NSK

# VIVAsupport2

## **OPERATION MANUAL**

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



Thank you for purchasing VIVAsupport 2.

Please read this Operation Manual carefully before use to become familiar with operation instructions and care & maintenance. Keep this Operation Manual for future reference.

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## 1 User and Indications for Use

#### User: Qualified Professionals

Indications for Use: This device is intended for supplying coolant water and ejecting saliva during dental treatment.

## 2 Precautions for Handling and Operation

- Please read these precautions 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
	Hazard that could result in personal death or serious injury if the safety instructions
	are not followed.
	Hazard that could result in serious injury or damage to the device if the safety
	instructions are not followed.
	Hazard that could result in light or moderate injury or damage to the device if the
	safety instructions are not followed.
NOTICE	General product specification information highlighted to avoid product malfunction
NUTICE	and reduction in performance.

#### 1 DANGER

- If you NOTICE battery fluid leakage, appearance or pump deformation, or partial discoloration, immediately discontinue use and contact your Authorized NSK Dealer. These abnormalities may lead to accidents by battery fluid leakage, electric shock or fire.
- Should battery fluid leak and get into patients or user's eyes, immediately flush eyes thoroughly with clean water and seek medical attention. If left untreated this condition may result in blindness.
- Do not short-circuit the connector terminals of the battery pack. Do not carry or store the battery pack with metal necklaces, hairpins and other metal objects. The battery pack may be short-circuited and an excessive electric current may cause heat or smoke contamination, rupture or fire. It may also cause the heating of metal objects, such as wires, necklaces and hairpins.
- Do not heat the battery pack or dispose of it in a fire. This may cause overheating, smoking, rupture, or fire due to melting of the insulator in the internal battery, damage to the gas relief valve or safety mechanism, or ignition of the battery fluid.
- Do not pierce nor cause any impact on the battery pack. This may cause overheating, smoking, rupture, or fire due to an internal short-circuit as a result of rupture or deformation of the internal battery.
- If electrolytic solution leaks from the battery pack or an unusual odor is detected, keep it away from fire. Electrolytic solution could catch fire and causing smoke, rupture, or explosion.
- Be careful not to get water or liquid disinfectant (saline solution) on the Control Unit. This could cause short circuits and lead to electric shock.

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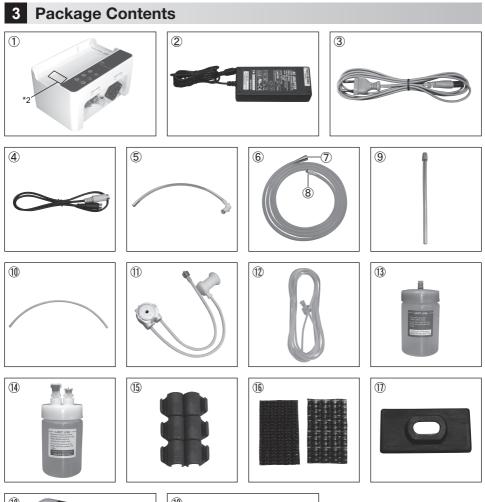
- Keep away from explosive substances and flammable materials.
- This product requires an exclusive battery. Any other battery may cause fluid leakage or rupture.
- Where battery fluid leaks and adheres to the skin or clothing, immediately wash it off with clean water. This may cause skin irritation.
- In case of smoke or a smell of plastic burning, immediately turn off the power and disconnect the power plug, and contact your Authorized NSK Dealer.
- Do not handle the power cord with wet hands. Wet hands coming to contact with electricity may result in electric shock.
- Repeatedly turning the main power switch ON and OFF may blow a fuse.
- The AC Adaptor is a fast way to disconnect the product from the commercial power supply. Therefore, install the AC Adaptor in such a way that it can be disconnected from the outlet quickly in an emergency. Do not place any object within 15 cm of the AC Adaptor.

### $\triangle$ caution

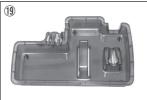
- Read this Operation Manual before use to fully understand the product functions.
- Always consider the safety of the patient when operating this product.
- The end user shall be responsible for any judgment on use of this product on a particular patient.
- Users are responsible for the operational control, maintenance and continual inspection of this product.
- Do not tamper or disassemble the product unless instructed in this operation manual.
- Do not allow any impact on to the product. Do not drop the product.
- Never use an AC Adaptor other than the one supplied by NSK for this product. This may cause the product failure. In addition, not connect accessories other than the ones specified by NSK either.
- Do not use strong acidic water, super acid water or sterile liquid to clean, immerse, or wipe the product.
- Do not use or store the product in direct sunlight, a vehicle, fire, stove, or other location where temperatures may be outside the range shown in the specification table in this manual. This may result in overheating, smoking, reduction in performance or reduction in the life of the rechargeable battery.
- Make sure to check the product before use by operating it outside the patient's mouth.
- If any abnormalities are observed during use, contact your Authorized NSK Dealer.
- This product is a dental device. Do not use it for any other purpose.
- Be sure to regularly inspect the device and parts.
- If the product is not used for a long period, check for normal and safe operation before using on a patient.
- Preparing spare parts is recommended for emergency.
- This product is rated Medical Electrical equipment. EMC (Electromagnetic compatibility) is described in the documentation included. Installation and use of this product requires special precautions regarding EMC according to the EMC information.
- Portable and mobile RF communications equipment can affect Medical Electrical equipment. Do not use RF equipment near the product.
- The use of ACCESSORIES such as handpieces and cables, other than those specified by the manufacturer of this product, may result in increased EMISSIONS or decreased IMMUNITY of this product.
- The system may present a possibility of malfunction when used in the presence of an electromagnetic interference wave. Do not install the system in the vicinity of any device which emits magnetic waves. Turn off the Main Power Switch of the system as an ultrasonic oscillation device or an electrode knife is located close to the vicinity of use.

#### NOTICE

- For handling the product connected to this product, see the operation manual of the applicable product.
- Contact your Authorized NSK Dealer if repairs are necessary. Repairs of this product are performed by authorized service technicians according to the service manual.
- No special training is required for this device.







No.	Part Name	Quantity
1	VS Control Unit	1
2	AC Adaptor	1
3	AC Power Cord	1
4	Junction Cable	1
5	Saliva Bottle Connection Tube	1
6	Saliva Tube <sup>*1</sup>	2
7	VS Saliva Joint	1

No.	Part Name	Quantity
8	VS Saliva Inline	1
9	Saliva Ejector	10
10	Saliva Drain Tube	1
11	VS Irrigation Pump	1
12	VS Irrigation Tube	1
13	VS Irrigation Bottle	1
14	VS Saliva Bottle	1

No.	Part Name	Quantity
15	Tube Holder	6
16	Velcro*2	1
17	Waterproof Rubber Sheet	1
18	VS Carrying Case	1
19	VS Tray	1

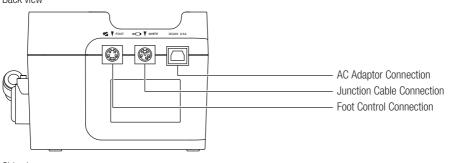
<sup>\*1</sup> No.7 Saliva Joint and No.8 Saliva Inline are connected to one of these two tubes.

<sup>2</sup> Velcro is adhered to the depressed area of the upper surface of the Control Unit as needed to fix VIVAMATE G5 or Varios 370.

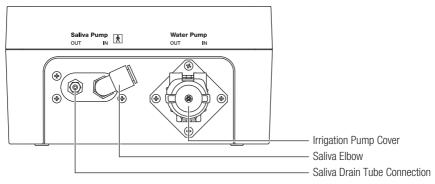
## 4 Component Names

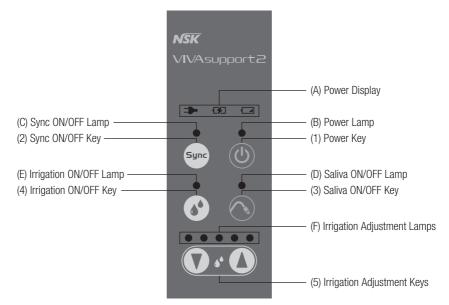
#### 4-1 Control Unit

Back view



Side view





#### 4-1-1 Keys on Operation Panel

(1) Power Key

To turn the power of the Control Unit ON or OFF.

(2) Sync ON/OFF Key

To switch over to the sync mode which can synchronize irrigation function with the operation of VIVAMATE G5 or Varios 370.

Under the sync mode, irrigation automatically starts when the motor or handpiece starts working.

(3) Saliva ON/OFF Key

To select ON/OFF of saliva ejector

Saliva ejector function only works with the manual mode (Press the key to start or stop ejection.) but not with the sync mode.

- (4) Irrigation ON/OFF Key
  - To select ON/OFF of irrigation.

To switch from the sync mode to the manual mode (Press the key to start or stop irrigation.).

(5) Irrigation Adjustment Keys

To select the irrigation volume from Level 1-5.

#### 4-1-2 Indicators on Operation Panel

#### (A) Power Display

These lamps indicate power state.

- AC-IN lamp: This lamp illuminates when power is supplied through AC Adaptor.
- CHARGE lamp: This lamp illuminates when battery is charged.
- Battery status lamp: This lamp illuminates when battery power is low. Charge the battery when this indicator lamp illuminates.

- (B) Power Lamp: This lamp illuminates when power is turned on.
- (C) Sync ON/OFF Lamp: This lamp illuminates when the Sync ON/OFF Key is pressed. The lamp flashes during operation.
- (D) Saliva ON/OFF Lamp: This lamp illuminates when saliva ejection starts.
- (E) Irrigation ON/OFF Lamp: This lamp illuminates when irrigation starts.
- (F) Irrigation Adjustment Lamps: These lamps indicate the selected irrigation volume. The more the number of lamps illuminates, the stronger the irrigation volume is.

• Do not place a heavy object on the display of the Operation Panel. Do not allow strong impact on this product (Do not drop any object on this product.). It may break the display.

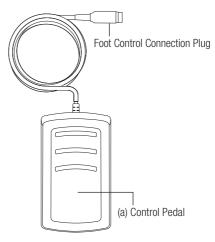
#### 4-2 Foot Control (FC-76M) (Option)

Foot Control is used for the following operations.

- Switch ON/OFF of VIVAMATE G5 or Varios 370 which is connected to this product and irrigate in sync with the operation of VIVAMATE G5 or Varios 370 (Sync mode).
- Only switch ON/OFF of VIVAMATE G5 or Varios 370 (When the sync mode is deactivated.).

(a) Control Pedal

- In case VIVAMATE G5 is connected, motor rotation speed changes depending on how deeply the Control Pedal is pressed. Under the sync mode, irrigation starts at the same time as the pedal is pressed.
- In case Varios 370 is connected, pressing down the pedal activates the Varios 370 tip. Under the sync mode, irrigation starts at the same time as the pedal is pressed.



• In case a product other than VIVAMATE G5 or Varios 370 is connected, or nothing is connected, under the sync mode, irrigation starts at the same time as the pedal is pressed.



- As a safety precaution, turning on the power while the Control Pedal is being pressed will not activate VIVAMATE G5 or Varios 370. To activate, release the pedal once and press it again.
- VIVAMATE G5 will not activate with the Foot Control for Varios 370.
- How strongly the pedal is pressed does not determine the irrigation volume.

## 5 Installation

• Be sure to turn off the power of the Control Unit before attaching or removing the bottle, tube, or cords. Liquid spillage on the product may cause failure or injury due to inadvertent operation.

#### 5-1 Connecting the Irrigation Pump

- Turn the Irrigation Pump Cover counter-clockwise and pull it out straight.
- Insert the Irrigation Pump slowly into the Drive Shaft in the same direction as Fig. 1 and turn it clockwise until it clicks into position.

\*To remove, turn the Irrigation Pump counter-clockwise until it clicks and pull it out straight.



Fig.1

## CAUTION

- If the Irrigation Pump or Drive Shaft is wet, wipe off and dry thoroughly before replacing. This may cause the roller inside the Irrigation Pump to slip, resulting in malfunction.
- Clean debris and moisture on the Drive Shaft from the base as shown in Fig. 2.
- Insert the Irrigation Pump into the Drive Shaft slowly and gently. If the pump is inserted forcibly, the roller inside the Irrigation Pump may be damaged.
- After replacing to a new Irrigation Pump, run the device for about 10 seconds at max irrigation volume before general use. This will prime the pump tube.





- Use an Irrigation Pump exclusive for VIVAsupport 2. Any other pumps are not accepted.
- **NOTICE** The Drive Shaft may accumulate debris after a long period of use. This may cause a rotational fault of the Irrigation Pump. To clean, regularly wipe off with cotton containing alcohol.
  - The Irrigation Pump is a wear item. If water volume drops significantly during use, it is time to replace the pump.

#### 5-2 Connecting the Irrigation Tube

- 1) Tuck the Irrigation Tube into the OUT side tube of the Irrigation Pump. (Fig. 3)
- Pull the tube slightly to confirm the tube is securely attached.
- \*To remove, turn the connecting portion in reverse.

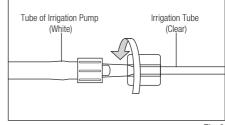


Fig.3

#### 5-3 Connecting the Irrigation Bottle

- Pour water into the Irrigation Bottle up to "the limit line".
- 2) Securely tighten the cap of the Irrigation Bottle Cap.
- Push the Irrigation Joint of the tube of the Irrigation Pump securely into the upper connection of the bottle. (Fig. 4)





#### 5-4 Connecting the Saliva Drain Tube

- Completely insert the Saliva Drain Tube into the Saliva Drain Tube Connection at the side of the Control Unit. (Fig. 5)
- 2) Pull the tube to confirm that the tube is securely inserted.
- Insert the end of the tube into the hole of the Tray at the bottom of the Carrying Case.





#### 5-5 Connecting the Saliva Bottle Connection Tube

- 1) Hold the Saliva Elbow at the side of the Control Unit, and insert the Saliva Bottle Connection Tube until the end. (Fig. 6)
- 2) Pull the tube slightly to confirm that the tube is securely inserted.

\*To remove, keep pushing down the Ring of the Saliva Elbow and pull the tube straight out.



Fig.6

#### 5-6 Connecting the Saliva Bottle

- Securely insert the joint of the Saliva Bottle Connection Tube while pressing the Lock Switch of the Saliva Bottle, then release the Lock Switch.
- 2) Perform the same steps as 1) for the Saliva Inline side of the Saliva Tube.
- 3) Pull the tube slightly to confirm that the tube is securely inserted.

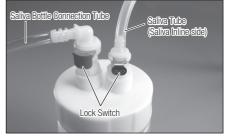
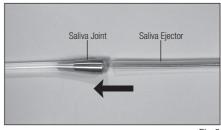


Fig.7

- Do not pour anything other than water into the Irrigation Bottle. Other liquids may cause clogging.
- Be sure to dispose of the aspirate accumulated in the Saliva Bottle before it reaches the upper limit. If the Saliva Bottle is FULL suction will stop (ejection).
- Securely tighten the cap of the bottle. Otherwise, the content may be spilled out or saliva suction power may decrease.
- Do not tilt or turn over the Irrigation Bottle or Saliva Bottle with the content still inside. The content may be spilled out of the bottle.

#### 5-7 Connecting the Saliva Ejector

- 1) Insert the Saliva Ejector into the Saliva Joint all the way. (Fig. 8)
- 2) Push and pull the Saliva Ejector slightly to confirm the ejector is firmly attached.

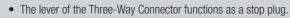




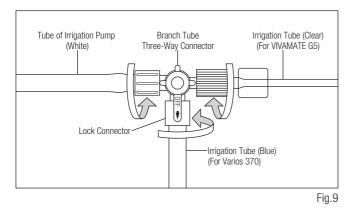
#### 5-8 Connecting the VS Branch Tube (Option)

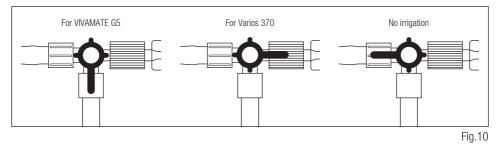
Connecting to the VS Branch Tube enables the connection of VIVAMATE G5 and Varios 370 to this product at the same time. It also enables switchover of irrigation direction.

- 1) Remove the protection cap of the Three-Way Connector.
- 2) Insert the Irrigation Tube for VIVAMATE G5 into the branch connector, and tighten by turning the Lock Connector. (Fig. 9)
- 3) Tuck the tube of the Irrigation Pump into the opposite side of 2).
- 4) Securely insert the Irrigation Tube for Varios 370.
- 5) Slightly pull each tube to confirm that the tubes are securely inserted.
- 6) Change the direction of Three-Way Connector to switch over the irrigation direction. (Fig. 10)



## CAUTION





### 5-9 Connecting the Foot Control (Option)

Align the positioning ( $\blacktriangle$  mark) of the Foot Control Plug with the Foot Control Connection at the back of the Control Unit and insert. (Fig. 11)

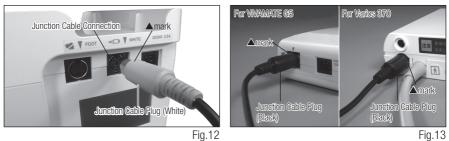


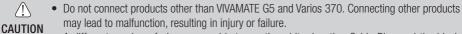


**CAUTION** • Pressing on the Foot Control starts operation of the product (VIVAMATE G5 or Varios 370) connected to this product. Turn off the power when attaching or removing the Foot Control to avoid injury due to inadvertent operation.

#### 5-10 Connecting the Junction Cable

- Align the positioning (▲ mark) of the Junction Cable Plug (White) with the Junction Cable connection at the back of the Control Unit, then insert the Junction Cable Plug. (Fig. 12)
- 2) Align the positioning (▲ mark) of the Junction Cable Plug (Black) with the Foot Control Connection of VIVAMATE G5 or Varios 370, then insert the Junction Cable Plug. (Fig. 13)

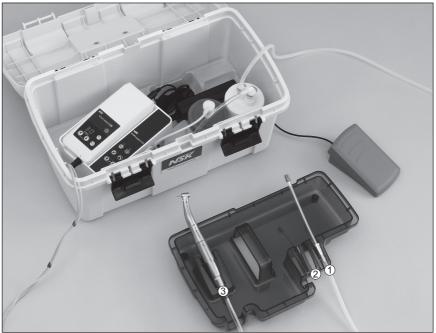




• A different number of pins are used between the white Junction Cable Plug and the black Junction Cable Plug. Make sure of the correct Plug is used before inserting. Inserting the wrong plug may cause damage to the pins.

#### 5-11 Carrying Case

This product can be used while inside the Carrying Case



The Tray provides a holder for each device to be used OSaliva Ejector Holder @Handpiece Holder for Varios 370 @Motor Holder for VIVAMATE G5 Fig.14

◆ Attaching the Waterproof Rubber Sheet

The Waterproof Rubber Sheet included in the product package is attached to the AC Adaptor of VIVAMATE G5. This prevents accidential liquid leaks from the Irrigation or Saliva Bottles entering inside of the AC Adaptor when VIVAMATE G5 is used connected to the AC Power Cord. Attach this rubber sheet as follows:

- 1) Prepare the supplied Waterproof Rubber Sheet and the AC Adaptor of VIVAMATE G5.
- 2) Wipe off any oil on the portion of AC Adaptor connected to the AC Power Cord.
- 3) Insert the AC Power Cord from the rubber side of Waterproof Rubber Sheet.
- Peel off the adhesive protective film of the Waterproof Rubber Sheet, and firmly connect the AC Power Cord to the AC Adaptor as in Fig. 15.
- 5) Firmly stick the Waterproof Rubber Sheet onto the AC Adaptor.
- 6) To remove the AC Power Cord, remove the cord without the Waterproof Rubber Sheet.

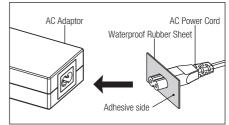


Fig.15

## 6 Check before Treatment

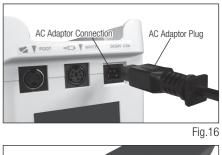
Connect the bottle and the tubes and check if the product irrigates and ejects saliva correctly before use by operating it outside the patient's mouth. If any abnormalities such as vibration, noise, and heat are observed discontinue use and contact your Authorized NSK Dealer.

## 7 Operating Method

#### 7-1 Charging the battery

Charge this product by using the supplied AC Adaptor. Check the battery charging status before use. The battery status lamp illuminates or flashes when the battery is low. Charge the battery promptly.

- 1) Connect the AC Adaptor plug to the AC Adaptor Connection at the back of the Control Unit. (Fig. 16)
- 2) Connect the AC Cord Plug to the AC Power Cord connection of the AC Adaptor. (Fig. 17)
- 3) Plug the AC Power Cord into the outlet.
- 4) AC-IN lamp illuminates.
- CHARGE lamp illuminates, and charging starts. (The Control Unit measures remaining battery and starts charging only if charging is necessary.)
- 6) CHARGE lamp turns off to indicate that the charging is complete.





- Fig.17
- Do not use the AC Adaptor for a device other than the Control Unit of this product.
- Do not insert or remove the AC Power Cord until the device has completely stopped.
  - Turn off the switch after using the product. When not using it for a long period, disconnect the AC Power Cord from the outlet.
  - Always pull out the AC Adaptor by holding the plug, not the cord. Pulling it out by the cord may damage the cord.

- **NOTICE** Do not plug into an outlet other than the commercial power supply. This may cause a failure of this product.
  - Remaining amount of battery is automatically measured. It takes a few seconds before charging starts. This is not a failure.
  - AC-IN lamp indicates that the power is supplied. The lamp remains illuminated even after battery charging is complete.
  - This product automatically shuts down when detecting a voltage drop of the battery pack. Voltage drop may not be detected right after the power is turned on again after a while. This is part of characteristics of the battery but not a failure. Voltage drop doesn't match with the battery remaining amount either, so use this information just as a reference.
  - Generally, a rechargeable battery discharges electric current little by little even if it is fully charged and unused. Therefore, charging right before use is recommended.
  - Charging time is approximately 2 hours. However, it varies depending on such conditions as the usage and temperature. Especially, the operating time of old battery pack may be extremely short.
  - The battery pack stored for a long period of time or under certain conditions may require a longer time to charge.

#### 7-2 Power

To turn ON/OFF the power, press and hold the power key for more than 1 second. Turning on the power illuminates the Power Lamp and each lamp indicates the current setting.

#### 7-3 Setting irrigation volume

Adjust the irrigation volume with the Irrigation Adjustment Keys ( $\blacktriangle$  and  $\checkmark$  keys). The irrigation volume is adjustable even during irrigation.

#### 7-4 Irrigation ON/OFF

Pressing the Irrigation ON/OFF Key illuminates the Irrigation ON/OFF Lamp and starts irrigation. Pressing again stops irrigation.

#### 7-5 Saliva ON/OFF

Pressing the Saliva ON/OFF Key illuminates the Saliva ON/OFF Lamp and starts ejecting saliva. Pressing again stops ejection.

#### 7-6 Setting the sync mode

Turning the sync mode ON enables irrigation in sync with ON/OFF of VIVAMATE G5 or Varios 370 connected to this product.

- 1) Confirm that VIVAMATE G5 or Varios 370 is connected to the Junction Cable properly.
- 2) Confirm that the Foot Control is properly connected.
- 3) Press the Sync ON/OFF Key to illuminate the Sync ON/OFF Lamp.
- 4) Turn on the power of VIVAMATE G5 or Varios 370.
- 5) Stepping on the Foot Control starts operation of VIVAMATE G5 or Varios 370 and irrigation in sync. The Sync ON/OFF Lamp flashes during the operation under the sync mode. This is not a failure.



• The Foot Control activates VIVAMATE G5 or Varios 370 even when the sync mode is OFF.

• The sync mode is not compatible with the Auto-cruise function of VIVAMATE G5.

- **NOTICE** The sync mode works only when operation is controlled by the Foot Control.
  - Pressing the Irrigation ON/OFF Key when the sync mode is set or during irrigation under the sync mode deactivates the sync mode and switches over to manual irrigation. To reactivate the sync mode, press the Sync ON/OFF Key on the Operation Panel.
  - The sync mode synchronizes irrigation only, but not saliva ejection.
  - Stop irrigation before switching to the sync mode. During manual irrigation, the sync mode cannot be set.

#### 7-7 Connecting to VIVAMATE G5, Varios 370

Connect the Junction Cable and Irrigation Tube (or Branch Tube) to this product, VIVAMATE G5, and/or Varios 370. (See 5-8, 5-10)

Refer to "VIVAsupport2 Operation and Connection Guide" included in this package.

#### 7-8 Connecting to a product other than VIVAMATE G5, Varios 370

**NOTICE** • In case a product other than VIVAMATE G5 or Varios 370 is connected to this product, the sync mode can not activate or deactivate the connected device.

- 1) Connect the tip of the Irrigation Tube to the irrigation nozzle of the device to be used.
- Press the Irrigation ON/OFF Key to start irrigation. To stop irrigation, press the Irrigation ON/OFF Key.
   \*Turning on the sync mode when the Foot Control is connected enables irrigation start/stop by the Foot Control.

#### 7-9 Auto power off function

When approximately 10 minutes has elapsed without operation, the power is automatically turned off to conserve battery life.

To restart, press the power key.

**NOTICE** • The power will remain ON, even without operation, as long as irrigation or saliva ejector is in action.

#### 7-10 Completing treatment

After treatment is completed, place the Irrigation Bottle and Saliva Tube back in each holder at the Tray or in the Carrying Case. Then turn off the power by pressing and holding the power key for more than 1 second.

• This product always memorizes the settings as they were when it was turned off. There is no need to reset next time it is turned on.

## 8 Maintenance

After each patient maintain the product as follows.

**NOTICE** • The use of rubbing alcohol (ethanol) with its alcohol content of 77 - 81% is recommended. Any alcohol other than the specified one may not sufficiently clean the product.

#### 8-1 Cleaning the Irrigation Tube

- 1) Pull out the bottle joint from the Irrigation Bottle slowly.
- 2) Press the Irrigation ON/OFF Key to idle-run the Irrigation Pump until all the water inside the Irrigation Tube is gone.
- 3) Wipe the surface of the Irrigation Tube with cloth wrung out with water, and then wipe off with cloth steeped in rubbing alcohol.

#### 8-2 Cleaning the Saliva Tube

- 1) Prepare a container with clean water inside.
- 2) Put the Saliva Ejector into the container prepared at 1) to remove the debris inside the Saliva Tube.
- 3) Take the Saliva Ejector out of the container, and run the device until the water inside the Saliva Tube is gone.
- 4) Detach the Saliva Ejector.
- 5) Detach the Saliva Tube by pressing the Lock Switch of the Saliva Bottle.
- 6) Wipe the surface of the Saliva Tube with cloth wrung out with water, and then wipe off with cloth steeped in rubbing alcohol.



• A Saliva Ejector is not reusable. After use, properly handle it by considering infection prevention.

#### 8-3 Cleaning the Irrigation Bottle and the Saliva Bottle

- 1) Turn the cap of each bottle counterclockwise to remove. (Fig. 18)
- 2) Remove the filter and Gaskets from the cap and bottles. (Fig. 19)
- Wash out debris with running water. Use a brush (A metal brush is not accepted.) if necessary.
- 4) Install a filter and Gaskets to the cap and bottles.

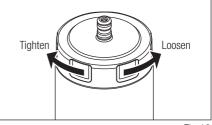
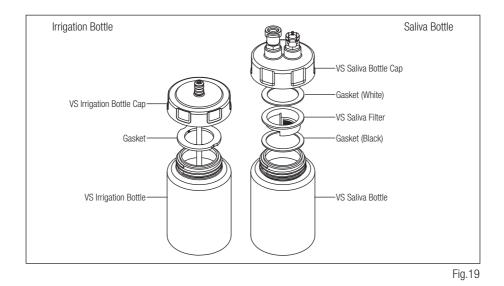


Fig.18



- Never use any solvents such as benzine and thinner for cleaning.
- After use, clean the bottles, Irrigation Tube, and Saliva Tube immediately before storing. Leaving the product with the blood attached could cause solidification inside, which may result in a product failure. In case chemical solution, solvent, or antiseptic solution is attached to the Control Unit, Irrigation Tube, or Saliva Tube, wipe off immediately. Leaving as it is may cause discoloration or deformation.
  - This product cannot be sterilized. Do not sterilize it.
  - Be careful not to lose the Gaskets when washing out.

#### 8-4 Cleaning the Control Unit

- 1) Turn off the power.
- 2) Wipe with a water dampened cloth, then again wipe the surface with an alcohol dampened cloth.

#### Storage 9

<u>/ľ</u>

Perform the following procedures to store the product in the Carrying Case.

1) Place the Control Unit. Irrigation Bottle, Saliva Bottle, and AC Adaptor on the designated position in the Carrving Case.

If VIVAMATE G5 and Varios 370 are used, place either one on the Control Unit. (Fig. 20)

- 2) If water is inside the Irrigation Bottle, empty the bottle to prevent water spill or connect the bottle joint to the cap of the Irrigation Bottle. Be sure to dispose of the aspirate inside the Saliva Bottle before storing the bottle.
- 3) Place the Tray inside the Carrying Case. Bundle the Irrigation Tube, Saliva Tube, the motor cord of VIVAMATE G5 or the handpiece cord of Varios 370. (Fig. 21)
- 4) Insert the motor of VIVAMATE G5 or the handpiece cord of Varios 370 into the holder of the Tray. Be sure to remove the handpiece before insertion.
- 5) Put in other tubes, cords, and accessories, and lock the cover of the Carrying Case. (Fig. 22)



Fig.20



Fig.21



Fig.22

- Before storing, be sure to detach the handpiece from the motor or the handpiece cord. Contacting the cover of the Carrying Case may break the handpiece. CAUTION
  - Do not put the tube or cord in between the cover of the Carrying Case. This may result in damage or failure. The cover may not be closed either.

## 10 Replacing the Battery Pack

This product is rechargeable but the battery pack has a limited life which varies depending on use. When a shorter charging time or shorter operating time is detected, the battery should be replaced. Contact your Authorized NSK Dealer to have the batteries replaced or purchase a battery to replace. In case of replacing batteries by yourself, be sure to follow "CAUTIONS on CHANGING BATTERY" below. NSK is not liable for any malfunction or a failure if the precautions are not followed properly.

## 

#### CAUTIONS on CHANGING BATTERY

- Do not open anything other than the battery cover.
  - Always use the genuine battery pack NSK recommends. Using other batteries may cause damage, leakage, or rupture.
  - Do not replace the battery with wet hands. This may result in short-circuit of the battery pack or a failure due to the ingress of moisture inside.

#### 10-1 How to replace the battery pack

- 1) Turn off the power and take out the AC Adaptor.
- Remove the Screw of the battery cover at the back of the Control Unit with a Phillips screwdriver.
- 3) Slide the battery cover in the direction of the arrow to remove. (Fig. 23)
- 4) Pull the tape to remove the old battery pack. (Fig. 24)
- 5) Pressing the Ratchet of the connector, remove the connector. (Fig. 25)
- 6) Bring a new battery pack and insert the connector firmly until the Ratchet of the connector locks.
- Insert the battery pack into the Control Unit without the cords being caught.
- 8) Lock the battery cover with the Screw.
- 9) Confirm that the power turns on.
- 10) Be sure to charge before use.

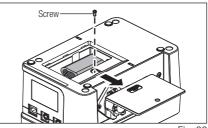


Fig. 23

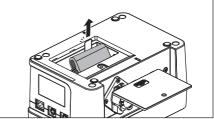


Fig. 24

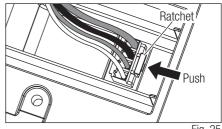


Fig. 25



- Do not lose the Screw when removed.
- Do not put the battery in fire. The battery will rupture, causing an accident.
- **NOTICE** The used lithium ion batteries are recyclable, but their disposal may sometimes not be permitted by the country. Return them to your Dealer.

## **11** Periodical Maintenance Checks

Perform periodical checks based on the check list below every three months. If abnormality is detected in any of the check items, contact your Authorized NSK Dealer.

Point to check	Details	
Irrigation	Connect the device to be used and turn on irrigation to check abnormalities such as the flow volume and water leakage.	
Saliva ejection	Turn on saliva ejection to check abnormalities in suction.	
Sync mode	Connect VIVAMATE G5 or Varios 370 to confirm synchronized irrigation.	
	Activate only with the battery to check the remaining battery level. If the battery lamp	
Battery level	illuminates or flashes, charge the battery for degradation protection.	

## **12 Protection Circuit**

When the product is operated under a load exceeding the allowable limit, the protection circuit gets activated to stop the product and prevent a hazard or damage. The corresponding lamp flashes on the Operation Panel to display the error.

## 13 Error Display

In case abnormality occurs and the device stops working due to failure, overload, disconnection, or misuse, the status of Control Unit is automatically detected and possible cause is identified to display an error on the Operation Panel by the flashing lamp. In such case, power cycle to see if the error is displayed again. Perform the following actions if the error continues. If the error cannot be resolved even after the remedy, a failure of this product is suspected. In that case, contact your Authorized NSK Dealer.

Error display	Error description	Cause	Check and remedy
The power turns off after the Power Lamp flashes twice.	Out of operating temperature.	Out of product operating temperature or internal thermistor malfunction.	Turn on the power within the acceptable use temperature.
The Irrigation ON/OFF Lamp and Saliva ON/OFF Lamp both flash.	Faulty circuit.	Failure of pump circuit.	Repairs are necessary. Contact your Authorized NSK Dealer.
The Irrigation ON/OFF Lamp flashes.	Overload of irrigation motor.	High load applied continuously to the Irrigation Pump.	After checking that no foreign object is mixed in the Irrigation Tube, deactivate the lamp by pressing the Irrigation ON/OFF Key or the Foot Control.
The Saliva ON/OFF Lamp flashes.	Overload of saliva motor.	High load applied continuously to the Saliva Pump.	After checking that no foreign object is mixed in the Saliva Tube, deactivate the lamp by pressing the Saliva ON/OFF Key or the Foot Control.
The battery status lamp flashes twice.	The battery pack is not connected.	The battery pack is not connected.	Disconnect the AC Adaptor and connect the battery pack to turn on the power.
The CHARGE lamp flashes twice.	Out of charging temperature.	Out of charging temperature of battery pack or internal thermistor malfunction of battery.	Turn off the power, and turn on the power within the acceptable temperature range.
The CHARGE lamp flashes.	Faulty circuit.	Failure of charge circuit.	Repairs are necessary. Contact your Authorized NSK Dealer.

## 14 Troubleshooting

If a problem is detected, check the following list before requesting service. If none of the listed remedies corrects the fault, contact your Authorized NSK Dealer.

#### <Control Unit, AC Adaptor>

Trouble	Cause	Remedy
	The AC Adaptor is not connected to the Control Unit.	Check the power connection.
The power does not turn on.	AC Adaptor plug is not connected to the outlet. Or the electricity is not supplied to the outlet.	Check the power connection.
	The battery level is low.	Charge the battery pack or use the AC Adaptor.
	An internal fuse is activated.	Contact your Authorized NSK Dealer.
	The AC Adaptor is not connected to the Control Unit.	Check the power connection.
The AC-IN lamp doesn't illuminate.	AC Adaptor plug is not connected to the outlet. Or the electricity is not supplied to the outlet.	Check the power connection.
	An internal fuse is activated.	Contact your Authorized NSK Dealer.
	Rechargeable battery full charge or close to it.	No problem.
No battery charge (The CHARGE lamp does not illuminate.)	The temperature of the battery pack is low.	No charge when the temperature of the battery pack is less than approx. 0°C. Charge the rechargeable battery at room temperature. (Be careful of condensation.)
	The temperature of the battery pack is high.	No charge when the temperature of the battery pack is approx. 45°C or higher. Charge the rechargeable battery within permissible temperature.
The battery status lamp flashes twice.	The battery pack is not connected.	Check if the battery pack is connected.

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	The Foot Control (Option) is not connected.	Check the connection (In case the Foot Control is not used, irrigation is activated at the unit side.)
Oranatimizata	Each tube is not firmly connected.	Confirm that each tube is firmly connected.
Cannot irrigate.	The pump is broken.	Contact your Authorized NSK Dealer.
	Foreign object is mixed in the tube.	<ul> <li>Remove the foreign object.</li> <li>Maximize the irrigation volume and turn on and off the irrigation several times.</li> </ul>
	Each tube is not firmly connected.	Confirm that each tube is firmly connected.
	The pump is broken.	Contact your Authorized NSK Dealer.
	Foreign object is mixed in the tube.	Remove the foreign object.
	The cap of the bottle is not securely tightened.	Securely tighten the cap of the bottle.
Cannot eject saliva.	The ball inside the Bottle Cap is placed upward.	Push the ball down using a thin stick.
VIVAMATE G5 or Varios 370 cannot	The Junction Cable is not firmly connected.	Confirm that the Junction Cable is firmly connected.
be synchronized.	The sync mode is not set.	Press the Sync ON/OFF Key to turn on the Sync ON/OFF Lamp.
Does not operate	The battery level is low.	Charge the battery.
with battery.	The battery pack is not connected.	Connect the battery pack.
Foot Control (Option) cannot stop irrigation	Irrigation is activated by the Irrigation ON/ OFF Key	Stop irrigation by the Irrigation ON/OFF Key.

## **15** Specifications

Model	VIVAsupport 2	
Weight	3500g (standard set)	

#### <Control Unit>

Model	NE291
Rated Input	DC24V 2.5A
Power Consumption	15VA
Pump Suction	300ml/min
Irrigation Volume	50ml/min
Charging Time	Approx. 2 hours
Dimensions	W147×D188×H98mm
Weight	850g

#### <AC Adaptor>

Model	TR60M24
Rated Input	AC100 - 240V
Dimensions	$W58 \times D132 \times H31mm$
Weight	410g (includes AC Power Cord)

#### <Carrying Case>

Dimensions	W460×D265×H233mm	
Weight	1300g	

	Temperature	Humidity	Atmospheric Pressure
Use Environment	0-40°C	30 - 75%	700 - 1060hPa
Transportation and Store Environment	-10 – 50°C	10 - 85%	500 - 1060hPa

\*Use the product in a place where the Control Unit is free from moisture.

\*Non condensing

\*Using in conditions outside the limits above may cause a failure of this product.

## 16 Classification of Equipment

- Type of protection against electric shock:
  - Class II equipment
- Degree of protection against electric shock:
  - Type BF applied part 🕅 (Applied part: Saliva Ejector)
- · Method of disinfection recommended by the manufacturer:
  - See "8 Maintenance"
- Degree of protection against ingress of water as detailed in the current edition of IEC 60529 :
  - Foot Control: IPX1(Protected against water dropping vertically.)
- 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, oxygen or nitrous oxide.
- Mode of operation:
  - Intermittent operation

\*This product is intermittent operation device. Allow 10 minutes break after 3 minutes of continuous action.

- Operation Principle:
  - By driving the injection motor and Saliva motor by the electric energy, it is a device to perform irrigation and aspiration.

## 17 Symbols

- Consult operation instructions.
- Type BF applied part.

Class II equipment.

- AUTION, Refer to attached instructions
- (P) Marking on the outside of Equipment or Equipment parts that include RF transmitters or that apply RF electromagnetic energy for diagnosis or treatment.
- C € European Directive of "Medical equipment directive 93/42/EEC."
- Manufacturer.

EC REP Authorised representative in the European community.

## 18 Warranty

NSK products are warranted against manufacturing errors and defects in materials. NSK reserves the right to analyze and determine the cause of any problem. Warranty is voided should the product be not used correctly or for the intended purpose or has been tampered with by unqualified personnel or has had non NSK parts installed. Replacement parts are available for seven years beyond discontinuation of the model.

## **19 Option Parts List**

Model	Order Code	Remarks
FC-76M	Z1082002	Foot Control
VS Branch Tube set	Z1125091	A set of Three-way Connector and Branch Tube (for connecting Varios 370)
Saliva Tube G	Z1137562	Gray non-transparent tube(only tube)

## 20 Spare Parts List

Model	Order Code	Remarks
Battery Pack	U1068052	
Junction Cable	U1089600	
Disposable Saliva Ejector	Z1137054	10 pieces
VS Saliva Tube	Z1137050	A set of Saliva Joint, Saliva Inline, and Saliva Tube
Saliva Tube	Z1137560	Only tube
VS Saliva Joint	Z1137052	Joint at Saliva Ejector side
Saliva Inline	Z1137503	Joint at Saliva Bottle side
VS Irrigation Tube	Z1125050	
Tube Clamp Set	U1089058	6 pieces
VS Irrigation Pump	U1089010	A set of Irrigation Joint and Irrigation Pump
VS Irrigation Bottle Set 400	Z1125002	A set of Cap, Gasket, and bottle
VS Irrigation Bottle Cap	Z1125010	Cap for Irrigation Bottle (blue)(not including gasket)
VS Irrigation Bottle Gasket	Z1125405	White
VS Irrigation Bottle	Z1125011	Only bottle(not including cap and gasket)
VS Saliva Bottle Set 400	Z1137002	A set of Cap, Gasket (white and black), filter, and bottle
VS Saliva Bottle Cap	Z1137010	Cap for Saliva Bottle (white)(not including gasket)
VS Gasket (White)	Z1137353	
VS Gasket (Black)	Z1137352	
VS Saliva Filter	Z1137102	
VS Saliva Bottle	Z1137011	Only bottle(not including cap, gasket and filter)
VS Saliva Bottle Connection Tube	Z1137056	A set of tube and joint
AC Adaptor	U1115003	With Waterproof Rubber Sheet (not including power cord)
AC Power Cord	U439550	Not including AC Adaptor
Saliva Drain Tube	Z1137401	Yellow
VS Carrying Case	U1089054	With a Tray at the bottom (not including VS Tray)
VS Tray	U1089111	A tray with instrument holders

## **21** Disposal of the Product

In order to avoid the health risks of operators handling the disposal of medical equipment, as well as the risks of environmental contamination caused thereof, a surgeon or a dentist is required to confirm the equipment is Disinfected. Ask specialist firms who are licensed to dispose of specially controlled industrial wastes, to dispose the product for you. For questions, contact your Authorized NSK Dealer.

The used batteries are recyclable, but their disposal may sometimes not be permitted by the respective country. In case of reuse, there is a possibility that a risk such as infection may occur.

## 22 EMC Information (Electromagnetic Compatibility Information)

Guidance and manufacturer's declaration - Electromagnetic Emissions				
The product is intended for use in the electromagnetic environment specified below. The customer or the user of the product				
should assure that it i	should assure that it is used in such an environment.			
Emissions test	Compliance	Electromagnetic environment - guidance		
RF emissions		The product uses RF energy only for its internal function. Therefore, its RF		
CISPR11/EN55011	Group 1	emissions are very		
		low and are not likely to cause any interference in nearby electronic equipment.		
RF emissions	Class B			
CISPR11/EN55011	U1022 D			
Harmonic emissions	Not Applicable	The product is suitable for use in all establishments, including domestic		
EN/IEC61000-3-2	INUL APPIICADIE	establishments and those directly connected to the public low-voltage power		
Voltage fluctuations/		supply network that supplies buildings used for domestic purposes.		
flicker emissions	Not Applicable			
EN/IEC61000-3-3				

Guidance and manufa	acturer's declaration - El	ectromagnetic Immunity	,	
The product is intende	ed for use in the electror	magnetic environment s	pecified below. The customer or the user of the product	
should assure that it is used in such an environment.				
Immunity test	IEC60601 test level	Compliance level	Electromagnetic environment - guidance	
Electrostatic discharge (ESD) EN/IEC61000-4-2	±(2, 4, 6)kV contact ±(2, 4, 8)kV air	±(2, 4, 6)kV contact ±(2, 4, 8)kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.	
	±2kV for power supply lines ±1kV for input/output lines	lines ±1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.	
Surge EN/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 EN/IEC61000-4-11	<5% Ut (>95% dip in Ut) for 0.5 cycles 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	<5% Ut (>95% dip in Ut) for 0.5 cycles 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 product requires continued operation during power mains interruptions, it is recommended that the product be powered from an uninterruptible power supply or a battery.	
Power frequency (50/60Hz)magnetic field EN/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 AC m	nains voltage prior to app	plication of the test level		

Guidanco and monufo	eturor's declaration	octromagnotic Immunit	by
	acturer's declaration - El	v	specified below. The customer or the user of the product
	s used in such an enviro	0	specified below. The customer of the user of the product
Immunity test	IEC60601test level	Compliance level	Electromagnetic environment - guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the product, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Conducted RF EN/IEC61000-4-6	3Vrms 150kHz to 80MHz	3Vrms	Recommended separation distance $d=1.2 \sqrt{P}$ $d=1.2 \sqrt{P}$ 80MHz to 800MHz $d=2.3 \sqrt{P}$ 800MHz to 2.5GHz
Radiated RF EN/IEC61000-4-3	3V/m 80MHz to 2.5GHz	3V/m	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 <sup>a</sup> should be less than the compliance level in each frequency range <sup>b</sup> . Interference may occur in the vicinity of equipment marked with the following symbol:
NOTE1: At 80MHz and	800MHz, the higher fre	quency range applies.	
NOTE2: These guideli	nes may not apply in all	situations. Electromagr	netic propagation is affected by absorption and reflection
from structures, object	cts and people.		
a:Field strengths from	i fixed transmitters, such	n as base stations for ra	adio (cellular/cordless) telephones and land mobile radios,
			be predicted theoretically with accuracy. To assess
0			ctromagnetic site survey should be considered. If the
•			exceeds the applicable RF compliance level stated above
	,		al performance is observed, additional measures may be
	corienting or relocating t		

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

Cables and accessories	Maximum length	Complies with		
		RF emissions, CISPR11	Class B/ Group 1	
		Electrostatic discharge (ESD):	EN/IEC61000-4-2	
Foot Control Cord	2.0m	Surge:	EN/IEC61000-4-5	
Junction Cable	0.6m	Voltage dips, short interruptions and voltage variations	EN/IEC61000-4-11	
AC Adaptor	1.8m	on power supply input lines:		
		Conducted RF:	EN/IEC61000-4-6	
		Radiated RF:	EN/IEC61000-4-3	

Recommended separation distances between portable and mobile RF communications equipment and the product

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

5 I I I I I I I I I I I I I I I I I I I				
Rated maximum output	Separation distance according to frequency of transmitter			
power of		m		
transmitter	150kHz to 80MHz	80MHz to 800MHz	800MHz to 2.5GHz	
W	d=1.2 √P	d=1.2 √P	d=2.3 √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.

NOTE1: At 80MHz and 800MHz, the higher frequency range applies.

NOTE2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

CE The EU directive 93/42/EEC was applied in the design and production of this medical device.

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