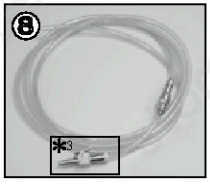




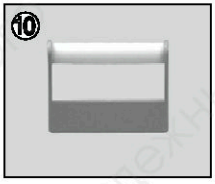




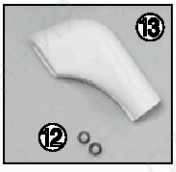














*1 By an area, AC Adaptor Shape change

*2 Either one is contained with the set that you purchased

*3 Only 120 V

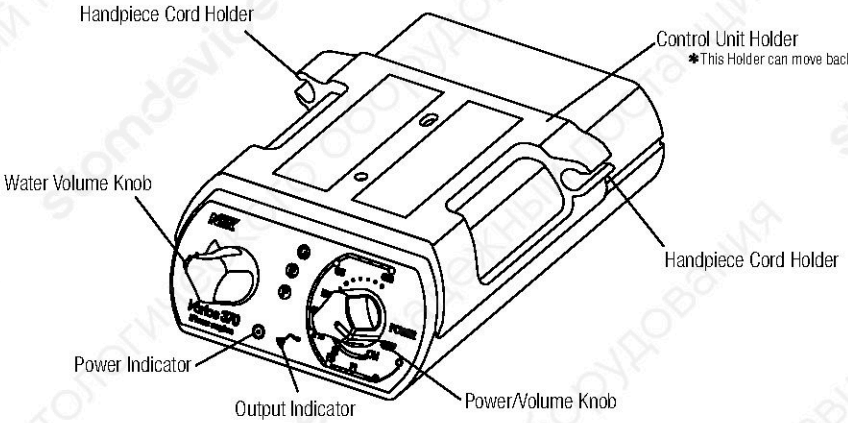
1	Control Unit (with Handpiece Cord Unshielded 2M)	1
2	Handpiece (Varios2 or Varios2 LUX)	1*2
3	Control Unit Holder	1
4*1	AC Adaptor (Unshielded cord 5M)	1
5	Handpiece Holder	1
6	Double-Face Tape	2
7	Foot Control (Unshielded 4M)	1
8	Water Tube Set	1
9	Tip (G4,G6, G8)	1
10	Tip Holder	1
11	Tip Wrench	1
12	O Ring	2
13	Tip Cover S (Option)	1
14	Spanner Wrench (5x8)	2

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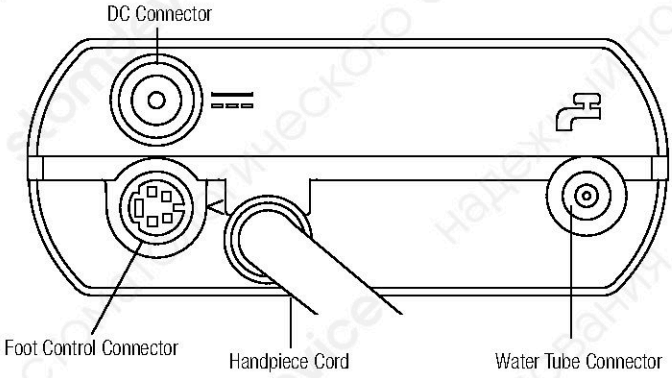
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2. Name and Function of each part

Front side (Control Unit With Control Unit Holder)



Back side



3. Prior to Operating System

3-1 Set the AC Adaptor

Insert each plug into appropriate connector.

❶ Set the AC Adaptor head like right Figure.

❷ Slide into the Plug Head to the AC Adaptor.

To release, push the Release Button shown on the right figure, and remove the Plug Head from the Adaptor Body.



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3-2 Connecting

Insert each plug into appropriate connector. (Fig.1)

1. Align the "△" Mark on the Foot Control Connector and Foot Control Plug and connect those firmly into Foot Contro Connector.
2. Connect Water Tube(Water Filter Case Side, refer to Fig.21 for detail) firmly into Water Tube Connector.
3. Connect AC Adaptor into DC Connector.

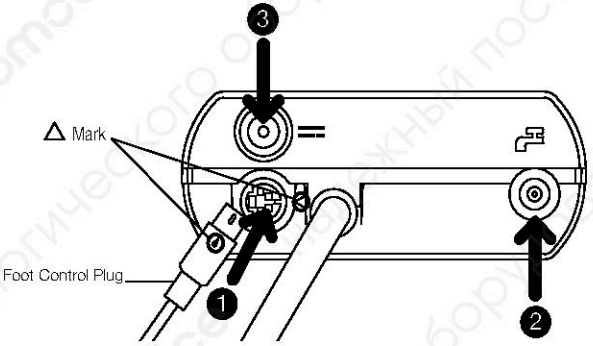


Fig.1

⚠ CAUTION

- Insert plugs firmly into the connector. Lose connection may be cause a malfunction.
- Ensure Power is OFF on the Control Unit during the AC Adaptor Connection.
- Do not connect the cord in wall outlet before connecting DC Connector.
- Do not pull the AC Adaptor forcibly.
- Do not unplug the AC Adaptor while pressing on the Foot Control.
- Turn OFF the power to connect or disconnect the cords and plugs.

3-3 Disconnecting

3-3-1 DC Plug and Foot Control Plug

Simply pull out plugs from the Control Unit.

3-3-2 Water Tube (Fig.2)

Pull out the Water Tube while pushing the White Ring.

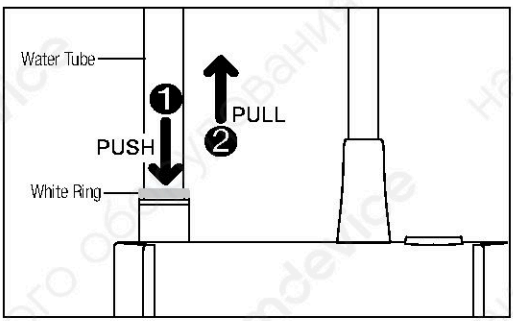


Fig.2

⚠ CAUTION

It requires the water removal before the Water tube disconnection.

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3-4 Handpice Holder (Fig.3)

❶ Peel off cover of the Double-Faced Tape.
❷ Fix the Handpieceholder on the flat surface.

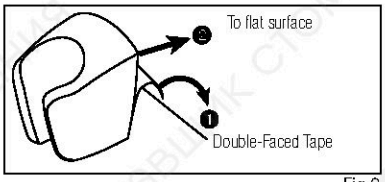


Fig.3

3-5 Handpice Cord Holder and Control Unit Holder (Fig.4)

❶ Align the chase and Slide the Control Unit into the Control Unit Holder.
❷ Tuck the Handpiece Cord into Handpiece Cord Holder.
❸ Peel off the Double-Face Tape cover and put the Control Unit Holder under the Table or Tray.

⚠ CAUTION

- Do not pull the Handpiece cord forcibly. This is because water tube had bended forcibly that is inside the Handpiece cord. Water may not be out appropriately from the handpiece.(Especially for connection for Handpiece cord to Handpiece cord Holder)
- You can mount Control Unit Holder on the Top Surface and Bottom Surface.

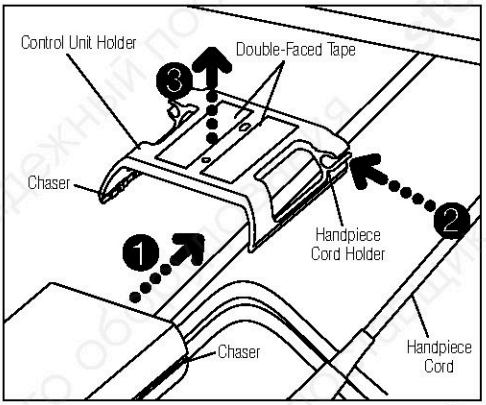


Fig.4

3-6 Rubber Pad

To stop slipping the Control Unit on the table, mount the Rubber Pad at the bottom of it.
1) Clean bottom of the Control Unit.
2) Fit the Rubber Pad appropriate place as shown on the Fig.5.

⚠ CAUTION

Control Unit Holder is not mount to the bottom when a Rubber Pad is attached to the bottom.

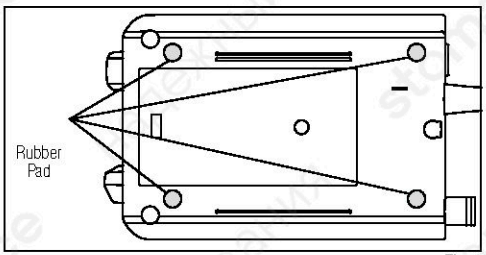


Fig.5

4. 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 then pull it out stright. (Fig. 6)

⚠ WARNING

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

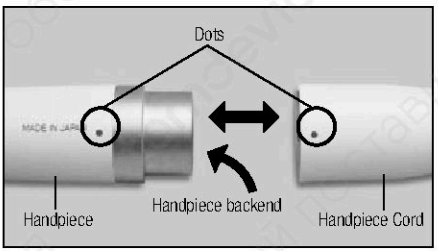


Fig.6

⚠ CAUTION

Always confirm that the handpiece is correctly seated and locked into place.

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5. 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. 7) 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.

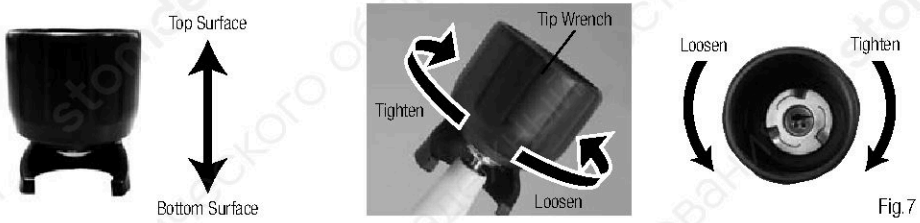


Fig.7

⚠ 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 metal or prosthetic crown etc. except for removing them. Tip could break and fall into mouth.
- Do not hit gingival, mucosa and/or skin directly. 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 or the handpiece cord.
- If you feel the Tip is not vibrating, remove it from an operative site, and press the Foot Control 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 must be "0", when you use Tip which does not appear of water.
- Tip Wrench is consumable For reliable operation replace annually.

6. Operating Procedures

6-1 Power On (Fig.8)

Connect the AC Cord to the wall outlet. Rotate the Power/ Volume Knob on the Control Unit. (Power indicator will light on.)

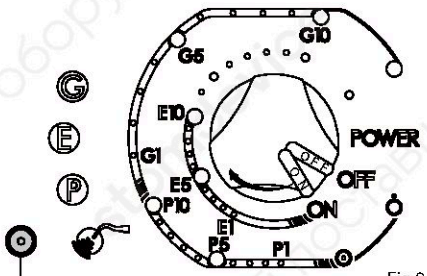


Fig.8

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6-2 Power Level Setting

DO ENSURE Power setting does not exceed the recommended Power Level (Tip-Power Guide included in the package.)
Set the power level with the Power/Volume Knob on the Front Panel. Make sure the power level is set in the appropriate range for the attached Tip.

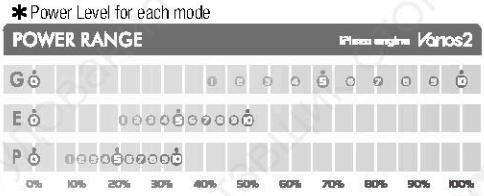


Fig.9

NOTICE

- Turn the Power Volume Knob will increase or decrease the Power Level.
- If the Power Level is 0 (zero) and set the water volume, Tip will not oscillate but water comes out from the handpiece.

6-3 Operate Varios 370 / 370 LUX

Tip vibration will begin when the Foot Control is depressed. Also, Output Indicator will be on. (For Varios2 LUX, Handpiece LED will illuminate.)

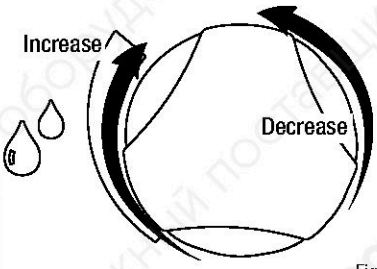


Fig.10

NOTICE

LED of the handpiece will remain 'On' for approx 5 seconds after Foot Control is released. (Varios2 LUX)

6-3-1 Water Supply Volume Adjustment

Turn the Water Adjustment Knob clockwise gradually to increase the supply volume. (Fig. 10)

◆ **During the Handpiece operation :**
Possible: Power Level and Water Volume adjustment.

6-4 After the Treatment

Release the Foot Control abd Power off the Control Unit. Close the dental unit's water valve.

6-5 Protection Circuit

It may overheat inside when you use this Control Unit in more than Power 8 at G for long time. In this case, Protection Circuit reduces the Power automatically. (Power 7)

If you need to increase more than Power 7, decrease the power less than 5 once and increase agin.

NOTICE

During Protection Circuit function, the Control Unit can not increase the Power Level more than 8.

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7. 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. 11)



Fig.11

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. 12)
Clean periodontal pocket at low power. (Set the level less than "Power 5" at P mode.)

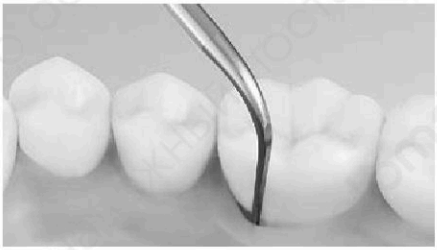


Fig.12

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. 13)



Fig.13

⚠ CAUTION

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

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◆ 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.

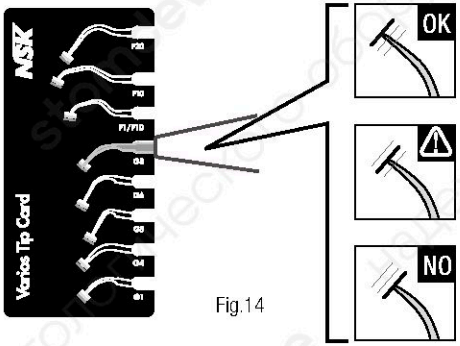


Fig.14

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.

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

⚠ 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.

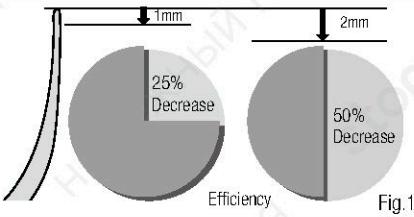


Fig.15

8. 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. 16)

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

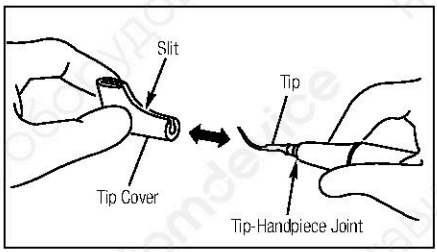
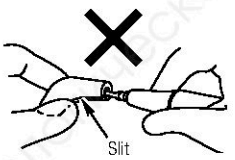


Fig.16

⚠ CAUTION

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



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9. Holder

9-1 Handpiece Holder

While the Handpiece is not in use, put the Handpiece on the Handpiece Holder. (Fig.17)

⚠ NOTICE

To prevent injury, always mount Scaler Tip Cover S.

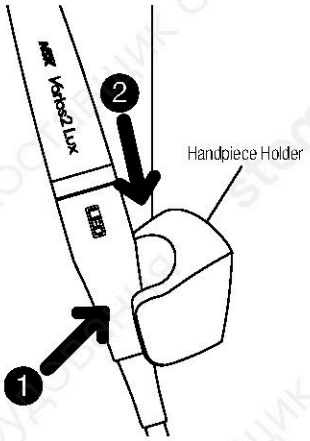


Fig.17

9-2 Tip Holder

For a Tip removed from the handpiece, use the Tip Holder.
The Tip Holder is Autoclavable and hold up to 5 tips at once. To Autoclave, tilt the tips in the direction of the arrow in Fig.18.

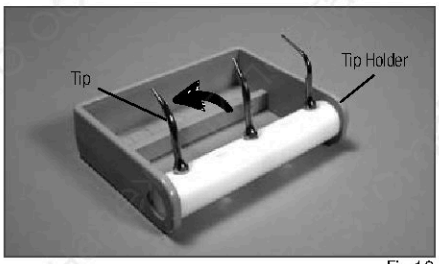


Fig.18

10. Care and Maintenance

10-1 Cleaning of Optic Fiber (Varios2 LUX)

Wipe the debris off the end of the Optic Fibers at the handpiece with alcohol soaked cotton swab. (Fig.19)

⚠ CAUTION

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

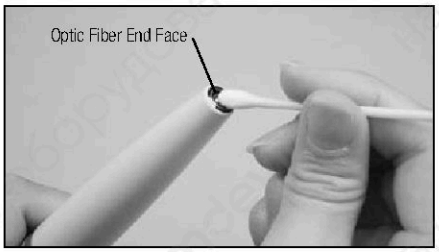


Fig.19

10-2 Changing O-Ring

Handpiece Cord

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. 20)

✱Optional O-Ring: Order No. 0311020080

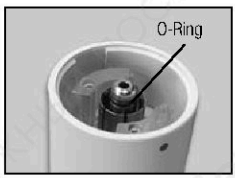


Fig.20

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10-3 Changing Water Filter (Option)

Change the Water Filter as it may necessary.

1) Close the water valve of the dental unit.
2) Mount two Spanner Wrenches (5x8) and turn those as shown in Fig.21.
3) When the Water Filter case is separated, the Water Filter can be removed as shown in Fig. 22.
4) Replace with new (Order No. U387 042) and reassemble the filter in the reverse order.

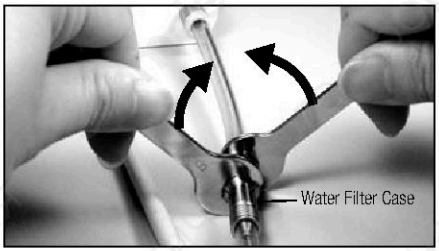


Fig.21

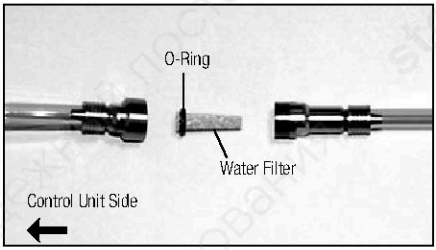


Fig.22

11. 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,Tip Wrench, Tip Holder and Tip Cover S can be autoclaved.

This handpiece can be cleaned and disinfected with a Thermo-Disinfector.

■ Autoclave Procedure

1) Remove the Tip after use. (Refer to 4. Mounting and Removing Tip)
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

- 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.
- Do not autoclave any parts (the Control Unit, AC Adaptor, Foot Control, Handpiece Cord, O-Ring). Other than those that can be subjected to autoclave sterilization. Perform alcohol disinfection to the Control Unit, AC Adaptor, Foot Control, Handpiece Cord including after every patient.
- Do not wipe with, or clean or immerse in, high acid water or sterilizing solutions.
- Do not sterilize diamond coated Scaler Tips for the reason of single use.

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12. Troubleshooting

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

Problem	Probable Cause	Cause	Solution
No / Poor vibration	The Power Indicator does not on,even if the power is ON	The AC Adaptor or the DC Plug is disconnected	Correctly insert the AC Adaptor or the DC Plug
	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 level the Power Guide or Tip case label. Do not exceed
		The Foot Control is disconnected	Connect the Foot Control correctly
		Failure of vibrator in the handpiece	Contact dealer
		Failure of internal components of the Foot Control	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 Control Unit	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 Control Unit	Contact dealer
No / Poor water	The water does not reach to the Control Unit	—	Check the water circuitry and supply to the Control Unit. Water pressure : 0.1-0.5MPa (1-5kgf/cm^2)
	Check to see if water reaches the Control Unit	The Water Adjustment Knob is closed.	Turn the Water Volume Knob and adjust to the appropriate volum
		Disconnected Irrigation supply at low volume range. (less than 10ml/min.)	No problem. Turn the Water Volume Knob and increase the Irrigation volume
		The Water Filter is clogged	Replace with new Water Filter (Refer to 9-3 Changing Water Filter (Option))
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 9-2 Changing O-Ring Handpiece Cord)
Attachment of the Control Unit Holder is loose	—	The click of a holder was worn out	Contact dealer

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Problem	Probable Cause	Cause	Solution
Handpiece LED does not illuminate. (Varios2 LUX)	Tip oscillates, but Handpiece LED turns on and off	The handpiece is not connected into the Handpiece Cord correctly	Firmly insert the handpiece into the Handpiece Cord inmost
Loss of the power output without operation	Power output is set 8 at G	Safety function is activated	Powerful output will weaken automatically while continuous operation is over 10min at the setting of Maximum power at G mode. Releasing the foot from the Foot Control. Decrease the Power less than 5, once then increase the power again. (Refer to 7-5)

13. Spare Parts

Model	Products	Order code
Water Tube Set		U387 060
Water Supply Connector		U387 030
Water Filter		U387 042
Spanner Wrench (5x8) X 2 pcs		Y100 1301
Tip Wrench (CR-10)		Z221 076

Model	Products	Order code
Tip Holder		Z221 080
Tip Cover S		Z217 851
O-Ring		0311020080
Double-Face Tape (For Control Unit Holder)		20002545
Double-Face Tape (For Handpiece Holder)		20002544

135°C SSS Autoclavable at 135°C max.

14. Disposing product

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

15. 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 are not covered by this warranty.

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Symbols

TUV Rhineland of North America is a Nationally Recognized Testing Laboratory (NRTL) in the United States and is accredited by the Standards Council of Canada to certify electro-medical products with Canadian National Standards.

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

Consult operation instructions. Manufacturer. Class II Equipment.

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

Type BF applied part. Authorised representative in the European community. Protected against vertically falling water drops. IPX1

Autoclavable up to Max.135°C. *for detail see Sterilization. This product can be cleaned and disinfected with a Thermo-Disinfector.

Marking on the outside of Equipment or Equipment parts that include RF transmitters or that apply RF electromagnetic energy for diagnosis or treatment.

Guidance and manufacturer's declaration - electromagnetic emissions		
The Varios 370 / Varios 370 LUX is intended for use in the electromagnetic environment specified below. The customer or the user of the Varios 370 / Varios 370 LUX should assure that is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR11	Group 1	The Varios 370 / Varios 370 LUX uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emmissions CISPR11	class B	
Harmonic emissions IEC61000-3-2	class A	The Varios 370 / Varios 370 LUX is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supply network that supplies buildings used for domestic purposes.
Voltage fluctuations/flicker emissions IEC61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity			
The Varios 370 / Varios 370 LUX is intended for use in the electromagnetic environment specified below. The customer or the user of the Varios 370 / Varios 370 LUX should assure that it is used in such an environment.			
Immunity test	**IEC60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC61000-4-2	±6kV contact ±8kV air	±6kV contact ±8kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC61000-4-4	±2kV for power supply lines ±1kV for input/output	±2kV for power supply lines ±1kV for input/output	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC61000-4-5	±1kV line(s) to line(s) ±2kV line(s) to earth	±1kV line(s) to line(s) ±2kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC61000-4-11	<5% Ut (>95% dip in Ut) for 0.5 cycle 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut) for 5 secs	<5% Ut(>95% dip in Ut) for 0.5 cycle 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Varios 370 / Varios 370 LUX requires continued operation during power mains interruptions, it is recommended that the Varios 370 / Varios 370 LUX be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE: Ut is the a.c. mains voltage prior to application of the test level.			

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Guidance and manufacturer's declaration - electromagnetic immunity

The Varios 370 / Varios 370 LUX is intended for use in the electromagnetic environment specified below. The customer or the user of the Varios 370 / Varios 370 LUX should assure that it is used in such an environment.

Immunity test	IEC60601 test level	Compliance level	Electromagnetic environment - guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the Varios 370 / Varios 370 LUX, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance**
Conducted RF IEC61000-4-6	3Vrms 150 kHz to 80MHz	3Vrms	$d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ 80MHz to 800MHz
Radiated RF IEC61000-4-3	3V/m 80MHz to 2.5 GHz	3V/m	$d = 2.3\sqrt{P}$ 800MHz to 2.5GHz Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1 At 80MHz and 800MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobiles radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Varios 370 / Varios 370 LUX is used exceeds the applicable RF compliance level above, the Varios 370 / Varios 370 LUX should be observed to verity normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the Varios 370 / Varios 370 LUX.

b Over the frequency range 150kHz to 80MHz, field strengths should be less than 3 V/m.

Cables and accessories	Maximum length	Complies with	
Handpiece cord	2 m	RF emissions, CISPR11,	Class B/ Group 1
Foot Control	4 m	Harmonic emissions,	IEC61000-3-2
		Voltage fluctuations/ flicker emission,	IEC61000-3-3
		Electrostatic discharge (ESD)	IEC61000-4-2
		Electric fast transient / burst	IEC61000-4-4
		Surge	IEC61000-4-5
		Voltage dips, short interruptions and voltage variations on power supply input lines	IEC61000-4-11
		Power frequency(50/60Hz) magnetic field	IEC61000-4-8
		Conducted RF	IEC61000-4-6
		Radiated RF	IEC61000-4-3

Recommended separation distances between portable and mobile RF communications equipment and the Varios 370 / Varios 370 LUX.

The Varios 370 / Varios 370 LUX is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Varios 370 / Varios 370 LUX can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Varios 370 / Varios 370 LUX as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150kHz to 80MHz $d=1.2\sqrt{P}$	80MHz to 800MHz $d=1.2\sqrt{P}$	800MHz to 2.5GHz $d=2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

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EN Specification

Type	NE252
Power Sorce	AC 100 - 240 V 50 - 60Hz
Vibration Frequency	28 - 32 kHz
Maximum Output	11 W
Rated Power	25VA
Lighting	Varios 370 : No Varios 370 LUX: Yes
Dimension	W 80 x D 115 x H 32 mm (Body without knob and cord)
Weight	0.43 kg (Except Attachment)

Use Enviroment	Temperature 0 - 40 °C (The liquid must not freeze up) Humidity 30 - 75 % Atomospheric Pressure 700 - 1060 hPa
Store Environment	Temperature -10 - 60 °C Humidity 10 - 85 % Atomospheric Pressure 500 - 1060 hPa

DE Spezifikationen

Typ	NE252
Stromquelle	AC 100 - 240 V 50 - 60Hz
Vibrationsfrequenz	28 - 32 kHz
Maximaler Ausgang	11 W
Nennleistung	25VA
Beleuchtung	Varios 370 : No Varios 370 LUX: Yes
Dimensionen	W 80 x D 115 x H 32 mm
Gewicht	0.43 kg (Außer attachement)

Benutzungsumgebung	Temperatur 0 - 40 °C (Die Flüssigkeit darf nicht gefrieren) Feuchte 30 - 75 % Atmosphärischer Druck 700 - 1060 hPa
Lagerungsumgebung	Temperatur -10 - 60 °C Feuchte 10 - 85 % Atmosphärischer Druck 500 - 1060 hPa

FR Spécifications

Type	NE252
Source d'alimentation	AC 100 - 240 V 50 - 60Hz
Fréquence de vibration	28 - 32 kHz
Sortie maximale	11 W
Puissance estimée	25VA
Eclairage	Varios 370 : No Varios 370 LUX: Yes
Dimensions	W 80 x D 115 x H 32 mm
Poids	0.43 kg (sans accessoires)

Environnement d'utilisation	Température 0 - 40 °C (Le liquide ne doit pas geler) Humidité 30 - 75 % Pression atomosphérique 700 - 1060 hPa
Environnemen stocka	Température -10 - 60 °C Humidité 10 - 85 % Pression atomosphérique 500 - 1060 hPa

ES Características técnicas

Tipo	NE252
Fuente de potencia	AC 100 - 240 V 50 - 60Hz
Frecuencia de vibración	28 - 32 kHz
Salida máxima	11 W
Índice de potencia	25VA
Iluminación	Varios 370 : No Varios 370 LUX: Yes
Dimensiones	W 80 x D 115 x H 32 mm
Peso	0,43 kg (Excepto accesorio)

Entorno de uso	Temperatura 0 - 40 °C (El líquido no se debe congelar) Humedad 30 - 75 % Presión atmosférica 700 - 1060 hPa
Entorno de uso	Temperatura -10 - 60 °C Humedad 10 - 85 % Presión atmosférica 500 - 1060 hPa

IT Specifiche

Tipo	NE252
Alimentazione	AC 100 - 240 V 50 - 60Hz
Frequenza	28 - 32 kHz
Uscita max	11 W
Potenza nominale	25VA
Iluminazion	Varios 370 : No Varios 370 LUX: Yes
Simensioni	W 80 x D 115 x H 32 mm
Peso	0,43 kg (Accessorio escluso)

Ambiente di utilizzo	Temperatura 0 - 40 °C (Il liquido non deve congelare) Umidità 30 - 75 % Pressione atomosferica 700 - 1060 hPa
Ambiente di conservazione	Temperatura -10 - 60 °C Umidità 10 - 85 % Pressione atomosferica 500 - 1060 hPa

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Specifications are subject to change without notice.

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