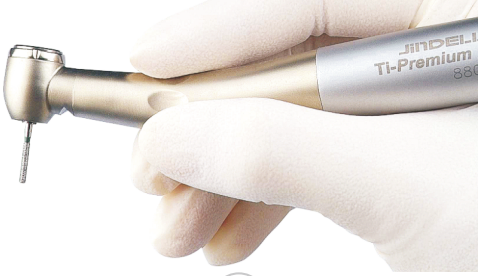


High-Speed Air Turbine Handpiece Operating Instruction



Only for USA
Caution! Federal Law restricts this device to sale by or on the order of a dentist, physician or any other practitioner licensed by the law of the State in which he or she practices to use or order the use of the device.

Introduction

Dear User
Congratulations on purchasing this Jindell Quality High Speed Air Turbine Handpiece product as your professional tool. This device is designed for dental treatment such as grinding, drilling and polishing teeth purpose. By following the instructions below you will be able to work smoothly, economically and safely.

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- Refer to the chapter on Safety/ Warning symbol
- Important information for users and service technicians
- Thermo washer Disinfectable
- Can be steam-sterilized at 134°C -1°C/ +4°C (273°F -1.6°F/ +7.4°F)

CE This Medical Device production meets the requirements of the applicable EU directive 93/42/EEC & 2007/47/EC.

01

Disclaimer

- The Jindell Company will not be responsible for accidents, equipment damage, or bodily injury resulting from:
- repairs made by personal not authorized by the Jindell Company
 - any changes, modifications, or alterations of its products
 - the use of products or equipment made by other manufacturers, except for those procured by the Jindell Company
 - maintenance or repairs using parts or components other than those specified by the Jindell company and other than in the original condition
 - operating the equipment in ways other than the operating procedures described in the manual or resulting from the safety precautions and warnings in this manual not being observed
 - workplace conditions and environment or installation conditions which do not conform to those stated in this manual such as improper electrical power supply
 - fires, earthquakes, flood, lightning, natural disasters, or acts of God
- The Jindell Company will supply replacement parts and be able to repair the product for a period of 10 years after the manufacture of the product has been discontinued.
- Warranty is honored only when a claim is accompanied by the warranty agreement with purchase date, product name and model, serial number (inscribed on the body of the product) and name of the distributor.
 - Products are subjected to change without notice.

02

Product Description

Turbine with/ without light for MULTiflex®, NSK PTL-CL®, Bien- Air Uniflex®, NSK QD-J®, Sirona® R/F/B, W&H Roto Quick® connections

- Push Button Back Cap
- Fit to MULTiflex type Coupling Connection
- Fit to QD-J® type Coupling Connection
- Single Port type Water coolant spray Nozzle
- Four Ports type Water coolant spray Nozzles
- Fiber Optic light guide outlet (LUX type model)
- Cleaning Spray Nozzle Needle

B2/ M4 type Fixed Connections:

- Drive air
- Water Coolant
- Spray (Chip) air
- Return (Exhaust) air

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Technical data

Drive Condition	• Drive Air Pressure: 2.1 – 3.5 bar (30 – 50 psi) • Return air: < 0.5 bar (7 psi) • Water: 0.8 – 2.5 bar (12– 36 psi) • Spray air: 1.0 – 2.5 bar (15 – 36 psi) • Chip air consumption at 2 bar > 1.5 NI/min
Recommendation Condition	• Drive Air Pressure: 2.5-2.8 bar • Water: 1.5 bar • Chip air: 2 bar • Coolant supply volume: 50ml/min
Air Consumption	42– 51 NL/min
Idle speed(±20,000)	300,000 to 450,000 R.P.M.

The chip air / water pressure must be set at the same time. Chip air must be higher than the water pressure.

Transportation and storage condition

Prior to start-up, very cold products must be heated to a temperature of 20 °C to 25 °C (68 °F to 77 °F). Otherwise it can cause the medical device to malfunction.

DO NOT STORE TURBINE HANDPIECE IN EXCESSIVELY COLD LOCATION

Storage conditions:
Surrounding Temperature from -20°C (-4°F) to +70°C (+158°F); Atmospheric pressure from 700hPa to 1060hPa (10 to 15 psi); Relative humidity from 5%RH to 95%RH absence of condensation.



04

Caution

- The handpiece is not supplied sterile condition before shipping. It must be autoclaved or sterilized before first use and after each use.
- The handpiece must be regular maintained, lubrication, cleaning, sterilized is essential and must be done after each use.
- A supply of dry, clean, cooling and contamination-free compressed air according to EN ISO 7494- 2 must be provided.
- The handpiece must use ISO- conforming standard shank diameter Burs (Ø1.5 – Ø1.60mm).
- Never use non-clean, bent, non-concentric, worn shaft, damaged or longer than 26mm bur (rotary instruments).
- The sterilization parameters must correspond with those of the Pharmacopoeia Official. (ex.: 121°C/ 134°C)
- Proper cleaning& lubrication before sterilizations is essential to prevent the build-up of debris.
- Never press the Push-Button Back Cap while the turbine handpiece is operating. Otherwise it could result in overheating and injury.
- The handpiece of fastening to the handpiece tubing (hose) or connector must meet the standard of ISO 9168.
- Only fit in the Turbine chuck Burs whose shanks meet the requirements of ISO 1797-1.
- Infected and humid cooling compressed air will result in malfunctions and lead to premature bearing wear.
- Do not attempt to disassemble the handpiece nor tamper with the mechanism.
- Do not use Dry-Heat sterilization; it will result in malfunctions and lead to premature bearing wear.
- Remove the bur (rotary instrument) only after the handpiece has completely stopped rotating.
- Do not use wire brush to clean the handpiece sheath. Wipe clean with alcohol-immersed cloth or cotton swab.
- Must the handpiece not function normally, cease operation immediately and return the handpiece to your authorized Jindell Dealer for service.

05

Caution

- Do not immerse handpiece or cartridges/ rotor in disinfectant solution or boiling water, nor chemicals, and not to be cleaned by ultrasonic cleaning bath device process.
- Avoid crashing the handpiece. Take care not to drop the handpiece as it may cause serious damage and void the warranty. Be careful!
- Do not operate the handpiece without first inserting a bur or shipping bur into the chuck, or a bur loosely mounted; always keep a bur or shipping bur into the chuck to protect the chuck while the period of non-use.
- If damage due to wear happened, like as irregular running noise, significant vibration, Head overheating, unbalanced or with insufficient, please stop work immediately. Contact your authorized Jindell Dealer for service.
- The patient's teeth may cause overheating from lack of Spray water, and thermal will damage to the pulp. Danger always comes from the lack of water.
- Always check the spray water tube and clean the spray nozzles which in the front of handpiece head with the provided cleaning spray nozzle needle if necessary to avoid the lack of spray water.
- All O-rings are on the coupling must be in place and must not be worn or damaged. Missing or damaged O-rings must be replaced or they may result in premature wear, water or air leak and failure.
- Before each use, check if the handpiece is securely locked onto the coupling or tubing (hose) by pulling on it.
- Daily maintenance procedure will recommended: step 1 is remove the handpiece from the swivel coupler or handpiece tubing (hose), step 2 is remove the bur (rotary instrument), step 3 is scrub handpiece under running water with soft sponge or cloth to remove external debris, step 4 is lubrication, final is Sterilization.

06

Installation

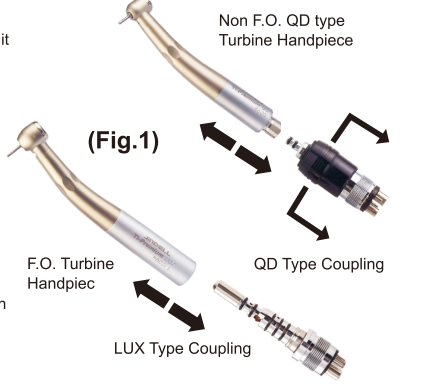
- Connect to the Units:
- Screw the coupling or Backend fixed connection type handpiece onto the tubing (hose) and tighten firmly.
- Checking the pressure:
- Recommended pressure is 2.8 bar (41 psi). The air consumption is 42- 51 NL/min. Return (Exhaust) Air pressure is less 0.5 bar (7 psi). Water is 0.8- 2.5 bar (12- 36 psi). Spray Air is 1.0- 2.5 bar (15- 36 p.s.i.). The minimum volume of water required for spray coolant is 50 ml/min. The Chip air consumption at 2 bar is larger 1.5 NI/min.
- Mounting the Swivel Coupling to Handpiece Tubing (hose):
- Screw the coupling onto the handpiece tubing (hose) must tighten firmly and may tighten firmly with the wrench tool in lux type coupling.

- Checking the amount of water:
- Adjust the water volume for the spray coolant to 50 ml/ min (cm³/min) or 3.1 inch³/ min.
 - At the beginning of each workday, the water-conducting systems should be rinsed for at least 2 min. without the instrument being attached; if there is a risk of contamination from reflux or back suction, the system must be rinsed for 20-30 seconds.

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Connection to the Coupling: (Fig.1)

- Mount the handpiece accurately on the Swivel Coupling in a precise direction and push it backward until coupling audibly locks in the handpiece. (Per the coupling manufactures instructions)



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Disconnection to the Coupling: (Fig.1)

- Hold the coupling tight, and pull the handpiece off while twisting slightly. Release the handpiece from coupling. (Per the coupling manufactures instructions)
- Before each use, check and make sure if the handpiece is securely locked onto the coupling by pulling on it.
- Check for secure seating on the coupling by gently slightly pulling on the handpiece again and pushing the coupling. The action can also increase the coupling lock retention power. The coupling must not come loose.
- Inexact coupling, especially during the shutoff delay period, may destroy the coupler's high-pressure lamp or reduce its service life.

Insert the milling cutters or diamond grinders or burs (rotary Instruments)

Only use rotary instruments which are in perfect condition and which have shanks that meet the requirements of the DIN EN ISO 1797-1 type 3 standards. Follow the operating instructions of the manufacturer. Insert rotary instruments only when the turbine handpiece is stationary.

- All models Handpiece except the **Miniature head type**
- Shaft diameter from 1.59 to 1.60 mm.
 - Overall length up to max. 21 mm.
 - Shaft clamping length: min. 9 mm.
 - Blade diameter: max. 2 mm
- All models of the **Miniature head type** Handpiece
- Use **short shank burs** are recommended.
 - Shaft diameter from 1.59mm to 1.60mm.
 - Overall length up to max. 19 mm.
 - Shaft clamping length : min. 9 mm.
 - Blade diameter : max. 2 mm

- Caution**
- Do not use bent, worn, damaged or non-concentric burs. Such burs can result in damaged to the handpiece.
 - Do not exceed the bur speed recommended by the bur manufacturer's instructions.
 - Bur must be kept clean and sterilized at all time, and if showing signs of wear they must be replaced.
 - Entry of hard debris into the chuck via the bur shank could cause rotation slip and also prevent the bur from being securely located in the chuck.
 - Do not use short shank burs in standard or torque head Handpieces.
 - Do not interfere with the running or slowing down of rotary instruments (protection against injury and infection).
 - Do not activate the press button of the turbine handpiece during operation or slowing down. This leads to detachment of the rotary instrument and overheating of the press button (risk of injury).

09

To Change the Bur (rotary instrument):

- Insert the cutter or grinder all the way. Press the push-button back cap on the turbine handpiece head with your thumb (Fig.2) firmly and at the same time insert the bur (rotary instrument) until it reached the limit secure stop and cannot go further.
- Check bur secure locating by applying slight axial tension all the time.
- Remove the bur (rotary instrument) first must stop drive the turbine handpiece first and after the bur totally stop rotate, depress the push-button back cap firmly and remove the bur by pulling it. (Fig.3).



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Test run

- Insert rotary instrument.
- Start the turbine handpiece.

- Caution**
- Never press the push-button back cap while the turbine handpiece is operating. Otherwise it could result in overheating of the turbine handpiece head and risk of injury.
 - Test the function of the chuck and the bur is secure by gently slightly pulling on the bur again and pushing the bur without the push button. The action can also increase the chuck retention power. The bur must not come loose.

- Caution**
- Action during operation may result in damage to the chuck system and cause injury. It is essential to avoid contact between soft tissue and the head back-cap of the handpiece. In the event of handpiece damage, heating-up of the head and associated burns are possible.
 - Placing the instrument in its holder with a bur remaining in the chuck may result in injury and infection. Secure the high-speed handpiece to prevent it from dropping since this may damage the handpiece. Avoid unintentionally touching rotating tools.
 - After inserting a bur, always operate the handpiece outside of the oral cavity to make sure it runs smoothly.
 - Bur (rotary instrument) comes out during use, stop operating the handpiece immediately.
 - If removing the bur become difficult, while depressing the Push Chuck Button. Discontinue use immediately if bur become loose or unstable in turbine assembly. Please contact your Local Dealer. Do not use the instrument with worn chucking mechanism.
 - Never touch soft tissue with the head or bur since it may be hot and cause a burn.
 - Remove bur from the high-speed handpiece when finished with treatment all the time.
 - Crown removal and other similar operations produce considerable vibration and can cause the bur to get stuck in the handpiece. Avoid this by frequently removing and reinserting the bur.
 - In case of abnormal noise or vibration during use, replace the bur. If this eliminates the problem, the bur was defective. After long usage, wear on bearings results in a greater noise.
 - If you observe problems (e.g. vibrations, unusual noise, overheating, coolant supply failure or leakage), stop the turbine handpiece immediately and contact an authorized Jindell service partner.

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Hygienic Maintenance& Cleaning:

- Follow your country-specific directives, standards and guidelines for cleaning, disinfection and sterilization. Daily maintenance the turbine handpiece manually or mechanically procedure will recommend:
- Wear protective clothing & remove the handpiece from the swivel coupler or handpiece tubing (hose).
 - Remove the bur (rotary instrument).
 - Scrub handpiece under flowing tap water (30 °C ± 5 °C (86 °F ± 10 °F) with soft sponge or cloth or a medium hard toothbrush to remove external debris.
 - lubrication.
 - final: Sterilization
- Caution**
- Do not immerse handpiece or cartridges/ rotor in disinfectant solution or boiling water, nor chemicals, and not to be cleaned by ultrasonic cleaning bath device process.
 - Only use lubrication maintenance products and/or components approved by spray oil or the automatic cleaning & lubrication device.
 - Manually clean debris off with a brush off the handpiece outside under running water 30 °C ± 5 °C or clean with 70%– 80% alcohol solution for Disinfection.
 - Wire cleaner may be inserted into exterior spray holes to dislodge any foreign matter and debris. If the blockage is located in the interior portion of the spray tubes, the instrument must be sent to Jindell or an authorized repair facility for repair.

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Cleaning the spray nozzle:

Clean the water cooling spray nozzles (Fig.4) with the provided the cleaning spray nozzle needle (Fig.9) if they get plugged up with cutting debris or impurities in the water. After cleaning, dry it off with air from three syringe or some other method, and then wipe it with a piece of gauze dampened with 70%– 80% alcohol solution for Disinfection.



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Thermo washer Disinfectant

- Handpiece with this symbol may be cleaned and disinfected with a thermal washer disinfectant.
- To use a thermal washer disinfectant, first read the operation instructions for the unit. Strictly follow the instructions attached for cleaning mode of solution.
- Jindell recommends thermo washer disinfectors in accordance with EN ISO 15883-1, which are operated with alkaline cleaning agents with a pH value of max. 10 (e.g. Miele G 7781G 7881 – Validation was carried out with Programme "VARIO-TD", cleaning agent "hediShe® mediclean", neutralisation agent "hediShe® Z" and rinsing agent "hediShe® mielclear" and only applies to the material compatibility with Jindell products).
 - For program settings as well as cleansers and disinfectants to be used, please refer to the instructions for Use of the thermo washer disinfectant (complying with max. pH value of 10).
 - Follow the instructions for use of the thermo washer disinfectant.

- Caution**
- Do not use Dry-Heat sterilization; it will result in malfunctions and lead to premature bearing wear.
 - Improper cleaning modes and solutions will damage the instrument.
 - Only disinfect in a thermo washer disinfectant or manually.
 - Follow the disinfectant manufacturer's recommendations for cleaning solutions and methods for dental instruments. Do not use strong acidic or alkaline solutions. Thoroughly rinse off all cleaning solution.

Disinfection: Manual disinfection - external

- Jindell recommends the following products based on material compatibility. The microbiological efficacy must be ensured by the disinfectant manufacturer.
- Approved disinfectants:
- Mikrozid AF made by Schülke & Mayr (liquid or cloths)
 - FD 322 made by Dürr
 - WL-cid made by ALPRO
 - CaviCide made by Metrex

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- Consumables required:
- Cloths for wiping off the medical device.
 - Spray the disinfectant on a cloth, then thoroughly wipe down the medical device and leave the disinfectant to soak in according to the instructions from the disinfectant manufacturer.
 - Follow the instructions for use of the disinfectant.

Disinfection: Manual disinfection - internal

- The efficacy of manual internal disinfection must be demonstrated by the manufacturer of the disinfection agent. With Jindell products, use only disinfection agents that have been released by Jindell with respect to the compatibility of materials (e.g. WL-cid / made by ALPRO).
- Follow the instructions for use of the disinfectant.

Drying

- Manual Drying: Blow off the outside and inside with compressed air or 3 way syringe until water drops are no longer visible.
- Automatic Drying: The drying procedure is normally part of the cleaning program of the thermo washer disinfectant.

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Lubrication:

- Make sure to use the CORRECT application nozzle (Fig.5) is connected to plastic valve at the top of the spray oil can. Firmly insert the application nozzle into the rear of the handpiece and activate the spray for 1- 3 seconds until the spray oil exhausts from the handpiece head. Always hold Spray Oil can upright.
- The spray lubricant is delivered from the can, into the handpiece, under pressure. To prevent the handpiece from slipping from the application nozzle, always hold the handpiece securely to the application nozzle.



- For the M4 (4 hole) / B2 (2 hole) type backend fixed connection handpiece; supply 2- 3 drops of oil into the drive air tube or hole of the handpiece once or twice a day. (Fig.6) Operate the handpiece for 15- 20 seconds to remove residual debris and oil. Lubricate at least twice a day.

- Jindell recommended lubricating the chuck (clamping) system weekly!

- Caution**
- Only high quality lubricants recommended for use with dental instruments must be used.
 - Always cleaning& lubricate before sterilization!

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Sterilization

- Sterilization in a steam sterilizer (autoclave) in accordance with EN 13060 / ISO 17665-1
- The Jindell medical device has a maximum temperature resistance up to 138°C (280.4°F).
- (Depending on the available autoclave,) select a suitable procedure from the following sterilization processes:
- Recommended sterilization methods/parameters for wrapped loads are as follows:
- Autoclave with three times with an pre-vacuum Pressure pulse "S" cycle (According with EN 13060, class S) at least 3 minutes at 134°C -1°C / +4°C (273.2°F -1.6°F / +7.4 °F) and cool at room temperature.
 - Autoclave using the gravitation method: at least 10 minutes at 134°C -1°C / +4°C (273.2°F -1.6°F / +7.4 °F) or alternatively at least 60 minutes at 121°C -1°C / +4°C (250°F -1.6°F / +7.4 °F) and cool at room temperature.
 - Insert into an autoclave pouch and seal the pouch before Sterilization is recommended according to EN 868-5.
 - Follow the steam sterilizer (autoclave) manufacturer's Instructions for Use.

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- Caution**
- Do not use Dry-Heat sterilization; it will result in malfunctions and lead to premature bearing wear.
 - Sterilization is recommended by DIN EN 13060 or EN554. Jindell recommended sterilization according to EN 13060, class B (pre & post vacuum).
 - Proper cleaning& lubrication before sterilizations is essential to prevent the build-up of debris & remove the bur (rotary instrument).
 - Wrap the turbine handpiece and the accessory in sterile goods packing (autoclave pouch) and seal according to EN 868-5.
 - Make sure, that you only remove dry sterile goods, & Stone sterile goods dust-free and dry.
 - Immediately remove the product from the steam sterilizer after the sterilization cycle will damaged to product!
 - Sterilization is required before the first use and between each patient use to prevent cross- infection.
 - If the sterilizer chamber temperature must exceed during 135°C (or 275°F) during the drying cycle, then delete the drying cycle.
 - Always place the handpiece in the center or upper shelf of the chamber, as the local temperature at the bottom of the chamber could rise beyond the level indicated on the autoclave.
 - Never heat or cool the handpiece quickly; Rapid change in temperature could damage the glass rod or subject other metals to abnormal stress.
 - Do not wash, soak, or wipe off the handpiece with a Potentially Corrosive Solution (strong acid, super acid solution) or cold sterilization solution.
 - The MULTiflex, QDj, and any coupler cannot be sterilized.

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Cleaning the Cellular Glass Optic Rod

Wipe it and clean the cellular optic glass rod exit hole which locates at the neck of turbine handpiece. Wipe it and clean with an alcohol immersed cotton swab to remove all debris and oil to extend the effect of the light guide.

- Do not Use a sharp tool to clean the cellular glass optic rod. It could damage the glass and reduce the light guide effect. But if you damage thecellular optic glass rod with sharp tools or at drop-down conditions, we will not carry the warranty risk.
- If illumination becomes dim please contact your dealer.



- Accessories:**
- Cleaning Spray nozzle needle (Fig.9); Back cap open tool (Fig.10); Swivel coupling screw key (Fig.11).



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Replacing the O-rings on the Swivel coupling on the supply Handpiece Tubing

- Remove the O-rings if water is present in the exhaust air line. This is and indication of possible water leakage within the coupling. Always change the complete set of O- rings. Remove the handpiece from the coupling.
- Checking the MULTiflex® LUX type of Coupling all 5 O-rings or the other Brands of Coupling all O-rings must be in place (maybe some model of the O- rings will be placed in the rear of Turbine handpiece) and all O-rings must not be damaged. Missing or damaged O- rings must be replaced or they may result in premature wear and failure
- Gently press the O-ring between your fingers to form a loop.
- Shove the O-ring to the front, and remove it.
- Insert the complete set of new O-rings into the correct grooves.
- The O-rings on the coupling may only be lubricated with a cotton ball wet with spray-oil.

- Caution**
- Danger from Improper care of the O-ring; it can cause the medical device to partially or completely malfunction.
 - Do not use Vaseline or other grease or oil on O-rings.

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Repair and changing of the cartridges

Jindell turbine handpiece are manufactured from the highest quality materials. The turbine assembly is fragile and must be handled by qualified personal only.

If any problem with the turbine handpiece occurs, please contact our authorized repair center for technical support.

USE ONLY ORIGINAL REPLACEMENT TURBINE To fully ensure the quality and reliability of the Instrument.

Note: High- Speed handpiece are used to remove decay, old restorations or teeth structure in the preparation of the teeth for a new restoration.

As the revolution (speed) of the bur is very fast, the cutting of teeth structure means that the bur creates heat. To keep the working area cool these handpieces are equipped to send a fine spray of water onto the working surface. This keeps the teeth and the tool cool and helps to keep the working surface free of debris. The 'finishing' work is then done using a low- speed handpiece.

- MULTiflex® is a registered trade mark of Kallenbach & Voigt GmbH & Co. KG, Germany.
- NSK PTL-CL®/ NSK QD-J® is a registered trade mark of NSK NAKANISHI INC., Japan
- Bien Air Uniflex® is a registered trade mark of Bien-Air Dental SA, Switzerland.
- Sirona® R/F/B is a registered trade mark of Sirona Dental Systems GmbH, Germany
- W&H Roto Quick® is a registered trade mark of Dentalwerk Burmoose GmbH, Austria

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Guarantee:

The following warranty conditions apply to this Jindell medical device:

Jindell provides the end customer with a warranty of proper function and guarantees zero defects in respect of material and processing for a period of 6 to 12 months from the date of the invoice, subject to the following conditions:

In case of justified complaints, Jindell will honor its warranty with a free replacement or repair. Other claims of any nature whatsoever, in particular with respect to compensation, are excluded. In the event of default, gross negligence or intent, this shall only apply in the absence of mandatory legal regulations to the contrary.

Jindell shall not be liable for defects and their consequences that have arisen or may arise from natural wear, improper handling, cleaning or maintenance, non-compliance with operating, maintenance or connection instructions, calcination or corrosion, contaminated air or water supplies or chemical or electrical factors deemed abnormal or impermissible in accordance with Jindell's instructions for use or other manufacturer's instructions. The warranty granted does not usually extend to lamps, light conductors made of glass and glass fiber optic, glassware, rubber parts, and the colorfastness of plastic parts.

All liability is excluded if defects or their consequences originate from manipulations or changes to the product made by the customer or a third party that is not authorized by Jindell.

Warranty claims will only be accepted if the product is submitted along with proof of purchase in the form of a copy of the invoice or note of delivery. The dealer, purchase date, type, and serial number must be clearly evident from this document.

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MORE THAN 50% OF THE HANDPIECE FAILURES ARE CAUSED BY IMPROPER CLEANING AND CARE. Dental handpiece are exposed to very high loads in the course of your daily routine.

- This includes:
- Spreads out up to 400,000 rpm at the outer diameter of the turbine rotor
 - High cutting rates
 - Strong contract pressure
 - Extreme temperatures from sterilization

Wear and tear can also be generated by the following debris reaching the inside of the handpieces:

- Saliva and blood
- Dental materials
- Saline solutions

Malfunctions can arise from:

- Incorrect operation and care
- Damage from dropping and impact

If cleaned and serviced well, your handpieces can remain a reliable tool after many years of use.

PROTECT THE CHUCK SYSTEM

Use dental burs with good shafts

Always check the quality of dental burs before inserting them into the handpiece.

Burs should be free of any dents or scoring.

If a bur with poor quality shafts are used, the handpiece may suffer substantial damage.

Damage to the handpiece chuck system could lead to stuck burs or the bur slipping inside the chuck mechanism.

***Worn-out or damaged shafts/grooves(you can feel grooves when you run a fingernail along the shafts)**

Note on shaft clamping length:

The dental bur shaft must be smooth along the minimal shaft clamping length and must not show any recesses/grooves.

- The min. shaft clamping length of KaVo miniature turbines is 9 mm
- The min. shaft clamping length of KaVo standard turbines is 11 mm
- If the bur is not fully inserted and seated into the chuck (clamping length) the front and rear bearings on the turbine will have uneven loading and fail prematurely.
- Non-approved dental bur (shaft has recesses/grooves in the clamping area)
- Consequences of non-compliance with manufacturer specifications:
 - The dental bur retention force may be too low due to a worn-out shaft and the dental bur may be released during the treatment.
 - The shaft can spin freely in the chuck and destroy the chuck.
 - There is a risk that the dental bur will drop out.
 - The ball bearings, gear wheels and chuck can be overloaded, e.g. by the dental bur being too long.