Kerr™
ENDODONTICS

Apex Connect

ELECTRONIC APEX LOCATOR

INDEX

Apex Connect
ELECTRONIC APEX LOCATOR

CONTENTS OVERVIEW

❶ All Components

Apex Connect Unit	Probe Cord	File Holder Adapter	Lip Hook (5)

File Holder A	File Holder B	AC/DC Adapter	Power Cord
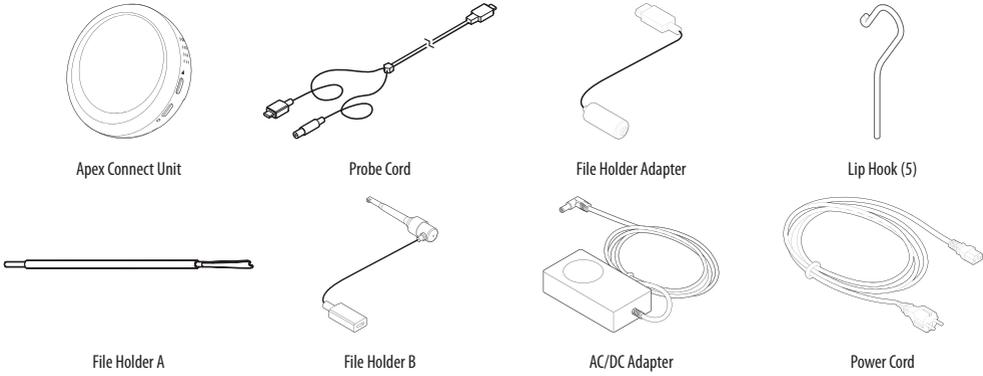
APEX CONNECT UNIT
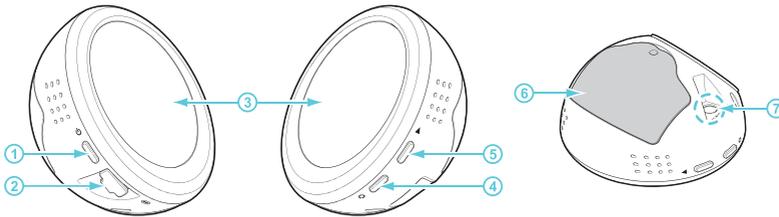
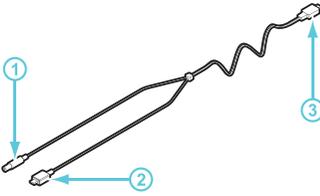| No.		Name	Function
1	⏻	Power button	Turns on the main body. To turn off the power, press and hold the [⏻] button for 2 seconds.
2	▯	USB connector terminal	Use probe cord to connect the file holder and lip hook to the main body.
3		Display Screen	Displays the main body status and the measured value of the root canal length while the main body is in use.
4	✲	Settings button	Press and hold the [✲] button to enter the settings mode. • In the settings mode, the APEX can be set for the reference value, sound volume, and standby time
5	▲	Select button	In the settings mode, change the settings.
6		Battery cover	There is a built-in rechargeable battery that supplies power.
7		Charging terminal	Connects the power cord and AC/DC adapter to charge the battery.

LCD SCREEN

The measurement screen is the screen that appears on the display when the device is turned on. On this screen, the device can be checked and the root canal length read and set the usage environment.
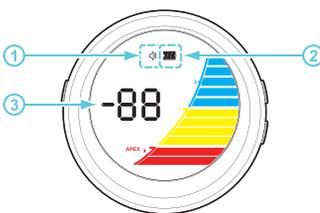
No.	Description
1	Volume icon. The alert sound volume is displayed.
2	Battery Icon. The remaining battery charge is displayed.
3	Measurement information of the root canal length. The current location of the file in the root canal is displayed in a number and a graph.

PROBE CORD

No.	Name	Function
1	Lip hook connector	Install the lip hook.
2	USB connector (H)	Connects to the file holder.
3	USB connector (A)	Connects to the Apex Connect unit

INDICATIONS FOR USE

Apex Connect is an Electronic Apex Locator designed to measure the working length of root canals.

CONTRAINDICATIONS

- Do not use this device on patients with pacemakers or nerve regulators. Also, do not use this device on patients who are sensitive to metals such as stainless steel.
- Do not use this device in the presence of oxygen oxides, nitrogen oxides, or flammable anesthetic mixtures containing air. There is a risk of explosion.

SAFETY PRECAUTIONS

To ensure the safety of users and patients and to use the device properly, be sure to read the contents of this instructions for use before using the device. The manufacturer is not responsible for any injuries or damage caused by not following the precautions.

The most important thing when using medical devices is the safety of all users, including patients and medical staff members. Please read the following safety information thoroughly to identify and prevent potential hazards.

⚠️ **WARNING**
May cause serious damage or severe injury such as death if not followed.

⚠️ **PRECAUTION**
May cause physical injury or property damage, as well as, indicates unsafe procedures or cases where the device may be damaged.

WARNINGS

- For use by qualified and trained dental personnel only.
- U.S. federal law restricts the sale of this device to or on the order of a healthcare professional.
- Do not use this device with electric surgical devices.
- Use of other accessories that are not authorized for use in connection with this device may cause malfunction and compromise patient safety.
- Do not use the device in a place that it is exposed to direct sunlight, heat sources, or near a fire. The battery may explode or cause a fire.
- Never use a damaged cable. There is a risk of fire or electric shock.
- Be sure to connect the power plug to a grounded power supply. There is a risk of fire or electric shock.
- Do not touch electrical parts with wet hands. There is a risk of electric shock and injury.
- To prevent accidental aspiration, the use of a rubber dam is strongly recommended.
- Use the battery, AC/DC adapter, and power cord included in the package. Only use Kerr Endodontics batteries designated for this system. Use of other batteries may damage the device(s) or cause a malfunction.

- Ensure conductors such as metal are not in contact with the metal part of the device. There is a risk of device malfunction, fire, or electric shock.
- Do not disassemble the device. Direct physical contact with the inside of the device can cause electrical shock and burns.
- Do not repair, modify, or disassemble the device, except for authorized service engineer or a specialist who has received repair training. Product failure or damage caused by unauthorized actions is not subject to free service and warranty service.
- When transporting the device, use the original packaging provided by manufacturer to prevent accidental activation of the unit or any damage to the device itself.
- Air or land transportation of the device is permitted in the original packaging container.
- For shipping batteries within the United States or Internationally, consult the Department of Transportation's Pipeline and Hazardous Materials Safety Administration or the International Air Transport Association guidelines.

PRECAUTIONS

- Do not use this device for any purpose other than its intended use. The manufacturer is not responsible for any injuries or damage caused by this.
- This device is not waterproof. Do not submerge or directly contact the device with water. There is a risk of electric shock or device malfunction.
- Do not connect unsupported types of devices. The device may break down or malfunction.
- When using or moving the device, do not throw or drop it. The device may break down or malfunction.
- When using, be fully aware of the protective measures for the patient and be prepared for possible risks.
- Check the patient's condition and device operation during use.
- If the device is dropped during use, ensure that there is no danger to the patient or user.
- For long-term storage, keep the device in a clean and dry place, where the temperature and humidity do not change easily.
- If there are sign of smoke or burning, turn off the power immediately, and take appropriate measures.
- If the device breaks down or has a problem, stop using it immediately, and contact customer services.

ADVERSE EVENTS

If a serious incident occurs with this medical device, report it to the authorized representative, Kerr Italia S.r.l. and to the competent authority for that country in which the user and/or patient is established.

ADVERSE REACTIONS

None known.

SYMBOL DESCRIPTION

Full explanation of symbols used on Kerr packaging is located at: **http://www.kerrdental.com/symbols-glossary**

STEP-BY-STEP INSTRUCTIONS

⚠️ **PRECAUTION**
The components and devices have not been disinfected or sterilized prior to shipping. Please perform the necessary cleaning and disinfection steps prior to patient treatment.

GETTING STARTED

Remove the device, file probes, AC/DC adapter, and power cord from their packaging.

2

❶ Charging the Battery

- When using the device for the first time or after long-term storage, charge the battery sufficiently before use.
- After connecting the power cord and AC/DC adapter, plug the AC/DC adapter into the charging terminal on the right side of the device and plug the power cord into the power supply. The battery icon appears on the display.
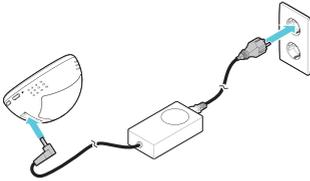
- When charging is complete, the battery icon stops blinking and stays on.
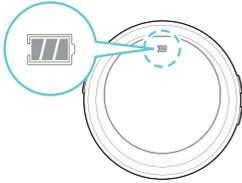
⚠ **WARNING**
- Charge using the AC/DC adapter and power cord included in the package.
- Be sure to connect the power plug to a grounded power supply.

⚠ **PRECAUTION**
This device is designed to not operate while charging. To use the device, disconnect the AC/DC adapter from the device.
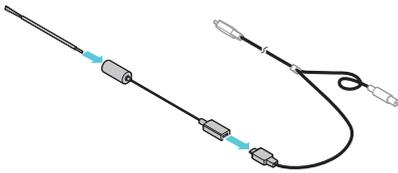
INITIAL SET-UP

❶ Assembling the Device

a. Attach the lip hook and file holder to the probe cord, and then connect it to the body.
b. Insert the USB connector (H) of the probe cord into file holder B and insert the lip hook into the lip hook connector.
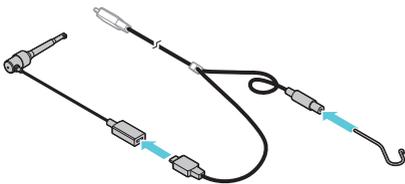
Or connect holder A using the holder adapter.

c. Plug the USB connector (A) of the probe cord into the Apex Connect unit USB connector.
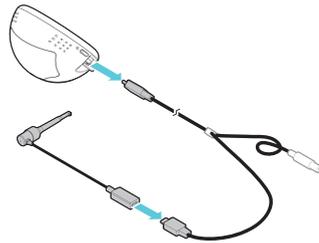

⚠ **PRECAUTIONS**
- The USB connector (Type C) on the probe cord has its intended use. Examine each connector and connect to the appropriate device.
- USB connector (A) connects to the Apex Connect Unit.
- USB connector (H) connects to the file holder.

❷ Disassembling the Device

1. Pull the lip hook from the lip hook connector on the probe cord to remove.

2. Pull out the USB connector at both ends of the probe cord from the Apex Connect Unit and file holder B.

3. If using File Holder A, remove File Holder A from the File Holder Adapter and disconnect the File Holder Adapter from the Probe Cord.

⚠ **PRECAUTION**
After using the device, refer to "**Autoclavable Components: Lip hook, File holder A and File holder B**".

❸ Turning the Device On/Off

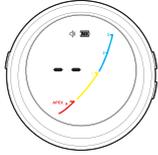Press the **[⏻]** button on the left side of the device without the file holder and lip hook touching anything. The device is connected to power and turns on the display.
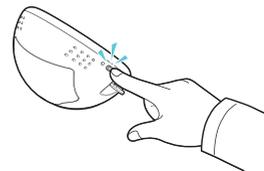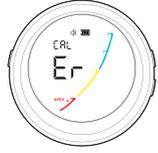

a. Once powered on, the calibration function will run automatically. **[CAL]** flashes while the device is being calibrated.
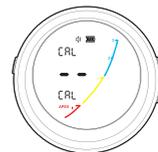
b. When calibration is complete, the measurement screen appears on the display.

c. If the calibration function is not executed, Er will flash on the measurement screen.

d. To end use, press and hold the [⏻] button. The display turns off.

⚠ **PRECAUTION**
If the device is powered on while the file holder and lip hook are touching the object, the calibration function will not start, and **[Er]** is displayed on the measurement screen.

NOTE:
Calibration is completed in about 10 seconds, if the measurement screen does not appear after 10 seconds, contact Kerr Customer Care.

⚠ **PRECAUTION**
After using the device, refer to "**Cleaning, Disinfection and Sterilization Instructions**" section to properly manage the device.

PREPARING THE DEVICE

❶ Preparation and Use Environment

The environmental information appropriate for using this device is as follows.
• Appropriate temperature: 10–35°C (50–95°F) / Appropriate humidity: 30–75% / Atmosphere pressure: 700–1060 hPa
• Do not use the device in a place that it is exposed to direct sunlight, heat sources, or near a fire.

❷ Assembly

• Charge the battery sufficiently when using the device for the first time or after long-term storage.
• Be sure to charge the battery using the power cord and AC/DC adapter included in the package.
• Sterilize the lip hook and file holder when using the device for the first time and after every patient.
• Examine the role of each USB connector on the probe cord and connect to the appropriate device.
• Ensure the file holder and lip hook are properly connected to the probe cord.

NOTE:
• Refer to "**Charging the Battery**" on page 3 for more information on how to charge and replace the battery.
• Refer to "**Assembling the Device**" on page 3 for more information on how to mount and remove the lip hook and file holder.

USING THE DEVICE

1. Refer to "**INITIAL SET-UP**" to connect the lip hook and file holder to the device.
2. To turn on, press the [⏻] button on the left side of the device without the file holder and lip hook touching anything.

⚠ **PRECAUTION**
If the device is powered on while the file holder and lip hook are touching the object, the calibration function will not start, and **[Er]** is displayed on the measurement screen.

3. With the clip of the file holder B touching the lip hook, ensure that the figures and graphs are activated on the measurement screen.
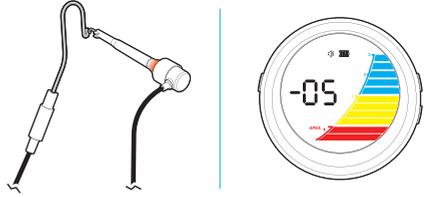
4. While holding down the **[Push]** button on file holder B, insert the file according to the shape of the clip.
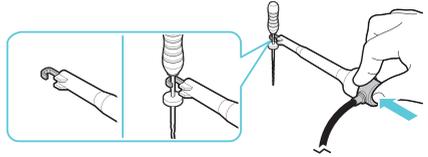
⚠ **PRECAUTIONS**
• Use a stainless-steel hand file (k-file).
• Do not use deformed or damaged files.

5. Gently pull on the file to confirm it is secured.

⚠ **PRECAUTION**
If the file is not properly secured to the file holder, the file may become detached during use and may result in inaccurate readings.

6. Place the lip hook on the lip opposite the tooth to be worked on.

7. Slowly insert the file into the root canal, checking the information on the measurement screen.
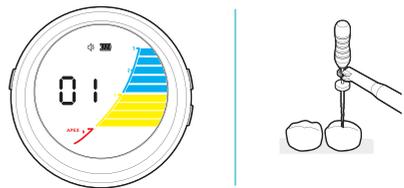
• Refer to "**Measuring Working Length**" on to measure the length of the root canal.
• When measuring with file holder A, confirm that the file is connected to the metal part under the file handle.

4
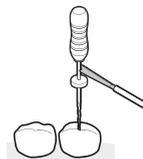
⚠️ **PRECAUTIONS**
- When measuring the root canal length, the file length may vary depending on the operator's viewing angle.
- After root canal instrumentation, the length of the file may differ from the measured angle of the original working length. After instrumenting the root canal, check the working length again.

8. When finished, press, and hold the **[⏻]** button for 2 seconds. The display turns off.
9. Press the **[Push]** button on the file holder B to remove the file from the clip.
10. Refer to "**Disassembling the Device**" to remove the lip hook and file holder from the device.
11. Refer to "**Cleaning, Disinfection and Sterilization Instructions**" to manage the device.

❶ Measuring Working Length

1. Slowly insert the file into the root canal while checking the readings.
   - When the file approaches the APEX reference value, an alarm beeps.
   - When the file reaches or passes the APEX reference value, the device will sound the alarm continuously and measurement screen and file holder will flash at the same time.
   - The measured value range and corresponding color will be shown on the display with the file holder lamp. See Table below.
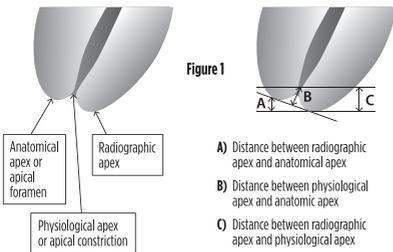
Lamp Color	Lamp Status	Measured value range (mm)
Blue	On	30–11
Yellow	On	10–01
Red	On	00– -05

2. Once the distance between the file and APEX reaches the APEX reference value, stop inserting the file, place the rubber stopper of the file on the reference point of the tooth, and then remove the file from the tooth.
3. Use an Endo ruler to measure the working length between the end of the file and the rubber stopper.

NOTE:
Use radiographs to check the working length.

Different results from radiographs than the results obtained from the measuring device may be shown. This is not a malfunction of the measuring device. It may be due to the anatomical apex and/or the physiologic apex may be located coronal to the radiographic apex, or there was a misalignment of the angle of the X-ray beam and the film. (See Figure 1)

Figure 1

A) Distance between radiographic apex and anatomical apex
B) Distance between physiological apex and anatomic apex
C) Distance between radiographic apex and physiological apex

Anatomical apex or apical foramen
Radiographic apex
Physiological apex or apical constriction

❷ Helpful Tips to Avoid Measuring Errors

- Before measuring root canal length, remove any exudates such as blood from the root canal.
- Before measuring the root canal length, be sure to dry the pulp chamber around the root canal opening.

- If the root canal is completely dry, the actual length and measurement may differ. Fill the inside of the root canal with saline water and measure.
- After inserting the file to approximately half the length of the root canal, attach the file to the file holder.
- When measuring the root canal length, start working with a thicker file. If the reading does not reach the APEX point, use a thinner file to measure the root canal length.
- During root canal length measurement, be mindful of the errors that may occur if the file touches a metal restoration.
- The presence of necrotic dentition and cementum within the root canal can affect the measurements. Measure several times, extending the root canal with a file of the appropriate thickness.
- If the root canal is not fully formed or is over instrumented, the measurement of the working length may be shorter than the actual measurement.
- To obtain a more accurate measurement with minimal error, measure at least twice.
- If the root canals within the tooth are connected, such as a multi-root canals or the tooth has a crack, it may affect the measured value and cause an error. Use a radiograph to check the structure of the tooth, including cracks

USER ENVIRONMENT SETTINGS

Follow the steps below to set the user environment for the Apex Connect unit

1. With the device powered on, press, and hold the **[⚙]** button for about 2 seconds. Entering the settings mode, the figures and graphs flash on the display.
2. Press the **[▲]** button to select the APEX reference value, and then press the **[⚙]** button. The settings are saved, and the volume icon blinks.
   - The APEX reference value is displayed as a line on the graph on the measurement screen, and this line can be used as an estimate of the working length of the root canal.
   - APEX reference value can be set between -0.5 and 1.0 mm. (Default: 0.0 mm)
   - The default setting of the APEX reference value which is 0.0 means that the file has reached the anatomical foramen (apical constriction) and is approximately 0.5 mm away from the physiological foramen (apical foramen).
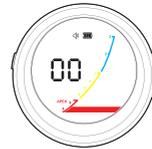
3. Press the **[▲]** button to select the alarm volume, and then press the **[⚙]** button. The settings are saved, and the value flashes.
   - Set the alarm volume between 0 and 3. (Default: 2)
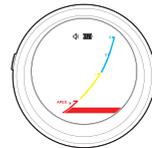
4. Press the **[▲]** button to select the standby time, and then press the **[⚙]** button. The settings are saved and returned to the measurement screen.
   - Set a standby time so that the device turns off after a certain period of inactivity.
   - The standby time can be set between 2 and 10 minutes, in 2-minute increments. (Default: 4 minutes)

ADVANCED SETTINGS

### ❶ Linking the Apex Connect to the Elements Connect Endodontic Motor

This device can be used in conjunction with Elements Connect Endodontic Motor, by connecting the two devices, the instrumentation and enlargement of the root canal can be performed while checking the working length of the root canal.

⚠️ **PRECAUTIONS**
- This device is designed to be compatible with Elements Connect. Do not connect any device other than Elements Connect.
- Use the USB connection terminal on this device only to connect Elements Connect and lip hook. Do not connect the charging USB cable.

❷ Elements Connect Endodontic Motor Components

The following components are required to set up the Cordless endodontic motor:

**Motor Handpiece**

Battery (2)

Contra angle
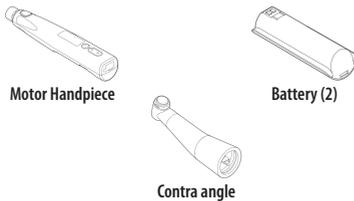
NOTE:
For more information on the components of the Elements Connect Cordless Endodontic Motor and how to use them, refer to the "**Elements Connect Endodontic Motor Instructions for use**".

❸ Assembly and Connection

1. Plug the USB connector (H) on one end of the probe cord into the USB connection terminal of the motor handpiece and the other USB connector (A) into that of the Apex Connect Unit.
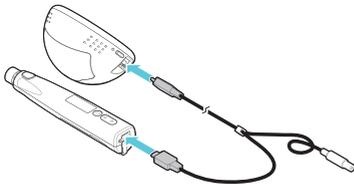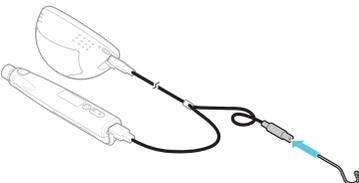
⚠️ **PRECAUTIONS**
The USB connector (Type C) has specific connectors for each intended use. Examine the role of each connector and connect to the appropriate device.
- Single USB connector (A): Apex Connect device connection.
- USB connector (H) supplied with lip hook connector: Motor handpiece connection.

2. Insert the lip hook into the lip hook connector of the probe cord.

⚠️ **PRECAUTION**
Be sure to clean and sterilize the lip hook, File Holder A and File Holder B before use. Refer to "**Cleaning, Disinfection and Sterilization Instructions**".

3. Refer to "**BEFORE USE > Using Accessory**" in the Elements Connect Cordless Endodontic Motor Instructions for use to attach the contra angle and Ni-Ti file to the motor handpiece.

⚠️ **PRECAUTION**
When selecting the proper file length for the procedure, note that the total working length of the file is reduced by 2mm due to the deep set insert in the contra angle head and might difficult the repositioning of the silicone stopper. A longer file might have to be selected.

4. Press the **[Main]** button on the motor handpiece and the **[⏻]** button on the Apex Connect Device. The power and the display of both turn on.
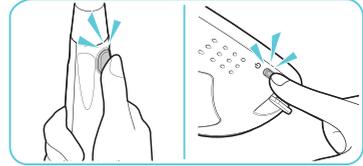
5. Check that **[EAL]** appears on the main screen of the motor handpiece. If **[EAL]** appears, it means that the motor handpiece and main body are properly connected.

```
M1
EAL  CW    1000rpm
🔋   REV    2.0Ncm
```
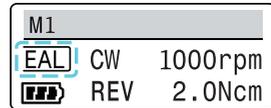
❹ Setting the Linkage

Set the motor operation options when using the device in conjunction with Apex Connect.

1. On the main screen of the motor handpiece, press the **[S]** button for 2 seconds. The linkage settings appear.
2. Press the **[S]** button until the desired menu appears, then press the **[△/▽]** button to select a value.
3. **[Auto start&stop]**: Set whether to operate the motor depending on the location of the file.

```
Auto start&stop

On
```
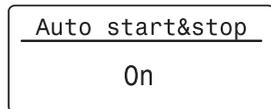
- **[On]**: The motor operates when the file is inserted into the root canal, and the motor stops when the file is pulled out from the root canal.
- **[Off]**: The motor does not run even if the file is inserted into the root canal. Regardless of where the file is, the **[Main]** button must be pressed to operate the motor.

4. **[Apical action]**: When the Apex Connect measurement approaches the APEX reference value during root canal instrumentation, the speed of motor and the torque of the motor decrease so that the root canal does not instrument deeper than the set value.

```
Apical action

Off
```
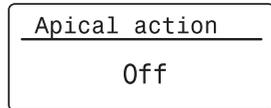
- **[Speed slowdown]**: When the Apex Connect measurement approaches the APEX reference value, the motor's rotational speed decreases.
- **[Torque slowdown]**: When the Apex Connect measurement approaches the APEX reference value, the motor's torque limit decreases.
- **[Off]**: The motor operates the same regardless of whether or not the Apex Connect measurement approaches the APEX reference value.

6

5. Press the **[Main]** button. The settings are saved, and return to the main screen.

❺ Using Linkage

1. Refer to "**USING THE DEVICE > Basic functions**" in the Elements Connect Endodontic Motor Instructions for use to set the memory number and the motor operation method.
2. Place the lip hook on the lip opposite to the tooth being treated
3. Slowly insert the Ni-Ti file into the root canal. The root canal length is measured, and the Apex Connect measurement is displayed in the **[EAL]** area of the main screen.

```
┌─────────────────┐      ┌─────────────────┐
│ M1              │      │ M1              │
│ EAL  CW  1000rpm│  ▶   │ 05  CW  1000rpm │
│ (▮▮)  REV  2.0Ncm│      │ (▮▮)  REV  2.0Ncm│
└─────────────────┘      └─────────────────┘
```

NOTE:
To measure root canal length only, **[Auto start&stop]** must be set to **[Off]**. For more information on how to set the motor operation, refer to "**Setting the Linkage**" in this manual.

4. When the **[Main]** button is pressed on the motor handpiece, the motor will start, and the operation is displayed in the motor screen.


```
      0  .5   1      APEX
                       05
                     TORQ
      1   2   3   4  Ncm
```

- The following information is displayed in the motor operation screen:

No.	Description
1	• These values represent the APEX reference value and the measurements taken by the Apex Connect at the file's current location. The measured value is also displayed numerically on the right side of the screen. • When the measured value reaches the APEX reference value, the motor operates as follows. • **[R&S]**: The motor stops after rotating in the opposite direction of the current setting. • **[REV]**: The motor rotates in the direction opposite to the current setting. It then rotates in the set direction again.
2	It is the torque value of the motor when operating and the torque limit value set in the memory.
3	**[APEX]** blinks when the measurement reaches or passes the APEX reference value.

- Confirm the following information with the Apex Connect Unit.
  - If the instrument reading approaches the value of the APEX reference value, an alarm will beep rapidly.
  - If the reading reaches or passes the value of the APEX reference value, the alarm will beep continuously, and the screen will blink.
- Confirm the measured value range with the lamps of the **[Main]** button on the motor handpiece.
  - If the reading reaches or passes the value of the APEX reference value, the **[Main]** button of the motor handpiece will blink.

Lamp Color	Lamp Status	Measured value range (mm)
Blue	On	30–11
Yellow	On	10–01
Red	On	00– -05

- To stop the motor operation, press the **[Main]** button. The memory number and motor operation settings are changed on the main screen.

- If selected **[CW]**, **[CCW]**, **[Adaptive]**, or **[RCP]** as the motor operation method, press and hold the **[Main]** button on the main screen to rotate the motor in the opposite direction of the current setting.
  - The motor rotates in the opposite direction only while the button is pressed and stops when release it.
  - Here, the operation screen does not appear on the display, and the main screen remains on.
5. To end use, press any two buttons on the motor handpiece at the same time for 2 seconds, then press and hold the **[⏻]** button on the Apex Connect Unit. The power and the display of both are turned off.
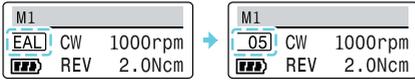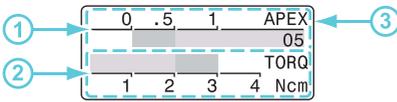6. To remove pull the lip hook connector from the probe cord.
7. Pull out the USB connectors at both ends of the probe cord from the motor handpiece and Apex Connect Unit.
8. Refer to "**INITIAL SET-UP > Disassembling the Device**" in the Elements Connect Instructions for use to detach the Ni-Ti file and contra angle from the motor handpiece.
9. Refer to "**Cleaning, Disinfection and Sterilization**" from the Kerr Endodontic Motor instructions for use to manage the device and accessories.

⚠️ **PRECAUTION**
Be sure to clean and sterilize the lip hook and contra angle.

MAINTENANCE

❶ Replacing the Battery

Replace the battery with a new one if there is a problem, such as when the battery has reached the end of its life or not charging properly.

1. Remove the silicone ball from the screw hole in the battery cover on the back of the device. Remove the screw with a screwdriver, and then remove the battery cover.
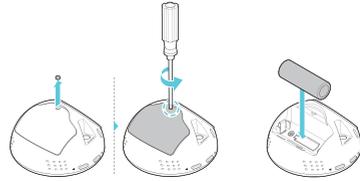
2. After removing the used battery, insert a new battery in the correct direction of the battery terminal.
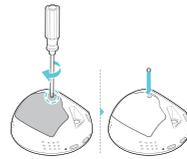
3. Place the battery cover on the back of the device, screw it in, and insert the silicone ball into the screw hole.

⚠️ **PRECAUTIONS**
- Dispose of used batteries in accordance with applicable laws and regulations in the current country and region.
- Contact the dealer, Kerr Endodontics sales representative or Kerr Customer Care and use an Apex Connect Battery approved by Kerr Corporation.

CLEANING, DISINFECTION AND STERILIZATION INSTRUCTIONS

After using the device, be sure to keep it thoroughly clean for the next use. And clean everything thoroughly before autoclaving. In order to prevent the dirt on the surface of the device from drying out before cleaning, please wash it as soon as possible after use. In addition, the reprocessing procedure should minimize delays between steps.

Autoclavable Components: Lip hook, File holder A and File holder B

The lip hook and the file holder must be sterilized after cleaning.

❶ Cleaning and Disinfection: File Holder A

1. Put the file holder A in the tap water for 5 minutes.
2. Thoroughly clean the surfaces of the file holder A with a tissue containing isopropyl alcohol (e.g., CaviWipes).
   - Wipe the surface of the file holder A at least twice in one minute.
   - Clean the surface of the file holder A thoroughly to avoid leaving any residue of contamination.
3. Rinse the file holder A in tap water for at least 30 seconds.
4. Dry the file holder A with a soft cloth, and dry at room temperature for at least 30 minutes.

❷ Cleaning and Disinfection: File Holder B

NOTE: Do not spray the File Holder B with a liquid disinfectant.

1. Clean the surfaces of the file holder B with a tissue containing isopropyl alcohol (e.g., CaviWipes).
   - Wipe the surface of the file holder B at least twice in one minute.
   - Clean the surface of the file holder B thoroughly to avoid leaving any residue of contamination.
2. Dry the file holder B with a soft cloth, and dry at room temperature for at least 30 minutes.

❸ Cleaning and Disinfection: Lip Hook

1. Put the lip hook in the tap water for 5 minutes.
2. Thoroughly clean the surfaces of the lip hook with a tissue containing isopropyl alcohol (e.g., CaviWipes).
   - Wipe the surface of the lip hook at least twice in one minute.
   - Clean the surface of the lip hook thoroughly to avoid leaving any residue of contamination.
3. Rinse the lip hook in tap water for 30 seconds.
4. Dry the lip hook with a soft cloth, and dry at room temperature for at least 30 minutes.

❹ Packing and Sterilization

NOTE:
- Health Care facilities are responsible for making sure that the sterilization equipment is calibrated according to the manufacturer's manuals and specifications. In addition, health care facilities are responsible for training their staff on infection control, proper sterilization and disinfection procedures
- Make sure that the sterilization pouches are suitable for steam sterilization and comply with the national guidelines, standards, and requirements.
   - ISO 11607
   - For USA: Use FDA-cleared accessories
1. Place the cleaned lip hook and the file holder(s) into an autoclave pouch.
2. Recommended sterilization parameters:

Cycle	Gravity Displacement	Pre-Vacuum
Temperature (°C)	121°C (250°F)	132°C (270°F)
Exposure time (min)	30 minutes	4 minutes
Drying time (min)	30 minutes	30 minutes

3. Take out the lip hook and the file holder from the autoclave and dry it while keeping it packed in the pouch for at least 30 minutes at room temperature.

⚠ **PRECAUTIONS**
- Maximum number of re-sterilization of lip hook and the file holder is 250 times.
- Immediately after sterilization, the lip hook and the file holder can be very hot. Cool it sufficiently before use as there is a risk of injury such as burns.
- Do not leave the lip hook and the file holder inside the autoclave after sterilization.
- Never sterilize components other than the lip hook and the file holder.

NON-AUTOCLAVABLE COMPONENTS

❶ Cleaning and Disinfection: Apex Connect Unit

After using the device, be sure to keep it clean for the next use.
- Wipe the surface of the Apex Connect Unit using a cloth (or gauze) lightly moistened with ethanol (70-80%). Clean the crevices with a cotton swab moistened with ethanol. And dry at room temperature for 30 minutes.

⚠ **PRECAUTIONS**
- Do not use organic solvents such as thinner, benzene, or methanol to clean the device.
- Do not put the device in alcohol or water and be careful not to let foreign substances such as water or dust get inside the device.

❷ Cleaning and Disinfection: Probe Cord

1. Clean all the surfaces with a cloth lightly moistened with ethanol for disinfection (ethanol 70-80 vol%).
2. Use a cotton swab and a small, soft brush moistened with ethanol for disinfection to remove any soil that may have accumulated in crevices.
3. Wipe the device with cloths lightly moistened with distilled water, then dry with a clean, dry cloth.
4. If any contamination is visible, repeat the cleaning steps.

❸ Cleaning and Disinfection: File Holder Adapter

NOTE: Do not spray the File Holder Adapter with a liquid disinfectant.

1. Clean the surfaces of the file holder adapter with a tissue containing isopropyl alcohol (e.g., CaviWipes).
   - Wipe the surface of the file holder adapter at least twice in one minute.
   - Clean the surface of the file holder adapter thoroughly to avoid leaving any residue of contamination.
2. Dry the file holder adapter with a soft cloth, and dry at room temperature for at least 30 minutes.

STORAGE AND DISPOSAL

❶ Storage:

After sterilization, place the pouches containing the devices in a dry and dark place such as a closed cupboard or a drawer.
- Follow the instructions provided by the pouch manufacturer regarding storage conditions and maximum allowed time in storage.

❷ Disposal

- For proper disposal always follow local and regional laws (i.e. The Waste Electrical and Electronic Equipment - WEEE).

TROUBLESHOOTING GUIDE AND TECHNICAL SUPPORT

If a problem occurs with the device, refer to the guide below. If this guide does not resolve the problem, contact Customer Care at 0800 30 32 30 32 or email us at Customerservice-EMEA@kerrdental.com. Alternatively, contact the dealer or Kerr Endodontics sales representative.

Problem	Cause	Solution
The power does not turn on.	The battery is dead.	Charge the battery before use. If the problem persists, please contact customer care
	The Apex Connect unit is charging.	The Apex Connect Unit is designed not to operate while charging. Disconnect the AC/DC Adapter from the device and press the power button [⏻].
The Apex Connect Unit turns off during use.	The battery is dead.	Charge the battery before use.
When connecting the File Holder B or File Holder Adapter, the screen automatically turns off.	Either the File Holder B or File Holder Adapter is faulty.	Switch off and restart the device after replacing with the new File Holder B or File Holder Adapter.
No alarm sounds.	The alert sound volume is set to '0'.	Refer to "**USER ENVIRONMENT SETTINGS**" and adjust the alarm volume.
The measurements are not displayed.	The probe cord is not properly connected.	Refer to "**INITIAL SET-UP**" and install the probe cord.
Even though the file has reached the APEX, the measured value is not displayed.	The root canal is completely dry.	Add saline solution to the root canal.
Measurement is not working properly.	Foreign substances such as washing liquid have accumulated in the mouth.	Measure after removing foreign objects from the mouth.
	There is a metal restoration on the tooth.	Make sure that the metal restoration is not connected to the root canal or the file, as errors may occur if the metal restoration is connected to the root canal or contacts the file.
	There is necrotic dentin or tissue and inorganic debris in the root canal.	If necrotic dentin and inorganic debris in the root canal are not removed, errors may occur, so please start the measurement with a thick file to a thin file.
	This is a multi-rooted canal tooth.	Check with a radiograph if there are any cracks in the teeth and then re-measure
Er will flash on the measurement screen.	Calibration has not been executed.	Disconnect the probe cord from the Apex Connect Unit. Restart the Apex Connect Unit and reattach the probe cord to the device. If problem persists, please contact Kerr Customer Care.

SPECIFICATIONS

❶ General Specifications:

Item	Description
Protection from electric shock	Internal powered ME equipment
Degree of Protection (IEC 60529)	IPX0
Applied part	Lip hook, File holder A, File holder B, File holder Adapter
Battery	Lithium-ion battery

❷ Device specifications:

	Item	Description
Apex Connect Unit	Rated input	3.6 V / 1900 mAh (Lithium-ion battery)
	Dimensions	90 X 75.4 X 73.6 mm
	Weight	184 g (including battery)
	Operation mode	Continuous operation
	Accuracy	±0.5 mm
AC/DC Adapter	Input voltage	100–240 V, 50–60 Hz
	Output voltage	9 V DC
	Output current	2.0 A

❸ Environmental Specifications:

	Item	Description
Operation	Temperature	10–35℃ (50–95℉)
	Humidity	30–75%
	Atmosphere pressure	700–1060 hPa
Storage and transportation	Temperature	-20–60℃ (-4–140℉)
	Humidity	5–90%
	Atmosphere pressure	700–1060 hPa

WARRANTY

Kerr Endodontics warrants the system (excluding batteries) to be free from defects in materials or workmanship for period of 3 years from the original date of purchase. The batteries are warrantied for a period of 6 months from the original date of purchase.

If the system shows any defect within the warranty period that are not excluded from this warranty, Kerr Endodontics shall, at its sole discretion, either replace or repair the device using suitable new or reconditioned parts. In the case other parts are used which constitutes an improvement, Kerr Endodontics may, at its discretion, charge the customer for the additional cost of these parts. If the warranty claim provides to be justified, the product will be returned to the user freight prepaid. Warranty claims other than those indicated herein, are expressly excluded.

EXCLUSIONS

Damage and defects caused by the following conditions are not covered by the warranty:

• Improper handling/disassembly/modifying, neglect, or failure to operate the unit in compliance with the instructions given in this manual.

• Force majeure or any other condition that is beyond the control of Kerr Corporation.

• Damage caused by customer misuse or uses other than those specified.

DISCLAIMER

For safety reasons, this product should be used with accessories manufactured and sold by Kerr Corporation. Any use of non-authorized accessories or not following any of the instructions for use is done so at the operator's risk and voids the warranty. Kerr Corporation does not assume any responsibility for incorrect diagnosis due to operator error or equipment malfunction.

Product name	Apex Connect
Warranty	Device: 3 years / Accessories: 6 months
Distributor	Kerr Corporation 1889 W. Mission Blvd., Pomona, CA 91766 USA 1-800-KERR-123 | kerrdental.com
Manufacturer	Meta Systems Co., Ltd. #1214-18, Sicox tower 12F, 484 Dunchon-daero, Jungwon-gu, Seongnam-si, Gyeonggi-do, 13229, Korea
Sales Place Info.	Business name: Phone: Address:

PART NUMBERS

Part number	Components
815-1902-UK	Apex Connect Kit - UK
815-1803	Apex Connect Kit - EU
815-1902-AU	Apex Connect Kit - AUS
815-1904-UK	Elements/Apex Connect Power Cord - UK
815-1805	Elements/Apex Connect Power Cord - EU
815-1904-AU	Elements/Apex Connect Power Cord - AUS
815-1907	Apex Connect AC/DC Adapter - ROW
815-1912	Apex Connect Probe Cord - ROW
815-1913	Apex Connect Lip Hook - ROW
815-1914	Apex Connect File Holder Adapter - ROW
815-1915	Apex Connect File Holder A - ROW
815-1916	Apex Connect File Holder B - ROW
815-1917	Apex Connect Replacement Battery - ROW
818-1911	Apex Connect Main Body - ROW

ELECTROMAGNETIC COMPATIBILITY

This device has been tested for compliance with electromagnetic tests according to EN60601-1-2 and is designed to protect against harmful interference when installing and using the device following the instructions. This device can generate, use, and discharge radio wave energy. This device may cause harmful interference with other nearby equipment. In this case, the user should use one or more of the recommendations described below to resolve the interference.

- Increase the distance between the device and the device causing the interference.
- Reinstall the device and restart.
- Contact the dealer, Kerr Endodontics sales representative or Customer Care.

BUYER INFORMATION

Business Name _____

Address _____

_____

Phone _____

Date of Manufacture _____

Serial Number _____

Date of Purchase_____

Purchase Price/Quantity _____

Distributor:
Kerr Corporation
1889 W. Mission Blvd.
Pomona, CA 91766 USA
1-800-KERR-123 | kerrdental.com

Manufacturer:
Meta Systems Co., Ltd.
#1214-18, Sicox tower 12F, 484
Dunchon-daero, Jungwon-gu
Seongnam-si, Gyeonggi-do
13229, Korea

EC REP Meta Biomed Europe GmbH
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Ruhr, Germany

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MADE IN KOREA

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