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

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Specifications are subject to change without notice.

2014.08.20 005 

OPERATION MANUAL

NSK

 0197

Air Scaler

Ti-Max S970

Ti-Max S970

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

MADE IN JAPAN

OM-T0377E 001



Powerful Partners®

Intended to Use

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

WARNING

- Do not exceed the recommended air pressure at the back end of the scaler. Excessive air pressure might cause the scaler tip to accidentally break while in use.
- The oscillation of the tip could exceed 200µm amplitude at the recommended air pressure. Caution is requested not to harm the patient.
- Do not use a tip on which rust is found. It may break while in use at where rust grew.

CAUTION

- Prior to each use, all instruments and accessories must be inspected for proper operation.
- Do not exceed the recommended air pressure to the scaler.
- This handpiece is the structure which lets escape exhaust from coupling side.
- Should the handpiece function abnormally, cease operation immediately and return the handpiece to dealer for repair.
- Do not attempt to disassemble the handpiece or tamper with the mechanism except NSK recommends on this Operation Manual.
- Do not allow any impact on to the handpiece. Do not drop the handpiece.
- 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 dealer.
- Do not connect or disconnect the handpiece/tip until the drive motor has completely stopped.
- Make sure that do not wound the tip to finger and hand.
- Operators and all others in the area must wear eye protection when operating this handpiece.

- Do not wipe nor immerse the handpiece or tips in acidic water or acidic solutions.
- Refer to Operation Manual of coupling.
- Perform periodical maintenance checks.
- If the handpiece has not been used for a long period, check for noise, vibration, and overheating before use.

1. Specification

Model	S970L/S970KL/S970SL	S970
Supply Air Pressure	0.3MPa (3.1kgf/cm ²)	
Max. Air Consumption (0.3MPa)	35±5NL/min	
Water Consumption	20mL/min	
Vibration (Air Pressure Adjuster Ring Level 3)	5,800 - 6,200Hz	
Supply Water Pressure	0.05MPa (0.5kgf/cm ²) - 0.20MPa (2.0kgf/cm ²)	
Optic	Glass Rod	Non-Optic
Use Environment	Temperature: 10 -40°C, Humidity: 30 - 75%RH, Atmospheric Pressure: 700 - 1,060hPa	
Storage and Transportation Environment	Temperature: -10 -50°C, Humidity: 10 - 85%RH, Atmospheric Pressure: 500 - 1,060hPa	

S970L/S970 For NSK Phatelus/Mach Coupling
 S970KL For KaVo® MULTiflex® LUX Coupling
 S970SL For Sirona® Quick Coupling

KaVo® and MULTiflex® are registered trademarks of Kaltenbach & Voigt GmbH & Co., Germany.
 Sirona® is a registered trademark of Sirona Dental Systems GmbH, Germany.

2. Preparation for use

2-1 Connecting/Removing the handpiece

2-1-1 Connecting

Refer to Operation Manual of the coupling.

S970L/S970

Insert the handpiece into Coupling until it clicks. (Fig. 1)

CAUTION

- Before use always check that the Coupling and Hose/Handpiece and Coupling are correctly seated and locked in place.
- If the instrument is activated without the handpiece completely seated, the handpiece may fly out.

2-1-2 Disconnecting

Refer to Operation Manual of the coupling.

S970L/S970

Pull back the Connector Ring and remove the handpiece from the Coupling. (Fig. 1)

CAUTION

Do not operate Connector Ring during the supplying the air pressure. Handpiece may jump out from the coupling because of the pressure. (S970L/S970)

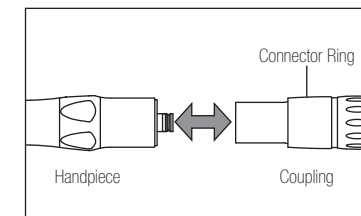


Fig. 1

2-2 Setting the Air Pressure

Set the Air pressure at the arrowed point on Fig. 2. The setting values are on the specification table. Do not exceed the recommended air pressure.

Set the Multi Gauge between turbine and hose, and set and measure the air pressure.

Multi Gauge for Midwest 4 hole: Order Code Z109400

WARNING

Do not exceed the recommended air pressure to the scaler. Higher air pressure may cause higher tip oscillation, which could damage the tooth surface and may cause pain to the patient. It also may shorten the tip life and premature failure or breakage of the tip. Excessive air pressure may cause the short life of tip or scaler tip to fracture during use.

CAUTION

- Ensure clean, dry air supply. Moisture and debris in air supply may cause the malfunction.
- It should be noted that the air scaler supply air pressure reads approximately 0.05 MPa (0.5 kgf/cm²) higher than the air turbine handpiece.
- When a KaVo® MULTIflex® (Non-optic) is used with S970KL, the scaler cannot transmit light.

2-3 Power Output

Air Pressure adjustment Ring can adjust the tip power level. (Fig. 3)

WARNING

Do not exceed Power Level below. If it exceeds the level, tip may brake or tooth surface may injure.

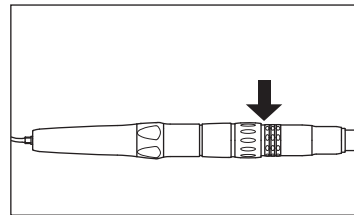


Fig. 2

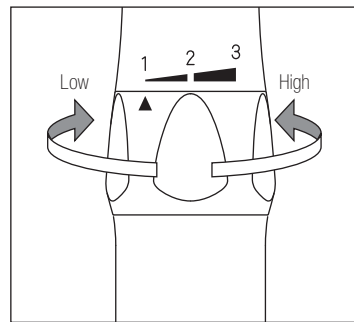


Fig. 3

Purpose	Tip	Power Level		
		1	2	3
SCALING	S1, S2, S3	←————→		
PERIO	S10, S20, S21R, S21L	←————→		
ENDODONTICS	S75+V Tip (V-U15-35, V-S50-53, V-S50D-53D)	←————→		
	S75+V Tip (V-N50, 51)	←————→		
Restorative	S75+V Tip (V-G70, 71, 72, 75, 76, G77-79)	←————→		

*Set the Power Level according to the condition of the oral cavity or the case.

3. Scaler Tips

Three types of scaler tips as shown in Fig. 4 are provided as accessory items. Typical applications are explained below:

S1 Universal Type (Order Code: Z252411) Curved surfaces, exposed anterior root surfaces, posterior teeth with excessive lingual tipping, etc.

S2 Sickle Type (Order Code: Z252413) Mandibular anterior teeth, lingual surfaces, hard thick-walled calculus firmly adhered to a tooth.

S3 Perio Type (Order Code: Z252412) Subgingival and supragingival calculus, tar-like deposit, etc.

Remove tips after use, and dry them, especially irrigant port and thread by air syringe.

CAUTION

Poor drying could cause the tips to rust, which may result in premature failure and injury.

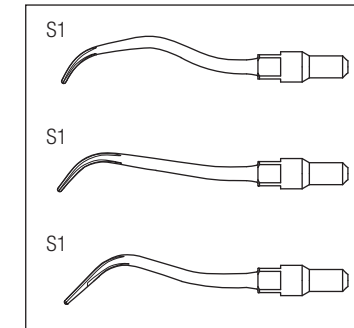


Fig. 4

4. Check before treatment

Follow the check below, before use. If any abnormalities are found, stop using the handpiece immediately and contact the authorized NSK dealer.

- 1) Insert the tip.
- 2) Check for vibration, noise and overheating outside the patient's oral cavity before use. If any abnormalities are found, stop using the Product immediately and contact dealer to repair.
- 3) If there are no immediate apparent abnormalities, continue to rotate the handpiece for about 1 minute. Then check that there is no abnormal heating on the outer surface.
- 4) Operate it if there are not abnormalities above.

5. Changing Tips

- 1) Screw in the Tip until it stops lightly.
 - 2) Insert the Tip in the provided wrench hole and align the shapes of hole and Tip. Turn the wrench firmly until two or three clicks are heard.(Fig. 5)
Do not touch the top part of Tip to avoid an injury (There is the case that is longer than height of Tip Wrench)
- To remove the Tip, mount the wrench over the Tip and turn it in the direction. (Fig. 5)

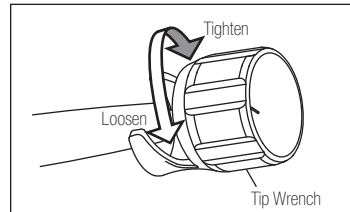


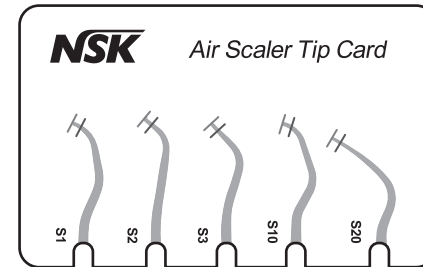
Fig. 5

CAUTION

- Always use the Tip Wrench to securely tighten the Tip. Loose Tip may come off during use and cause injury.
- Do not use such Tips as shown below. Tips are expendable items.
 - Tips with worn and dull edges.
 - Corroded or rusted.
 - Deformed, caused by impact of fall.
- Do not grind or polish for reuse.
- Watch out the sharp point.
- Tip Wrench and tip can sterilize together.
- Tip Wrench is consumable supply. Replace it annually. * Tip Wrench: CR-20 Order Code Z1090001

6. How to use the Tip Card

- 1) Place the neck of the Tip in the cut out.
- 2) Check wear of the Tip.
- 3) See the green and red line to check wear of the Tip.
*See below what each color means. At NSK we recommend to replace a Tip when the Tip meets the red line to guarantee safe and effective use.



Green:Tip is OK
Tip replacement is not necessary.



Red:Tip is badly worn
Tip replacement is necessary.

CAUTION

Tips are consumables. The efficiency of dental scaling decreases. In addition, the vibration condition changes owing to the wear, which may damage a patient's tooth surface. Check the Tip wear condition with the Tip Card periodically, and replace the Tip with a new one in good time.

7. Tip Cover (L)

In order to protect the Tip which is mounted in the handpiece, NSK recommends the use of Tip Cover (L).

7-1 Mounting

Hold Tip Cover (L) as shown and insert the Tip all the way to the tip-handpiece joint.

7-2 Removing

Hold Tip Cover (L) and the handpiece as shown, and carefully remove the Tip.

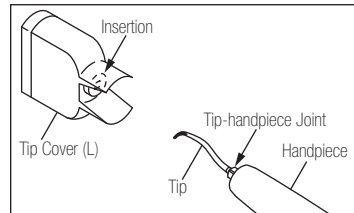


Fig. 6

CAUTION

Do not use Tip Cover (L) as a tip change tool.

* Tip Cover (L) : Order Code Z217850

8. Tip Holder (OPTION)

For a Tip removed from the handpiece, use the Tip Holder.

The Tip Holder is Autoclavable and hold up to 5 tips at once. To Autoclave, tilt the tips in the direction of the arrow in Fig.7.

* Tip Holder for Air Scaler : Order Code Z252A080

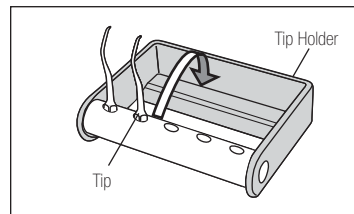


Fig. 7

9. Maintenance after the treatment

Maintenance is required after each patient as noted below.

9-1 Cleaning Fiber Optic (except S970)

Carefully wipe debris off the end face of the fiber bundles with alcohol-soaked cotton swab.

CAUTION

Do not use a needle or pointed tool. They may damage the fiber face and reduce the light transmission efficiency. In case the light becomes dim due to fiber damage, send to the dealer you bought from for repair.

9-2 Washing

 This handpiece can be washed via Thermo Disinfector.

*Confirmed Thermo Disinfector is "Type: G7882" (Miele & Cie)

Wipe dirt and debris from the products, and wipe clean with alcohol-immersed cotton swab or cloth. Do not use a wire brush.

Refer to the Operation Manual of Thermo-disinfector.

9-3 Lubrication

■ NSK PANA SPRAY Plus

1) Mount the Spray Nozzle into the spray port.

2) Remove the Tip from the handpiece.

3) Insert the Spray Nozzle in rear of the handpiece and spray at least 2 seconds.

4) To remove excess oil from the handpiece, operate the handpiece until oil no longer flows from the rear of the handpiece (the connection point of the handpiece and coupling).

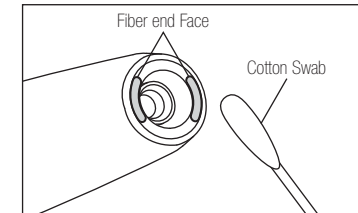


Fig. 8

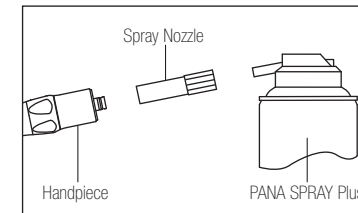


Fig. 9



CAUTION

- Lubricate handpiece by using NSK PANA SPRAY plus every patient or before Autoclave.
- Spray the handpiece until oil comes out from the rear side of the handpiece. (At least 2 seconds) To prevent mist spray from escaping into the environment, use absorbent cloth. Expel excess lubrication.
- Be sure to hold the handpiece firmly to prevent the handpiece from slipping out by the spray pressure when lubricating.
- Keep the NSK PANA SPRAY plus can upright.
- To prevent accident, lubricate without Tip.


■ NSK automatic handpiece cleaning and lubrication system

When using NSK automatic handpiece cleaning and lubrication system, refer to the system instructions.

* Select the system Cycle mode as follows.

iCare: L mode

9-4 Sterilization

 This symbol on your NSK product means that the product can be autoclavable up to Max. 135°C.

Autoclave sterilization is recommended.

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

■ Autoclave Procedure :

- 1) Wipe dirt and debris from the products, and wipe clean with alcohol-immersed cotton swab or cloth. Do not use a wire brush.
 - 2) Lubricate the handpiece. (Refer to 9-3 Lubrication)
 - 3) Insert those into the autoclave pouch. Seal the pouch.
 - 4) Autoclavable up to max. 135°C.
Ex.) Autoclave for 20 min. at 121°C, or 15 min. at 132°C.
 - 5) Keep the products in the autoclave pouch to keep it clean until you use it.
- * Sterilization at 121°C for more than 15 minutes is recommended by EN13060 or EN ISO17665-1



CAUTION

- To prevent infectiveness, Autoclave the handpiece every patient.
- Do not autoclave the handpiece even when it is bagged, together with other instruments, from which chemicals are not sufficiently cleaned. This is to avoid discoloration and/or damage the plating of the handpiece.
- In case the sterilizer chamber temperature could exceed 135°C during the dry cycle, skip the dry cycle.
- Do not touch the handpiece just after the autoclave. It is very hot.
- Do not heat or cool the handpiece quickly. Rapid change in temperature could break the glass rod and give abnormal strain to other metals. (Optic handpiece)
- The handpiece is kept in suitable atmospheric pressure, temperature, humidity, ventilation, and sunlight. Moreover, air does not include a dust, salt and sulfur.
- We do not recommend you to sterilize on plasma sterilization or EOG sterilization.

10. Changing O-Ring (S970L/S970)

Replace the O-rings if water is present in the exhaust air line. This is an indication of possible water leakage within the coupling.

- 1) Loosen and remove the Taper Ring at the rear of the handpiece. (Fig. 9)
- 2) Gently remove each O-ring with your thumb. (Fig. 10)
- 3) Insert the complete set of new O-rings in the correct grooves.
- 4) Tighten the Taper Ring at the rear of the handpiece.

*O-Ring : S970 O-Ring Set (4pcs) Order Code Y1001953

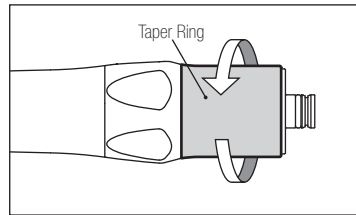


Fig. 9

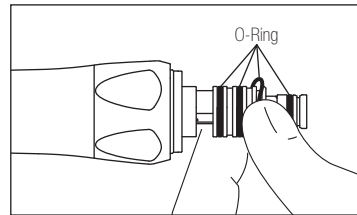


Fig. 10

CAUTION

- Do not disassemble the Taper-Ring except the O-ring changing.
- Make certain that the Taper Ring is firmly tightened. If the Taper Ring is loose water and air leakage could occur.

11. Non-Retraction Valve

A Non-Retraction Valve is equipped in the Coupling Joint, which shuts off the water retraction right at the handpiece head, to prevent oral fluids sucked into the water line.

NSK Coupling

- 1) Remove the back-end gasket.
- 2) Pull and remove the Water Tube, and replace the Non-Retraction Valve.
*Non-Retraction Valve: Order Code P401054

12. Warranty

NSK warrants the handpiece against production errors and material defects. NSK reserves the right to analyze and determine the cause of any problem. Warranty is voided should the handpiece be not used correctly. Replacement parts are available for seven years beyond discontinuation of the model.

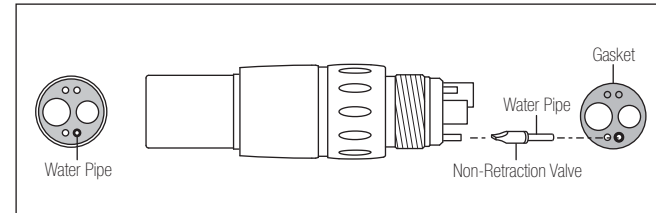


Fig. 11