OPERATION MANUAL

BRASSELER USA
DENTAL INSTRUMENTATION

High Speed Air Turbine Handpiece

# NL Series

## NL9000 NL9000K NL6000

## N5000 NL45

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

## ⚠ Caution

- When operating the handpiece always consider the safety of the patient.
- The handpiece is designed only for dental clinical use.
- Do not attempt to disassemble the handpiece or tamper with the mechanism.
- Check the vibration, noise and overheating outside the patient's oral cavity before use. If any abnormalities are found, stop using immediately and contact Brasseler USA.
- Should the handpiece function abnormally, cease operation immediately and return the handpiece to Brasseler USA for repair.
- Depressing the push-button while handpiece bur is in rotation will result in 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.
- Do not allow any impact on the sheath. Do not drop the handpiece.
- Do not use bent, damaged, or sub-standard burs. The shank could be bent or broken even within the recommended speed.
- Always keep the bur shank clean. Entry of debris into the chuck could cause bur run-out.
- Do not exceed the speed recommended by the bur manufacturers.
- Do not operate the handpiece without the bur or test-bur
- Remove the handpiece or the bur after the air supply is stopped completely.

## 1. ⚠ Caution on Burs

- Do not use non-standard burs. The ISO standard shank diameter is Ø1.59 - Ø1.60 mm.
- Do not use bent, worn, damaged, or non-concentric burs.
- Always use within the bur manufacturer's recommended allowable speed.
- Always use clean burs. Unclean burs may allow debris to build up inside chuck, causing weak bur retention or premature chuck wear.
- Insert the bur all the way into the chuck until it stops with the push-button fully depressed.
- Do not use short shank burs in Standard or Torque head handpiece.
- Use short shank burs in the Mini head handpiece.

## 2. Mounting and Removing the Bur

### Mounting

Insert the bur into the chuck. Press the push-button and insert the bur into the chuck until it is secure. (Fig. 1)

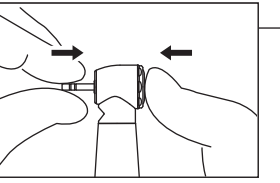

Fig. 1

### ⚠ Caution on Burs

Make sure that the bur is secure by pushing and pulling the bur.
It could also increase the chucking power. (Fig. 2)

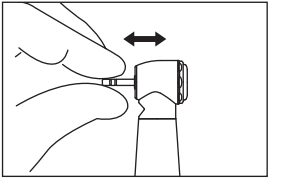

Fig. 2

## Removing

Press the push-button firmly and remove the bur. (Fig. 3)

### ⚠ Caution

- Mount / Remove the bur after the air supply is stopped completely.
- It could be hard to remove the bur after cutting (e.g. removing the crown). Pull the bur with a pair of pliers while pressing the push-button.

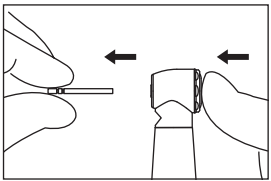

Fig. 3

# 3. Chuck Cleaning

Perform the cleaning of the chuck once a week for Push Button Chuck (FG bur).

## Chuck Cleaning Method

1) Mount the arrow-head spray nozzle tip into the spray port.
2) Lubricate chuck directly thorough the hole for bur attachment.

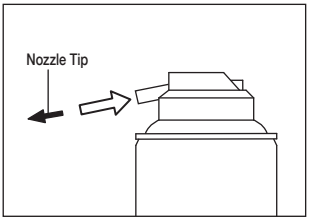


Fig.4

**⚠ Caution**

Push the Push Button during the lubrication.

3) Lubricate the handpiece. (Refer to Lubrication)
4) After the cleaning, mount the bur and check the griping force for the chuck. If you feel griping force is weak, stop using it and send it to Brasseler USA for evaluation.

**⚠ Caution**

Do not attempt oil or alcohol rinse it in the water. It may cause malfunction.

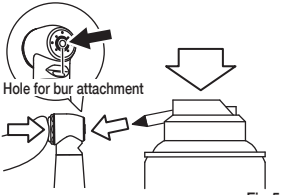


Fig.5

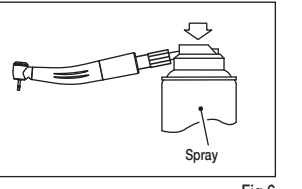


Fig.6

## 4. Sterilization

Autoclave sterilization is recommended.

Autoclave sterilization required first time you use and after each patient (after lubrication) as noted below.

### Autoclave Procedure

1) Scrub dirt and debris from the handpiece, and wipe clean with alcohol-immersed cotton swab or cloth. Do not use a wire brush.
2) Lubricate with spray.
3) Insert into an autoclave pouch. Seal the pouch.
4 )Autoclavable up to a max. 275°F (135°C). ex.) Autoclave for 20 min. at 250°F (121°C) or 15 min. at 270°F (132°C).
5) Keep the handpiece in the autoclave pouch to keep it clean until you use it.

**⚠ Caution**

- Do not heat or cool the handpiece quickly. Rapid change in temperature could break the cellular glass rod give abnormal strain to other metals. (only for optic handpiece)
- Do not wash, soak, or wipe off the handpiece with/in the oxidation potential solution (strong acid, superacid solution) or sterilized solution.

# NL9000

## NL9000M • NL9000S • NL9000T

## 5a. Specifications

| Model | NL9000M | NL9000S | NL9000T |
|---|---|---|---|
| Head Type | Mini | Standard | Torque |
| Rotation Speed | 390,000~450,000 $min^{-1}$ (rpm) | 380,000~440,000 $min^{-1}$ (rpm) | 300,000~360,000 $min^{-1}$ (rpm) |
| Drive Air Pressure | 35.6psi (2.5bar)~42.7psi (3.0bar) | | |
| Spray Type | Four Port Spray | | |
| Chuck Type | Push Button | | |
| Bur Size | ISO1797-1 Type3 Ø1.59~1.60 | | |
| | Short Shank | Standard | |
| Optics | Cellular Glass | | |
| Head Diameter | Ø0.406" (10.3mm) | Ø0.441" (11.2mm) | Ø0.52" (13.2mm) |
| Head Height | 0.445" (11.3mm) | 0.528" (13.4mm) | 0.528" (13.4mm) |

## 5b. Connecting / Disconnecting the Handpiece

1) Align the pipe of the coupling and the pipe hole of the hose, and push the coupling onto the hose. Hold the coupling tightly and fasten the nut of the hose securely. (Fig. 7)
2) Insert the handpiece firmly onto the coupling until it clicks to engage. (Fig. 8)

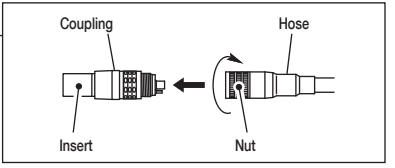


Fig. 7

**⚠ Caution**

Check tightness at the connection between the coupling and the handpiece.

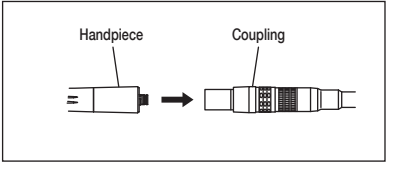


Fig. 8

3) Do not exceed the air pressure of 42.7psi (3.0bar). Air pressure readings must be checked at the coupling joint as shown in Fig. 9.

**⚠ Caution**

Air Pressure in excess of 42.7psi (3.0bar) could cause fracture of the bur or premature failure of ball bearings.

4) Pull the connector ring of the coupling backward and remove the handpiece. (Fig. 10)

**⚠ Caution**

Connect / Disconnect the handpiece after the air supply is stopped completely.

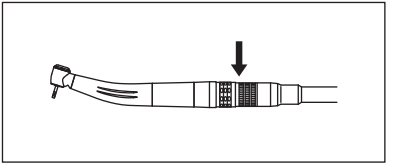

Fig. 9

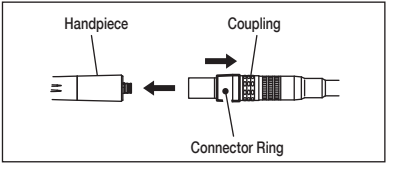


Fig. 10

## 5c. Clean After Each Patient

It is important to clean the holes in the head as follows after each patient and before autoclaving to maintain lasting CLEAN-HEAD performance. (Fig. 11)

1) Use the cup filler of the dental unit and fill the patient's paper cup.
2) Brush off the debris at the holes.
3) Immerse half of the head in clean water while the handpiece is running. (Fig. 12)
4) Run and stop the handpiece in the water 4-5 seconds.
5) Remove the handpiece, while running, from the water. Stop and wipe dry the handpiece.
6) If debris still does not come off, use the brush supplied, and clean the holes. (Fig. 13)
7) Lubricate before autoclaving.

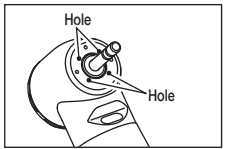

Fig. 11

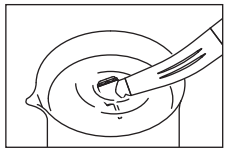
Fig. 12

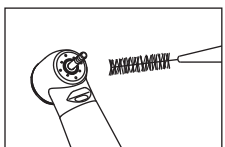
Fig. 13

## 5d. Lubrication

Supply spray after each use (after cleaning the holes) and/or before autoclaving.

1) Push spray nozzle attachment over the SPRAY nozzle until it firmly seats.
2) Insert the spray nozzle in the rear of the handpiece and spray for approximately 2-3 seconds.

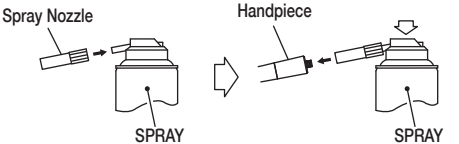


Fig. 14

**⚠ Caution**

- Hold the spray can upright.
- Be sure to hold the handpiece firmly to prevent the handpiece from slipping out of hand by the spray pressure when lubricating.
- Supply lubricant until it comes out of the handpiece head (for approx. 2-3 seconds).

## 5e. Changing O-ring

Change O-rings if there is water in the exhaust line. There is a possibility of water leak from the coupling joint. Please make sure to change O-rings by the set.

1) Remove the handpiece from the coupling, loosen and remove the taper ring. (Fig. 15)
2) Push out the worn O-ring with your thumb. Insert new O-ring in the O-ring groove. (Fig. 16)
3) Securely tighten the taper ring.

*Optional O-ring: PTL O-ring Set (Pack of 5)  Order No. 5010149U0

**⚠ Caution**

Screw in the taper ring tightly. A loose taper ring could result in water and/or air leak.

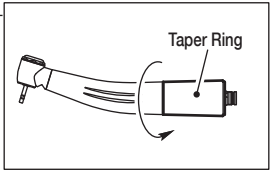


Fig. 15

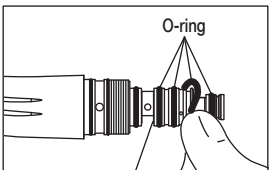


Fig. 16

## 5f. Cleaning the Cellular Glass Optics

Wipe clean the Cellular Glass optic face with alcohol-immersed cotton swab, in case debris and oil adhered onto. (Fig. 17)

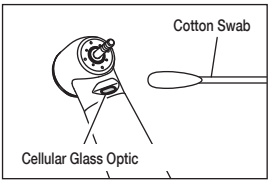


Fig. 17

**⚠ Caution**

Do not use a sharp tool to clean the Cellular Glass optics. It could damage the Cellular Glass optics and decrease the light transmission. If it becomes dim, contact Brasseler USA.

## 5g. Warranty

Brasseler USA warrants the handpiece against defects in manufacturing, workmanship and materials. Brasseler USA reserves the right to analyze and determine the cause of any problem. Warranty is voided should the handpiece not be used in accordance with this manual.

# NL9000K

## NL9000KM • NL9000KS • NL9000KT

(For KaVo® MULTIflex® LUX)*

*KaVo® and MULTIflex® are registered trademarks of Kaltenbach & Voigt GmbH & Co., Germany.

## 6a. Specifications

| Model | NL9000KM | NL9000KS | NL9000KT |
|---|---|---|---|
| Head Type | Mini | Standard | Torque |
| Rotation Speed | 390,000 - 450,000min$^{-1}$ (rpm) | 380,000 - 440,000min$^{-1}$ (rpm) | 300,000 -360,000min$^{-1}$ (rpm) |
| Drive Air Pressure | 35.6psi (2.5bar) - 42.7psi (3.0bar) | | |
| Spray Type | Four Port | | |
| Chuck Type | Push Button | | |
| Bur Size | ISO1797-1 Type3 Ø1.59 - 1.60 mm | | |
| | Short Shank | Standard | |
| Optics | Cellular Glass | | |
| Head Diameter | Ø0.406" (10.3mm) | Ø0.441" (11.2mm) | Ø0.52" (13.2mm) |
| Head Height | 0.445" (11.3mm) | 0.528" (13.4mm) | 0.528" (13.4mm) |

## 6b. Connection / Disconnecting the Handpiece

1) Connect the coupling to the hose. Refer to the manufacturer's coupling manual for details. 2) Insert the handpiece firmly onto the coupling until it clicks to engage. (Fig. 18)

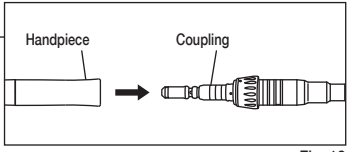

Fig. 18

**⚠ Caution**

Check tightness at the connection between the coupling and the handpiece.

Do not exceed the air pressure of 42.7psi (3.0bar). Air pressure readings must be checked at the coupling joint as shown in Fig. 19.

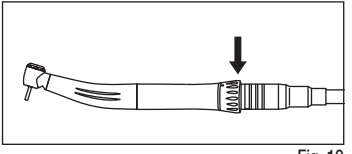
Fig. 19

**⚠ Caution**

Air Pressure in excess of 42.7psi (3.0bar) could cause fracture of the bur or premature failure of ball bearings.

3)To disconnect the handpiece from the coupling, follow the manufacturer's coupling manual.

**⚠ Caution**

Connect / Disconnect the handpiece after the air supply is stopped completely.

## 6c. Clean After Each Patient

It is important to clean the holes in the head as follows after each patient and before autoclaving to maintain lasting CLEAN-HEAD performance. (Fig. 20)

1) Use the cup filler of the dental unit and fill the patient's paper cup.
2) Brush off the debris at the holes.
3) Immerse half of the head in clean water while the handpiece is running. (Fig. 21)
4) Run and stop the handpiece in the water 4-5 seconds.
5) Remove the handpiece, while running, from the water. Stop and wipe dry the handpiece.
6) If debris still does not come off, use the brush supplied, and clean the holes. (Fig. 22)
7) Lubricate before autoclaving.

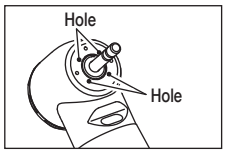

Fig. 20

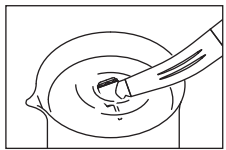
Fig. 21

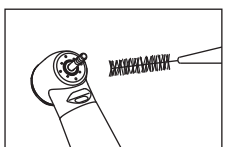
Fig. 22

## 6d. Lubrication

Supply spray after each use (after cleaning the holes) and/or before autoclaving.

1) Attach spray nozzle securely to the spray can.
2) Insert the spray nozzle in the rear of the handpiece and spray for approximately 2-3 seconds.

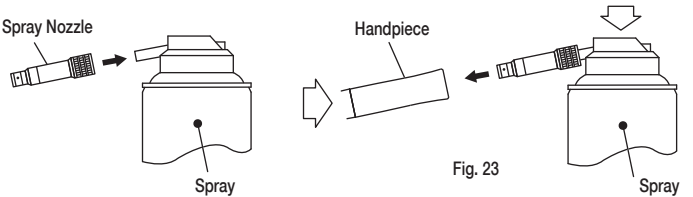


Fig. 23

**⚠ Caution**

- Hold the spray can upright.
- Be sure to hold the handpiece firmly to prevent the handpiece from slipping out of hand by the spray pressure when lubricating.
- Supply lubricant until it comes out of the handpiece head (for approx. 2-3 seconds).

## 6e. Cleaning the Cellular Glass Optics

Wipe clean the Cellular Glass optic face with alcohol-immersed cotton swab, in the event oil and debris are located on the glass rod. (Fig. 24)

**⚠ Caution**

Do not use a sharp tool to clean the Cellular Glass optics. It could damage the Cellular Glass optics and decrease the light transmission. If it becomes dim, contact Brasseler USA.

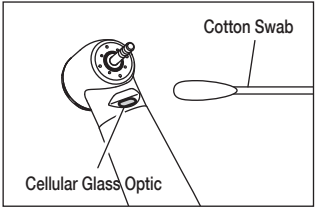


Fig. 24

## 6f. Warranty

Brasseler USA warrants the handpiece against defects in manufacturing, workmanship and materials. Brasseler USA reserves the right to analyze and determine the cause of any problem. Warranty is voided should the handpiece not be used in accordance with this manual.

# NL6000S

## 7a. Specification

| | |
|---|---|
| Model | NL6000S |
| Drive Air Pressure | 32psi |
| Rotation Speed | 380,000 - 450,000 min $^{-1}$ |
| Bur Size | Ø1.59 - Ø1.60 mm ISO1797-1 Type 3 Standard Bur |
| Spray Type | Single Spray |
| Head Size | Ø11 X 13.9mm |
| Chuck Type | Push Button |
| Light | Fiber Optic |

## 7b. Connection / Disconnection to Hose

1) **Connection**
Align the holes and tube on the handpiece and hose.
Insert handpiece into hose straight.
Tighten the hose nut firmly. (Fig.25)

2) **Disconnection**
Twist hose nut in reverse. (Fig.25)

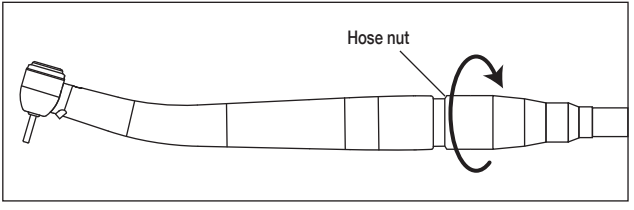


Fig. 25

**⚠ Caution**

This handpiece follows ISO9168 Type 2 Standards for 5 Hole Joints.

Set the pressure at the arrow, Fig.26, to 32psi.

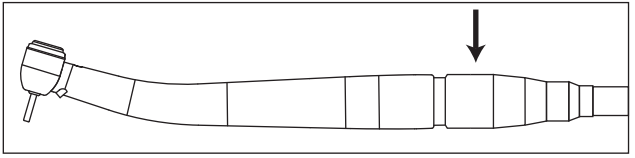

Fig. 26

**⚠ Caution**

Do not exceed the recommended air pressure. This is important to prevent higher speed which could cause breaking of the bur and premature bearing failure.

# 7c. Lubrication

Supply spray after each use and/or before autoclaving.

1) Mount the arrow-head spray nozzle tip into the spray port.
2) Insert the arrow-head spray nozzle in the drive air tube of the handpiece and spray for approximately 2-3 seconds.

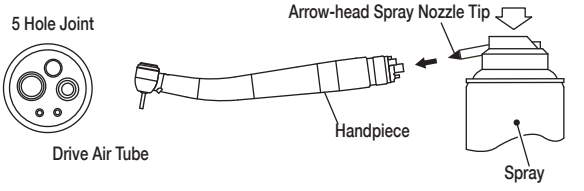


Fig. 27

## 7d. Cleaning of Fiber Optic End

Wipe clean the fiber optic entry point and exit point (Fig.28) with an alcohol-immersed cotton swab. Remove all debris and oil.

**⚠ Caution**

Do not use a sharp tool to clean the fiber optic. It could damage the glass and reduce the light transmission.
If illumination becomes dim contact Brasseler USA.

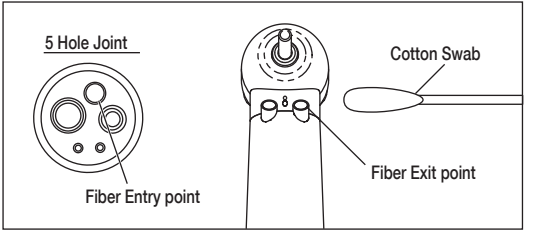


Fig. 28

## 7e. Warranty

Brasseler USA warrants the handpiece against defects in manufacturing, workmanship and materials. Brasseler USA reserves the right to analyze and determine the cause of any problem. Warranty is voided should the handpiece not be used in accordance with this manual.

# N5000S

## 8a. Specification

| | |
|---|---|
| Model | N5000 |
| Drive Air Pressure | 30psi - 36psi |
| Rotation Speed | 400,000 - 450,000 min $^{-1}$ |
| Bur Size | Ø1.59 - Ø1.60 mm ISO1797-1 Type 3 Standard Bur |
| Spray Type | Single Spray |
| Head Size | Ø11 X 13.9mm |
| Chuck Type | Push Button |

# 8b. Lubrication

Supply spray after each use and/or before autoclaving.

**Spray**

1) Mount the arrow-head spray nozzle tip into the spray port.
2) Insert the arrow-head spray nozzle in the drive air tube of the handpiece and spray for approximately 2-3 seconds.

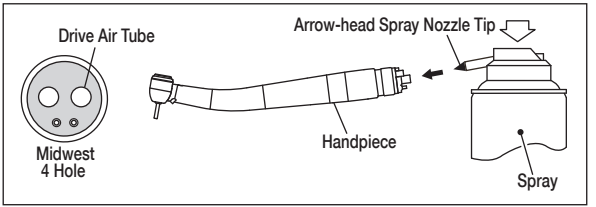


Fig. 29

**⚠ Caution**

- Hold the spray can upright.
- Be sure to hold the handpiece firmly to prevent the handpiece from slipping out of hand by the spray pressure when lubricating.
- Supply lubricant until it comes out of the handpiece head.

# 8c. Cartridge Replacement

## Removing Cartridge

1) Install the turbine head on the test bur.
2) Fit the head cap wrench onto the head and remove the head cap. (Fig. 30)
3) Remove the head cap, and remove the cartridge by pushing up on the test bur.
4) Use the needle to remove the O-ring in the head cap. (Fig. 31)
5) Remove the wave washer under the O-ring. (Fig. 32)

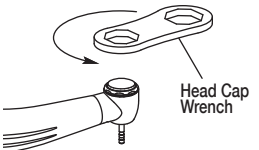


Fig. 30

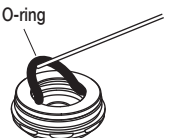


Fig. 31


Fig. 32

## Mounting Cartridge

1) Set the wave washer in the head cap. Direction doesn't matter. (Fig. 33)
2) Install the new O-ring in the head cap. Apply a small amount of turbine oil to the O-ring before installation. Needles should never be used for installation. (Fig. 34)
3) Install the cartridge in the head by inserting it vertically. (Fig. 35)
4) Screw the head cap with fingers until it stops, then hold the tip of the test bur and make sure if it's tightly and securely locked by giving a pull-and-push test. (Fig. 36)
5) Fasten the head cap with the head cap wrench until it's fixed firmly.

**⚠ Caution**

- The threads in the head are very fine. Do not turn the head cap with the wrench on the first turn.
- Use of non-Brasseler USA cartridge may void warranty

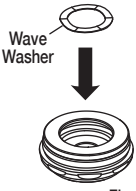

Fig. 33

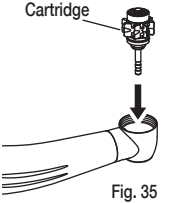

Fig. 35

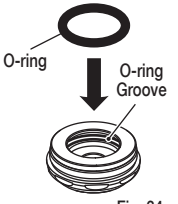

Fig. 34

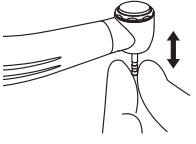
Fig. 36

## 8d. Warranty

Brasseler USA warrants the handpiece against defects in manufacturing, workmanship and materials. Brasseler USA reserves the right to analyze and determine the cause of any problem. Warranty is voided should the handpiece not be used in accordance with this manual.

# NL45S
# N45S

# 9a. Specifications

| Model | NL45S | N45S |
|---|---|---|
| Head Type | Standard | |
| Drive Air Pressure | 35.6psi (2.5 bar) - 42.7psi (3.0 bar) | |
| Rotation Speed | 380,000~450,000 $min^{-1}$ (rpm) | |
| Spray Type | Single Water Supply | |
| Chuck Type | Push Button | |
| Bur Size | ISO1797-1 Type3 Ø1.59 - Ø1.60 mm Surgical long shank bur (0.98" / 25mm) | |
| Optics | Cellular Glass | None |
| Head Diameter | Ø0.4" (ø11 mm) | |
| Head Height | 0.55" (14 mm) | |

■ Please note that only water is supplied, no coolant/chip air supplied. A water stream is not mist.

• Light and a water stream are designed to be delivered to the tip of the long shank bur (0.98" / 25mm).
• Speed may slightly vary depending on the back-end configuration and type of hose used.

## 9b. Connection / Disconnection to Hose

1) Align the pipe of the coupling and the pipe hole of the hose, and push the coupling onto the hose. Hold the coupling tightly and fasten the nut of the hose securely. (Fig. 37)
2) Insert the handpiece firmly onto the coupling until it clicks to engage. (Fig. 38)

**⚠ Caution**

Check tightness at the connection between the coupling and the handpiece.

3) Do not exceed the air pressure of 42.7psi (3.0bar). Air pressure readings must be checked at the coupling joint as shown in Fig. 39.

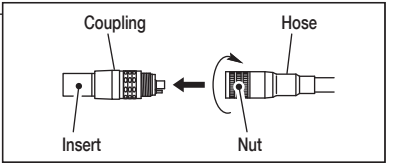


Fig. 37

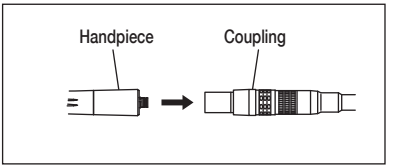


Fig. 38

**⚠ Caution**

Air Pressure in excess of 42.7psi (3.0bar) could cause fracture of the bur or premature failure of ball bearings.

4) Pull the connector ring of the coupling backward and remove the handpiece. (Fig. 40)

**⚠ Caution**

Connect / Disconnect the handpiece after the air supply is stopped completely.

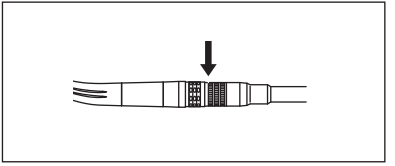

Fig. 39

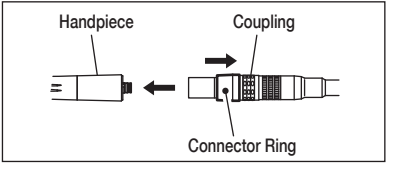


Fig. 40

# 9c. Clean slit after each patient

Clean the slits at the handpiece head. Building up of debris at the slits may gradually deteriorate the Clean-Head performance and slows down the speed. (Fig. 41)

1) Spray lubricate the handpiece, and re-connect to the coupling.
2) Use the cup filler of the dental unit and fill the patient's paper cup.
3) Immerse the handpiece head completely in the water. Run the handpiece for 3 seconds and stop for 3 seconds in water. Repeat five times. (Fig. 42)
4) Remove the handpiece from the water, run for 3 seconds to expel water, wipe dry, and disconnect from the coupling.
5) Spray lubricant to the handpiece, and expel excess oil.
6) If debris still does not come off, use the brush supplied, and clean the slits. Go back to step 2. (Fig. 43)
7) Discard the paper cup and water.

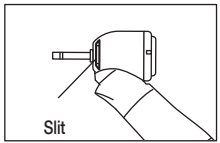

Fig. 41

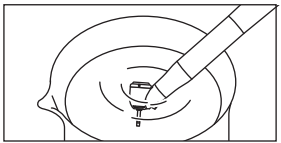
Fig. 42

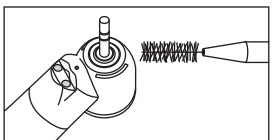
Fig. 43

## 9d. Lubrication

Supply spray after each use (after cleaning the holes) and/or before autoclaving.

1) Push spray nozzle attachment over the spray nozzle until it firmly seats.
2) Insert the spray nozzle in the rear of the handpiece and spray for approximately 2-3 seconds.

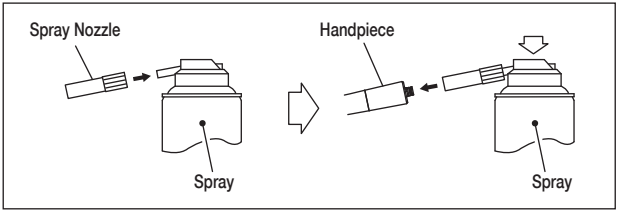


Fig. 44

**⚠ Caution**

- Hold the spray can upright.
- Be sure to hold the handpiece firmly to prevent the handpiece from slipping out of hand by the spray pressure when lubricating.
- Supply lubricant until it comes out of the handpiece head.

## 9e. Changing O-ring

Change O-rings if there is some water in the exhaust line. There is a possibility of water leak from the coupling joint. Please make sure to change O-rings by the set.

1) Remove the handpiece from the coupling, loosen and remove the taper ring. (Fig. 45)
2) Push out the worn O-ring with your thumb. Insert new O-ring in the O-ring groove. (Fig. 46)
3) Securely tighten the taper ring.

*Optional O-ring: PTL O-ring Set (Pack of 5)  Order No. 5010149U0

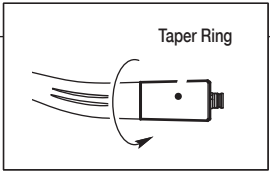


Fig. 45

**⚠ Caution**

Screw in the taper ring tightly. A loose taper ring could result in water and/or air leak.

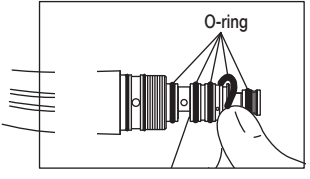


Fig. 46

## 9f. Changing Turbine Cartridge

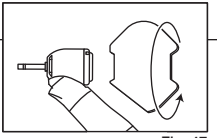

Fig. 47

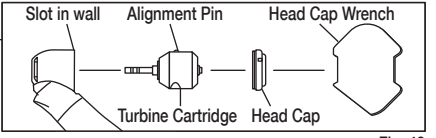


Fig. 48

### Removing Turbine Cartridge

1) Mount a bur blank in the chuck.
2) Mount the head cap wrench over the head cap, and remove the cap by turning it counter-clockwise. (Fig. 47)
3) Push on the bur blank, and the cartridge is easily removed from the head.
4) Clean the head interior with Spray Lubricant. Wipe dry.

### Mounting New Turbine Cartridge

1) Insert the new turbine cartridge into the cleaned head. Align the locating pin on the turbine cartridge with the slot in the head, and gently push it in. It is a snug fit.
2) Mount the head cap. First align the threads. Gently turn the head cap over the threads with fingers until tight. Use the head cap wrench for final, secure turns. (Fig. 48)

**⚠ Caution**

Do not use the head cap wrench on the 1st turn. The head cap threads are very fine, and if not aligned correctly, it could strip the threads.

## 9g. Cleaning Cellular Optic End

Wipe clean the cellular optic end face with alcohol-immersed cotton swab, in case debris and oil adhered onto. (Fig. 49)

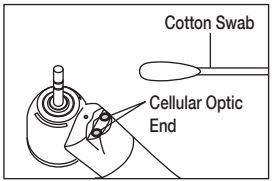


Fig. 49

**⚠ Caution**

Do not use a knife or a pointed tool. This could damage the end surface and cause reduction in light transmission.

The cellular optic end can be replaced at the factory. Send to Brasseler USA for replacement.

## 9h. Warranty

Brasseler USA warrants the handpiece against defects in manufacturing, workmanship and materials. Brasseler USA reserves the right to analyze and determine the cause of any problem. Warranty is voided should the handpiece not be used in accordance with this manual.

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