

# NSK

## SURGERY SYSTEM

# *Surgic XT*



## OPERATION MANUAL



OM-E0071E Rev.D

**Thank you for purchasing the NSK Surgic XT surgical unit.**

**◆ Classification 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 8. Sterilization
- Degree of protection against ingress of water as detailed in the current edition of IEC 60529 :
  - Foot Control : IPX8 (Protected against the effects of continuous immersion in water)
- Degree of safety of application in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide :
  - Motor, Foot Control: Category AP Equipment 
- Mode of operation :
  - Continuous operation

**IMPORTANT**




For correct operation please read this manual before use.

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 **Cautions for handling and operation**

- Read these safety cautions thoroughly before use and operate the product properly.
- These indicators are to allow you to use the product safely and prevent danger and harm to you and others. These are classified by degree of danger, damage and seriousness. All indicators concern safety, be sure to follow them.

Classification	Degree of Danger or Danger and Seriousness
 <b>WARNING</b>	Explains an instruction where personal injury or physical damage may occur.
 <b>CAUTION</b>	Explains an instruction where minor to medium injury or physical damage may occur.
 <b>NOTICE</b>	Explains an instruction that should be observed for safety reasons.

# 1 Safety precautions prior to use

## WARNING

The system may present a possibility of malfunction when used in the presence of electromagnetic interference wave. Do not install the system in the vicinity of the device which emits magnetic waves. Turn off the power switch of the Control Unit of this system when an ultrasonic oscillation device or an electrode knife located in the vicinity is used.

## CAUTION

- Surgic XT is intended for use in dental, oral surgical, and surgical procedures.
- Patient safety is a priority.
- Read this Operation Manual before use, and fully understand the functions of each part for starting use.
- Inspect the operating status of the equipment before use, and use only after confirming that no abnormalities exist.
- Test run the product to ensure its correct operation prior to using it.
- If the product should ever malfunction (excessive vibration, noise, heat, etc) please turn it off immediately and return it to your Authorized Dealer for inspection.
- When the product is very frequently used please consider the maintenance of a small stock of replaceable parts.
- We recommended to prepare spares for consumable parts. Such as SGM head.
- Use an electrical outlet that is grounded.
- To avoid possible injury or product damage, ensure that the Micromotor has completely stopped before changing burs.
- Severe shock – Eg. Dropping the product – may cause damage.
- Do not bend the Irrigation Tube while the water pump is operating. It could cause tube breakage.
- Never attempt to disassemble the Control Unit, the Foot Control or the Micromotor.
- Handpiece Attachments should be cleaned, lubricated and sterilized immediately after use.
- Do not lubricate the Micromotor. Oil could generate excessive heat and cause damage.
- The Control Unit and the Foot Control cannot be sterilized by any method.
- The Control Unit may be cleaned with a moist cloth. Disconnect the power supply before cleaning.
- Do not clean the Control Unit with any solvent solutions.
- Do not disconnect the motor cord from the motor.
- Make sure that the cover is not fitted during calibration.
- Be sure to dispose of the irrigation tube as medical waste after use.
- The system functions normally in the environment where the temperature is at 0-40°C (32-104°F), humidity at 10-85% RH, atmospheric pressure at 500- 1060hPa, and no moisture condensation in the Control Unit. Use at outside of these limits may cause malfunction.

## NOTICE

- Turn off the Power Switch after each use.
- For service requirements and spare parts please contact your dealer.
- The use of NSK genuine pre-sterilized, disposable Irrigation Tube Kit is recommended.
- Store the system in the place where the temperature is at -10-60°C (14-140°F), humidity at 10-85%RH, atmospheric pressure at 500-1060 hPa, and the system is not subject to air with dust, sulfur, or salinity.

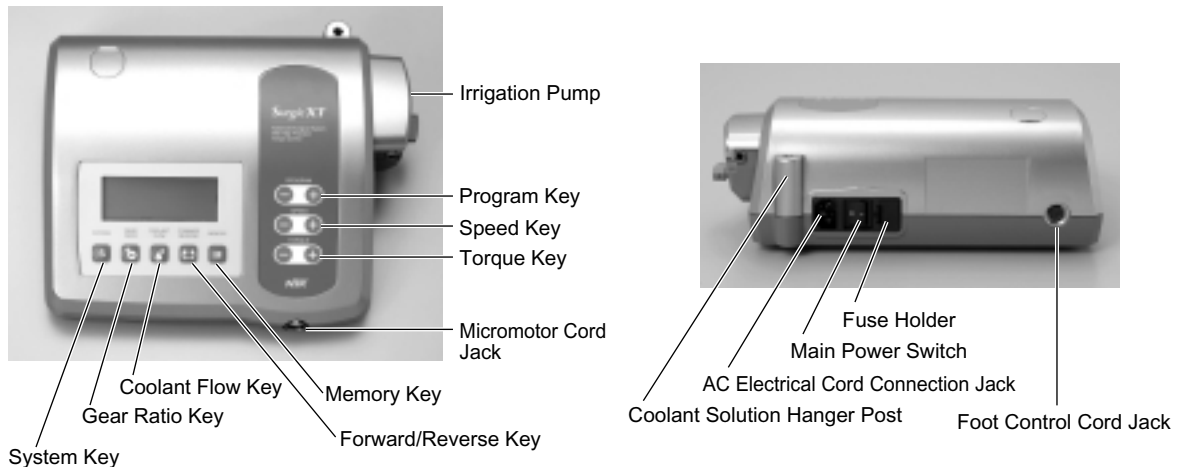
## 2 Package Contents



Item No.	Description	Quantity
①	Control Unit	1
②	Foot Control	1
③	AC Electrical Cord	1
④	Micromotor with Motor Cord	1
⑤	Implant Handpiece (SGM-ER20i, opt)	1
⑥	Irrigation Tube	5
⑦	Coolant Solution Hanger Post	1
⑧	Micromotor Cradle Set	1
⑨	Tube Holder	7

Item No.	Description	Quantity
⑩	Irrigation Tube Clamp	1
⑪	Internal Irrigation Nozzle	1
⑫	Y-Connector	1
⑬	Wrench for Handpiece Attachment	1
⑭	Surgical Head Spray Nozzle	1
⑮	Autoclave Plug	1
⑯	Nozzle Cleaning Fine Wire	1
⑰	Spare Fuse	2

### 3 Control Unit with an Irrigation Pump



## Description of Operation

### ◆ Keys on the Unit

#### (1) Program key

This key is used to select any one of 10 available programs. Press [+] to ascend program numbers and [-] to descend the numbers. By pressing either [+] or [-] the numbers rotate continuously through all available programs.

#### (2) Speed key

This key is used to set the micromotor speed. Press [+] to increase speed by one step, and [-] to decrease speed by one step. When [+] is pressed and the speed setting reaches maximum or [-] is pressed and the speed setting reaches minimum, an audible intermittent beep sounds, and the speed cannot be changed any further.

#### (3) Torque key

This key is used to set the torque. Press [+] to increase torque by one step and [-] to decrease torque by one step. When [+] is pressed and the torque setting reaches maximum, or [-] is pressed and the torque setting reaches minimum, an audible intermittent beep sounds, and the torque cannot be changed any further. The range of torque setting steps vary according to the gear ratio selected to match the handpiece attachment in use.

#### (4) System key

This key is used to calibrate the handpiece attachment before use. To activate the automatic calibration mode, connect the handpiece attachment to the micromotor and press this key. The micromotor will automatically operate for a few moments and, when it automatically stops, the handpiece attachment will be calibrated to the micromotor.

#### (5) Gear Ratio key

This key is to select match ratio of the handpiece attachment, before use, to the unit. Press this key until the LCD display exhibits the correct gear ratio of the handpiece attachment.

#### (6) Coolant Flow key

This key is used to select the coolant solution flow volume. 5 flow volume rates are available for selection, plus the flow can be turned off.

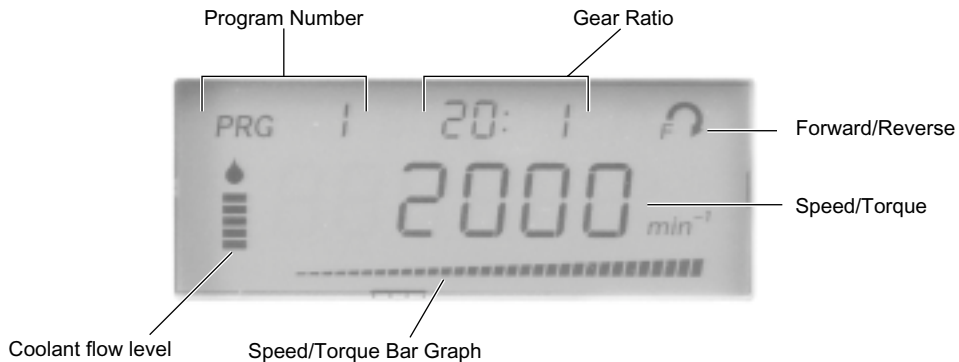
#### (7) Forward/Reverse key

This key is used to change the rotational direction of the micromotor. Press this key once to change the rotational direction.

#### (8) Memory key

This key is used to memorize the program parameters set by the operator. Press this key for approx. 1 second to memorizes parameters. An audible beep confirms that new program parameters have been memorized.

## ◆ LCD display on the unit console



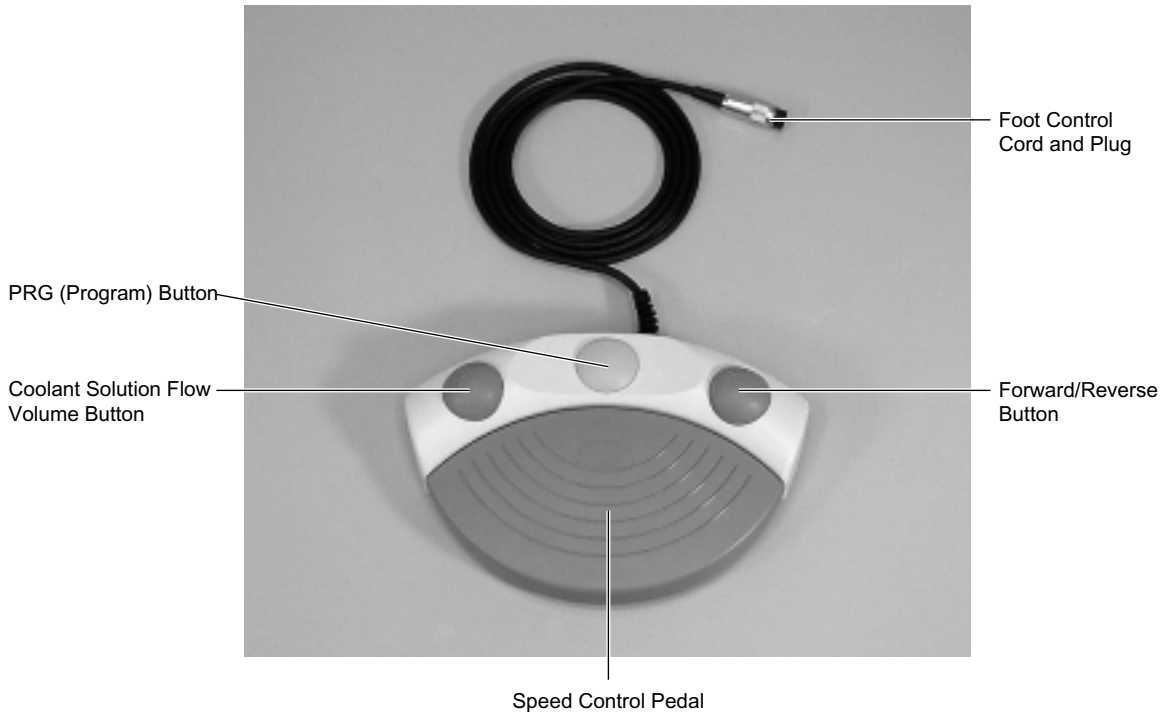
- (1) Coolant Flow  
Displays the selected coolant solution flow volume level. The selected flow volume level is indicated by one of 5 levels of illuminated indicators. No light indicates the coolant solution flow is off.
- (2) Program Number  
Displays the selected program number.
- (3) Gear Ratio  
Displays the gear ratio of the handpiece.
- (4) Forward/Reverse Indicator  
Displays the rotational direction of the micromotor.
- (5) Speed/Torque  
Displays the selected speed and torque. Normal speed is shown when the unit is switched on and also when a program is changed. To display speed, press the [Speed] key on the Control Unit. To display torque, press the [Torque].  
\* When using the 1:1 direct drive or Speed Increasing Handpiece, the torque is not displayed.
- (6) Speed/Torque Bar Graph  
During operation displays an approximate percentage indication of the actual operating speed or torque relevant to the preset maximum speed or torque. When all bars illuminate, the operating speed or torque is at maximum. When bars are half illuminated then the operating speed is approximately 50% of the preset speed.



### CAUTION

The LCD display panel is produced from liquid crystal and should always be treated with care.

## 4 Foot Control



### (1) Coolant Solution Flow Volume Button

This button is used to select the volume of coolant solution flow. Five levels are available and each level may be increased by one step pressing this button once only. The step above level 5 and below level one turns the flow off.

### (2) PRG (Program) Button

This button is used to select the desired program number. Program numbers will always ascend each time this button is pushed and will roll from No. 10 program onto No. 1 program. When the button is pushed too many times and the wrong program is selected, press the button for 1 second more. It could get back to one program before the selected program.

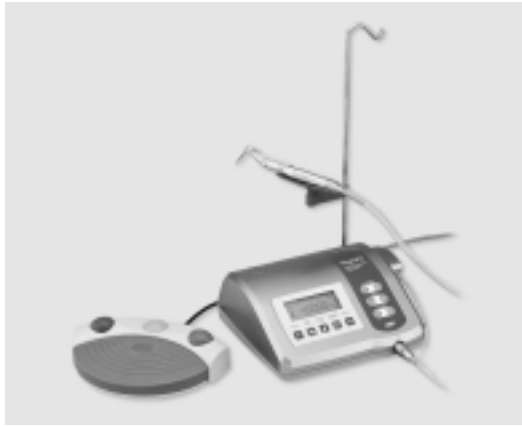
### (3) Speed Control Pedal

This pedal is used to start and stop the micromotor and to vary the speed during operation.

### (4) Forward/Reverse Button

This button is used to change the rotational direction of the micromotor. Push once to change the rotational direction.

## 5 Installation



### 5-1 Connecting the Motor Cord

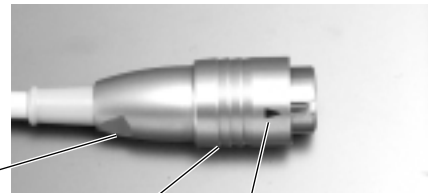
Face the [▲] mark on the Micromotor Cord plug upward then insert the plug into the Micromotor Cord jack on the Control Unit (Fig.1).

A click is heard when the motor cord plug is correctly inserted into the control unit. To disconnect the plug, pull back the lock joint, then disconnect the cord (Fig.2).



Fig.1

Base of Micromotor  
Cord Jack



Lock Joint

▲ Marking

Fig.2

### 5-2 Connecting the Foot Control

Face the screw on the foot pedal control cord plug downward then insert the plug into the Foot Control cord jack on the control unit. Secure the plug by fastening the lock nut. See Figs.3 & 4.



Fig.3

Lock Nut

Screw

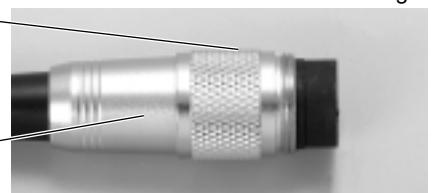


Fig.4

### 5-3 Connecting the Electrical Power Cord

Align correctly then insert the electrical power cord into the power cord connection at the back of the control unit (Fig.5).



Fig.5



## 5-4 Installing the Irrigation Tube

Mount the irrigation tube in the irrigation pump, with the irrigation tube needle toward backside of the unit. Position the stoppers of the tube in the guide securely. (Fig.6)

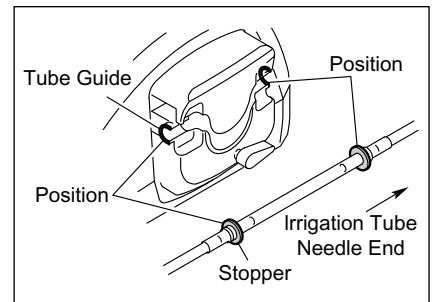


Fig.6



### CAUTION

**Make sure that the tube is securely set on the rollers when closing the pump cover. If the tube is not correctly positioned on the rollers and the cover is closed, the tube could be cut or sheared. (Fig.7)**

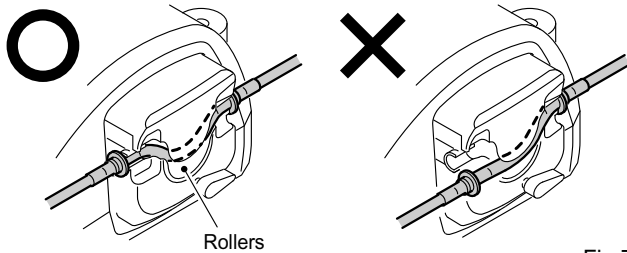


Fig.7

Only after the tubes are correctly positioned, close the pump cover by turning the pump cover lever 180 degrees to the left. (Fig.8)

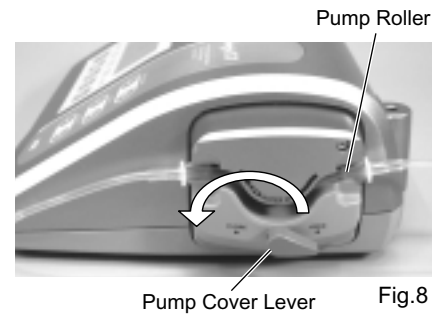


Fig.8



Fig.9

## 5-5 Mounting the Coolant Solution Bottle

Insert the coolant solution bottle hanger post into the holder on the Control Unit. Place the bottle as shown in Fig.10.



Fig.10

## 5-6 Setting Motor Cradle

Attach the base of Motor Cradle to Coolant Solution Hanger Post (Fig.11) and rotate it clockwise until it clicks. (Fig.12) Fit the cradle with the base as shown in Fig.13. Adjust the height of Motor Cradle Set, the direction of the base and the cradle, if needed.

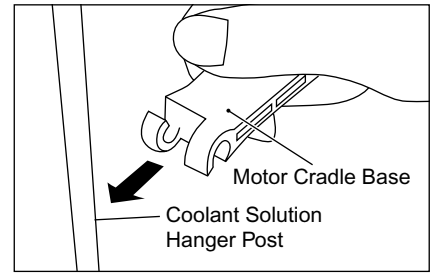


Fig.11

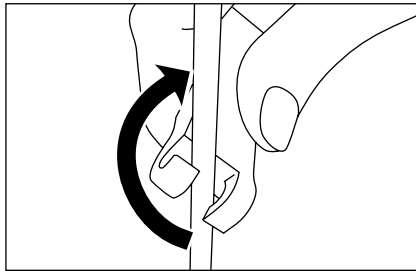


Fig.12

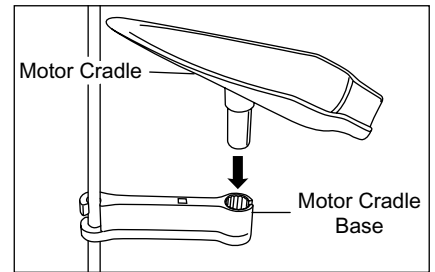


Fig.13

## 5-7 Insertion of the Irrigation Tube

- (1) Close the tube clamp, between the irrigation tube needle and the irrigation pump, as shown in Fig.14
- (2) Insert the irrigation tube needle into the bottle cap. (Fig.15)
- (3) Open the tube cap to supply air into the bottle. (Fig.16)
- (4) Open the tube clamp.

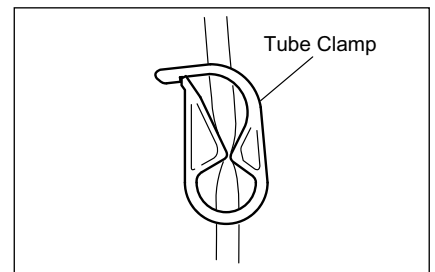


Fig.14

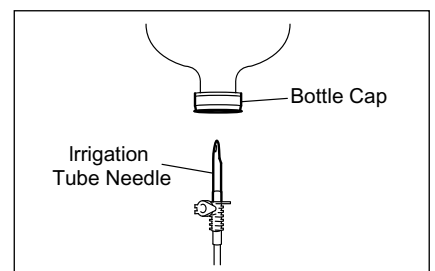


Fig.15



### CAUTION

Do not operate the irrigation pump if the tube is bent or the tube clamp is in the closed position. This could cause the tube to burst or slip out of the bottle.

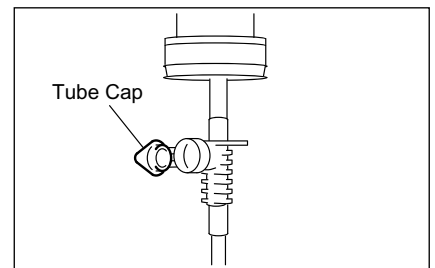


Fig.16

## 5-8 Mounting the Irrigation Nozzle

### ◆ Compatibility Check of Internal Irrigation Nozzle

Internal irrigation nozzles accompanied with Surgic XT is not necessarily fitted into all the drills on the market. Follow the instructions given below for confirmation prior to use.

Failure to do so or to fit the internal irrigation nozzle into drills may cause a leakage of saline solution, which will result in problems such as rust, sudden stop of an equipment during use.

#### Instructions:

- ① Attach a bottle of saline solution to Surgic XT to operate the pump.
- ② Set the internal irrigation nozzle fitted into a drill to the tip of the tube.
- ③ Insert the internal irrigation nozzle into the drill from the back.
- ④ Pour water at maximum for 5 seconds.

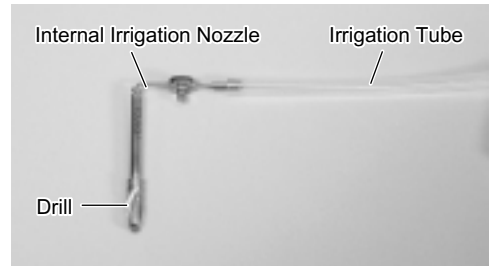


Fig.17

#### Points to be checked :

##### ◇ Cleanliness of the saline solution coming out from the tip

If there is rust inside of the drill, the colored solution may come out. Replace it with new one in such cases.

##### ◇ Water flow

There is a possibility of clogging with bone dust at the outlet, if the flow is low and/or the flow from the drill is not symmetrical. Clean it or replace it with new one in such cases.

##### ◇ No water leakage between Internal Irrigation Nozzle and drill

The broken seal or no seal in the drill may cause water leakage from the entry point for nozzle. Saline solution ingress into handpiece will be a cause of malfunction. Make sure of no water leakage, even if it's a new drill.



### CAUTION

**If malfunction such as a leakage of saline solution from the back of contra head is detected during use, halt the use and perform some troubleshooting.**

It is possible to connect water to the external irrigation nozzle (Fig.18) and the internal irrigation nozzle (Fig.19) simultaneously. Simply connect the Y-Connector (Fig.20) onto the main water supply tube at the rear of the handpiece then connect the 2 water supply tubes.

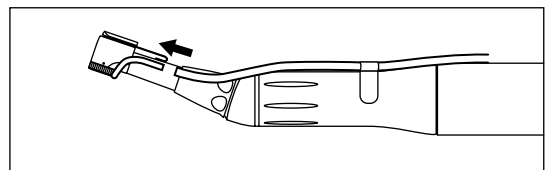


Fig.18

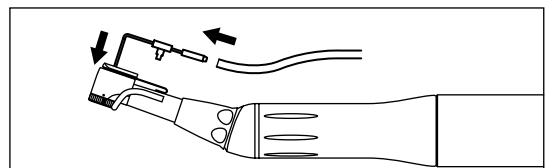


Fig.19

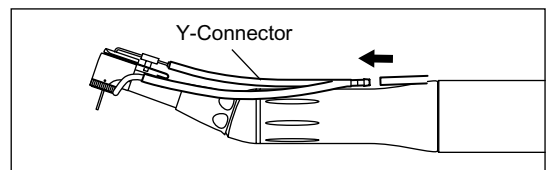


Fig.20

## 5-9 Attaching the Tube Holder

Use the tube holder to combine together the motor cord and the irrigation tube. It is easier to insert motor cord first and, next, the irrigation tube.

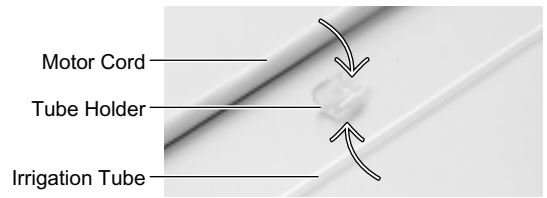




Fig.21


## 6 Operation

### 6-1 Programming the Micromotor Operation


The control unit can memorize 10 sets of programs. Each program includes the following functions which will be automatically performed when the appropriate program number is selected.

- ◇ Gear ratio of contra angle handpieces
- ◇ Speed
- ◇ Direction of rotation
- ◇ Torque upper limit
- ◇ Coolant solution flow
- ◇ Display Selection on LCD display


- (1) Turn on the power by pushing the main switch toward [-]. Whenever the main power switch is turned ON, program number 1 is always displayed.
- (2) Select a program number by using either step (a) or step (b):
  - (a) Press the [Program]  key on the unit control panel until the program number you require is displayed OR
  - (b) Press the [Program] button on the foot control until the program number you require is displayed.
- (3) Selecting the gear ratio of the handpiece relevant to the program. Press the [Gear Ratio]  key the gear ratio of the handpiece to be used is displayed.
- (4) Setting the speed.
 



Set the speed by pressing the [Speed]  key.

  - Each time this key is pressed the display changes to the next speed level. By pressing this key for more than 1 second brings the speed quickly to the next level until the speed display reaches its upper or lower limit.
  - When the speed setting reaches the upper or the lower limit, an audible beep is heard and the speed setting cannot be changed any further.
- (5) Setting the torque upper limit.
 

Set the torque upper limit by pressing the [Torque]  key on the unit control panel.

  - Each time this key is pressed the display changes to the next torque level. By pressing this key for more than 1 second brings the torque quickly to the next level until the torque display reaches its upper or lower limit.
  - When the torque setting reaches the upper or the lower limit, an audible beep is heard and the torque cannot be changed any further.
- (6) Select the rate of coolant solution flow volume.
 

Select the rate of the coolant solution flow volume by pressing the [Coolant Flow]  key.

  - The rate of coolant solution flow volume has 5 flow rate steps plus "no coolant flow".
- (7) Select either rotation speed or torque to be shown on the LCD display by choosing the [Speed]  key or the [Torque]  keys.

Power Switch Symbol Mark	○	
Function	OFF	ON

(8) Memorize settings.

After completing steps 1-6 press the [Memory] **M** key for more than 1 second until a long audible beep is heard. The long beep confirms that the programming is completed. If you hear a short audible beep when the [Memory] **M** key is first pressed please ignore this signal and keep the [Memory] **M** key depressed until a long beep is heard.

Repeat the above steps 1-7 to program any one of the 10 available programs.

## 6-2 Calibration of the Handpiece to be used

The resistance of a handpiece attachment against the rotation of the micromotor varies slightly depending on the handpiece model, its age and condition, the degree of wear on the handpiece gears, and so on. The Surgic XT unit incorporates an automatic function to recognize the level of the resistance of any handpiece attached to the micromotor, and to calibrate the micromotor to rotate the handpiece attachment to the specific speed and torque settings required.

- (1) Attach the handpiece to the micromotor and remove the bur.
- (2) Press the [System] **S** key for approx. 3 seconds until a long beep is heard. "CAL" is displayed.
- (3) Press the [Gear Ratio] **G** key and select the gear ratio of the attached handpiece.



### CAUTION

- **This equipment is optimized to obtain the highest accuracy at a gear ratio of 1/20. When using another gear ratio, please note that the accuracy decreases with an increase in the ratio relative to 1/20.**
- **Micro saw handpiece should not be calibrated, it may cause a malfunction.**
- **This product also has a calibration function of Rotation Speed. When using a straight handpiece, calibrate rotation speed, because failure to do so may prevent Bar Graph from displaying the maximum even if the motor reaches the maximum speed.**
- **Calibration should be performed only on NSK handpieces, it's not applied to the others.**

- (4) Press the [System] **S** key again. After a moment the micromotor will automatically start to run. After a short series of resistance diagnosis is completed, the display returns to normal display and the micromotor will automatically stop. Calibration of the handpiece is now completed.



### CAUTION

- **Because the handpiece AUTOMATICALLY starts to run, any bur must be removed from the handpiece before beginning the calibration process. Leaving a bur in the handpiece may cause harm to the operator. Care should be exercised not to ever add any load to a handpiece during calibration, because an incorrect diagnosis would result in incorrect torque control.**
- **If "FAIL" is displayed on the liquid crystal panel, check the mounting of each part and operate again. If "FAIL" is still displayed, contact your dealer.**

## 6-3 Standard Operation

All standard operational functions can be controlled at the foot control.

- (1) Turn on the main switch.  
The Control Unit is ready to perform the program memorized in program number 1.
- (2) Select the desired program number.  
Step on the foot control PRG (Program) button and the program display ascends to the next program number. Select the desired program number as displayed on the control unit. The program numbers ascend to 10 and then continue on to program 1. Pressing the PRG (Program) Button for one second more could get back to one program before the selected program.
- (3) Verify the details of the program  
Verify the details of the program on the display.  
The largest numerals displayed exhibit the speed setting.
- (4) Operating the micromotor.  
Step on the speed control pedal in the middle of the foot control and the micromotor will start to run. When the coolant solution flow is programmed to operate the pump will also automatically run. Speed increases as the pedal is depressed. When the pedal is fully depressed the speed reaches the maximum set value.
- (5) Activation of the torque limiter.  
During operation of the micromotor, when the drilling load reaches the programmed torque upper limit the integrated torque limiter automatically activates to prevent torque application excessive to the set requirement. When the torque limiter activates, the motor stops over beeping after 5 seconds. To reactivate the micromotor, after repressing the foot control pedal to release the halt condition, push the pedal again.
- (6) Stopping the micromotor  
Release the foot control pedal, and the micromotor will automatically stop.
- (7) Reversing the micromotor rotational direction  
To reverse direction of the micromotor (and bur) simply step on the foot control Forward / Reverse button. A warning beep can be heard when the rotational direction is in reverse mode.

## 7 Care and Maintenance

### 7-1 Protection Circuit

An electronic circuit breaker automatically functions to protect the micromotor and the control unit if the micromotor is ever overloaded. Power supply to the micromotor will automatically be terminated and the Error code will be displayed on the control unit.

#### ◆ Resetting the Protection Circuit.

To reset the protection circuit, release and then depress the speed control pedal.

## 7-2 Error Code

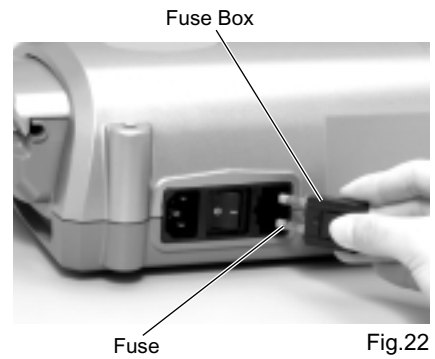
If an operational problem occurs the display shows the error code to allow an immediate problem diagnosis.

Error Code Display	Cause of Error	Cause of Error	Remedy
E 0	System Error	Erroneous memory. Memory failure.	Request repair.
E 1	Excessive Current Detected	Extended use under heavy load. Short circuit in the power cord. Short circuit in the motor cord.	Electrical contact may be insufficient. Securely re-connect the motor cord.
E 2	Excessive Voltage Detected	Main power cord failure.	
E 3	Motor Sensor Error	Micromotor sensor failure (Hall IC). Micromotor cord failure. Signal line failure.	When an error cannot be eliminated, request repair.
		Ingress of water into a motor.	Please request repair. Make sure to put a Autoclave Plug when autoclaving it.
E 4	Unit Interior Over-heating Error	Overheating by extended use under heavy load. Operation of the unit under an extremely high temperature.	Allow it to cool down before use. In order that heat is sufficiently radiated, periphery of the main unit should be well-ventilated wherever possible. When an error cannot be eliminated, request repair.
E 5	Braking Error	Abnormal voltage generated in the start / stop switch circuit. Failure in the start / stop switch circuit.	When rotation and stop are repeated in short frequencies, a circuit may be activated which limits acceleration at start. Wait a few seconds and then use. When an error cannot be eliminated, request repair.
E 6	Motor Rotation Failure Error	Handpiece attachment failure. Micromotor failure.	The chuck may be opened, or may not be sufficiently closed. Securely close the chuck. When an error cannot be eliminated, request repair.
		When the motor stops for more than 5 seconds after reaching the torque upper limit.	This is not a failure. It stops for safety reasons. When the error is reset, this can be used as it is.
E7	Pump excess voltage	<ul style="list-style-type: none"> <li>The irrigation tube is hung to the pump roller.</li> <li>The pump fails.</li> </ul>	<ul style="list-style-type: none"> <li>Check the irrigation tube.</li> <li>An error code is displayed even when the irrigation tube is normal, please request repair.</li> </ul>
E8	Pump excess current		
E9	Foot control abnormality	Connection failure of the connector.	Check the connection state of the connector.
		Failure of the inside of the foot control.	The error code is displayed even when the connector is normally connected, please request repair.

### 7-3 Replacement of the Fuse

If the control unit does not function, check the fuses. To access the fuse box simply squeeze the fuse box lock located on the side of the control unit (Fig.22). If the lock is too tight use a pointed tool to squeeze the lock.

120V	T3.15AL	250V
230V	T1.6AL	250V



### 7-4 Maintenance of the Control Unit and Foot Control

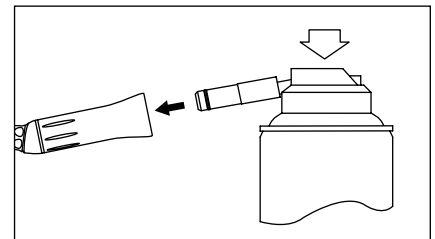
If blood or saline solution is stained on the control unit or foot control, remove the power code, wipe off the unit or foot control with a damp cloth, and wipe off with the alcohol-absorbed cloth.

### 7-5 Maintenance of the Handpiece Attachment

After each operation, immerse the head of the handpiece in clean, warm water and repeat run-stop of the motor four or five times to rinse out blood or saline solution from the handpiece head. If the handpiece exterior is heavily stained, wash off with water, and dry with a soft cloth. Do not immerse the entire handpiece in water and prevent water from entering from back end of the handpiece.

#### [ Using a Spray Lubricant ]

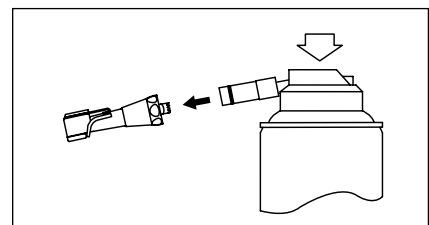
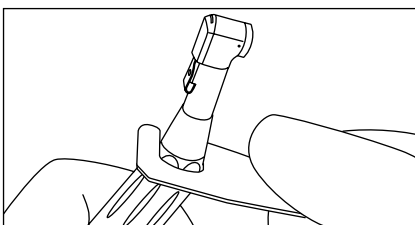
As shown in Fig.23, insert the spray lubricant can surgical head spray nozzle into the back of the handpiece. Spray the lubricant into the handpiece 2-3 times for 2-3 seconds each time.



#### **CAUTION**

- Hold the handpiece and the spray can securely or the handpiece may eject from your hand due to the high pressure of the spray.
- Shake the spray can a few times to mix well the lubricant and the propellant.
- Hold the spray can upright for spraying.

If the handpiece head is excessively stained with blood or debris then remove the head by unscrewing the nut with the supplied wrench (Fig.24). Attach the surgical head spray nozzle onto the spray lubricant can and spray directly into the head to wash away blood and debris. (Fig.25)





If the coolant nozzle is clogged use the nozzle cleaning fine wire supplied. Push it into the nozzle to unclog it. (Fig.26)

When debris or dirt accumulates around the coolant nozzle use the cleaning brush supplied. (Fig.27)

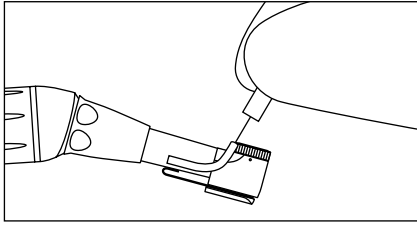


Fig.26

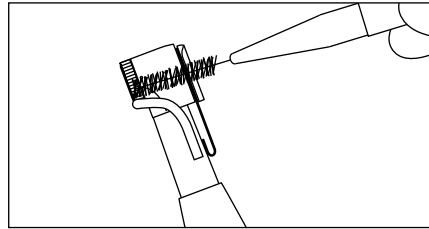


Fig.27

## 8 Sterilization

Autoclave sterilization is recommended.

Autoclave sterilization required after each patient as noted below.

The following items are autoclavable.

- Implant Handpiece (SGM-ER20i, Opt)
- Micromotor with Motor Cord
- Micromotor Cradle
- Internal Irrigation Nozzle
- Irrigation Tube Clamp
- Tube Holder
- Autoclave Plug



### CAUTION

**Do not autoclave any parts (the control unit, foot control, AC electrical cord, irrigation tube, Y-connector, and fuse) other than those that can be subjected to autoclave sterilization.**



\* SGM-ER20i handpiece can be washed via Thermo Disinfector.

## [ Autoclaving ]

- ① Remove blood and debris from the handpiece.
- ② Clean inside the handpiece, by using the spray lubricant (refer to "7. Care and Maintenance").  
Do not attempt to spray lubricant into the micromotor.  
Attach the micromotor autoclave plug to the micromotor. (Fig. 28 & 29)
- ③ Place the handpiece in an autoclave pouch (not included in the package) and seal it.
- ④ Autoclavable up to a max. 135°C.  
ex.) Autoclave for 20 min. at 121°C, or 15 min. at 132°C.

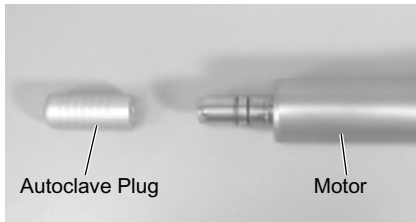


Fig.28

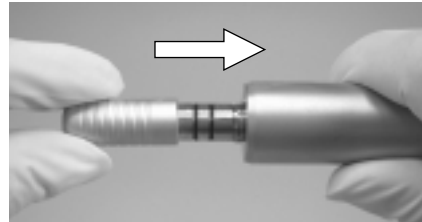


Fig.29



### Caution for Autoclaving

- **Clean and lubricate the handpiece before autoclaving. Autoclaving a handpiece stained with blood or debris could cause damage to the handpiece.**
- **Do not lubricate the micromotor.**
- **Do not disconnect the motor cord from the motor.**
- **Do not use the autoclave drying cycle if the temperature at this cycle could exceed 135°C.**
- **Always place the handpiece, motor, the others to be sterilized in the center or upper shelf of the chamber, as the local temperature at the bottom of chamber could rise beyond the set value.**
- **The irrigation tube is a single use disposable type and cannot be autoclaved.**

## 9 Optional Accessories

Part No.	Description	Remarks
C823-752	Y-Connector	Used for branching the internal and external coolant irrigation. (See Fig.20 for installation)
Z900-113	Irrigation Tube	For replacement tube use.
C293-025	Internal Irrigation Nozzle	Supplied as standard accessory items.
C202-750	Irrigation Tube Clamp	Supplied as standard accessory items.
U370-246	Tube Holder	Supplied as standard accessory items.
Z182-100	PANA SPRAY	For High & Low speed handpieces.

## NSK Surgical Handpieces

Part No.	Model No.	Description	Bur Speed	
			Min.	Max.
C293	SGM-I	Mini latch head	–	–
Y200-830	SGM-E16RI	16:1 reduction E-type sheath with mini latch head	12.5	2,500
Y200-890	SGM-E20RI	20:1 reduction E-type sheath with mini latch head	10	2,000
Y110-127	SGM-ER20i	20:1 reduction E-type sheath with mini latch head	10	2,000
Y200-880	SGM-E32RI	32:1 reduction E-type sheath with mini latch head	6.25	1,250
Y200-840	SGM-E64RI	64:1 reduction E-type sheath with mini latch head	3.125	625
Y200-850	SGM-E256RI	256:1 reduction E-type sheath with mini latch head	1.56	156
C833	SGP-I	Push Type Head	–	–
C496	Ti-SG20	Ti-Max Non-Optic Implant Contra Angle Handpiece	10	2,000
C487	Ti95EX	EX E-Type Contra Angle Handpiece Ti-Max 1:5 Increasing	1,000	200,000
H084	SGS-E	Micro Surgery Straight Handpiece 1:1 Direct Drive	200	40,000
H185	SGS-E2G	Micro Surgery Straight Handpiece 1:2 Increasing	400	80,000
H083	SGA-E	Micro Surgery 20° Angle Handpiece 1:1 Direct Drive	200	40,000
H184	SGA-E2G	Micro Surgery 20° Angle Handpiece 1:2 Increasing	400	80,000
H173	SGR-E	Micro Saw Hanpiece Reciprocating	–	30,000
H174	SGO-E	Micro Saw Hanpiece Oscillating	–	15,000
H175	SGT-E	Micro Saw Hanpiece Sagittal	–	20,000

## 10 Specifications

### 10-1 Control Unit

Type	NE111
Power Supply Voltage	AC120 / 230V
Frequency	50/60Hz
Power Consumption	48VA
Max. Pump Output	75mL / min. (.02 gal/min.)
Dimensions	W268 x D230 x H103mm
Weight	3.1kg

### 10-2 Micromotor

Speed Range	200 - 40,000min <sup>-1</sup> (rpm)
Input Voltage	DC30V
Dimensions	ø 24 x L120mm
Weight	133g (Without the motor cord)

## 11 Disposing Product

Please consult with dealer from whom you purchased it about waste disposal.

## 12 Warranty

Manufacturer warrants its products to the original purchaser against defects in material and workmanship under normal practices of installation, use and servicing. Irrigation tube etc. are expendable components, and are not covered by this warranty.

Specifications may be changed without notice.

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