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'10.03.005 Ⓑ

Multi Function Ultrasonic Scaler

Varios 750 (Non-Optic)

Varios 750 LUX (Optic)

OPERATION MANUAL

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

Powerful Partners®

OM-E0144E 003

MADE IN JAPAN CE 0197

◆ *Original Operation Manual*

English

Thank you for purchasing the Varios Ultrasonic Scaler (Varios 750 / Varios 750 LUX).
This product is used in dental office only.
This device generates ultrasonic waves intended for use in dental applications such as scaling, root canal treatment, periodontal and cavity preparation. Read this operation manual carefully before use, and keep it within user's reach.

■ Classifications of equipment
- · Type of protection against electric shock :
  - – Class I equipment
- · Degree of protection against electric shock :
  - – Type BF applied part:
- · Method of sterilization or disinfection recommended by the manufacture :
  - – See 12. Sterilization
- · Degree of protection against ingress of water as detailed in the current edition of IEC 60529:
  - – Foot Control (Option) : IPX1 (Protected against vertically falling water drops)
- · Degree of safety of application in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide :
  - – EQUIPMENT not suitable for use in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide.
- · Mode of operation :
  - – Continuous operation

⚠ 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

- · Use by medical professional, such as doctor or dental hygienist, is intended.
- · Do not unplug the power cord with wet hands to avoid electric shock.
- · Be sure to prevent water on the Control Unit, because it may result in short circuit and electric shock.
- · Do not give a strong impact to the handpiece/Control Unit, nor drop onto a hard surface. This could result in electric shock.
- · Do not touch the handpiece backend, where electrical connections are attached to the cord. It might result in electric shock.
- · 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.
- · Use the Fuse of specified rating. (120V : T1.25AL/125V, 230V : T400mAL/250V)
- · Sterilize the Tip, handpiece, Tip Wrench, Tip Cover S, and Tip Holder by autoclaving and the Control Unit, Power Cord, Foot Control, Handpiece Cord including the cover by alcohol disinfection after treatment for every patient.
- · This product is Medical Electrical equipment Electromagetic compatable (EMC). As described in the accompanying documentation.

· This product needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information.
· Portable and mobile RF communications equipment can affect this product.
· The use of ACCESSORIES, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of the product as replacement parts for internal components, may result in increased EMISSIONS or decreased IMMUNITY of it.
· This product should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, it should be observed to verify normal operation in the configuration in which it will be used.
· Use an electrical outlet that is grounded. It may cause electrical shock, if it may not use it.

⚠ CAUTION

· When operating the handpiece always consider the safety of the patient.
· The handpiece is designed only for dental clinical use.
· Check the vibration outside the patient´s oral cavity before use. If any abnormalities are found, stop using immediately and contact your dealer.
· Should this product function abnormally, cease operation immediately and returen it to the dealer for repair.
· Do not force or pull on Power Cord and/or Handpiece Cord. It could cause disconnection.
· Do not exceed Maximum Power Level for Tips. It could damage tooth structure and Tips.
· Check if the Tip has no flush, damages, bending and rust before use. Use new one.
· Always use with pouring enough water, or it may damage tooth plane and overheat the handpiece.
· Do not hit metal or prosthetic crown etc., except for removing them. Tips could break and fall into mouth.
· Do not sharpen and/or bend the Tip. Tips may damage and not generate enough vibration during scaling.
· Do not hit gingiva, mucosa and/or skin directly. It could cause damage and burn.
· During cutting, Tip will gradually wear away, as the Tip wears the stroke will get smaller and cutting power level will decrease. When level drops too far, change the Tip.
· Be sure to firmly mount the Tip with provided Wrench, or the Tip will not generate enough vibration.
· Check to see if dust does not stick on the screw of the Tip before use. If not clean, Tips will not generate enough vibration.
· Be sure to turn the Power Switch after mounting the handpiece.
· Be sure to attach NSK genuine Tips when using NSK Varios Ultrasonic Scaler (Varios 750 or Varios 750 LUX) The 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 failuer that could happen when using the Non-NSK Tips.
  · Vibration failure caused by using nonconformable screws.
  · Patients' accidental ingestion of damaged Tips.
  · Damage of thread ridge of handpiece.
· Do not sterilize by ultraviolet light. Handpiece could discolor.
· If chemical, solvent or antiseptic solution is deposited on this product, immediately wipe it away. Discoloration or deformation may occur if left as it is.
· If water is spilled on the irrigation pump, please wipe it off thoroughly and allow to dry completely prior to use. If water gets inside the irrigation pump the roller may slip and fail to pump irrigation.
· Remove the handpiece after Tip is taken off.
· Do not put liquid such as high acid water in the bottle.
· Implant maintenance scaler tips should be inspected for proper resin coating prior to use and any possible exposure of the metal core to a dental implant should warrant replacement of the scaler tip.

⚠ NOTICE

· During vibration, the handpiece and the handpiece cord may affect computer and LAN cable. Noise could be heard during operation near a radio receiver.
· Be sure to turn off the Power Switch after use. Remove the power plug and water inside of the control unit if not used for a long time.
· Users are responsible for operational control, maintenance and inspection.
· When trouble is found, send to dealer.
· 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.
· There is the judgment that applies this product to a patient in the user side.

1. Features

· The system is capable wide range from low power for periodontal procedures to high power for excavating procedures.
· Use supplied bottle for saline and other irrigant.
· The Control Unit can simply be wiped off so spills are very easy to clean up, and the Front Control Panel is extremely easy to read.
· Three modes of irrigation system operation are available : irrigation from dental unit or city water, irrigation from bottle and no irrigation.
· The Irrigation Tube from the pump is exposed outside of the Control Unit, and solution could not enter the Control Unit.
· Various operation presets can be input into the system memory.
· The handpiece ring light is extremely bright for easy viewing of the operating area. (Varios 750 LUX)
· The Control Unit has provision to operate the handpiece with light or the one without.
· The handpiece is autoclavable at 135°C

2. Component Names

Fig. 1

3. Prior to Operating System

(1) Water System Setup

● Use of City Water

1) Remove the Cover from the Connector for Water. (Fig. 2)
2) Connect the filter side of the Water Tube deep into the water connector on the Varios Control Unit. (Fig. 3)
3) Connect the provided water tube to the water outlet on the dental unit.

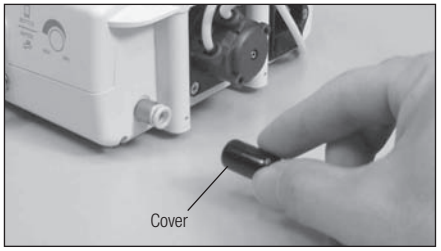


Fig. 2

⚠ CAUTION

- Insert the Water Tube deep into the connector on the Control Unit.
- If water has not been used at the water outlet of the dental unit for a long time, brownish water may come out but wait until clean water comes out. Then connect it.

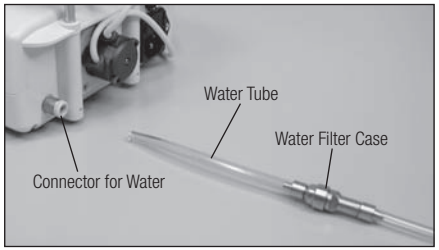


Fig. 3

⚠ NOTICE

- Pushing the White Ring, (the Quick Connector Release Ring) on the Water Connector, gently remove the Tube. (Fig. 4)
- When the water tube is not connected, mount the cover on the connector on the Control Unit.

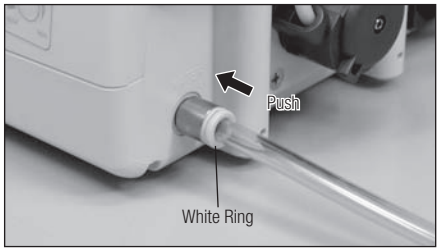


Fig. 4

● Use of Bottle

1) Remove the Dust Cover from the Bottle Base. (Fig. 5)
2) Remove the cap of the Irrigation Bottle and fill solution to the desired level.
3) Close the cap of the Irrigation Bottle, check the Air Hole is clean and insert the Joint into the Bottle Base Connector until it clicks into place. (Fig. 6)

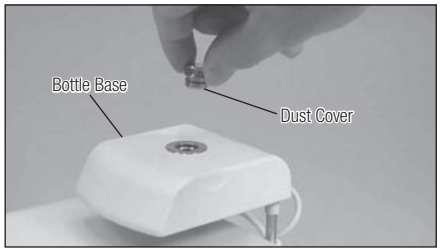


Fig. 5

⚠ CAUTION

Make sure the connector and surrounding area is completely clean before installing the Irrigation Bottle. Wipe the Irrigation Bottle and Connector Area thoroughly prior to inserting the Irrigation Bottle.

⚠ NOTICE

- To remove the bottle, pull up the bottle gently.
- The Irrigation Bottle graduations are printed on both sides of the bottle and can be read accurately from the fill position or mounted on the Control Unit.
- Mount the Dust Cover when not in use.

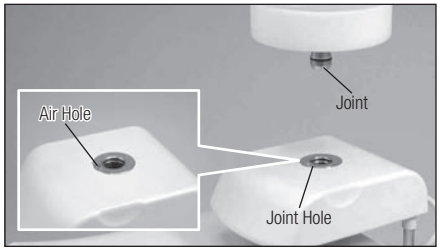


Fig. 6

(2) Foot Control Connection

Connect the Foot Control Plug to the Foot Control Connector at the back of the Control Unit, take care in properly align all the pins. Push the Plug gently into the Connector. (Fig. 7)

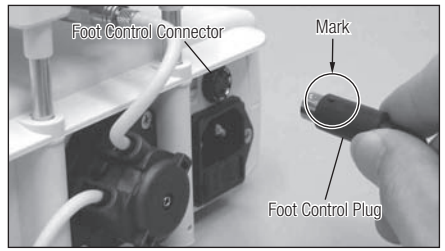


Fig. 7

(3) Handpiece Connection

● Use of City Water

Align the Marks on the Control Unit and the Handpiece Plug. Gently push the Plug into the Connector. (Fig. 8)

● Use of Bottle

1) Align the Marks on the Handpiece Plug and the Control Unit. Gently insert.
2) Loosen and remove the Cap. (Fig. 9)
3) Insert firmly the Irrigation Tube deep into the Connector. (Fig. 10)

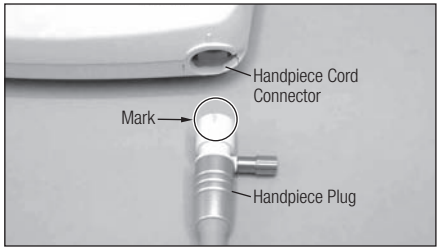


Fig. 8

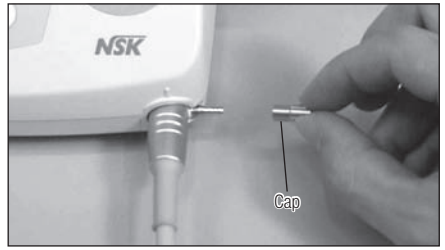


Fig. 9

⚠ NOTICE

Mount the Cap when the Irrigation Tube is not connected.

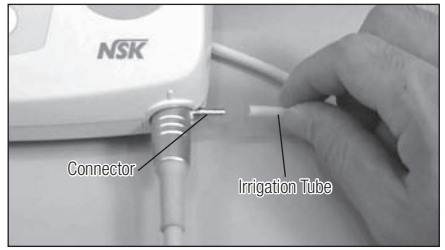


Fig. 10

(4) Mounting Power Cord

Insert the Power Cord into the Inlet at the back of the Control Unit. (Fig. 11)

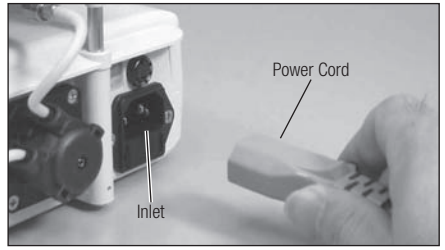
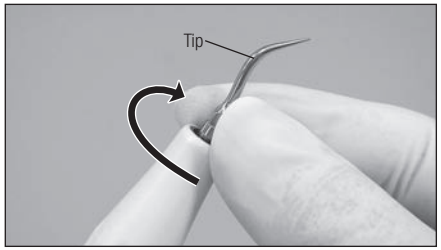


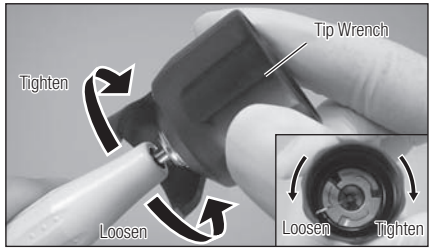
Fig. 11

4. Mounting and Removing Tip

Mount the Tip by fastening it lightly by hand. (Fig. 12)
Insert the Tip through the hole of the Tip Wrench, align the four cornered tip's base into the hole of the Tip Wrench. Turn it clockwise until the wrench clicks. (Fig. 13)
To remove the Tip, turn counterclockwise with the Tip Wrench.



✻Picture shows Varios 750 LUX Fig. 12



✻Picture shows Varios 750 LUX Fig. 13

⚠ CAUTION

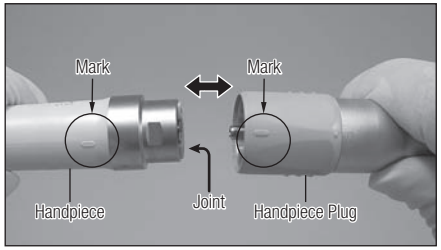
· When mounting the tip, always use groves, tip wrench. Handpiece that have been sterilized.
· Tip Wrench is consumable For reliable operation replace annually.

5. Mounting and Removing the Handpiece

When mounting the handpiece, align the positioning Marks on the handpiece and the Handpiece Cord. Push straight inmost.
When removing the handpiece, grip the Front and the Rear of the handpiece firmly. Pull to separate. (Fig. 14)

⚠ WARNING

Do not touch the handpiece backend. (where Electrical Connections are made to the cord.) It might result in electrical shock.



✻Picture shows Varios 750 LUX Fig. 14

⚠ CAUTION

· Detach Tip before removing handpiece.
· Push handpiece against handpiece plug inmost to connect.
· When removing the handpiece, grip the plug of the Handpiece Cord.

6. Operating Procedures

(1) Water System Setup

● Use of City Water

Carefully check all water supply connections prior to starting procedure.
Open the dental unit's water valve.
Set water pressure between 0.1~0.5MPa (1~5 kgf/cm^2).

● Use of Bottle

Check that the Bottle is filled to the proper level.

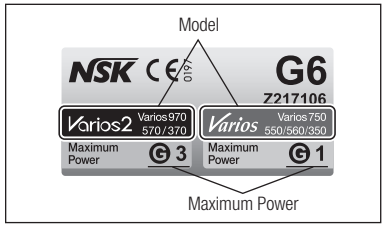
(2) Power On

Connect the Power Cord to the wall outlet.
Turn on the Power Switch of the Control Unit.
Front Panel will light up.

Fig. 15

(3) Power Range Setting

Check the case the selected Tip came in for proper power.
You can check Maximum Power on the Tip Case Label. Check your model.



✻Tip Case Label Fig. 16

1) Select the Operating Mode with the Mode Selection Keys on the Front Panel. The light over the selected mode will illuminate. (Fig. 17)

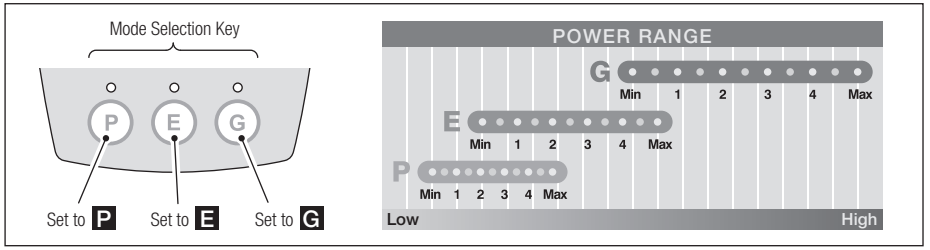


Fig. 17

2) Set the power level with the Power Level Key on the Front Panel. The lamps in the Power Display Panel will indicate the selected power level. Make sure the power level is set in the appropriate range for the selected Tip. (Fig. 18)

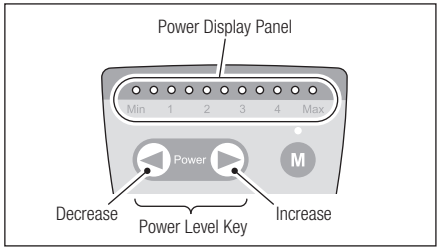


Fig. 18

⚠ CAUTION

Do not exceed Muximun power level for the Tip. It could damage teeth plane and the Tip could be broken.

⚠ NOTICE

· Continuous pushing of the Power Level Key will cause the Power Level Display to climb.
· When only water is desired without oscillating the Tip, keep pressing "Decrease" key to extinguish Power Display Pannel Lamp.

(4) Water Mode Selection

Select the mode with the Water Selection Key on the Front Panel. Bottle, City Water or Dry mode(No Irrigation Mode) is available. (Fig. 19)

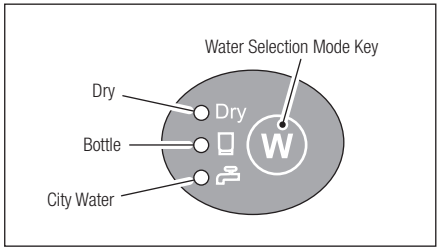


Fig. 19

(5) Operate Varios750/750LUX

Depress the Foot Control. Tip will vibrate. In case of the Varios 750 LUX, the handpiece donut -shape light will illuminate. Adjust the power level to the proper range. Adjust the water spray as follows.

Water Supply Volume Adjustment

Turn the Water Adjustment Knob counterclockwise gradually to increase the supply volume. (Fig. 20)

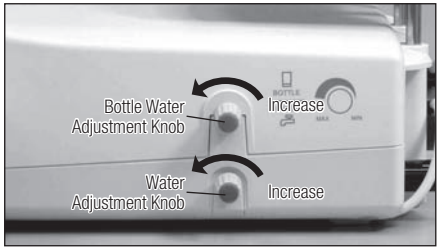


Fig. 20

⚠ CAUTION

- Always use the water supply unless you are doing procedure requiring dry mode. If water supply is insufficient, handpiece will overheat patient´s tooth surface can be injured.
- Prior to starting the procedure, verify that the water spray is clean and at adequate volume.

(**● Use of City Water**)

(6) When Treatment is Finished.

Release the Foot Control and power off the Control Unit by turning off the Power Switch.

● Use of City Water

Close the dental unit's water valve.

● Use of Bottle

Thoroughly wash the Bottle Water Supply system. Refer to the 11. (4) Auto Cleaning (Cleaning of Irrigation Tube (**● Use of Bottle**)).

⚠ CAUTION

When using medicated solutions, clean the entire Irrigation System thoroughly.

⚠ NOTICE

When the Control Unit is shut down, the last mode settings in use are automatically retained in memory. When you power on the system for the next procedure, the system will reactivate in the same configuration as when shut down.

✻Safety Function

If you operate more than 10 minutes and operate mode set to “G”, also power setting to maximum, the Control Unit automatically reduce power. (The output display moves 3 lamps from “Max” to “4”.)

To increase power again after auto reduction, release the Foot Control completely and depress it again.

✻Memory Function

The Control Unit can be preset for water spray mode, power setting and operating mode. To set the desired preset conditions into memory follow the procedure below.

1) Set the desired levels.
2) Push the Memory Button for about 2 seconds or more, the Memory Light will illuminate and the Control Unit will produce a beep. The memory is set. (Fig. 21)

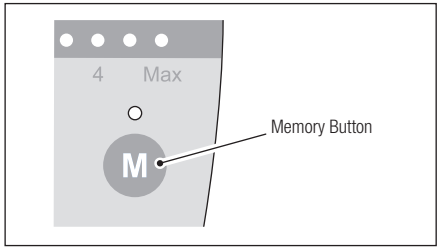


Fig. 21

To enter new settings

After confirming the settings of Water Spray Mode, Power Setting and Operating Mode, push the Memory Button for approx. 2 seconds. (The Memory light will illuminate.) The old memory is cleared and new settings are programmed.

7. Provided Scaler Tips

G1

This Tip is designed for removing tartar on the neck of tooth (the tooth plane), between teeth, and below the gum margin. Set the level less than “Ⓖ3”.

Removing tartar on the neck of tooth ··· Apply the top of the Tip on the tooth plane and move it sideways finely along the neck of tooth. (Fig. 22)

Removing tartar on the tooth plane ··· Place the side of the Tip parallel with the tooth plane and finely move it up and down. (Fig. 23)

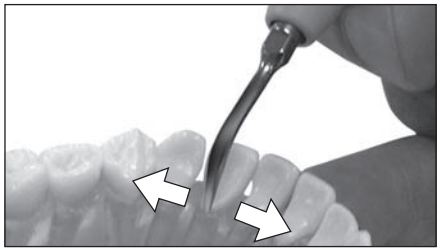


Fig. 22

Removing interdental calculus ··· Insert the Tip between the teeth vertically and move it slightly. Always touch the tip on the tooth.

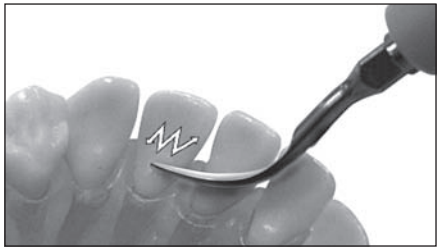


Fig. 23

G4

Designed for removing tartar on the neck of tooth (subgingival) and interdental calculus. Set the level less than "Ⓖ3".

Apply the top of the tip on the tooth plane and move it sideways finely in the same way as G1 Tip. (Fig. 24)

Fig. 24

G6

Designed for removing subgingival calculus and cleaning periodontal pocket. Set the level less than "Ⓖ1".

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 corone and retracted gingival. (Fig. 25)

✻ Clean periodontal pocket at low power. (Set the level less than "Ⓟ2".)

Fig. 25

◆ 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

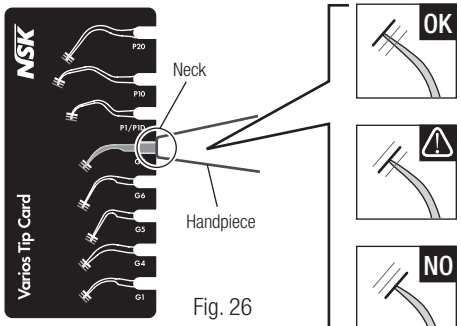


Fig. 26

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.

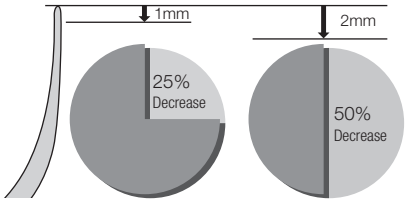


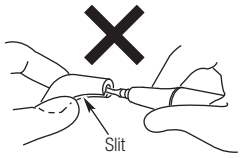
Fig. 27

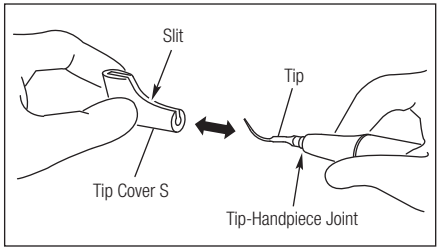
8. How to Use Tip Cover S

Hold the Tip Cover S as shown and insert it all the way to the Tip-Handpiece Joint.
To remove, hold the Tip Cover S and the handpiece as shown and pull straight out. (Fig. 28)

⚠ WARNING

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





✻Picture shows Varios 750

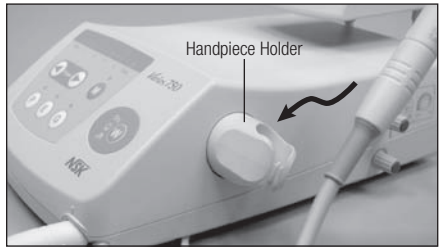
Fig. 28

⚠ CAUTION

Do not use the Tip Cover S as a Tip change tool.

9. Handpiece Holder

Mount the Tip Cover S onto the Tip and put the handpiece in the Handpiece Holder while the handpiece is not used. The Handpiece Holder direction is adjustable. (Fig. 29)



✻Picture shows Varios 750

Fig. 29

⚠ CAUTION

Whenever the handpiece is mounted in the Handpiece Holder, always cover The tip with the Tip Cover S to prevent accidental injury.

10. Tip Holder

· Use the Tip Holder for Tips removed from the handpiece.
· The Tip Holder is autoclavable and can hold up to 5 types at once. To autoclave, tilt the Tips in the direction of the arrow in fig.30.

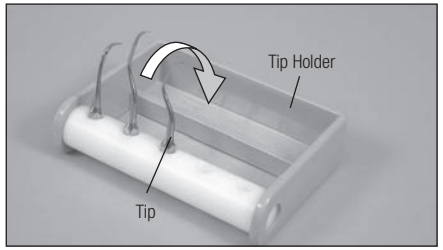


Fig. 30

11. Care and Maintenance

(1) Changing O-ring

· **Handpiece (Varios 750)**
An O-ring is located between the handpiece and the Handpiece Cord Connector. Use a pointed tool to remove, and mount a new one in the groove. (Fig. 31)
✻ Optional O-ring : Order No. 0312012100

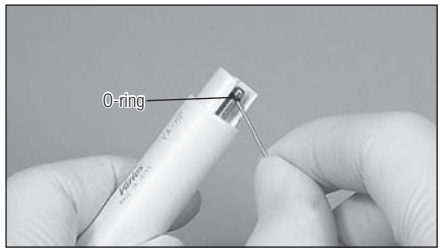


Fig. 31

· **Bottle (● Use of Bottle)**
Remove two O-rings at the Bottle Joint with a pointed tool, and mount new ones into the grooves. (Fig. 32)
✻ Optional O-ring : Order No. 0312090100

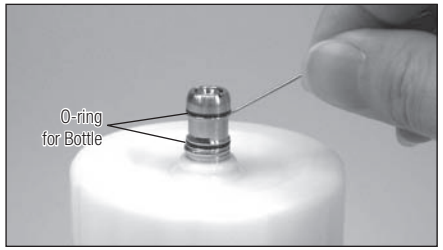


Fig. 32

(2) Changing Water Filter (● Use of City Water)

1) Close the water valve of the dental unit to which Varios 750 or Varios 750 LUX is connected. Mount two Spanner Wrenches (5X8) as shown in Fig. 33, and turn in the directions shown. When water tube is getting twisted by this, relieve the twist by turning it, as its end on the Control Unit side is free to turn.

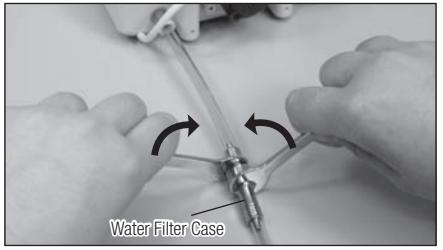


Fig. 33

2) When the Water Filter case is separated, the Water Filter can be removed as shown in Fig. 34.
Replace with a new one and reassemble the filter in the reverse order.

✻ Optional Water Filter : Order No. U387042

⚠ CAUTION
Assemble the Water Filter in the correct direction as shown in Fig. 34.

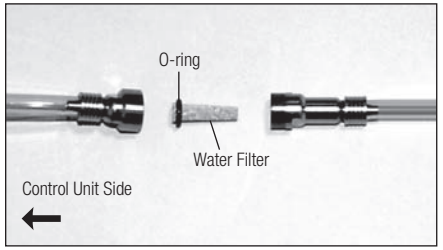


Fig. 34

(3) Changing the Irrigation Pump (● Use of Bottle)

1) Remove the Bottle in straight up motion.
2) Push the Joint Ring in to release the Tube Connector and disconnect the Irrigation Tube. (Fig. 35)
3) Remove the Irrigation Tube from connector. (Fig. 36)
4) Remove the Irrigation Tube from the groove on the reverse side of the Control Unit. (Fig.37)
5) Turn the Irrigation Pump counterclockwise until it clicks. Pull out. Align the replacement Irrigation Pump with the drive shaft at the same released position and turn clockwise until it clicks. (Fig. 38)
6) Insert the Irrigation Tube into the Groove on the reverse side with slack between pump and groove.
7) Connect the Irrigation Tube to the connector on the handpiece cord connector.
8) Insert the Tube Connector to the Joint Ring until it clicks.

✻ Optional Irrigation Pump : Order No. U424061

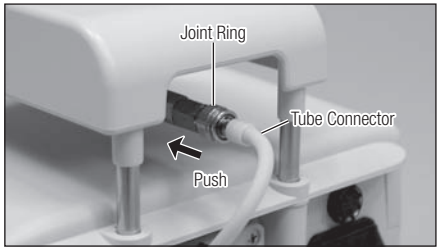


Fig. 35

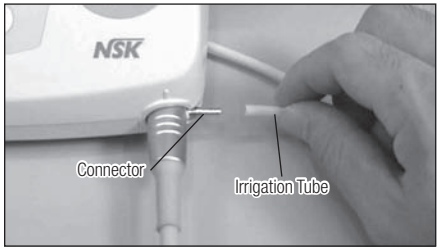


Fig. 36

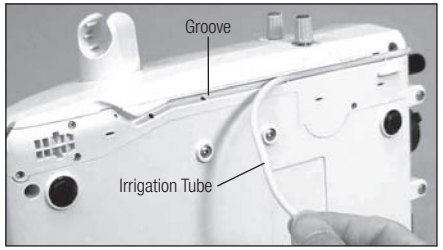


Fig. 37

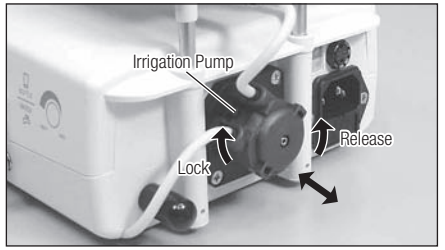


Fig. 38

⚠ CAUTION
· Before replacing the Irrigation Pump, wipe off excess water on pump and Drive Shaft. The wet Drive Shaft and rollers can be slippery and cause improper operation.
· Insert the replacement Irrigation Pump into the Drive Shaft straight (slow and soft) to prevent damaging rollers in pump.
· Run the replaced Irrigation Pump about 10 seconds on largest setting of Water Volume before operation to adopt Irrigation Tube to new pump.

(4) Auto Cleaning (Cleaning of Irrigation Tube (● Use of Bottle))

⚠ CAUTION

After each use, remove all the disinfectant solution and perform "Auto Cleaning" procedure.
If you have not cleaned the system, there is a good chance that dried disinfectant is stuck in the tubing or some of the metal parts may be rusted.

1) Remove the bottle from the Bottle Base by pulling straight.
2) Fill the spare Bottle over half full with clear water.

⚠ CAUTION

Use only distilled water for cleaning.

3) Install the cap on the Bottle, check the Joint Hole and surrounding area and clean as needed. After cleaning install the Bottle Joint into the Joint Hole and press down until it click into place. (Fig. 39)

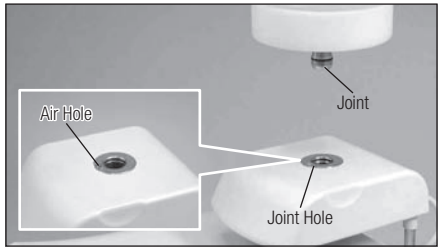


Fig. 39

⚠ CAUTION

Before installing the Bottle, make sure the Air Hole and surrounding area are clean and free of debris.

4) Turn the Bottle Water Adjustment Knob to maximum. (Fig. 40)
5) Use the Water Selection Mode Key to select Bottle Water. (The Bottle Lamp will light.) (Fig. 41)

Fig. 40

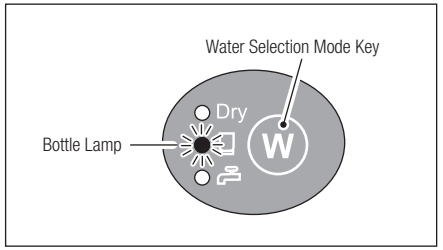


Fig. 41

6) Press and hold the Water Selection Mode Key for 2 seconds. The Control Unit will emit a beep, all the lamps except the Bottle Lamp will shut off and the auto cleaning sequence will start. The auto cleaning sequence takes about 30 seconds.

After the auto cleaning sequence commences pushing the water Selection Mode Key will stop the sequence.

⚠ CAUTION

If you press the Mode Selection Key and the Power Key during auto cleaning, the Tip will vibrate. Make sure power setting does not exceed the maximum recommended power for the Tip.

⚠ NOTICE

Setting the Bottle Water Adjustment Knob at less than maximum during cleaning, Result in incomplete cleaning in the 30 seconds cycle.

7) When the Auto Cleaning sequence completes the Control Unit will revert to the settings prior to cleaning. Remove the Bottle from the Bottle Base by pulling straight. After cleaning thoroughly clean and dry both Bottles prior to use.

✻Following method is also available for cleaning. (Manual Cleaning)

1) Remove the Bottle from the Bottle Base.
2) Open the cap of the Bottle and fill the with solution.
3) Close the cap firmly and insert the joint part on the Bottle Cap into Joint Hole on the Bottle Base until it clicks. (Make sure air hole located on the Bottle Cap is not closed with dirt.)
4) Operate the Control Unit about 20 seconds with water supply at maximum setting.

(5) Cleaning of Donut-Shape Light (Varios750LUX)

Wipe the debris off the end of the Optic Fibers at the handpiece with alcohol soaked cotton swab.(Fig. 42)

⚠ CAUTION

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

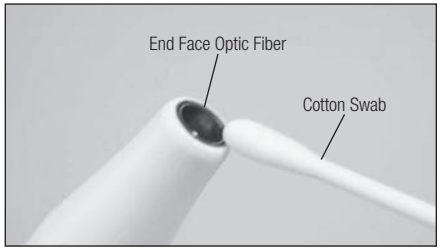


Fig. 42

(6) Changing Lamp (Varios 750 LUX)

Refer to 5. Mounting and Removing the Handpiece. Disassemble the handpiece from the Handpiece Cord. Remove the cover. Use a prevision screw driver and push lamp out. Align the lamp pins of a new lamp with the holes, and push the lamp into. (Fig. 43) Align the mark on the cover with the same on the Handpiece Cord. Push the cover to the cord unit it clicks. (Fig. 44) Assemble the handpiece and the Handpiece Cord.

✻Optional Lamp : VA Bulb Set (A Set consist of 3 pieces) Order No. Y900107

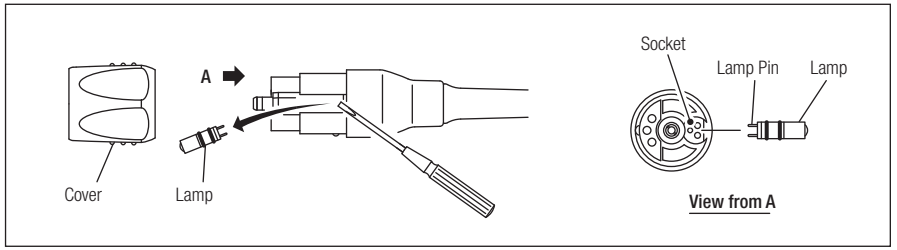


Fig. 43

⚠ CAUTION

- Make sure that the bulb is sufficient cooled, when it is replaced.
- Do not touch glass part of new lamp.
- Care needs to be execised when mounting a new lamp to avoid the O-ring off from the groove or being twisted.

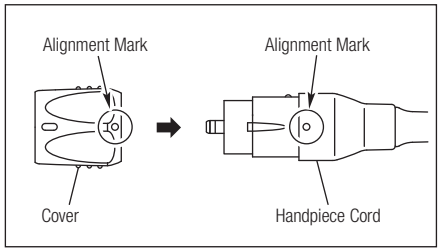


Fig. 44

(7) Fuse Replacement

Release ratched clamp located on the right and left of the Inlet and pull it out to chage.(Fig. 45)

✻Optional Fuse : T1.25AL/125V (120V) Order No. U424151
T400mAL/250V (230V) Order No. U459151

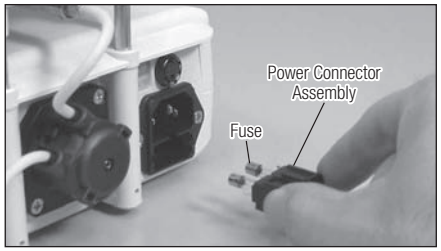


Fig. 45

⚠ WARNING

Use the Fuse of specified rating. (120V : T1.25AL/125V, 230V : T400mAL/250V)

12. Sterilization

· Autoclave sterilization is recommended.
· Autoclave sterilization required first time you use and after each patient as noted below.
· The Tip (except diamond coated scaler Tip), handpiece, Tip Wrench, Tip Cover S, and Tip Holder can be autoclaved.

■ Autoclave Procedure

1) Remove the Tip after use. (Refer to 4 Mounting and Removing Tip)
2) Wipe dirt and debris from the handpiece, and wipe clean with alcohol-immersed cotton swab or cloth. Do not use a wire brush.
3) Insert into 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 autoclave pouch to keep it clean until you us

✻Sterilization at 121°C for more than 15 minutes is recommended by EN13060 or EN ISO17665-1.

⚠ WARNING ON STERILIZATION

· This products 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.
· Since the bottom shelf of the sterilizer is close to the heat source, it can be too hot. Place instruments in the middle or top shelves.
·Do not autoclave any parts (the Control Unit, Power Cord, Bottle, Foot Control, Water Tube, Water Connector, Handpiece Cord including the Cover, Lamp, O-ring, and Spanner Wrench (5 X 8)). Other than those that can be subjected to autoclave sterilization. Perform alcohol disinfection to the Control Unit, Power Cord, Foot Control, Handpiece Cord including with reference after every patient.

13. Troubleshooting

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

Problem	Probable Cause	Cause	Solution
No / Poor vibration.	The Power Lamp does not light, even if the Power Switch is ON.	The Power Cord or the Jack is disconnected.	Correctly insert the Power Cord or the Jack.
		The Fuse is burned out.	Replace the Fuse. 120V : T1.25AL/125V/230V : T400mAL/250V
	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 stops.
		Worn Tip.	Replace the Tip.
		Output has not been correctly adjusted for the Tip.	Adjust the power on the Tip Case. 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.	—	Output has not been properly adjusted for the Tip.	Adjust the power on the Tip case. Do not exceed.
The Tip fly away.	—	The Tip is not tightened firmly.	Tighten the Tip until the Tip wrench stops.
Noise from the handpiece.	—	Output has not been properly adjusted for the Tip.	Adjust the power on the Tip Case. Do not exceed.
		The Tip is not tightened firmly.	Tighten the Tip until the Tip Wrench stops.
		Failure of vibration in the handpiece or the Control Unit.	Contact dealer.
The handpiece is overheating.	—	Output has not been properly adjusted for the Tip.	Adjust the power on the Tip Case. Do not exceed.
		The Tip is not tightened firmly.	Tighten the Tip until the Tip Wrench stops.
		Failure of vibration in the handpiece or the Control Unit.	Contact dealer.

Problem	Probable Cause	Cause	Solution
No / Poor water. (● Use of City 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/cm²)
	Check to see if water reaches the Control Unit.	The water adjustment knob is closed.	Turn the Water Adjustment Knob and adjust to the appropriate volume.
		Disconnected Irrigation supply at low volume range. (less than 10cc/min.)	No problem. Turn the Water Adjustment Knob and increase the Irrigation volume.
		The water filter is clogged.	Replace with new Water Filter (Refer to 11. (2) Changing Water Filter (● Use of City Water)).
No Irrigation supply and/or unstable Irrigation supply (● Use of Bottle)	The Irrigation Pump is running.	The Irrigation Tube is kinked.	Straighten the kinked tube.
	The Irrigation Pump is stopping.	Time to replace Irrigation Pump. (Applox. 500hours after used.)	Replace with new Irrigation Pump (Refer to 11. (3) Changing the Irrigation Pump (● Use of Bottle)).
Water leakage.	Water is leaking from the joint between the Irrigation Tube and the Irrigation Connector.	The Irrigation Tube is not connected correctly.	Firmly insert the Irrigation Tube into the Irrigation Connector inmost.
	Water is leaking from the joint between the handpiece and the core.	O-ring at the back of the handpiece is worn or damaged.	Replace with new O-ring (Refer to 11 (1) Changing O-ring · Handpiece (Varios 750)).
	Water is leaking from the Control Unit.	The water circuitry in the Control Unit is damaged.	Contact your dealer.
Donut light does not illuminate. (Varios 750 LUX)	Tip oscillates, but donut light turns on and off.	The handpiece is not connected into the Handpiece Cord correctly.	Firmly insert the handpiece into the Handpiece Cord inmost.
	Tip oscillates, but light does not turn on.	The lamp pins are not correctly engaged in the socket.	Mount the Lamp correctly and securely.
	Lamp is correctly and securely mounted in the socket, but light does not turn on.	Has the lamp burned out?	Replace with new lamp (Refer to 11 (6) Changing Lamp (Varios 750 LUX)).
		Disconnection in the Handpiece Cord, or failure in the Control Unit.	Contact dealer.
Loss of power output without operation.	Power output is set at maximum at G mode.	Safety function is activated.	Power output will weaken autom atically while continuous operation is over 10min at the setting of Maximum power at G mode. Releasing the foot from the Foot Control will reset the safety function. Stepping on the Foot Control then will resume the previous function.

Problem	Probable Cause	Cause	Solution
Start Beeping	Beeping while power on.	Depress Foot Control.	Turn the Power Switch on after release of the Foot Control.
	Beeping while stopping vibration of Tips.	Abnormal heating of the Control Unit.	Stop the operation and leave until Control Unit becomes cool.

14. Spare Parts

Model	Products	Order cord
Irrigation Bottle Set		U424060
Water Filter		U387042
Irrigation Pump Set		U424061
VA Bulb (Pack of 3)		Y900107
Bottle Hanger Set		Y900136
Bottle Hanger		U424514
Irrigation Needle (3 pcs.)		Y900137

15. Disposing product

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

16. 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 and lamps are not covered by this warranty.

Specifications

Type	NE134
Power Source	AC120V 50/60Hz AC230V 50/60Hz
Vibration Frequency	28~32kHz
Maximum Output	8W
Power Consumption	Max. 42VA
Water Pressure	0.1~0.5MPa (1~5kgf/cm^2)
Lighting	Varios750 : No Varios750LUX : Yes

Bottle Volume	350mL
Dimensions	W162 X D274 X H120mm
Use Environment	Temperature 0 - 40 ˚C (The liquid must not freeze up) Humidity 30 - 75 % Atmospheric pressure 700 - 1060 hPa
Store Environment	Temperature -10 - 60 ˚C Humidity 10 - 85 % Atmospheric pressure 500 - 1060 hPa

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/CE) to dispose of the product and accessories.

Consult operation instructions.

Manufacturer.

CE 0197 This conforms to CE European Directive of “Medical equipment directive 93/42/EEC.”

Type BF applied part.

EC REP Authorised representative in the European community.

IPX1 Protected against vertically falling water drops.

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

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 Varios750 / Varios750LUX is intended for use in the electromagnetic environment specified below. The customer or the user of the Varios750 / Varios750LUX should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR11	Group 1	The Varios750 / Varios750LUX 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 Varios750 / Varios750LUX 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 Varios750 / Varios750LUX is intended for use in the electromagnetic environment specified below. The customer or the user of the Varios750 / Varios750LUX 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 Varios750 / Varios750LUX requires continued operation during power mains interruptions, it is recommended that the Varios750 / Varios750LUX 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.			

Guidance and manufacturer's declaration - electromagnetic immunity			
The Varios750 / Varios750LUX is intended for use in the electromagnetic environment specified below. The customer or the user of the Varios750 / Varios750LUX 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 Varios750 / Varios750LUX, 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	$d = 1.2\sqrt{P}$
Radiated RF IEC61000-4-3	3V/m 80MHz to 2.5 GHz	3V/m	$d = 1.2\sqrt{P}$ 80MHz to 800MHz $d = 2.3\sqrt{P}$ 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 Varios750 / Varios750LUX is used exceeds the applicable RF compliance level above, the Varios750 / Varios750LUX should be observed to verity normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the Varios750 / Varios750LUX.			
b Over the frequency range 150kHz to 80MHz, field strengths should be less than 3 V/m.			

Cables and accessories	Maximum length	Shield	Complies with	
Handpiece Cord	2.0 m	Unshielded	RF emissions, CISPR11,	Class B/ Group 1
Foot Control	2.5 m	Unshielded	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 Varios750 / Varios750LUX.

The Varios750 / Varios750LUX is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Varios750 / Varios750LUX can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Varios750 / Varios750LUX 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.