

Cordless endodontic treatment motorized handpiece

Rooter S

Operation Instructions



Thank you for purchasing the Rooter S.

For optimum safety and performance, read this manual thoroughly before using the unit and pay close attention to warnings and notes. Keep this manual in a readily accessible place for quick and easy reference.

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NOTICE TO PROTECT INTELLECTUAL PROPERTY

US PAT. 6929476
US DESIGN 648026

Prevent Accidents

Attention Customers

Do not fail to receive clear instructions concerning the various ways to use this equipment as described in this accompanying Operator's Manual.

Prevent Accidents

Most operation and maintenance problems result from insufficient attention being paid to basic safety precautions and not being able to foresee the possibilities of accidents. Problems and accidents are best avoided by foreseeing the possibility of danger and operating the unit in accordance with the manufacturer's recommendations. First thoroughly read all precautions and instructions pertaining to safety and accident prevention; then, operate the equipment with the utmost caution to prevent either damaging the equipment itself or causing bodily injury.



The following symbols and expressions indicate the degree of danger and harm that could result from ignoring the instructions they accompany:

WARNING

This warns the user of the possibility of extremely serious injury or complete destruction of the equipment as well as other property damage including the possibility of fire.

CAUTION

This warns the user of the possibility of mild injury or damage to the equipment.

The warning symbols () and caution symbols () that appear next to the main text on the right hand side of the page refer to and are explained by the Warnings and Cautions at the bottom of the page.

(Mandatory Action)

This alerts the user of important points concerning operation or the risk of equipment damage.

The user (e.g., healthcare facility, clinic, hospital etc.) is responsible for the management, maintenance and use of medical device.

This equipment must only be used by dentists and other legally licensed professionals.

Do not use this equipment for anything other than its specified dental purpose.

Disclaimer

- FKG will not be responsible for accidents, equipment damage, or bodily injury resulting from:
 1. Repairs made by personnel not authorized by FKG.
 2. Any changes, modifications, or alterations of its products
 3. The use of products or equipment made by other manufacturers, except for those by FKG.
 4. Maintenance or repairs using parts or components other than those specified by FKG and other than in their original condition
 5. Operating the equipment in ways other than the operating procedures described in this manual or resulting from the safety precautions and warnings in this manual not being observed
 6. Workplace conditions and environment or installation conditions which do not conform to those stated in this manual such as improper electrical power supply
 7. Fires, earthquakes, floods, lightning, natural disasters, or acts of God.

In Case of Accident

If an accident occurs, the Rooter S must not be used until repairs have been completed by a qualified and trained technician authorized by the manufacturer.

Intended Operator Profile

The Rooter S must only be used by dentists and other legally licenced professionals.

Patient Population

Age	Child to Elderly
Weight	N/A
Nationality	N/A
Sex	N/A
Health	It is not intended for use on patients wearing pacemakers or ICDs.
Condition	Conscious and mentally alert person. (Person who can stay still during treatment.)



CAUTION

- The Rooter S is not recommended for use in children under 12 years of age.

Warnings and Prohibitions

WARNING

- Except for ways described in this manual, this unit must not be connected to or used in combination with any other apparatus or system. It must not be used as an integral component of any other apparatus or system. FKG will not be responsible for accidents, equipment damage, bodily injury or any other trouble which results from ignoring this prohibition.
- A rubber dam should be used when performing endodontic treatment.
- No modification of this equipment is allowed.

PROHIBITION : This indicates when not to use the equipment.

- Electromagnetic wave interference could cause this unit to operate in an abnormal, random and possibly dangerous manner. Cellular phone, transceivers, remote controls and all other devices which transmit electromagnetic waves located inside the building should be turned off.
- Instruments which produce considerable electrical noise such as electric scalpels can cause the Rooter S to operate abnormally. Turn the Rooter S off before using any instruments that produce electrical noise.
- Do not use this instrument on patients who have a pacemaker or an Implantable Cardioverter Defibrillator (ICD). It could cause the pacemaker or the Implantable Cardioverter Defibrillator (ICD) to function abnormally.
- Illumination devices such as fluorescent lights and film viewers which use an inverter can cause the Rooter S to operate erratically. Do not use the Rooter S near lights such as these.
- This unit must not be connected to or used in combination with any other apparatus or system. It must not be used as an integral component of any other apparatus or system. FKG will not be responsible for accidents, equipment damage, bodily injury or any other trouble which results from ignoring the above prohibitions.
- Do not use this unit in the medical operation room.
- Blocked canals cannot be accurately measured.
- Do not perform maintenance while using the instrument for treatment.

* FKG is not responsible for any accidents or other types of trouble that are caused by not following the warnings and prohibitions noted above.

Features

■ Indications for Use

The Rooter S is a compact, cordless endodontic treatment motorized handpiece for preparation and enlargement of root canals. It may be connected to the S-Apex (FKG), an apex locator (sold separately).

It can be used to enlarge and prepare root canals, remove of gutta-percha point and softened dentin, and professional mechanical tooth cleaning.

Instructions for how to use the Rooter S when it is connected to the S-Apex are printed on a blue background like this one.

■ Liquid Crystal Display (LCD) :

The LCD is easy to read and shows all settings as well as how the motor is running.

■ Controls :

< OTR (Optimum Torque Reverse) mode >

If the file torque is less than the set value, the file will keep rotating in the forward direction.

When the file torque is more than the set value, the file will automatically start rotating 90° in reverse and 180° forward repeatedly. Furthermore, the OTR mode can set various motor controls as described below.

Speed :	100, 300, 500 rpm.
Torque Setting :	0.2, 0.4, 0.6, 0.8, 1.0 Ncm.
Auto Start & Stop* :	The file starts when it is inserted in the canal and stops when it is taken out.
Apical Reverse or Stop* :	The motor reverses or stops when the tip of the file reaches a preset position inside the canal.

< Normal Mode >

If the file torque is less than the set value, the file will keep rotating in the forward direction. When the file torque is more than the set value, the file will automatically start rotating in reverse direction.

Furthermore, the Normal mode can set various motor controls as described below.

Speed :	Eleven rotation speeds can be set from 50 to 1,000 rpm.
Torque Reverse :	The motor automatically reverses its rotation if the torque load exceeds the set value to reduce the risk of jamming.
Slow Down :	The file slows down as torque increases. The file slows down as it approaches the apex if the Rooter S is connected to the S-Apex.
Forward & Reverse :	The file may rotate in both forward and reverse directions.
Auto Start & Stop* :	The file starts when it is inserted in the canal and stops when it is taken out.
Apical Reverse or Stop* :	The motor reverses or stops when the tip of the file reaches a preset position inside the canal.
Apical Torque Reduction* :	The automatic torque reverse value is reduced as the file tip approaches the apex.

* These controls can be used if the Rooter S is connected to the S-Apex.

■ Memory:

Six combinations of speed, torque etc. can be memorized.




Parts Identification and Accessories

Parts Identification

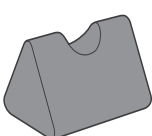




Accessories

■ Standard Accessories

Power Supply Cord (1)	Guide Bur (1)	LS Oil (1)
		

■ Optional Accessories

Handpiece Rest (1)	Transmission Cable (1)	Cap with External File Electrode (1)
		

Usage

■ Operation Conditions for Main Unit and Charger

Temperature: 10°C to 35°C (50°F to 95°F), Humidity: 30% to 80% (without condensation),

Atmospheric Pressure: 70 kPa to 106 kPa

* If the unit has not been used for some time, make sure it works properly before using it again.

(1) Before Use

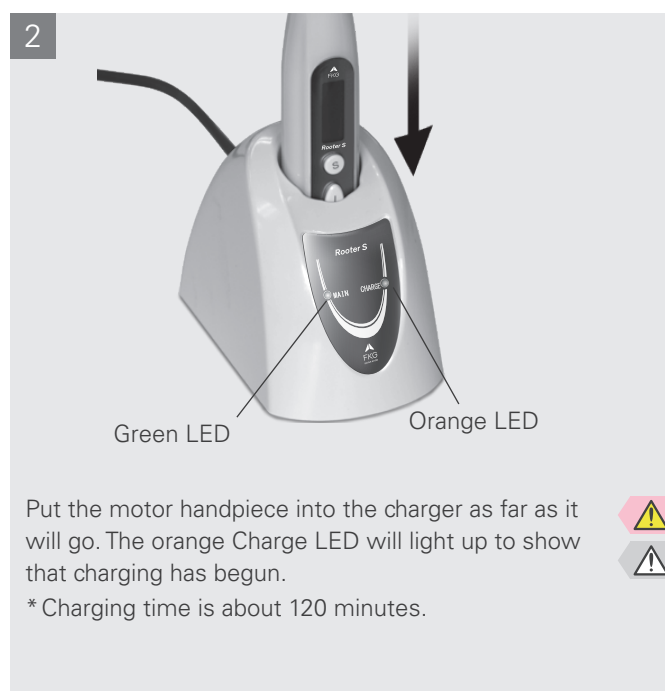
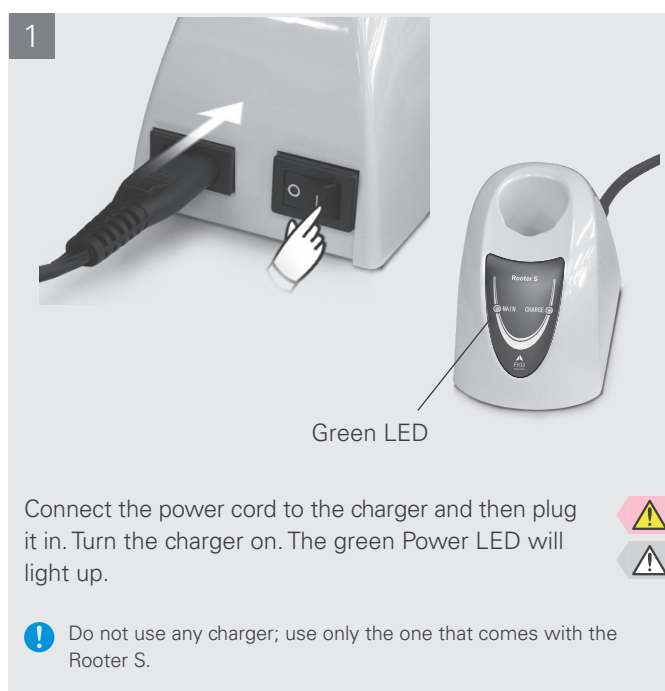
Check the following before using the instrument.

- Have autoclavable components been sterilized? Refer to page 30 "Sterilization".

Charge Battery

The battery is built into the motor handpiece.

* Ambient (room) temperature for charging is from 10°C to 35°C (50°F to 95°F).



- ⚠ Charge the battery as soon as the battery power indicator gets down to its last bar.
- ⚠ If the orange charge LED goes off immediately or doesn't light up when the motor handpiece is put into the charger, the battery is probably fully charged. To make sure, take the motor handpiece out and put it back in again.
- ⚠ Make sure the contact areas for the motor handpiece and charger are free of debris, especially metal fragments. Wipe with ethanol to remove any foreign debris. Do not press down too hard to wipe the charging areas; this could bend the electrical contacts.
- ⚠ Do not leave the charger where it will be exposed to direct sunlight.
- ⚠ Unplug the battery charger when it is not being used.

⚠ WARNING

- If an electrical storm occurs while the battery is being charged, do not touch the charger or its cord as there would be a risk receiving an electric shock.
- Do not get the charger wet or use it where it might get wet.

⚠ CAUTION

- The battery is not charged when the unit is shipped and must be charged before using the unit.
- Do not pull or yank the cord when disconnecting the power supply cord. Always grip the connectors.
- Use only the power cord provided and plug both ends all the way in.
- Charger and power supply cord must be located outside the so called patient environment (1.5 m around the patient location).

Charge Battery



The number of bars shows how much battery power is left.
Recharge the battery when there is only one bar left.



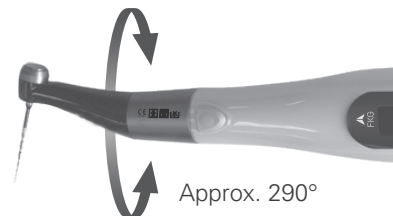
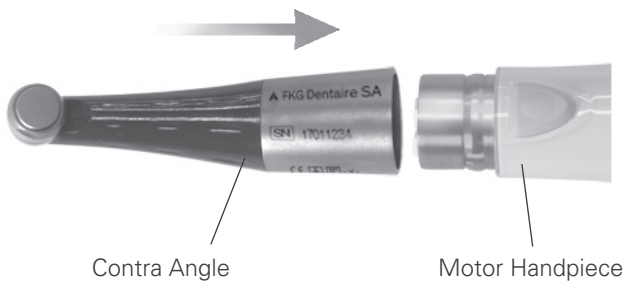
If the battery runs almost completely out, the Rooter S will automatically turn itself off after about 10 seconds. Recharge the battery as soon as possible.




If the battery power is very low and a large load is applied to the file, the motor may stop or the unit may turn itself off.

This is for safety; there may not be enough power to run the motor with sufficient stability. Recharge the battery if the display shown to the left appears frequently.

Connect Contra Angle



The rotation range of the contra angle is about 290°. Set it so that it reaches the treatment area and the display is easy to see.

 Do not force the contra angle to rotate beyond its limit.

Push the contra angle onto the motor handpiece until there is an audible click.

* The contra angle must be lubricated with the LS oil before using for the first time. Refer to page 29 "Lubrication".



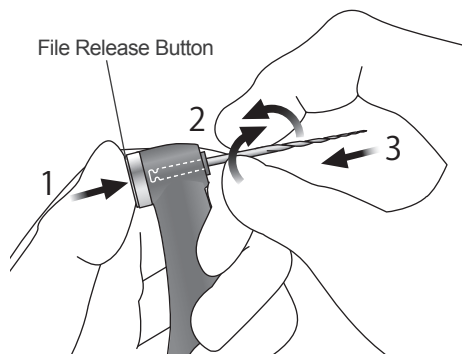
WARNING

- Make sure the connection components for both the motor handpiece and the contra angle are not damaged. An improper connection could cause the motor to reverse unexpectedly and result in injuring the patient.

CAUTION

- Push the contra angle all the way onto the motor handpiece and then give it a light tug to make sure it is securely attached.

File Installation



Hold down the file release button
Insert the file and turn it back and forth until it lines up with the latch mechanism.
Push the file all the way into the latch. Release the file release button.



- ! It's easiest to hold the button down if you put your index finger where the head joints the body.
- ! Use either Nickel-titanium or stainless steel files.

Calibration

* Before using right after purchase, whenever the motor handpiece or contra angle has been replaced, or if the motor alternates between forward and reverse rotation outside the canal, calibrate the instrument in the following way:



1. Make sure the battery is fully charged (three bars are displayed).
2. Put a commonly used file into the contra angle.
3. Turn the unit on and select memory M6.
4. Set the rotation mode for Rev.
5. Turn the unit off.
6. Hold down the plus and minus switches and turn the unit back on.

7. When "CO-Adjst" appears in the display, press the Select (S) switch.
The motor will start running. Make sure there is no load on the file.

8. When "Finished" appears in the display, the motor will stop and the calibration will be completed.
Press the main switch to go to the standby display.

* Once calibration has been completed, you may change the M6 setting and you may turn the unit off with a setting other than M6.

* If the unit uses a file electrode, calibrate the instrument by putting the electrode on the file and connecting the unit to a S-Apex unit which is turned on.

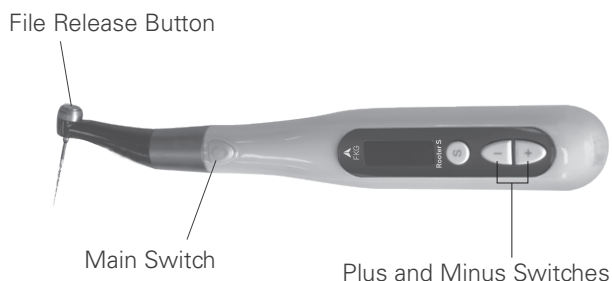
WARNING

- Never use deformed or damaged files.
- Give the file a light tug to confirm it is securely held in place. If the file is not securely placed, it could come out and injure the patient.
- Do not use reciprocal files (ones made to rotate back and forth). These could perforate the apical foramen when they reverse rotation.

CAUTION

- Use caution when inserting and removing files to avoid injury to fingers.
- Inserting and removing files without holding the file release button down will damage the chuck.
- Make sure the Rooter S is turned off before inserting or removing files.
- Do not connect the file electrode if the motor handpiece is not connected to the S-Apex.

Check Operation



Error:00
Chk-OM

If a malfunction occurs, the Rooter S will stop working. (Refer to page 37 "Troubleshooting".)

If this error display appears frequently, stop using the instrument and contact FKG. The number that appears after Error will depend on the type of malfunction.

- Make sure the angle and motor handpiece are properly and securely connected.
- Make sure the file is securely installed; give it a light tug.
- Check switch operation.

Turn the Main switch on and use the Plus or Minus switches to select a memory. Then press the main switch again to see if the Rooter S runs smoothly.



Refer to page 18 "Usage; Operation with S-Apex" for instructions on checking the Rooter S's operation when it is connected to the S-Apex.

⚠ WARNING

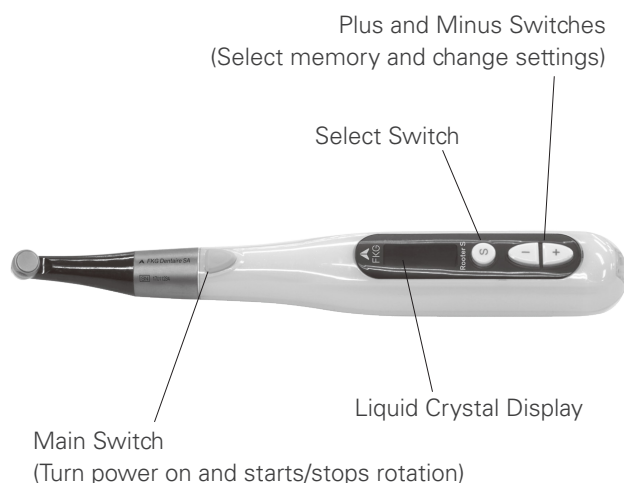
- Operate the Rooter S outside the oral cavity to make sure it will operate properly before using it for treatment.
- Some canals may be impossible to enlarge; always take an X-ray to check.
- Nickel-titanium file may suddenly snap depending on the curvature and shape of the canal; stop using the file if you notice or feel anything amiss.
- Files will eventually break due to metal fatigue and should be replaced before they reach this point.
- Electric noise or a malfunction could interfere with the motor control. Do not depend entirely on the unit controlling itself; always watch the display and be aware of tactile feedback.
- Files will jam and break if too much force is applied to them.
- Files may break even when the torque reverse is turned on, depending on the setting value. Never exert excessive force on the file.
- Files designed for use with engines break easily if too much force is applied. Also do not use these files for canals with excessive curvature.
- Always examine files for stretching and other deformities or damage before using them. Any type of deformity could result in the file breaking.
- Do not let the file release button on the contra angle press against the teeth opposite to the treatment area; this could cause the file to come out and result in an injury.
- Do not press the file release button while the motor is running. It could heat up and cause a burn, or the file could come out and cause an injury.

⚠ CAUTION

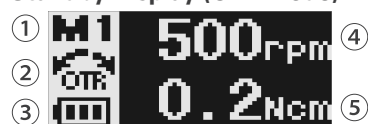
- Stop using the Rooter S if you feel or notice anything unusual. The Rooter S cannot be used for every canal and should be used along with manual enlargement.
- File break more easily at fast speeds; always follow the file manufacturer's usage recommendations. Also always check the speed settings before use.
- Do not use any type of files except nickel-titanium and stainless steel ones.
- Nickel-Titanium files are easily broken; note the following points.
 - Open the canal up to the apical constriction manually before using a nickel-titanium file.
 - Never use excessive force to insert the file.
 - First remove all foreign matter, such as bits of cotton from the root canal.
 - Never use excessive force to advance the file down the root canal.
 - Do not use for extremely curved canals.
 - Try not to trigger the auto torque reverse function when advancing the file down the canal.
 - Do not skip file sizes; suddenly using a much larger file could break it.
 - If you encounter resistance or the auto torque reverse is triggered, back the file up 3 or 4 mm and carefully advance it down the root canal again. Or replace the file with a smaller size. Never use excessive force.
 - Do not force the file down the root canal or press it against the root canal wall.
 - Do not use the same file continuously in one position as this may create "steps" on the root canal wall.
- Always take file out of the contra angle after use.

(2) Operation

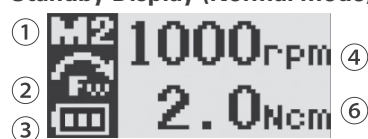
Basic Operation



Standby Display (OTR mode)

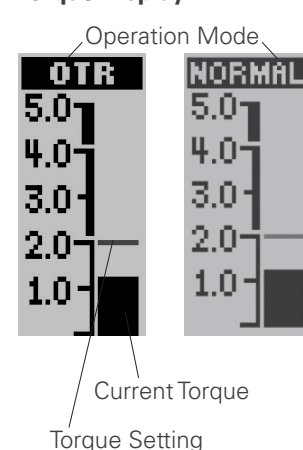


Standby Display (Normal mode)



- ① Memory Number
- ② Rotation Mode
- ③ Battery Power
- ④ Speed Setting
- ⑤ OTR Torque Setting
- ⑥ Torque Reverse Setting

Torque Display



1. Turn Rooter S On: Press Main switch.

The standby display will appear.

When the standby display is being shown, you can turn the Rooter S off by holding down the Select Switch and pressing the Main Switch

- * The Rooter S turns itself off automatically if it is not used for 3 minutes (initial setting).

2. Select Memory number: Press Plus or Minus switch.

- * There are six memories for various combinations of speed, torque reverse and rotation mode settings.
- * The backlight will temporarily change color if changing the memory number changes anything other than the speed, torque reverse, and rotation mode settings.

3. Start motor: Press Main switch again.

The Torque Display will appear.

- * If you hold the Main Switch down when you start the motor, it will run only while the switch is held down and stop when the switch is released.
- * You can temporarily change the torque reverse setting while the motor is running by pressing the Plus or Minus switch. (Normal mode only)
 - ! When the Apical Torque Reduction is turned on, the torque setting cannot be temporarily changed.
- * The color of the backlight changes depending on the load applied to the file.
- * The backlight starts blinking when the load approaches the torque reverse setting. While the OTR is triggered, the backlight does not blink.

4. Stop motor: Press Main switch again.

The standby display will reappear.

When connected to the S-Apex, refer to page 20 "Meter Display" for meter readings and operation.

⚠ WARNING

- Do not fail to check the new settings whenever you change the Memory Number.

⚠ CAUTION

- The temperature at the position 8 cm from the contra angle tip rises up to 48.3°C (118.9°F) when the ambient temperature is 35°C (95°F).
- When the OTR seems to be triggered too frequently, or it is triggered immediately after starting the normal rotation, increase the torque setting by one level.

Memory Settings

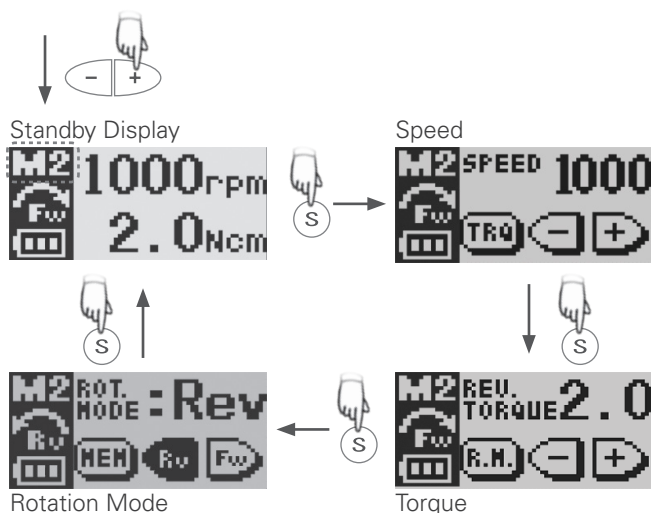
The initial settings are shown below. These settings can be changed.

Setting	Memory					
	M1	M2	M3	M4	M5	M6
Speed (rpm)	500	300	500	500	300	500
Reverse Torque or Trigger Torque (Ncm)	0.2			1.0		
Rotation Mode	OTR			Normal (Forward)		
Torque Slow Down	—			Off		
Linked Function**	On		Off	On		Off
Apical Reverse or Stop**	Reverse		—	Reverse		—
Auto Start or Stop**	On		Off	On		Off
Apical Slow Down**	—			Off		Off
Apical Torque Reduction**	—			Off		Off

** These functions are available only when connected to the S-Apex.

Memory Settings: Primary Functions

Primary Functions: Speed, Rotation Mode



Speed Settings:

< OTR mode >

100, 300 and 500 rpm

< Normal mode >

50, 100, 150, 200, 250, 300, 400, 500, 600, 800 and 1000 rpm

1. Select a memory number for the standby display by pressing the Plus or Minus switch.
2. Press the Select Switch to choose one of the primary functions.
3. Press the Plus or Minus switch to change the setting.

* The display will go back to the standby display if 5 seconds (initial setting) elapses without a switch being pressed.



Torque reverse values may differ somewhat depending on the motor and contra angle.

Torque Settings:

< OTR mode >

0.2, 0.4, 0.6, 0.8 and 1.0 Ncm

< Normal mode >

0.2, 0.4, 0.6, 0.8, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, and 5.0 Ncm

This function can also be turned off: TRL (torque reverse-less).

Rotation Mode:

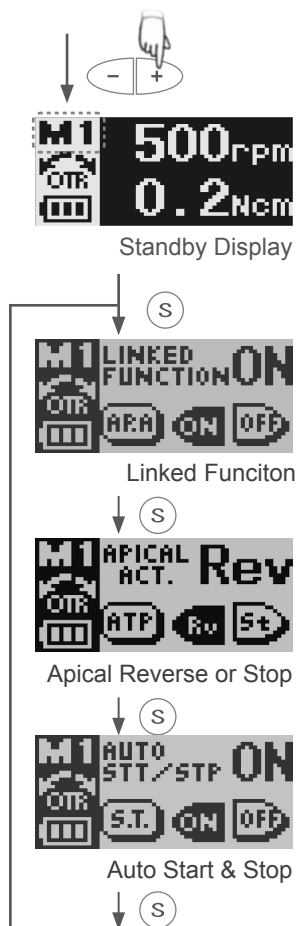
Normal (Fwd: Forward, Rev: Reverse), OTR

CAUTION

- If the torque limit is too high, the file could jam inside the canal and break.
- The torque settings must be changed depending on the root canal condition and the file.
- If the torque reverse seems to be activated too frequently increase its value.
- When the OTR mode (motor runs back and forth continuously) seems to be triggered too frequently, or it is triggered immediately after starting the normal rotation, increase the torque setting by one line. < OTR mode >

Memory Settings: Additional Operation Settings (OTR mode)

Additional Functions: Linked Function (Linked Func.**), Apical Reverse or Stop (APICAL ACT.**)
Auto Start or Stop (AUTO STT/STP**)



1. Select a memory number for the standby display; press the Plus or Minus switch.
2. Hold down the Select switch for at least 1 second to show the displays for additional operation settings.
3. Press the Select switch to go from one display to the next.
4. Change the setting; press the Plus or Minus switch.

* The display will go back to the standby display if 5 seconds (initial setting) elapses without a switch being pressed.

Linked Function**:

When this is turned on, Apical Reverse or Stop function be activated.

Apical Reverse or Stop**:

The file will reverse or stop when the file tip reaches the Flash Bar.
When Linked Function is turned off, this display will be skipped.

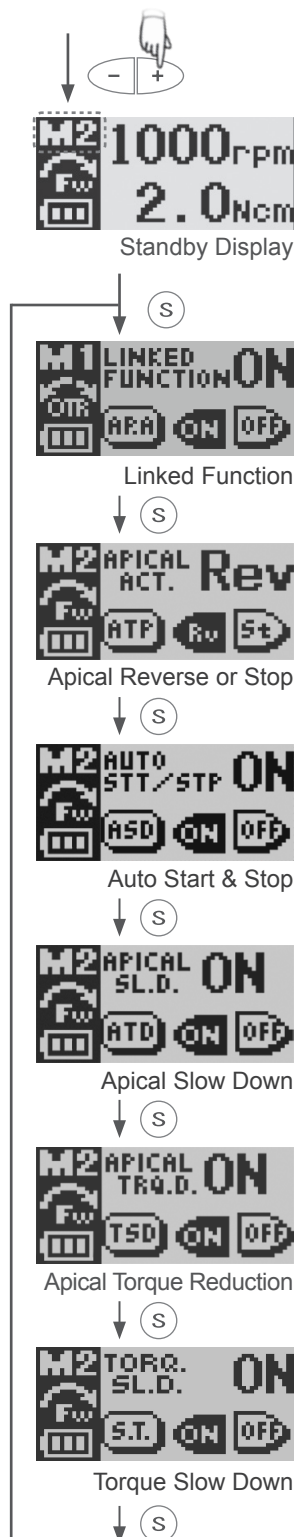
Auto Start & Stop**:

When this is turned on, the file starts rotating when it is inserted and stops when it is taken out of the canal.

** These functions are available only when connected to the S-Apex.

Memory Settings: Additional Operation Settings (Normal mode)

Additional Functions: Torque Slow Down (TORQ.SL.D.), Linked to canal measurement (APICAL ACT.**), Apical Reverse or Stop (APICAL ACT.**), Auto Start and Stop (AUTO STT/STP**), Apical Slow Down (APICAL SL.D.**), Apical Torque Reduction (APICAL TRQ.D.**)



1. Select a memory number for the standby display; press the Plus or Minus switch.
2. Hold down the Select switch for at least 1 second to show the displays for additional operation settings.
3. Press the Select switch to go from one display to the next.
4. Change the setting; press the Plus or Minus switch.

* The display will go back to the standby display if 5 seconds (initial setting) elapses without a switch being pressed.

Linked Function**:

When this is turned on, Apical Reverse or Stop function be activated.

Apical Reverse or Stop**:

The file will reverse or stop when the file tip reaches the Flash Bar.
When Apical Action Function is turned off, this display will be skipped.

Auto Start & Stop**:

When this is turned on, the file starts rotating when it is inserted and stops when it is taken out of the canal.

Apical Slow Down**:

When this is turned on, the file slows down as it approaches the Flash Bar.

⚠ Cannot be used along with Apical Torque Reduction function.

Apical Torque Reduction**:

When this is turned on, the torque setting that triggers reverse rotation is reduced as the file tip approaches the apex.

⚠ Cannot be used along with Apical Slow Down or Torque Slow Down functions.

⚠ If the Torque Reverse Less (TRL) is turned on, the Apical Torque Reduction function is disabled.

Torque Slow Down:

When this is turned on, the motor will slow down as the torque load increases.

⚠ Cannot be used along with Apical Torque Reduction function.

⚠ If the Torque Reverse Less (TRL) is turned on, the Torque Slow Down function is disabled.

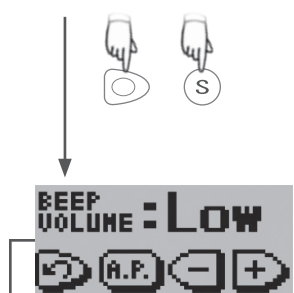
** These functions are available only when connected to the S-Apex.

Memory Settings: Other Settings

Other Settings: The initial settings are shown below.

Beeper (BEEP VOLUME)	Big	Right or Left Handed (DOMI. HAND)	Right
Auto Power Off (AUTO PWR)	3 min.	Backlight (B.L.COLOR CHANGE)	On
Positive/Negative Display (DISP. TYPE)	Posi	Return to Standby Time (S.S.R TIME)	5 sec.

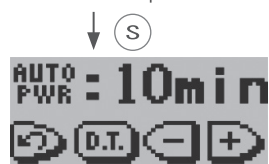
1. With unit turned off, hold down Select Switch and then press the Main Switch.
2. Press the Select Switch to select one of the settings.
3. Press the Plus or Minus switches to change the setting.
4. Press the Main Switch to return to the standby display.



Beeper Volume

Beeper Volume:

Press Plus or Minus switch to set beep volume used for switch operation and alarms at off, Low or Big.



Auto Power Off Time

Auto Power Off Time:

The time lapse for automatic shut off when the unit is not used can be set from 1 to 15 minutes. Press Plus or Minus switch to set the time.



Positive Display



Negative Display

Positive / Negative Display:

Set display for black on white background or vice versa.



Right Handed



Left Handed

Right or Left Handed:

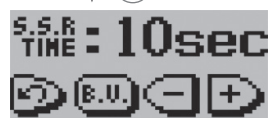
Set display for right- or left-handed user. Display turns up-side down for left-handed users.



Backlight Color Change

Backlight Color Change:

When this is turned on, the backlight will change color depending on torque and file tip location. It also changes color for setting displays. Does not change color when turned off.



Return to Standby Time

Return to Standby Time:

Set the time that elapses before display returns to standby from settings displays. Set from 1 to 15 seconds by pressing Plus or Minus switches.

Restore Default Memories

Restore the initial settings for the memories in the following way.

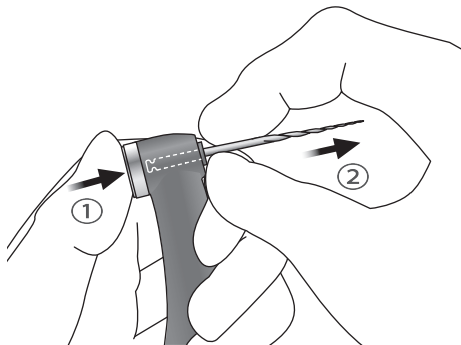
*This will restore the original memory settings. You cannot restore settings for just one memory.



1. Hold down the Select Switch, the Plus Switch and the Minus Switch and then turn the unit on with the Main Switch.
2. The "MemClear" display will appear. Press the Select Switch to restore the default memories or press the Main switch to cancel the operation.
3. Wait until the "Finished" display appears and then press the Main switch to go to the standby display.

(3) After Use

Take Out File



1. Hold down the Select switch and press the Main switch to turn the power off.

* The power will go off automatically if the unit is not used and no switches are pressed for 3 minutes.



2. Hold down the file release button and pull the file straight out.

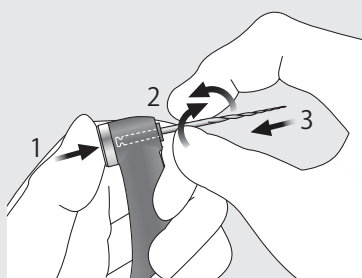
⚠ CAUTION

- Take care not to injure your fingers when inserting and removing files.
- Never insert or remove files without holding down the button; this will damage the chuck.
- Make sure the unit is turned off before inserting or removing files.

Usage; Operation with S-Apex



Install File Electrode



Hold the push button down and turn the file back and forth until it lines up with the notch and goes all the way in. Release the button to secure it.



WARNING

- Some files cannot use the built-in electrode to make measurement; always check for conductivity before using a file.
- Make sure the file goes all the way in. Give it a light tug to make sure it is held securely.
- Never use stretched, deformed or damaged files.
- Make sure the screw is tight enough. Otherwise, it might come out and be swallowed. Also, measurements might not be accurate.

CAUTION

- Never put file in or take them out without pressing the button down. This could damage the chuck. Always hold the button down to put a file in or take it out.
- Use only Ni-Ti or properly designed stainless steel files.
- Be careful not cut your finger when putting files in and taking them out.
- Do not let the cutting part of the file touch the electrode; this will wear it out very quickly.
- Some files cannot be used with this electrode.
- Also the files noted below cannot be used. To use these types of files, do not clip on the electrode and use the motor in manual mode.
 - Those with a file diameter of more than 1.2 mm.
 - Those with chuck shanks that are not perfectly round.
 - Gates-Glidden Drills
 - Those that have cutting sections with large diameters such as largo burs.
- Do not use files shanks larger than the ISO standard: Diameter 2.334 to 2.350 mm
- After use, do not fail to take the file out.

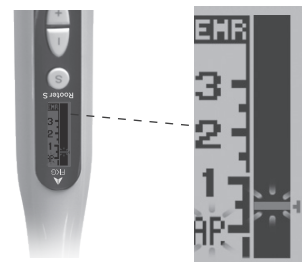
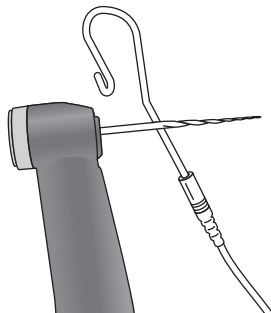
Connect Transmission Cable

* Refer to the user manual for the S-Apex.



- ! Do not mix up the cable plugs.
- ! Do not put stress on the transmission cable by twisting, bending, or stretching by wrapping it around the Rooter S or S-Apex.

Check Operation



- Make sure file electrode is making good contact with the file.
- Touch the file with the contrary electrode and make sure the meter goes all the way to its end and there are no segments that do not light up.

- ! Watch out because the motor might start up when you do this.

! WARNING

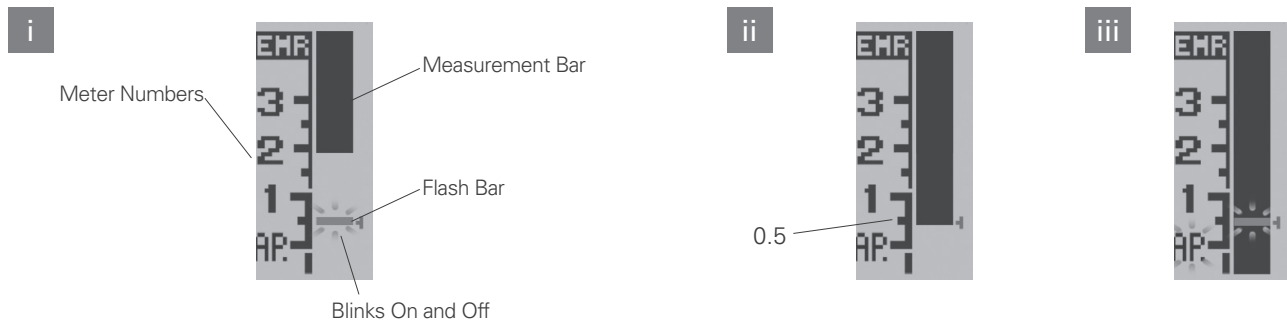
- Use only the special cable provided. Other cable could be electrically risky and result in damage or injury. Make sure the file goes all the way in. Give the file a light tug to make sure it is properly installed.
- Check the meter activity before each patient and do not use the instrument if all the segments of the display do not light up. This suggests that the meter cannot make an accurate reading.

! CAUTION

- Make sure the plugs go straight in.
- After insertion give plugs a light tug to make sure they are securely connected. Otherwise, data may not be transmitted accurately.
- Do not bump the plugs or drop anything on them when they are plugged in.

Meter Display

*Refer to the user manual for the S-Apex for information about canal measurement and for warnings and notes about use.



- The Measurement Bar shows the location of the file tip. The Flash Bar blinks on and off when the file is inside the canal.
 - The 0.5 meter reading shows where the file tip is about 0.5 to 1.0 mm from the anatomical apex.
 - If the file tip goes past the Flash Bar, an alarm will sound and the backlight will blink on and off.
- * The numbers 1, 2, and 3 on the meter do not indicate length in millimeters.



Operation

1

Contrary Electrode

Turn on the Rooter S and S-Apex.
The backlight for the display will be yellow.

Hook the Contrary Electrode in the corner of the patient's mouth.

⚠ WARNING

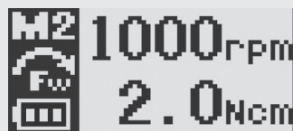
- In some cases such as a blocked root canal, a measurement cannot be made. (For details refer to the section of the S-Apex manual that covers canals not suitable for measurement.)
- Accurate measurement is not always possible, especially in cases of abnormal or unusual root canal morphology; always take an X-ray to check the measurement results.
- If the meter does not move when the file is inserted, the unit may be malfunctioning and must not be used.
- Do not use an ultra sonic scaler while the contrary electrode is hooked in the patient's mouth; noise from the scaler could cause the motor to start running resulting in an accident or injury.
- Absolutely never allow the contrary electrode, the handpiece file electrode or the connections for these to contact an ordinary AC power source such as a socket; this could result in a very serious and dangerous shock.

⚠ CAUTION

- Occasionally the meter will make a sudden and large movement as soon as the file is inserted into the root canal, but it will return to normal as the file is advanced down towards the apex.
- The contrary electrode, file electrode and metal parts of the contra angle could cause an adverse reaction if the patient has an allergy to metals. Ask the patient about this before using the Rooter S.
- Take care that medicinal solutions such as formalin cresol (FC) or sodium hypochlorite do not get on the contrary electrode or the contra angle. These could cause an adverse reaction such as inflammation.
- The file electrode cannot be used with the following types of files. Use these files without attaching the file electrode. Files with a shank diameter greater than 1.2 mm, Files with shanks that do not have a circular cross section, Gates Glidden Drills, Tools with large cutting heads such as largo burs.

Operation

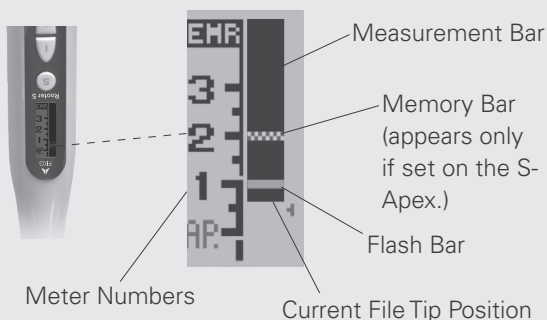
2



Select a memory number (M1 to M6) with the Plus or Minus switch.

- * Before using motor handpiece, use a small hand file, such as #10 or #15, to penetrate the root canal manually down to the apical constriction.
- * In some cases, a root canal cannot be measured because of an overflow of blood, saliva or chemicals or because the root canal is blocked.

3



The meter display appears when the file is inserted in to the canal. If the Auto Start and Stop is turned on, the motor will start running too.

- * The numbers 1, 2, and 3 on the meter do not indicate length in millimeters but are used to estimate how far the file tip has gone down the canal.
- * Press the Select switch to change the display to the Torque display. Press it again to go back to the canal meter display.

The motor will stop when the file tip reaches the point specified by the Flash Bar.

A single sustained beep will sound when this happens. If the unit is set for Apical Reverse, the motor will run backwards after it stops.*

If the load on the file exceeds the setting for torque reverse, the motor will stop and then reverse its rotation.* A rapid, repeated three-toned beep will sound when this happens.

The motor will stop when the file is taken out of the canal.*

Gradually increase the size of the file until the root canal preparation is completed.

If necessary, prepare the apical seat.

(* Depends on setting.)

- ! If the canal is very dry, the Auto Start may not be triggered; in this case, press the Main switch to start the motor.

⚠ WARNING

- Accurate measurements cannot be made in some cases because of shape or other conditions. Always check the measurement with an X-ray.
- Do not let the file or metal parts of the contra angle touch the oral mucosa. This could cause the motor to start running and result in injuring the patient.
- An accurate measurement cannot be made if all the connectors are not properly plugged in. If the meter does not move along with the file, stop using the instrument and check all the connections.

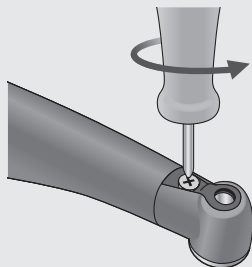
⚠ CAUTION

- The meter may not appear if the canal is infected or extremely dry. In this case, put a little hydrogen peroxide or saline solution in the canal but do not let it overflow.

Rotor Axle and Built-in Electrode Cleaning

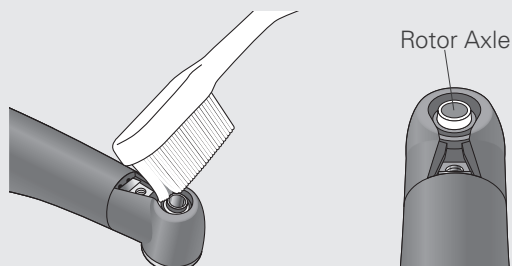
* If the bars flicker during use, or if all the bars in the meter do not light up when the file touches the contrary electrode, clean the rotor axle and the built-in electrode in the following way.

1



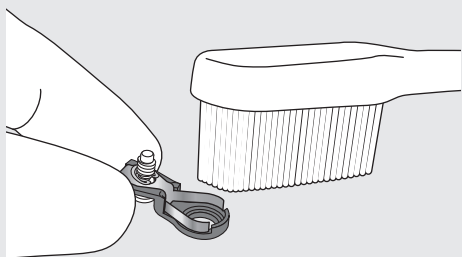
Take out the screw and then take out the built-in electrode.

2



Put a little Ethanol for Disinfection (Ethanol 70 to 80 vol%) on a brush and clean the rotor axle with it.

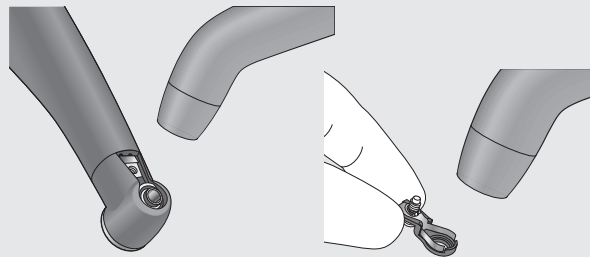
3



Clean the built-in electrode with the brush.

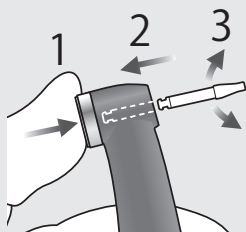


4



Blow air on the electrode to remove any remaining moisture.

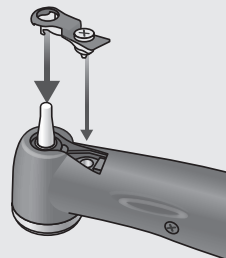
5



Hold the push button and slide the guide bur straight in as shown in the illustration. Then rotate it left and right.



6



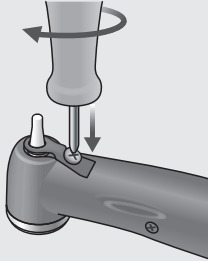
Slide the built-in electrode onto the guide bur and line up the screw holes.

CAUTION

- Do not bend or deform the electrode.
- Always use the guide bur and make sure it will not come out. If the guide bur is not properly fix in place, the internal contact could be bent, and then the instrument might not be able to make accurate measurements or else it might malfunction.
- Do not run the motor with the guide bur inserted; this could damage the instrument.

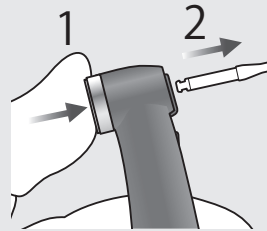
Rotor Axle and Built-in Electrode Cleaning

7



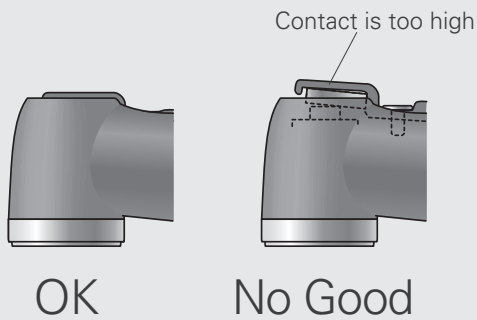
Slowly turn the screw and make sure the built-in electrode goes into the head properly.

8



Tighten the screw up securely and then hold down the push button and pull out the guide bur.

9



Contra angle must be lubricated with the LS oil. Refer to page 29 "Lubrication".



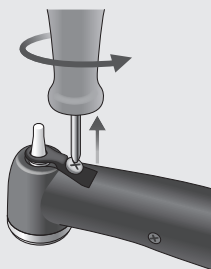
WARNING

- Make sure the screw is tight enough. Otherwise, it might come out and be swallowed. Also, measurements might not be accurate.

Replace Built-in Electrode with Cap with External File Electrode

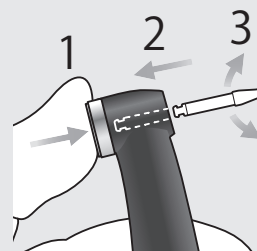
! If there is no electrical conductivity between the file and its shank, replace the cap with the one that has an external file electrode (sold separately).

1



Loosen the screw and take off the built-in electrode.

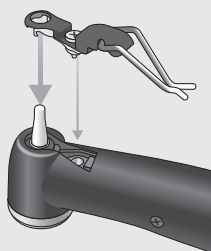
2



Hold the push button and slide the guide bur straight in as shown in the illustration. Then rotate it left and right.

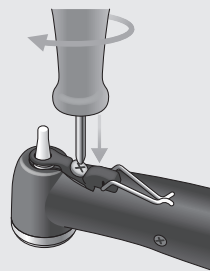


3



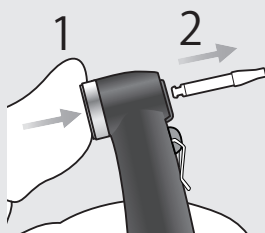
Slide the cap with the electrode onto the guide bur and line up the screw holes.

4

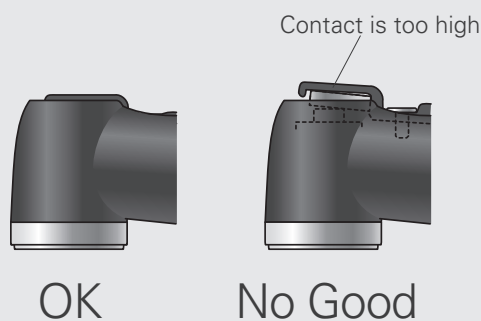


Slowly turn the screw and make sure the cap goes into the head properly.

5



Tighten the screw up securely and then hold down the push button and pull out the guide bur.



⚠ WARNING

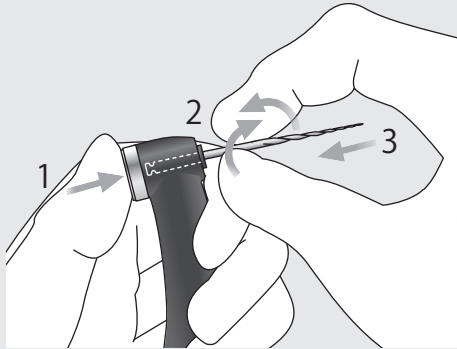
- Make sure the screw is tight enough. Otherwise, it might come out and be swallowed. Also, measurements might not be accurate.

⚠ CAUTION

- Always use the guide bur and make sure it will not come out. If the guide bur is not properly fix in place, the internal contact could be bent, and then the instrument might not be able to make accurate measurements or else it might malfunction.
- Do not run the motor with the guide bur inserted; this could damage the instrument.

Replace Built-in Electrode with Cap with External File Electrode

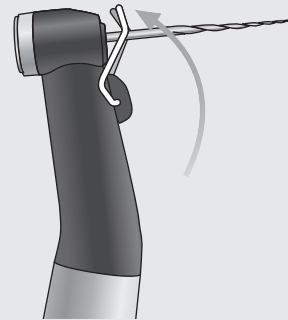
6



Hold the push button down and turn the file back and forth until it lines up with the notch and goes all the way in. Release the button to secure it.



7



Lift the electrode up and clip it onto the file.

! Always clip the electrode on the file when using it. Otherwise, measurements may not be accurate or rotation may not be properly controlled. (It may not be possible to measure a canal if blood or some other liquid overflows the canal or if the canal is completely blocked.)

⚠ WARNING

- Make sure the file goes all the way in. Give it a light tug to make sure it is held securely.
- Never use stretched or other damaged files.
- Make sure the screw is tight enough. Otherwise, it might come out and be swallowed. Also, measurements might not be accurate.
- Replace the external file electrode if it is worn out as shown in the photo to the left.



⚠ CAUTION

- Do not let the cutting part of the file touch the electrode; this will wear it out very quickly.
- Some files cannot be used with this electrode.
- Also the Ni-Ti files noted below cannot be used.
 - Those with a file diameter of more than 1.2 mm.
 - Those with chuck shanks that are not perfectly round.
 - Gates-Glidden Drills
 - Those that have cutting sections with large diameters such as largo burs.
- To use these types of files, do not clip on the electrode and use the motor in manual mode.
- Do not use files with shanks larger than the ISO standard.
ISO Standard: Diameter 2.334 to 2.350 mm
- After use, do not fail to take the file out.

Maintenance

Be sure to follow the procedure below when performing daily maintenance.



*Only for the contra angle.

- Components maintained this way:



Contra Angle

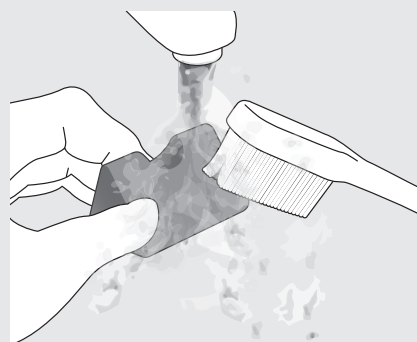


Handpiece Rest (option)

- ! Take out the file before cleaning the contra angle.
- ! For other components, refer to page 28 “Disinfection (other than Contra Angle): Wipe with Ethanol” for how to perform disinfection.

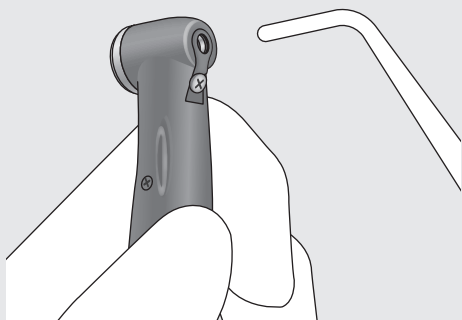
Cleaning

1



Disconnect the contra angle from the motor handpiece. Clean off the cutting debris in running water with a soft brush and then wipe off the water.

2



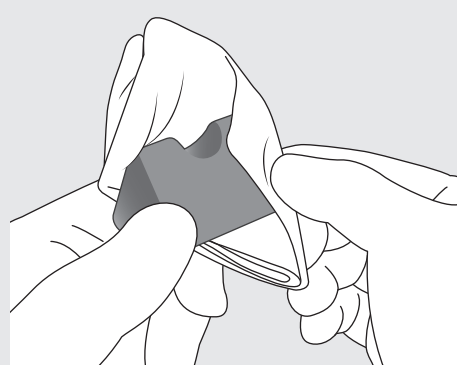
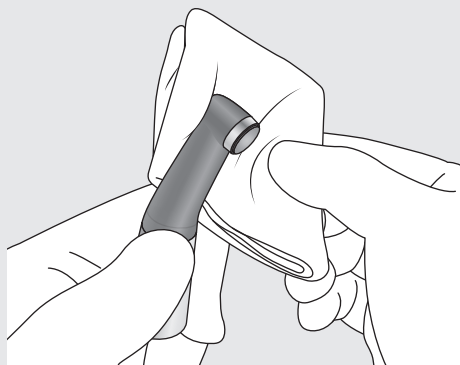
Dry the contra angle including its inside with air from the syringe or by another such method.

- ! If a medical agent being used for the treatment has adhered to the contra angle, wash it off in running water.
- ! Do not clean the contra angle ultrasonically.
- ! After washing is complete, check to see if the contra angle, including its inside, is completely dry. If any water remains inside the handpiece, expel it with an air gun or another such tool. Failure to do so could result in the remaining water coming out during use and cause poor lubrication or sterilization.
- ! If dust or other impurities enter the contra angle, they may cause poor rotation.

CAUTION

- Be careful to avoid cross contamination when performing maintenance.

Disinfection



Wipe the entire component with a piece of gauze dampened with Ethanol for Disinfection (Ethanol 70 to 80 vol%).

- ! Never wipe the components with any solution other than Ethanol for Disinfection (70 to 80 vol%).
- ! If too much Ethanol for Disinfection is applied to the piece of gauze, it will seep into the contra angle and cause a malfunction.
- ! If dust or other impurities enter the handpiece, they may cause poor rotation.
- ! Do not immerse the components in or wipe it with any of the following: functional water (acidic electrolyzed water, strong alkaline solution, and ozone water), medical agents (glutaral, etc.), medicinal solutions (FC: formalin cresol, sodium hypochlorite, etc.) or any other special types of water or commercial cleaning liquids. Such liquids may result in plastic degradation, metal corrosion and adhesion of the residual medical agent to the components. If any of these liquids being applied to the components, wash it off in running water.

Operating Conditions for High-Temperature Washer-Disinfectors



* When using a high-temperature washer-disinfector to clean the contra angle, strictly adhere to the conditions specified below.



High-temperature cleaning conditions

Unit Name	Mode	Detergent (concentration)	Neutralizer* (concentration)	Rinse (concentration)
Miele G7881	Vario TD	neodisher mediclean (0.3 – 0.5%)	neodisher Z (0.1 – 0.2%)	neodisher mieclear (0.02 – 0.04%)

* After cleaning, there may be streaks or white spots on the contra angle. Use a neutralizer only if there are streaks or white spots.

Operating Precautions

- Always use a handpiece holder when washing the contra angle, making sure to rinse the inside of the contra angle thoroughly.
- If any medical agent remains inside the contra angle, it may corrode, resulting in a malfunction of the contra angle.
- For details on handling medical agents or adjusting their concentration, refer to the user manual for the washing device.
- After washing is complete, check to see if the contra angle, including its inside, is completely dry. If any water remains inside the contra angle, expel it with an air gun or another such tool. Failure to do so could result in the remaining water coming out during use and cause poor lubrication or sterilization.
- Always lubricate the contra angle after washing.

CAUTION

- Inappropriate cleaning methods and solutions will damage the contra angle.
- Do not clean the contra angle using strong acidic or alkaline solutions that could cause the metal to corrode.
- Do not leave the components inside a high-temperature washer-disinfector.

Disinfection (other than Contra Angle): Wipe with Ethanol

Components Disinfected with Ethanol : Motor Handpiece, Charger, Power Cord, Transmission Cable

Dampen a piece of gauze with ethanol, wring it out and then wipe these components with it.

- ! Never wipe components with any solution other than Ethanol for Disinfection (70 to 80 vol%). Other solutions could cause cracking and discoloration.
- ! Never wipe components with a piece of gauze that is excessively wet with Ethanol for Disinfection (Ethanol 70 to 80 vol%). Do not apply or spray with any fluid. Also, do not immerse in any fluid or wash with water. It could seep inside the instrument and damage it. Be especially careful around the connection jacks for the transmission cable.
- ! Avoid spilling chemical solutions used for treatment on the motor handpiece, charger, contra angle or any other components. These chemicals could damage, deform or discolor plastic and metal. Use extra caution to avoid spilling formalin cresol (FC) and sodium hypochlorite as they are quite strong. Wipe up any chemical spills immediately. (Some chemicals may leave traces even if wiped up immediately.)
- ! Use only Ethanol for Disinfection (Ethanol 70 to 80 vol%) and OPTI-CIDE-3™ Surface Wipes for cleaning. Any other cleaning chemical or products should not be used including but not limited to the following cleaning products and similar cleaning products listed below because of the potential damage to the plastic components of the Rooter S.
 - CaviWipes™
 - CaviCide™
 - SANI-CLOTH™

* The “™” mark indicates that each trade name is a trademark or registered trademark owned by the manufacturer in US or other territories.

Lubrication

Before autoclaving, make sure that you lubricate and clean the contra angle with the LS oil.



1



Place the contra angle in a paper cup with the connection end facing up.

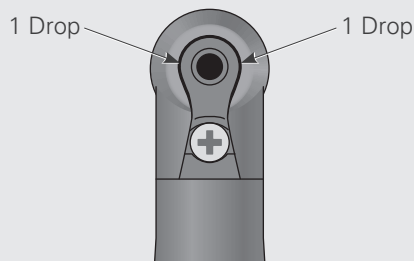


2



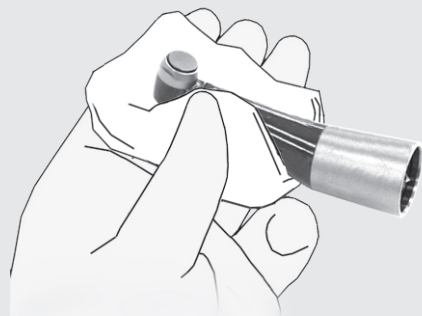
Put 5 drops of the LS Oil on the gear and wait for 10 minutes.

3



Put a drop of the LS oil in each of the two points between the built-in electrode and the head as indicated by the arrows in the illustration.

4

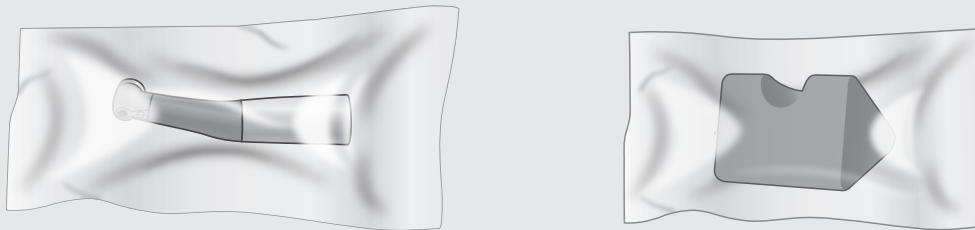


Take the contra angle out of the paper cup and wipe off any excess oil which may have seeped out. Dampen a piece of gauze with ethanol, wring it out and then wipe the contra angle with it.

CAUTION

- Use only the LS oil for lubrication.
- Put the cap on after use. Oil could seep out if the container is tipped over or the nozzle points down.
- After lubricating, wipe oil from the outside of the nozzle. Otherwise oil may seep out from under the cap.
- Failure to clean and lubricate the handpiece before autoclaving will lead to a malfunction of the handpiece.
- Leave the contra angle in the paper cup for at least 10 minutes so that the oil is thoroughly absorbed by the contra angle mechanism.

Packing



Individually place the contra angle and handpiece rest in a sterilization pouch.

Sterilization

Autoclave the contra angle and handpiece rest after use for each patient.

Recommended temperature and time:

In a sterilization pouch, minimum 6 minutes at 134°C (273.2°F) or minimum 60 minutes at 121°C (249.8°F).

Minimum drying time after sterilization:

10 minutes.



- ! Never autoclave the motor handpiece.



- ! Never autoclave the motor handpiece.
- ! Do not sterilize the autoclavable components by any method other than autoclaving.
- ! Do not leave the components in the autoclave.
- ! Take the file out of the contra angle before autoclaving it.
- ! For sterilizing files, follow the manufacturer's recommendations.
- ! Autoclaving and drying temperatures must never exceed 135°C (275°F). Excess temperature could cause the components to malfunction or could cause discoloration.
- ! Clean everything thoroughly before autoclaving. Any chemicals or foreign debris left on components could cause them to malfunction or could cause discoloration.

WARNING

- To prevent the spread of serious, life-threatening infections such as HIV and hepatitis B, the contra angle and handpiece rest must be autoclaved after each patient's treatment has been completed.

CAUTION

- The components are extremely hot after autoclaving; do not touch until they cool off.

Replacement Parts, Transport and Storage Conditions

(1) Replacement Parts

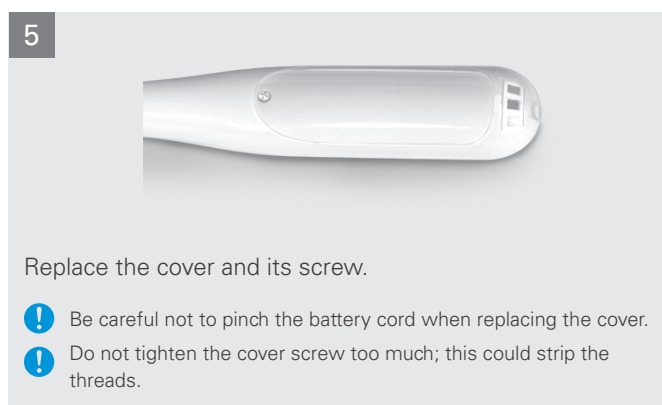
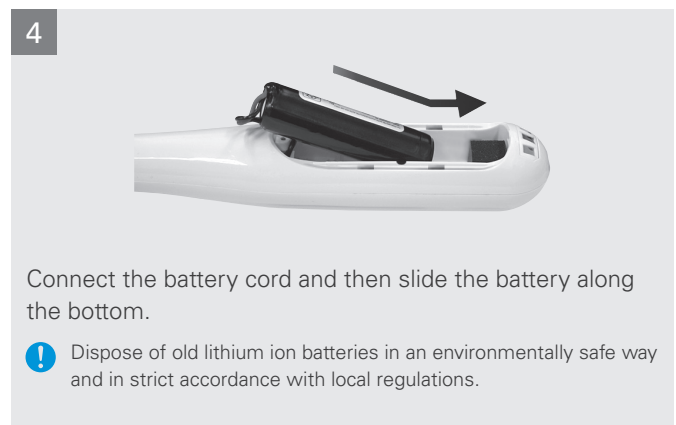
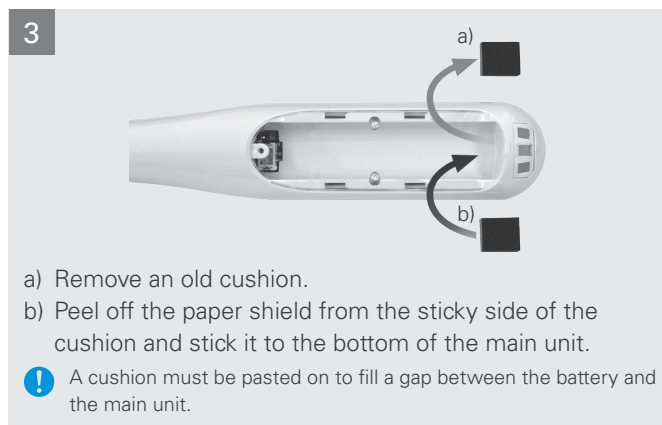
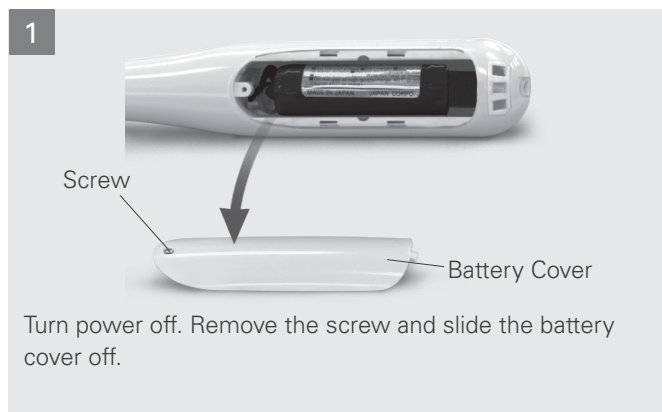
* Replace the parts as necessary depending on degree of wear and length of use.

* Order parts from FKG.

Battery Replacement

Replace the battery when it starts to lose power relatively quickly after being fully charged.

The battery will last for approximately 1 year under normal circumstances and use.



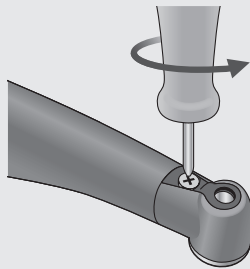
CAUTION

- Use only the battery designed for the Rooter S. Other types could cause overheating.
- Do not use a battery if it is leaky, deformed, discolored or if its label is peeled off. It might overheat.

Built-in Electrode Replacement

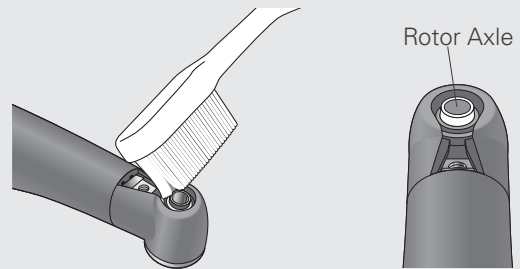


1



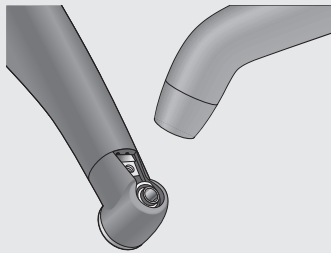
Take out the screw and then take out the built-in electrode.

2



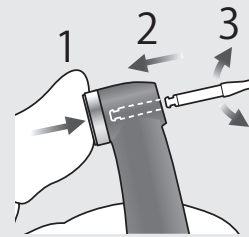
Put a little Ethanol for Disinfection (Ethanol 70 to 80 vol%) on a brush and clean the rotor axle with it.

3



Blow air on the electrode to remove any remaining moisture.

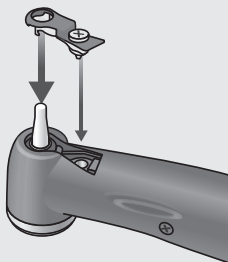
4



Hold the push button and slide the guide bur straight in as shown in the illustration. Then rotate it left and right.

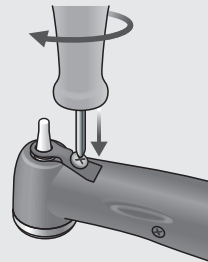


5



Slide the built-in electrode onto the guide bur and line up the screw holes.

6



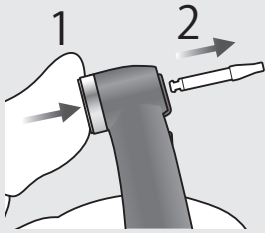
Slowly turn the screw and make sure the built-in electrode goes into the head properly.

CAUTION

- Always use the guide bur and make sure it will not come out. If the guide bur is not properly fix in place, the internal contact could be bent, and then the instrument might not be able to make accurate measurements or else it might malfunction.
- Do not run the motor with the guide bur inserted; this could damage the instrument.

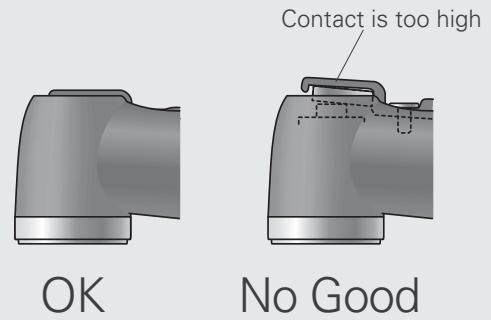
Built-in Electrode Replacement

7



Tighten the screw up securely and then hold down the push button and pull out the guide bur.

8



Contra angle must be lubricated with the LS oil. Refer to page 29 "Lubrication".

WARNING




- Make sure the screw is tight enough. Otherwise, it might come out and be swallowed. Also, measurements might not be accurate.

(2) Transport and Storage Conditions

Transport and Storage Conditions for the main unit and the charger:

Temperature: -10°C to 45°C (14°F to 113°F), Humidity: 10% to 85% (without condensation),

Atmospheric Pressure: 70 kPa to 106 kPa

-  Do not expose to direct sunlight frequently or for long times.
-  If the unit has not been used for a long time, make sure it works properly before using.
-  Always remove the battery prior to storing or shipping the unit.

Inspection and Warranty

Regular Inspection

- * Maintenance and inspection are generally considered to be the duty and obligation of the user, but if, for some reason, the user is unable to carry out these duties, contact FKG for technical support.
- * Replace the parts listed in the Parts Lists as necessary depending on degree of wear and length of use.
- * This apparatus should be inspected every 6 months in accordance with the following maintenance and inspection items.

Inspection Items

1. Check that the battery does not seem to be losing its charge too quickly.
2. Check that pressing the Main Switch turns the unit on. After the unit is on, check that pressing the Main switch turns the motor on and off. Check that the unit turns off when the Main Switch is pressed while the Select switch is being held down.
3. Check that pressing the Plus and Minus switches changes the memory number from M1 through M6.
4. Check that the settings for each memory can be changed.
5. Make sure the connection end of the motor handpiece is not damaged or dirty.
6. Make sure that the connection end of the contra angle is not damaged or dirty and that it can be securely connected to the motor handpiece. Make sure that the file release button operates properly and that files can be securely installed.
7. When used with the S-Apex, touch the file with the contrary electrode and make sure that all the segments for the meter light up properly.

* For repairs contact FKG.

Parts List

Rooter S Head W/ Built-in Electrode
(Contra Angle)
Code No. 08.961.00.001.FK



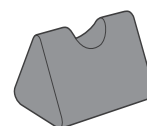
Lithium-Ion Battery
Code No. 08.961.00.002.FK



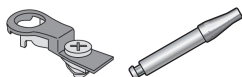
LS Oil
Code No. 08.961.00.003.FK



Handpiece Rest
Code No. 08.961.00.004.FK



Built-in Electrode with Guide Bur
Code No. 08.961.00.005.FK



Rooter S Charger
Code No. 08.961.00.006.FK



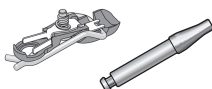
Power Supply Cord
Code No. 08.961.00.007.FK



Rooter S Motor Handpiece
Code No. 08.961.00.008.FK



Cap with External File Electrode (with Guide Bur)
Code No. 08.961.00.009.FK



Transmission Cable
Code No. 08.911.00.001.FK



Maintenance and Inspection Items

■ Disposal of Medical Devices

Any medical devices which could possibly be contaminated must be first decontaminated by the responsible doctor or medical institution and then be disposed of in accordance with local laws and regulations.

The rechargeable battery should be recycled. Metal parts of the equipment are disposed as scrap metal. Synthetic materials, electrical components, and printed circuit boards are disposed as electrical scrap. Material must be disposed according to the relevant national legal regulations. Consult specialized disposal companies for this purpose. Please inquire of the local city/community administrations concerning local disposal companies.

■ Service

The Rooter S should be repaired and serviced by J. MORITA's authorized technicians.
Please contact and call FKG's local dealer for more details.

Warranty

■ 2 Year Limited Warranty

1. FKG gives a guarantee for two years beginning from the date of purchase. Within this period any defect that is due to faulty manufacturing or material will be remedied by repair or replacement at the judgment of FKG.
2. Warranty repair and service: in the event of a claim under this warranty, please contact with FKG's local dealer.
3. In the case of damage caused by wear and tear, careless handling and repairs not carried out by FKG, the warranty ceases to be valid. This guarantee may not form the basis for any claims for damages, in particular not for compensation of consequential damages.

The buyer assumes responsibility for damage due to dropping of the unit, improper use and utilization of product and chemicals other than those stated in this instruction manual for cleaning. It is the customer's responsibility to maintain the exact rated voltage indicated at the bottom of the unit, and the office maintains electrical outlets for proper performance of the charger.

4. This warranty does not include the external accessories, built-in electrode or batteries.

Troubleshooting

If the instrument does not seem to be working properly, the user should first try to inspect and adjust it himself.

* If the user is unable to inspect the instrument himself or if the instrument fails to work properly after being adjusted or after parts are replaced, contact FKG.

Problem	Check Points	Response
Does not turn on.	<ul style="list-style-type: none"> • Check battery power. • Check battery installation. 	<ul style="list-style-type: none"> • Charge battery • Install battery properly.
No beeping sound.	<ul style="list-style-type: none"> • Check if sound is turned off. 	<ul style="list-style-type: none"> • Set beep volume for Low or Big
Beep sounds even when unit is not being used.	<ul style="list-style-type: none"> • Unit may be set for reverse rotation. 	<ul style="list-style-type: none"> • A beep sounds periodically whenever the unit is set for reverse rotation. Turn the beeper off if it is annoying. (This will stop all beeping except when the unit is turned on.)
Backlight color does not change.	<ul style="list-style-type: none"> • See if this function has been turned off. 	<ul style="list-style-type: none"> • Turn this function on, if necessary.
Motor does not start when file is inside canal.	<ul style="list-style-type: none"> • Is S-Apex properly connected and turned on? • Is the contrary electrode for the S-Apex hooked in the patient's mouth? • Is "Apical Action Function" setting turned off? • Is Auto Start & Stop turned off? • Has the meter gone past the Flash Bar? 	<ul style="list-style-type: none"> • Check transmission cable connections. Turn on the S-Apex. • Hook the contrary electrode in the corner of the patient's mouth. • Turn "Apical Action Function" setting on. • Turn "Auto Start & Stop" setting on. • Set the Apical Stop or Reverse for Reverse (REV).
Motor starts but then stops right away.	<ul style="list-style-type: none"> • Did you hold down the Main switch for more than 1 second? • Does "Abn.Stop LowBat" appear in the display? 	<ul style="list-style-type: none"> • If you hold the Main switch down for more than 1 second, the motor runs only while the switch is held down and stops when it is released. The motor will run without stopping if you release the switch in less than 1 second. • Very low battery power. Charge battery.
Motor reverses rotation on its own.	<ul style="list-style-type: none"> • Check Torque Reverse setting. • Check Apical Reverse setting. 	<ul style="list-style-type: none"> • The torque reverse can be turned off (TRL setting). • You can change the Apical Reverse setting to Apical Stop.
Motor reverses rotation too quickly.	<ul style="list-style-type: none"> • Check Torque Reverse setting • Is the Apical Torque Reduction setting turned on? 	<ul style="list-style-type: none"> • Increase the torque reverse setting. • The torque reverse value goes down as the file approaches the apex if the Apical Torque Reduction is turned on. Turn this function off to keep the torque reverse value constant.
Motor runs back and forth continuously	<ul style="list-style-type: none"> • Is it set for OTR mode? • Does it do this even after calibration? 	<ul style="list-style-type: none"> • Torque load is greater than the setting for the OTR mode. • Increase the torque setting by 1. <p>* See page 10 for how to calibrate the instrument.</p>

Problem	Check Points	Response
Meter is not stable during use.	<ul style="list-style-type: none"> Does the built-in electrode need replacement? Has it been replaced recently? Is the screw for the built-in electrode loose? 	<ul style="list-style-type: none"> Clean and lubricate contra angle. Take out the built-in electrode and clean it and the rotor axle with a brush. Replace the built-in electrode. Tighten the screw.
Motor handpiece will not go in reverse rotation.	<ul style="list-style-type: none"> Is Torque Reverse setting turned on? Is Torque Reverse setting too high? Is "Apical Action Function" setting turned off? Is the S-Apex set for Apical Stop? 	<ul style="list-style-type: none"> Set torque reverse value Reduce torque reverse value Turn "Apical Action Function" setting on. Change Apical Stop to Apical Reverse.
Micromotor changes speed on its own.	<ul style="list-style-type: none"> Is Apical Slow Down setting tuned on? Is Torque Slow Down setting tuned on? 	<ul style="list-style-type: none"> When this is turned on, the motor slows down as the file approaches the apex. Refer to page 15 for how to turn this setting on and off. When this is turned on, the motor slows down as the torque increases. Refer to page 15 for how to turn this setting on and off.
Unit turns off by itself.	<ul style="list-style-type: none"> Was the unit no used for a long time? Does "Please Charge" appear in the display? This can happen if the battery is very low and a large load is applied to the file. 	<ul style="list-style-type: none"> Auto power off was probably activated. Press the Main switch to turn the unit back on. Battery must be charged right away. Battery must be charged right away.
Error 01	<ul style="list-style-type: none"> Turn the unit off and disconnect the transmission cable; does the same error message appear when the unit is turned back on? Is there some debris on the connector for the transmission cable? Does the error message appear when the transmission cable is twisted or bent sharply? 	<ul style="list-style-type: none"> If the instrument's operation is restored by disconnecting the transmission cable, the problem was only temporary and there is nothing wrong with it. If the same error occurs after disconnecting the transmission cable, there is probably something wrong with the instrument. Contact FKG. If there is, clean the connector. There could be a broken wire inside the cable; replace it with a new one.
Error 04	<ul style="list-style-type: none"> Does this happen repeatedly? 	<ul style="list-style-type: none"> There may be something wrong with the control board. (In this case, memory settings cannot be saved, but they can still be changed even though they will not be saved.)
Error 06	<ul style="list-style-type: none"> Does this happen repeatedly? 	<ul style="list-style-type: none"> The motor circuits may be malfunctioning. Have the instrument repaired.

Technical Specifications

Specifications

*Specifications may be changed without notice due to improvements.

Name	Rooter S
Model	TR-CM
Degree of Protection (IEC 60529)	IPX 0
Intended Use	The Rooter S is a compact and cordless endodontic treatment motorized handpiece for preparation and enlargement of root canals. It can be connected to the S-Apex, and apex locator (sold separately). It can be used to enlarge and prepare root canals, remove gutta-percha and softened dentin, and perform professional mechanical tooth cleaning (PMTc).
Operating Principle	By electric drive, the Rooter S transmits motion, such as rotation and vibration, to treatment instruments (dental files, reamers, etc.).
Degree of Protection (IEC 60529)	IPX 0
Essential Performance	None (There is no unacceptable risk.)
Expected Service Life	6 years

Handpiece	
Free Running Operation Speed	50 ±5 to 1,000 ±100 r/min
Gear Ratio	1.9:1
Usable Burs	Type 1 (CA)
Rated Torque	Min. 4 N•cm
Chuck Type	Push button latch type
Protection against Electric Shock	Internal powered ME equipment / Type BF
Battery	Lithium ion battery (DC 3.7 V)
Dimensions	Approx. Dia. 28 × Length 196 mm (including contra angle and motor handpiece)
Weight	Approx. 100 g (including contra angle and motor handpiece)
Coupling Identification	Rooter S coupling
Applied Part	Contra angle, Motor handpiece

Battery Charger	
Rated Input Voltage	A.C. 100 – 240 V
Frequency	50/60 Hz
Power Consumption	19 VA
Protection against Electric Shock	Class II / No applied part
Dimensions	Approx. Height 85 × Width 68 × Length 108 mm
Weight	Approx. 330 g

Symbols



Serial number

(Charger)

E.g.) F A XXXX

① ② ③

- ① Year of Manufacture
E.g.) F: 2017, G: 2018, H: 2019...
- ② Month of Manufacture
E.g.) A: Jan., B: Feb., C: March...
- ③ Lot No.
0001, 0002, 0003...

E.g.) K314 XXXXXX K

①

- ① Lot No.
000001, 000002, 000003...

(Contra angle, Motor handpiece)

E.g.) 17050001

① ② ③

- ① Year of Manufacture
E.g.) 17: 2017, 18: 2018, 19: 2019...
- ② Month of Manufacture
E.g.) 01: Jan., 02: Feb., 03: March...
- ③ Lot No.
0001, 0002, 0003...



Reference number

E.g.) 08.961.00.003.FK



Manufacturer



Date of manufacture



CE(0197) marking

Conforms with the European Directive,
93/42/EEC.

CE marking

Conforms with the European Directive,
2011/65/EU.



Attention, consult accompanying documents.



Class II Equipment



Type BF applied part
(Contra angle, Motor handpiece)



Marking of electrical equipment in accordance with the European Directive
2012/19/EU (WEEE)



EU authorized representative under the
European Directive 93/42/EEC



Supports high-temperature cleaning and
disinfection.



Autoclavable up to 135°C



This way up



Keep away from rain



Temperature limitation



Fragile



Humidity limitation



Refer to instructions for use



Atmospheric pressure limitation

Appendix – Electromagnetic Declaration

The Router S (hereafter the TR-CM) conforms to IEC 60601-1-2: 2007, the relevant international standard for electromagnetic compatibility (EMC). The following is the "Guidance and Manufacturer's Declaration" which is required by IEC 60601-1-2: 2007, the relevant international standard for electromagnetic compatibility.



Guidance and Manufacturer's Declaration – Electromagnetic Emissions		
The TR-CM is intended for use in the electromagnetic environment specified below. The customer or the user of the TR-CM should assure that it is used in such an environment.		
Emissions Test	Compliance	Electromagnetic Environment – Guidance
RF emissions CISPR 11	Group 1	The TR-CM uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment. The TR-CM is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
RF emissions CISPR 11	Class B	
Harmonic emissions* ¹ IEC61000-3-2	Class A	
Voltage fluctuations/ flicker emissions* ¹ IEC 61000-3-3	Complies	

*¹: Charger Data


Guidance and Manufacturer's Declaration – Electromagnetic Immunity			
The TR-CM is intended for use in the electromagnetic environment specified below. The customer or the user of the TR-CM should assure that it is used in such an environment.			
Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±2, 4, 6 kV contact ±2, 4, 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transients/ bursts IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2.0 kV for power supply lines* ²	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±0.5, 1, 2 kV line(s) to line(s) ±0.5, 1 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply lines IEC 61000-4-11	<5% UT (>95% dip in UT) for 0.5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 sec	0% UT (>95% dip in UT) /0.5 cycle 40% UT (60% dip in UT) /5 cycles 70% UT (30% dip in UT) /25 cycles 0% UT /5 sec.	Mains power quality should be that of a typical commercial or hospital environment. If user of the TR-CM requires continued operation during power mains interruptions, it is recommended that the TR-CM be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3.15 A/m	Power frequency magnetic field should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note: UT is the a.c. mains voltage prior to application of the test level.

*²: This test is not applicable since the EUT signal cable is less than 3 m.

WARNING

- The TR-CM needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the ACCOMPANYING DOCUMENTS.
- Portable and mobile RF communications equipment can affect the TR-CM.
- Use of parts other than those accompanied or specified by FKG may result in increased EMC emissions or decreased EMC immunity of the TR-CM.
- The TR-CM should not be used adjacent to with other equipment. If adjacent use is necessary, the TR-CM should be observed to verify normal operation in the configuration in which it will be used.

Guidance and Manufacturer's Declaration – Electromagnetic Immunity			
The TR-CM is intended for use in the electromagnetic environment specified below. The customer or the user of the TR-CM should assure that it is used in such an environment.			
Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 3 V/m 80 MHz to 2.5 GHz	3.15 V 3.5 V/m	<p>Portable and mobile RF communications equipment should be used no closer to any part of the TR-CM, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance</p> $d = 1.11 \sqrt{P} \quad d = \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = 2 \sqrt{P} \quad 800 \text{ MHz to } 2.5 \text{ GHz}$ <p>Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <i>d</i> is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, ^a should be less than the compliance level in each frequency range. ^b</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p>NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people. Power frequency magnetic field should be at levels characteristic of a typical location in a typical commercial or hospital environment.</p>			
<p>^a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the TR-CM is used exceeds the applicable RF compliance level above, the TR-CM should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the TR-CM.</p> <p>^b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.</p>			

Recommended Separation Distances between Portable and Mobile RF Communications Equipment and the TR-CM.			
The TR-CM is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the TR-CM can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the TR-CM as recommended below, according to the maximum output power of the communications equipment.			
Rated Maximum Output Power of Transmitter (W)	Separation Distance According to Frequency of Transmitter (m)		
	150 kHz to 80 MHz $d = 1.11 \sqrt{P}$	80 MHz to 800 MHz $d = \sqrt{P}$	800 MHz to 2.5 GHz $d = 2 \sqrt{P}$
0.01	0.11	0.1	0.2
0.1	0.35	0.32	0.63
1	1.11	1	2
10	3.51	3.16	6.32
100	11.11	10	20
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.			
NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

Essential Performance:

None

Transmission Cable:

Length: 1.5 meters



WARNING

- Use of the parts other than those accompanied or specified by FKG may result in increased EMC emissions or decreased EMC immunity of the TR-CM Type FKG.

Safety and Accident Prevention for the Operation of Electrical Medical Devices

1. Only fully trained and qualified personnel may operate equipment.
2. Items to be duly noted when installing equipment.
 - 1) Locate the unit in a place where it will not get wet.
 - 2) Install the unit in a location where it will not be damaged by air pressure, temperature, humidity, direct sunlight, dust, salts, or sulfur compounds.
 - 3) The unit should not be subjected to tilting, excessive vibrations, or shocks (including during shipping and handling).
 - 4) Do not install the unit where chemicals are stored or where gas may be released.
 - 5) Follow all electrical specifications including frequency (Hz), voltage (V), and current capacity (A) (power consumption).
 - 6) The equipment must be properly grounded.
3. Item to be duly noted before use.
 - 1) Inspect all switch connections, polarity, dial settings, meters etc. to confirm that the equipment will operate properly.
 - 2) Confirm that the ground is connected properly.
 - 3) Confirm that all cords are connected properly.
 - 4) Take into consideration that simultaneous use of more than one instrument or device can create a dangerous situation or lead to a mistake in diagnosis.
 - 5) Reconfirm the safety of external circuits or systems which are connected directly to the patient.
4. Item to be duly noted during use.
 - 1) Never use the equipment for treatment or diagnosis more than necessary or for longer than necessary.
 - 2) Maintain a constant vigilance for abnormal conditions in both the equipment and the patient.
 - 3) Appropriate steps, such as shutting the equipment down, should be devised to protect the safety of the patient in case any abnormalities in the equipment or the patient are observed.
 - 4) Make sure the patient does not handle or manipulate the equipment.
5. Item to be duly noted after use.
 - 1) Turn the power off after returning dials, switches etc. back to their original positions in the prescribed order.
 - 2) Do not use excessive force or pull the cord itself to disconnect cords.
 - 3) The following items should be considered when storing the equipment:
 - (1) The storage area should protect the equipment from getting wet.
 - (2) The storage area should protect the equipment from any possible damage due to atmospheric pressure, temperature, humidity, wind, direct sunlight, dust or air containing salts or sulfur.
 - (3) The equipment should be protected from tilting, vibrations, percussive shocks, etc. (including when it is being moved).
 - (4) The storage area should be free of chemicals and gases.
 - 4) All accessories, cords, guides etc. should be cleaned, properly arranged and carefully put away.
 - 5) Before storage, the equipment should be cleaned so that it is ready to be used again.
6. In case of a malfunction or defect, the operator should attach a written notice indicating that the equipment is out of order without attempting to repair the equipment himself; repairs should be referred to a qualified serviceman.
7. Equipment should not be modified in any way.
8. Maintenance and Inspection
 - 1) All equipment and components should be inspected regularly.
 - 2) Equipment which has not been used recently should always be inspected to confirm that it functions properly and safely before being put back into use.



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EU Authorized Representative under the European Directive 93/42/EEC



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