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Specifications are subject to change without notice.

'09.03.01 

OPERATION MANUAL

**NSK**

  0197

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

Surgical Handpiece

**Ti-Max X**

*Ti-Max X-SG20L*  
*Ti-Max X-SG25L*  
*Ti-Max X-SG93L*  
*Ti-Max X-SG93*

**S-Max**

**S-Max SG20**

**MADE IN JAPAN**

OM-C0425E



Powerful Partners®

**CAUTION for X-SG20L,SG20**

This handpiece is used only for the Surgical Unit with Torque Calibration System such as NSK Surgic XT Plus. Using this product with other surgical units may break the handpiece or bone.

**Intended to Use**

The handpiece is designed only for surgical use by qualified personnel.

**CAUTION**

\* Only X-SG20L/SG20 can use drill

· When operating the handpiece always consider the safety of the patient.

## CAUTION

- Check for vibration, noise and overheating outside the patient's oral cavity before use. If any abnormalities are found, stop using the handpiece immediately and contact your authorized dealer.
- Galling of bearing and gear or entering abnormal materials into head may cause a burn injury.
- Do not allow any impact on to the handpiece. Do not drop the handpiece.
- Do not attempt to disassemble the handpiece or tamper with the mechanism.
- Make sure you have an additional handpiece ready in case of unexpected malfunction during operation.
- Sterilization in an autoclave is recommended before initial use and thereafter prior to every use.
- Do not connector disconnect the bur/drill or handpiece until the motor or has completely stopped.
- Do not use recommended burIf you use that bur/drill, it may bent or fly away during rotation and do not exceed the drive motor speed recommended the bur manufacturers.
- Do not use bent, damaged or sub-standard burs/drills. And do not exceed the drive motor speed recommended the bur/drill manufacturers. This may cause shank bend or brake even within the recommended speed.
- Always keep the bur/drill shank clean. Debris in the chuck mechanism can prevent burs from seating properly and cause them to fly out during use.

- Do not operate the handpiece without the bur/drill.
- Do not push the push-bottom during operation. If it pressed, it may
  - OVERHEATING of the handpiece head. Special caution must be exercised during use to keep cheek tissue *AWAY* from the push-button of the handpiece. Contact with cheek tissue may cause the push-button to depress and injury to the patient may occur.
  - Result of malfunction.
- Always operate with water spray. Failure to do so may result in overheating.
- During cut the teeth, wear eye protection and dust protective mask for your health.
- Do not use excess pressure on the treatment area.
- After each use, be sure to clean, lubricate and sterilize the handpiece. If blood is left on the handpiece, it can clot causing rust. Neglect lubrication may cause OVERHEATING.
- Do not wipe nor immerse the handpiece or tips in acidic water or acidic solutions.
- Perform periodical maintenance checks.
- If the handpiece has not been used for a long period, check for noise, vibration, and overheating before use.

**⚠ CAUTION for X-SG93L/X-SG93**

- Do not use the motor which runs at up to 400,000min<sup>-1</sup>.
- Do not use long surgical burs. Do not use burs longer than 26mm. The shanks of longer burs may warp under.
- Always use irrigation water during the operation. Head may overheat because of the high speed rotation.
- Even if it do Irrigation and use handpiece, bearing is worn and it may overheat or noise. Ask repair for your dealer.

**1. Connecting / Disconnecting the Handpiece**

(1) Connecting

Push the handpiece on to the motor taking care to keep it in alignment. Twist the handpiece until it locks into position with a clicking sound. (X-SG20L/SG20, X-SG25L, X-SG93L/X-SG93)

(2) Disconnecting

To disconnect, hold the motor and the handpiece, and pull out it straight.

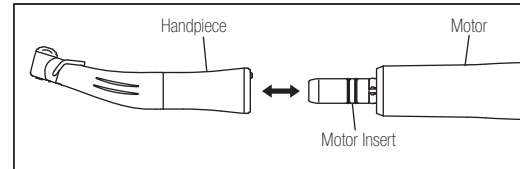


Fig. 1

**⚠ CAUTION**

- Do not connect or disconnect handpiece until the drive motor has completely stopped.
- Connect only the motor which has max rotation speed is less than 40,000min<sup>-1</sup> with E type joint (ISO3964)
- Connect only NSK's Motor or motor that it have stopper pin.
- This product's joint followed ISO3964 standards.

## 2. Mounting and Removing Bur / Drill

*\* Only X-SG20L/SG20 can use drill*

### (1) Mounting

X-SG20L/X-SG20,X-SG25L

- 1) Insert the bur/drill into the head.
- 2) Lightly turn the bur/drill until it engages with the latch mechanism. (Fig. 2)
- 3) Push bur/drill inward to click then it locks. (Fig. 3)

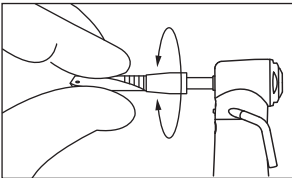


Fig. 2

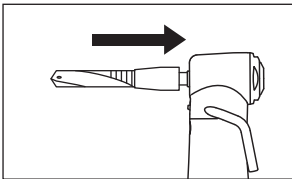


Fig. 3

X-SG93L/X-SG93

- 1) Align bur and guide area of the handpiece.
- 2) Depress push button to open chuck. Insert the bur into the chuck.
- 3) Gently turn the bur until it engages with the mechanism. (Fig. 4)
- 4) Push bur inwards to click into place.

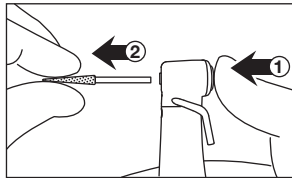


Fig. 4

### CAUTION

- After the bur/drill is locked in place, lightly pull out the bur/drill to make sure the bur/drill is locked. (Fig. 4)
- If the bur/drill does not install firmly. It may fly away or it does not remove.

- (2) Removing  
Push the push button with a thumb, and the bur/drill is removed. (Fig. 5)

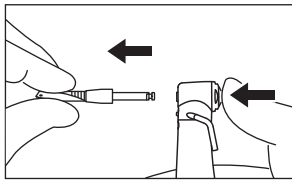


Fig. 5

**CAUTION**

- Depress the head cap button until it is almost parallel to the head cap.
- If removing the bur becomes difficult, depress the Push-button, grip the bur with fine pliers and gently remove the bur. This case may be prevented if you often change the position of the bur in the chuck.

### 3. Spray Nozzle

X-SG20L/SG20 has 3 irrigation methods are available; External, Internal or both of them, depending on tool and operation procedure. For X-SG25L, X-SG93L/X-SG93, it can connect the Irrigation Tube to the External Spray Nozzle firmly.

- (1) External Spray Nozzle  
Connect the Irrigation Tube to the External Spray Nozzle firmly. (Fig.6)

- (2) Internal Spray Nozzle (Fig.7)  
Only a drill with internal irrigation is used.  
1) Set the nozzle holder.  
2) Insert Irrigation Tube in Internal Spray nozzle.  
3) Put the Internal Spray Nozzle into the head firmly.  
4) Put the Internal Spray Nozzle into the slot on the Nozzle Holder.

\*Internal Spray Nozzle: 10000324

Nozzle Holder: X-SG20L: 20000396 / SG20:20000357

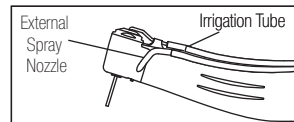


Fig. 6

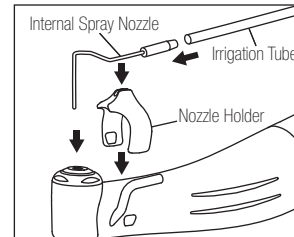


Fig. 7

- (3) External and Internal Irrigation together  
Only a drill with internal irrigation is used.

- 1) Connect the ends of the Y-Connector to the External Spray Nozzle and Internal Spray Nozzles refer as detailed in procedures (1) and (2).
- 2) Connect the Irrigation Tube to the Y-Connector firmly.(Fig.8)

\*Y-Connector: Order No. 20000503

## 4. Maintenance

- (1) Cleansing  
Handpiece

X-SG20L/X-SG20

- 1) Remove bur/drill form the handpiece.
- 2) Remove any debris in and around the outlet holes with the brush.
- 3) Half fill a cup with clean water. Operate the handpiece about 15seconds. And immerse 20mm of the handpiece head in the water
- 4) Lubricate before autoclaving.((2)Refer Lubrication)

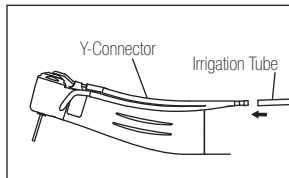


Fig. 8

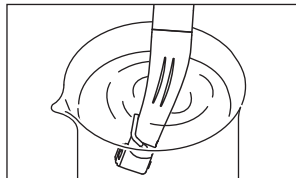


Fig. 9

### CAUTION

When handpiece clean dirt of external surface, be careful the water does not enter into inside of rear of the handpiece.

X-SG25L, X-SG93L/X-SG93

- 1) Remove any debris in and around the outlet holes under the running water.
- 2) Lubricate before autoclaving(Refer ((2)Lubrication)

### CAUTION

- Use only clean water to maintain the Clean Head System and change water each patient.
- When debris has been removed, ensure the water does not enter the indie of the handpiece by handpiece rear side. It may cause a malfunction.

## Spray Nozzle Cleaning

- 1) Clean Internal Spray Nozzle and External Spray Nozzle (internal and external) by using Cleaning Wire.(Fig. 10,11)
- 2) Insert a Irrigation tube in each Spray Nozzle, and wash it away with clean water.(Refer to 3. (1)(2))

\* Cleaning Wire: 20000512

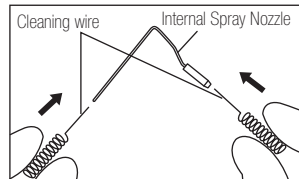


Fig. 10

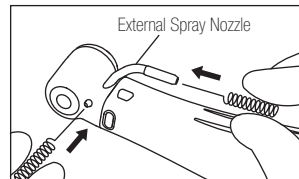


Fig. 11

## (2) Lubrication

- 1) Use PANA SPRAY Plus with an E-type spray nozzle.
- 2) Always lubricate handpiece WITHOUT bur.
- 3) Shake can well to mix lubricant and propellant.
- 4) Insert the spray nozzle into the handpiece. Place a tissue over the head end of the handpiece, hold firmly and spray for 2-3 seconds. Check the tissue, if it is clean the handpiece can be autoclaved, if not spray again until clean. For optimum lubrication use NSK Care 3 Plus.

\*E Type Spray Nozzle : Product number 109-09

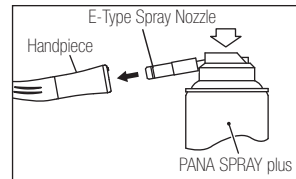


Fig. 12

## ⚠ CAUTION

- Hold handpiece firmly as you are lubricating under pressure.
- Repeat lubrication until handpiece is clean and free of debris. If blood is left on the handpiece, it can clot causing rust. This may cause failures those are shortage of rotation or torque.
- Always hold the PANA SPRAY Plus can upright.
- When lubricate except PANA SPRAY plus, it may cause OVERHEATING.



### (3) Stabilization

Autoclave sterilization is recommended.

Sterilization is required first time you use and after each patient as noted below.



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



This handpiece can be autoclavable up to Max.135°C.

- 1) The dirt of the handpiece surface is discarded with a brush (metal is improper). Clean handpiece using water or Isopropyl alcohol.
- 2) Lubricate the handpiece. (Refer to (2) Lubrication)
- 3) Insert into an autoclave pouch. Seal the pouch (Only if using a vacuum autoclave)
- 4) Autoclavable up to max.135°  
ex.) Autoclave for 20 min. at 121°C, or 15 min. at 132°C.
- 5) Keep the handpiece in the autoclave pouch to keep clean before use.



### CAUTION

- Do not wash, soak, or wipe off the handpiece with/in the oxidation potential solution (strong acid, super acid solution) or sterilized solution.
- Do not Autoclave the equipment which with residual chemical. It may cause a peel off the plating or exert a harmful influence to internal parts.
- Store it in a place where the handpiece is not subject to air with dust, sulfur or salinity.
- Do not touch the handpiece just after the autoclave. It is extremely hot.

## 5. Cleaning the Glass Rod Optic(X-SG20L, X-SG25L, X-SG93)

Clean the Glass Rod Optic with cotton swab soaked in alcohol. (Fig.12)

### CAUTION

Do not use a pointed tool or sharp edged to clean the Glass Rod Optic. They may damage the mirror finish and reduce the light transmission efficiency. If Glass Rod Optic end has become damaged, return it to dealer for repair.

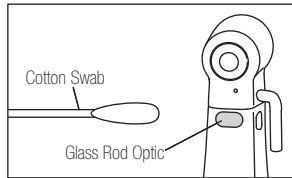


Fig. 12

## 6. Repair Service

For genuine NSK service and parts always return the handpiece to your NSK dealer.