CALAMUS® DUAL

3D Obturation System

DIRECTIONS FOR USE

DENTSPLY
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Distributed By:
DENTSPLY Tulsa Dental Specialties
DENTSPLY International, Inc.
608 Rolling Hills Drive, Johnson City, TN 37604 USA
1.800.662.1202 • Fax: 1.800.597.2779
www.tulsadentalspecialties.com

Manufactured By:
Aseptico, Inc.
8333 216th St. SE
Woodinville, WA 98072, USA

Manufactured under US patent #6,991,457 and other foreign patents pending.

Rx Only
For Dental Use Only

Congratulations!

Calamus® Dual 3D Obturation System is engineered to provide consistent and reliable results. Please read all instructions for use provided in this manual to achieve the optimal performance and longevity of your device and all related components.

Table of Contents

Package Contents

- Console Unit with 2 handpieces:
  - Pack (down pack)
  - Flow (backflow)
- Remote power cord (115V)
- Operating manual
- Technique Card

Contents for use with the Pack handpiece:

- Calamus® Electric Heat Pluggers (EHP):
  - Small - Black ISO 40/.025
  - Medium - Yellow ISO 50/.05
  - Large - Blue ISO 60/.06

Contents for use with the Flow handpiece:

- Bending Tool for the cartridges
- Cleaning Brush for the Flow handpiece
- Additional Cartridge Nut for the Flow handpiece
- Heat shield for the Flow handpiece
- Package of 10 Calamus™ gutta-percha cartridges, size 20G (90µl/ 0,25g)
- Package of 10 Calamus™ gutta-percha cartridges, size 23G (90µl/ 0,25g)

Figure 1
System Contents

Specifications

- **Console Dimensions:** . . . . . .11.2 x 15.0 x 15.2 cm (4.4” x 5.9” x 6.0”)
- **Weight:** . . . . . .1.6 kg (3.6 lbs)
- **Power Source:** 115V/60Hz, 230V/50Hz
- **Current Rating:** 115V/0.6A, 230V/0.3A
- **Fuses: 115V:** . . . . . .0.6A/250V Slo-Blo® fuse
  230V: . . . . . .0.3A/250V Slo-Blo® fuse
- **Plugger:** . . . . . .Stainless Steel
- **Capsule Contents:** . . . . . .Gutta-Percha
- **Capsule:** . . . . . .Aluminium
- **Cannula:** . . . . . .Silver
- **Environmental Conditions:**
  - Operating Temperature: 10° to 28°C (50° to 82.4°F)
  - Storage Temperature: -20 to 60°C (-4° to 140°F)
  - Relative Humidity: 5 to 95 % non-condensing
  - Altitude: 0 to 3048 meters (0 to 10,000 feet)
- **Pack Duty Cycle:** 25%
- **Temperature range Pack:** . .100 - 400°C
- **Volume range Pack:** . . . . . .0 - 100%
- **Temperature range Flow:** . .160 - 200°C
- **Flow rate Flow:** . . . . . .20% - 100%

Pack handpiece maximum continuous heating time:

- 10 seconds for temperatures above 200°C.
- 15 seconds for temperatures at or below 200°C.
- One minute in thermal response mode.

CLASSIFIED C UL US 41EJ

MEDICAL ELECTRICAL EQUIPMENT WITH RESPECT TO ELECTRIC SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL 60601-1 (First Edition) and CAN/CSA C22.2 No 601.1-M90.

Caution:

This device has been tested and found to comply with the emissions requirements of IEC 60601-1-2:2001-09. These requirements provide reasonable protection against harmful electromagnetic interference in a typical medical installation. However, high levels of radio-frequency emissions from electrical devices, such as cellular phones, may disrupt the performance of this device. To mitigate disruptive electromagnetic interference, position this device away from radio frequency transmitters and other sources of electromagnetic energy.

Symbol Descriptions

Fuse ratings: 115V: 0.6A
230V: 0.3A
250V SLO-BLO

Type BF Applied Part

Attention – Consult Accompanying Documents

Class II Equipment

Dangerous Voltage

Alternating Current

Hot Surface

Nonreturnable if Seal Is Broken

Caution, this product contains natural rubber latex which may cause allergic reactions.

Cartridge Contents: gutta-percha

Cartridge Cannula: silver

Cartridge Capsule: aluminium

Intended Use

Calamus® Dual is an integrated device designed for warm vertical obturation. The Dual contains handpieces that are used for down pack (Pack) and backfill (Flow) techniques to obturate the root canal system.

The Pack handpiece is intended to heat Electric Heat Pluggers for warming and softening gutta-percha master cones and searing off gutta-percha cones. This handpiece is also intended to heat the Thermal Response Tips that subjects a tooth to heat in order to determine pulp vitality.

The Flow handpiece is intended for heating and extruding gutta-percha into the root canal system. The single-use cartridges are designed to place heated gutta-percha into a cleaned and shaped canal.

The Calamus® Dual device can only be used with Calamus® Singles gutta-percha cartridges and Calamus® Electric Heat Pluggers.

A dental dam should be used with any dental procedure!

Contraindications

- Do not use on patients with a known sensitivity to natural rubber latex.
- Do not use on patients with a known sensitivity to silver.
- Do not use on patients with a known sensitivity to copper.

Warnings

Failure to adhere to the following instructions or blatant misuse of the device and/or related components will be considered abuse of the device and will void all warranty responsibilities.

- The gutta-percha cartridges may contain dry natural rubber or latex which may cause an allergic reaction.
- Do not use a disinfection solution for sterilization of cartridges.
- When replacing a cartridge during a procedure, the handpiece cartridge nut and expended cartridge may be hot to the touch.

  CAUTION: Do not remove a hot cartridge!
- Plugger tips become hot during use. Turn off unit and allow cooling before exchanging tips.
- Equipment not suitable for use in the presence of a flammable mixture with air, oxygen or nitrous oxide.
- Risk of fire: Do not contact the heated tip or handpiece with flammable gases or liquids.
- Do not use near standing water. Dropping the unit into water may cause electric shock, will destroy the device and can lead to death.
- This equipment provides ordinary protection against harmful ingress of liquids. Do not submerge the handpiece or cartridges in any liquid or spray any fluid directly onto the handpiece.
- Chemclaving is not recommended for sterilization and maintenance of the tips as this would cause corrosion.
- There are no serviceable components inside this unit. Do NOT Open!

Precautions

- A dental dam should be used with any dental procedure.
- Always unplug the unit before changing fuses or adjusting the voltage selector.
- Applying excessive downward pressure or not allowing the device to back out of the canal, may result in a broken cannula.
- Place the cannula gently into the canal. Too much pressure will stop the motor from turning.
- Take care when replacing a cartridge during a procedure, the cartridge nut and the expended cartridge will be hot to the touch.
- The forward portion of the Flow handpiece becomes very warm during use. The heat shield (included with the system) may be used optionally to reduce the handpiece surface temperature. If the heat shield is not utilized, avoid contact with the forward portion of the Flow handpiece.
- When replacing Electric Heat Pluggers during a procedure, the pluggers may be hot to the touch.
- Do not clean unit with a flammable cleaning solution.
- Do not clean unit with chlorinated solvents, as this will damage the handpieces.

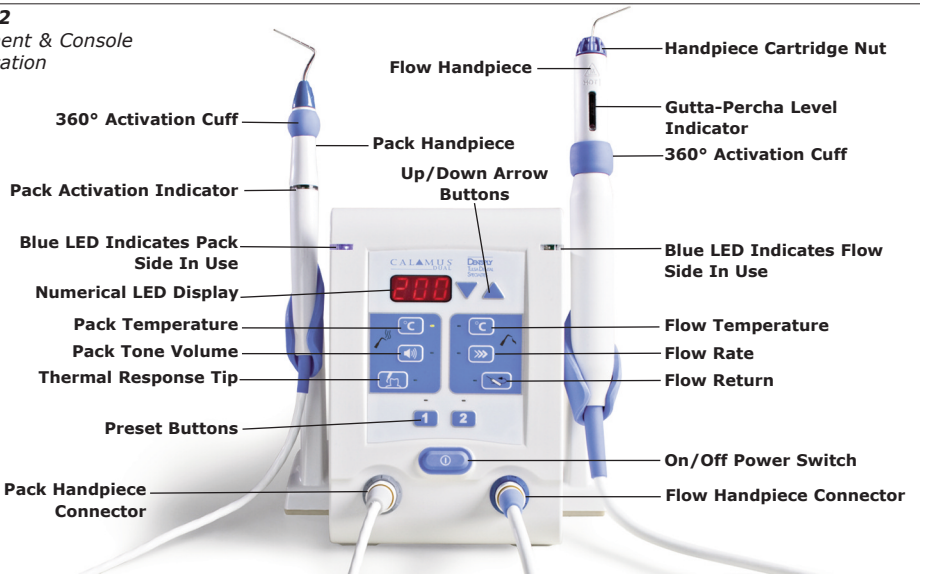
Adverse Reactions

Use in patients with a known sensitivity to latex, silver or copper may cause an allergic reaction. Such an allergic reaction to latex may result in swollen eyes, lips or face. It may also cause difficulty in breathing. The patient should be advised to notify you immediately if any of these symptoms occur.

Directions For Use

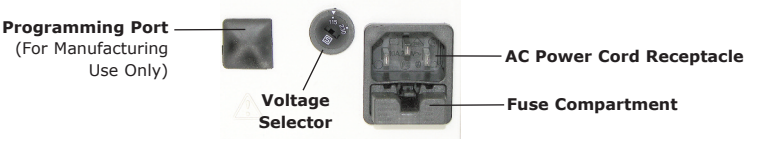
Setting Up The Dual

Figure 2
Component & Console Identification



1. Unpack the console and check that the Voltage Selector is set to the proper voltage. See Fig. 3.
   - Use the 115V position for 110-120V 60Hz voltages, and the 230V position for 220-250V 50Hz voltages. Always unplug the unit before changing fuses or adjusting the voltage selector.
   - To change voltage, use a flat head screwdriver to turn the Voltage Selector on the back of the console to the proper voltage setting.
   - To change fuse, replace the fuse to match voltage (see Specifications). Replace with 0.6 A, 250 V Slo-Blo® fuse (0.3 A for 230 V). For replacement, press on the black plastic clip of the fuse compartment, pull out and replace with the correct fuse.

Figure 3
Back of Device



2. Remove packaging from handpieces.

3. **Handpieces:** Clean the exterior of the handpieces with a soft cloth moistened with mild **non-chlorinated** detergent or disinfecting solution.
   - Do not use disinfecting solutions which contain phenol, anti-corrosives, very acidic or very alkaline solutions - do not submerge handpieces.
4. The handpiece cables are color-coded and keyed to only fit the proper receptacle on the console.
   - With the arrow on the connector facing up, gently push the connector into the console receptacle. See Fig. 4

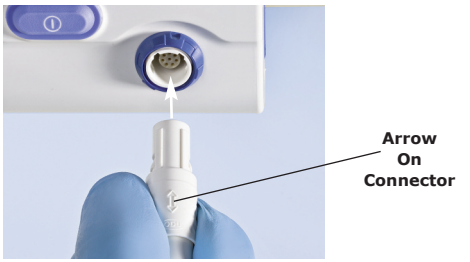


Figure 4
Handpiece Cable Connection

5. Place handpieces into their respective holders - Pack on the left side and Flow on the right side.
6. **Power Cord:** Attach the power cord to the back of the console and plug into a grounded electrical outlet.
7. **Heat Shield:** The heat shield (included) is designed to reduce the Flow handpiece surface temperature. If the heat shield is not utilized, avoid contact with the forward portion of the handpiece.
   - Sterilize the heat shield before first use and between each patient, using steam autoclave for 15 minutes at 132°C.
8. **Electric Heat Pluggers (EHP):** Sterilize using steam autoclave for 15 minutes at 132°C. See Fig. 5.
9. **Pack Handpiece:** Push EHP into handpiece tip and slowly rotate it until it clicks in with handpiece tip. EHP must be fully engaged to achieve desired heat settings. See Fig. 5.

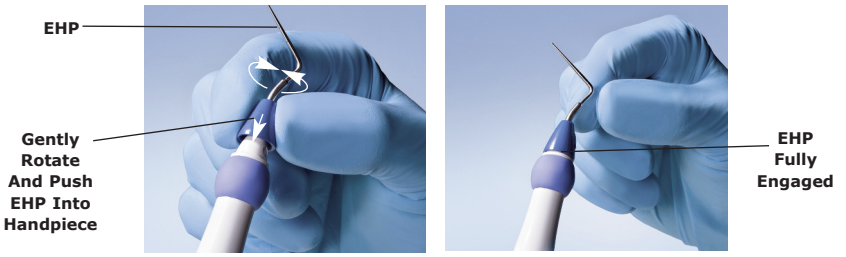


Figure 5
Attaching EHP

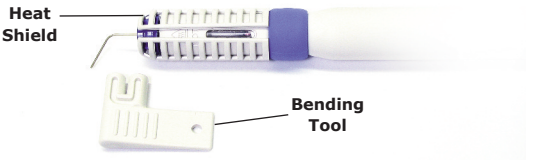
10. **Flow Handpiece:** Unscrew and remove the cartridge nut from the handpiece. See Fig. 6.

Figure 6
Flow Handpiece

- Turn the unit 'OFF' before inserting or replacing a cartridge.
- Insert a cartridge into the handpiece, cannula facing outward.
- Slip cartridge nut over cannula and screw cap on clockwise lightly - do not over-tighten.
- **NOTE:** If the cartridge isn't properly seated into the handpiece, turn the unit on and press the button on the right side of the control panel. The plunger must be in its retracted position to accept the cartridge. When fully seated, a few millimeters of the cartridge will be visible.
- **NOTE:** Take care when replacing a cartridge during a procedure, the handpiece, cartridge nut and the expended cartridge will be hot to the touch.

11. **Heat Shield:** Place the heat shield over the cannula and handpiece. Then turn the heat shield until the Flow indicator is visible. See Fig. 7.

Figure 7
Heat Shield & Bending Tool



12. **Bending Tool:** Use the bending tool to place a smooth radius curve on the cannula so it can extend to within 5 mm of the working length of the canal. See Fig. 7.
    - Place the cannula between the two raised bending posts. Gently bend the cannula to the desired angle.

    Warning: Using fingers or any other device other than the Bending Tool to curve the cartridge cannula can result in cartridge rupture or handpiece damage.
13. The device is now ready for operation.

    Warning: Do not touch hot EHPs or hot cartridges.

Console Instructions

Turning the device on:

- Press the Power On/Off button located on the front panel.
- Power is applied and removed to the device by alternately pressing and releasing this switch.
- The left side of the console keypad controls the Pack handpiece, while buttons on the right side control Flow handpiece. To increase or decrease settings use the up and down arrow buttons.

Activating either side of the device:

- Press the handpiece cuff or any button for the Pack or Flow side of the console.
- The blue LED indicator at the top of the device will light indicating which side is active.
- At initial power on, the Pack side of the device is turned on by default.
- The last used settings are retained in memory.

Heating Flow While Using Pack:

The Flow handpiece can be heated while the Pack handpiece is in use:

- Activate the Flow side, set the desired temperature, then switch back to the Pack side.
- The Flow temperature LED will continue to flash as it heats to the desired setting.
- Once the setting is achieved, the LED will remain lit.

PACK Programming:

Temperature Settings:

- Press the ℃ button on the left (Pack) side of the keypad and then use the ▼▲ buttons to set the desired temperature.
- The LED light to the right of the ℃ button will illuminate indicating the temperature setting has been enabled.
- Press either ▼▲ repeatedly to increase/decrease the temperature in 10°C increments.
- Holding down one arrow button will result in rapid scrolling through the temperature range (100°C minimum to 400°C maximum).
- Temperature setting is displayed on the numerical LED window.

NOTE: The Thermal Response Tip temperature is preset to 90°C and is not adjustable.

Volume Settings:

- Press the 🔊 button and then use the ▼▲ buttons to set the desired audible tone volume.
- The LED light to the right of the 🔊 button will illuminate indicating the volume setting has been enabled.
- Press either ▼▲ repeatedly to increase/decrease the volume level in 20% increments.
- Holding down one arrow button will result in rapid scrolling through the volume range (0% minimum to 100% maximum).
- Volume setting is displayed on the numerical LED window.

NOTE: The numerical LED window automatically defaults to displaying the selected temperature setting. If the Volume button is pressed, the numerical LED Window will display the volume for 5 seconds and then revert to the selected temperature setting.

FLOW Programming

Temperature Settings:

- Press the °C button on the right (Flow) side of the keypad and then use the ▼▲ buttons to set the desired temperature.
- The LED light next to the °C button will flash, indicating that the Flow handpiece is heating up. Once the device has reached set temperature, the LED light next to the °C button will light steadily.

Flow Rate Settings:

- Press the »» button and use the ▼▲ buttons to set the desired flow rate.
- The LED light to the left of the »» button will illuminate indicating the flow rate has been enabled.
- Press either ▼▲ repeatedly to increase/decrease the flow rate in 10% increments.
- Holding down one arrow button will result in rapid scrolling through the flow range (20 minimum to 100 maximum).
- Flow rate is displayed on the numerical LED window.

Factory Default Settings:

The two Preset buttons 1 2 store the settings for both the Pack and Flow sides of the device.

- **Pack:** 200°C temperature and 40% tone volume.
- **Flow:** 160°C temperature and 60% flow rate.
- Thermal Response button is set at 90°C and is fixed.

Custom Preset Settings:

The Preset buttons 1 2 can be manually programmed to store your personal settings.

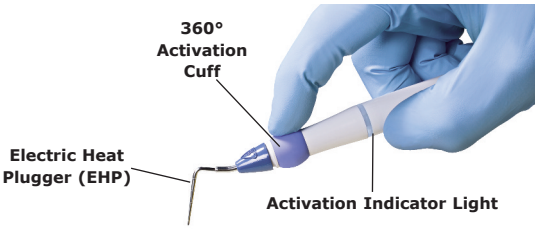
- Press and hold either preset button for at least two seconds.
- The preset button's LED will illuminate indicating that it is active.
- Settings for both the Pack side and Flow side are now stored in memory.

Pack Handpiece Instructions

PACK Operation:

- Press the 360° activation cuff on the handpiece to begin heating the EHP to the selected temperature setting. See Fig. 8.

Figure 8
Pack Handpiece Components



- If the °C LED is illuminated, the selected temperature will display on the numerical LED window.
- As the EHP's temperature rises, one high frequency tone is heard.
- Once the tip is within 20°C of the selected temperature setting, the tone will change to a lower frequency and remain at this tone until the activation cuff is released.
- When pressing the activation cuff, the tip will heat for 15 seconds for temperature settings of 200°C or lower, and 10 seconds for settings above 200°C before timing out.
- The Thermal Response Tip will heat for one minute while the 360° activation cuff is depressed. To restart after a timeout has been reached, release the activation cuff and press again.

  CAUTION: Do not stay in the root canal with a heated tip for more than 4 seconds to prevent thermal injury to the patient!

PACK Thermal Response Tip:

- Always press the button to set the temperature to 90°C before starting the pulp sensitivity test.

  CAUTION: Place gutta-percha on the tip of the thermo response tip before applying the thermo tip to the patient's tooth! Do not place the tip directly on the tooth!

Flow Handpiece Instructions

FLOW Operation:

- For optimal performance the bending tool should always be used to create the desired cannula curve.

Figure 9
Flow Handpiece Components

- Press the 360° activation cuff to start the flow of gutta-percha. See Fig. 9. You will notice a short delay as the plunger engages and pushes gutta-percha to the tip of the needle.
- Extrude a small amount of gutta-percha from the needle. Wipe the excess gutta-percha from the tip before inserting the needle into the canal.
- Place the heated tip of the cannula against the previously packed gutta-percha for 5 seconds.
- Hold the handpiece lightly when expressing material to allow the device to readily back out of the canal.
- As the material is expressed, the indicator will help you estimate how much gutta-percha remains in the cartridge.

  Warning: Applying excessive downward pressure or not allowing the cannula to back out of the canal may result in a dislocated cannula.

  Warning: Using fingers or other non-approved devices to bend or curve the cartridge cannula can result in cartridge rupture and/or handpiece damage.

FLOW Standby Mode:

- After 20 minutes of inactivity, the Flow heater will shut off and slowly cool to room temperature. The °C LED will also go out.
- Press any button on the Flow side of the console to reactivate the handpiece.

FLOW Replacing the Cartridge:

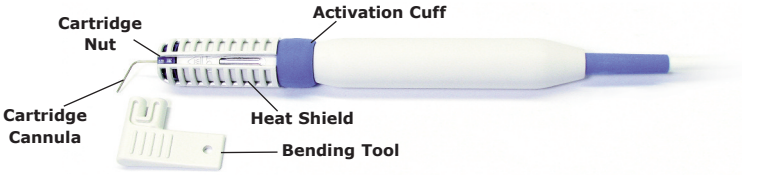
CAUTION: When replacing a cartridge during a procedure, the handpiece cartridge nut and expended cartridge are hot to the touch.

1. Select a 20 or 23 gauge cartridge.
2. Retract the delivery plunger by pressing the button.
3. Turn the unit off.
4. Allow the handpiece to cool.

CAUTION: Do not remove a hot cartridge!

5. Unscrew and remove the Flow handpiece cartridge nut. See Fig. 10.

Figure 10
Replacing Cartridge



6. Using the hole in the included bending tool, remove the cartridge from the handpiece.
7. Dispose of used cartridge in an appropriate biohazard container.
8. Insert a new cartridge, cannula out, into the handpiece end.
9. Slip cartridge nut over cannula and screw on clockwise lightly - do not over-tighten.
10. Place the **heat shield** over the forefront of the handpiece.
11. Use the **bending tool** to create the desired curve in the cannula.
12. Depress the 360° activation cuff to begin the flow of gutta-percha.

Fuse Replacement Instructions

Replacing the fuses:

Replacement Fuses:

115V: 600 mA, 250V rated Slo-Blo® type (Fuse size: 5 x 20mm)
230V: 300 mA, 250V rated Slo-Blo® type (Fuse size: 5 x 20mm)

NOTE: The Calamus® Dual is manufactured with 250V 600 mA rated fuses installed for a 115VAC power source. If power source is 230 VAC, ensure that 250V 300 mA rated fuses are installed.

Warning: Turn the power off and unplug the unit before following the fuse replacement steps.

1. Remove the fuseholder from the power inlet connector. See Fig. 11.
2. Replace the fuses in the fuseholder.
3. Replace the fuseholder.

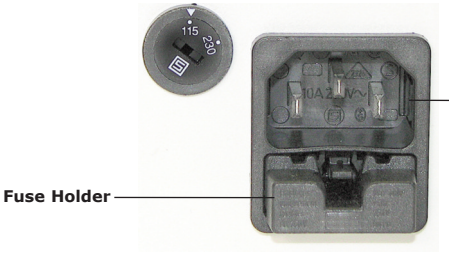


Figure 11
Fuse Replacement

Sterilization & Maintenance

Failure to adhere to the following instructions or blatant misuse of the device and/or related components will be considered abuse of the device and will void all warranty responsibilities.

Control Console

- Clean the exterior of the console by wiping with a soft cloth moistened with mild **non-chlorinated** detergent or disinfecting solution.
- Do not use disinfecting solutions which contain phenol, anticorrosive or very acidic or very alkaline solutions.
- Do not clean unit with chlorinated solvents, as this will damage the handpieces.

CAUTION: Do **NOT** SUBMERGE the device in any fluid.

CAUTION: When wiping down the handpiece cable, always wipe from the middle of the cable out to the handpiece and then again out to the console. Avoid gripping the cable tightly, as this will damage the wire casing over time.

Handpieces

- Clean the exterior of the handpiece with a soft cloth moistened with a mild **non-chlorinated** detergent or disinfecting solution.
- Do not use disinfecting solutions which contain phenol, anticorrosive, very acidic or very alkaline solutions.
- Do not clean handpieces with chlorinated solvents, as this will damage the handpieces.

CAUTION: Do **NOT** SUBMERGE the device in any fluid.

CAUTION: When wiping down the handpiece cable, always wipe from the middle of the cable out to the handpiece and then again out to the console. Avoid gripping the cable tightly, as this will damage the wire casing over time.

NOTE: Observe the concentration of the cleaning or disinfecting solution stated by the manufacturer!

- Handpieces can be removed from the console for repair or replacement. Gently pull the connection shield back (1) while simultaneously pulling the handpiece connector from the Calamus® Dual console (2). See Fig. 12

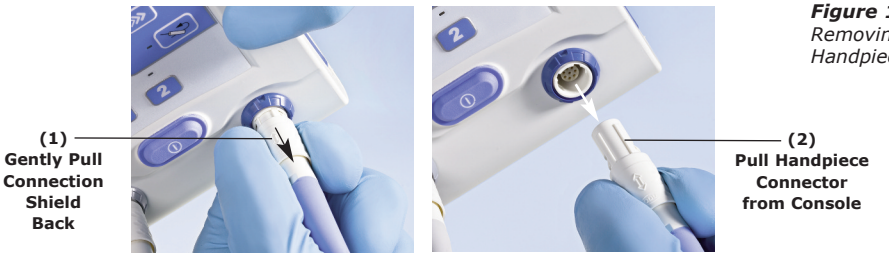


Figure 12
Removing Handpieces

Cartridge Nut

- Allow the FLOW handpiece to cool before removing the cartridge nut and any excess gutta-percha.
- Steam autoclave for 15 minutes at 132°C.

Heat Shield

- Steam autoclave for 15 minutes at 132 °C.

Cartridges

- Cartridges are for single patient use.
- Prior to using a cartridge on a patient, wipe the cannula with alcohol or a disinfectant.
- Make sure that the device has been switched off and cooled down.
- Store cartridges at room temperature.
- Do not immerse the cartridges into any liquid.
- Dispose of cartridge in a sharps receptacle.
- Do not use cartridges after the expiration date.
- Cartridges CANNOT be re-heated and/or re-used.

  WARNING: Re-heating or re-using a cartridge can result in the cartridge rupturing, which will **permanently** damage the FLOW handpiece! Re-heating cartridges is a misuse of the Calamus® Dual and **voids** the device warranty.

Electric Heat Pluggers & Thermal Response Tip

Electric Heat Pluggers (EHP) and Thermal Response Tip (TRT) must be disinfected and sterilized before every use:

1. Gently use a soft brush for removal of debris.
2. Clean the EHPs and TRTs under running water for a minimum of 1 minute using water and a mild, non-abrasive, detergent or disinfectant.
3. Do **NOT** use disinfecting solutions which contain phenol, anti-corrosives, very acidic or very alkaline solutions.
4. Rinse the EHPs and/or the TRT under running water for a minimum of 1 minute to remove all chemicals.
5. Dry thoroughly.
6. Steam autoclave plugger tips for 15 minutes at 132°C before initial use and between each patient.
7. Inspect the EHPs and TRTs regularly for damage.
   - Deformed or oxidized pluggers and tips should be replaced.
   - All EHPs and TRTs will gradually lose their heating efficiency over a period of time.
   - Use of damaged or contaminated tips is at the user's own risk. All risk and liability is excluded in this case.
8. Dispose of EHPs and TRTs in a sharps receptacle.

   NOTE: Observe the concentration of the cleaning or disinfecting solution stated by the manufacturer!

   WARNING: Do not touch Electric Heat Pluggers while hot!

Maintenance

For optimal performance and device life, maintenance of the Calamus® Dual should be performed at least every 12 months.

FLOW Cartridge Chamber

Over time gutta-percha can build up or become trapped in the cartridge chamber of the FLOW Handpiece. This is normal.

To Remove:

1. Turn on the unit and press the button on the console to fully retract the plunger.
2. Allow the heater section to reach operation temperature (180°C).
3. Turn off unit.
4. Insert the included cleaning brush into the heating chamber. Rotate the brush several times to remove the gutta-percha from the chamber.

FLOW Handpiece Plunger

1. Without a cartridge inserted, press the 360° activation cuff until the gutta-percha indicator reaches the top of the chamber.
2. Then, push the button and allow the indicator to completely retract.

Clinical Techniques

- Only use Calamus® cartridges and Calamus® Electric Heat Pluggers with the Calamus® Dual device.
- Always use root canal sealer when obturating with any Calamus® obturation device.
- Actual temperature in the root canal largely depends on the amount of filling material used.
- Although the device is able to precisely control the heat transmission to the tip, it is unable to prevent undesired heating up of the root.
- It is recommended to practice and test your technique on extracted teeth, prior to patient application.

CAUTION: Do not penetrate the root canal with a heated tip for more than 4 seconds for patient safety!

CAUTION: Do not contact the lips, gums or oral mucosa with the EHP, cartridge cannula or the cartridge nut as it can cause tissue damage after exposure.

Cone-Fit & Plugger Selection

1. Prepare the canal optimally recognizing shaping facilitates 3D cleaning and filling.
2. Select a larger size Calamus® manual plugger that will work passively and effectively over a range of a few millimeters in the coronal one-third of the canal.
3. Select a medium size Calamus® manual plugger that will work passively and effectively over a range of a few millimeters in the middle one-third of the canal.
4. Select a smaller size Calamus® manual plugger that will work passively, effectively and deeper in the straightaway portion of the canal and to within 4-5 mm of the canal terminus.
5. Select the Calamus® Electric Heat Plugger (EHP) that will passively fit through the straightaway portion of the canal and optimally to within 5 mm from the working length. Set the silicone stop at this depth to promote safety and accuracy.
6. Fit a nonstandardized, fully tapered master cone in a fluid-filled canal that visually goes to the working length, exhibits apical tugback and is confirmed radiographically.
7. Dry the canal with appropriately sized paper points to determine final working length.
8. Trim the master cone back to the canal terminus based on the paper point drying technique.
9. Lubricate the master cone lightly with sealer and gently insert it to length.

Calamus® Downpack: Vertical Condensation

1. Activate the Calamus® EHP and sear off the master cone at the level of the orifice.
2. Select the larger size, prefit Calamus® manual plugger and step its working end around the circumference of the canal using short, firm strokes to move gutta-percha apically, clean the canal walls and flatten the material.
3. Use this larger Calamus® manual plugger and press for 5 seconds to compact warm gutta-percha vertically and laterally into this region of the root canal system (First Wave of Condensation).
4. Activate the Calamus® EHP and plunge 3 to 4 mm into the previously compacted material, deactivate, hesitate for 1 second, then remove the cooling instrument along with a "bite" of gutta-percha.
5. Select the medium size, prefit Calamus® manual plugger and step its working end around the circumference of the canal using short, firm strokes to, again, move gutta-percha apically, clean the canal walls and flatten the material.
6. Use this medium Calamus® manual plugger and press for 5 seconds to compact warm gutta-percha into this region of the root canal system (Second Wave of Condensation).
7. Activate the Calamus® EHP and plunge deeper, another 3 to 4 mm, into the gutta-percha, deactivate, hesitate for 1 second, then remove the cooling instrument along with another bite of gutta-percha.
8. Select the small size, prefit Calamus® manual plugger and step its working end around the circumference of the canal using short, firm strokes to, again, move gutta-percha apically, clean the canal walls and flatten the material.
9. Use this small Calamus® manual plugger and press for 5 seconds to deliver warm gutta-percha into the apical one-third of the root canal system and to offset shrinkage during the cooling phase (Third Wave of Condensation).
10. Select the Calamus® Flow delivery system to optimally backfill the canal.

Calamus® Downpack: Continuous Wave Technique

1. Activate the Calamus® EHP and sear off the master cone at the level of the orifice.
2. Select the larger size, prefit Calamus® manual plugger and step its working end around the circumference of the canal using short, firm strokes to move gutta-percha apically, clean the canal walls and flatten the material.
3. Use this larger Calamus® manual plugger and press for 5 seconds to compact warm gutta-percha vertically and laterally into this region of the root canal system (First Wave of Condensation).
4. Activate the Calamus® EHP and, in one deliberate and continuous motion, firmly press the heated plugger through the thermosoftened gutta-percha until the silicone stop is 2 mm from the reference point. This procedure must be limited to 2 to 3 seconds to prevent thermal injury.
5. Deactivate the Calamus® EHP and continue to maintain firm apical pressure on the cooling instrument until the silicone stop reaches the reference point.
6. Maintain firm apical pressure for 10 seconds to compact the mass of warn gutta-percha into the apical one-third of the root canal system and to offset shrinkage during the cooling phase.
7. Activate the Calamus® EHP for 1 second, then deactivate and remove the plugger from the root canal using a back and forth motion. This procedure separates and removes gutta-percha from the coronal two-thirds of the canal without disturbing the gutta-percha in the apical one-third.
8. Select the small size, prefit Calamus® manual plugger and step its working end around the circumference of the canal using short, firm strokes to clean the canal walls and re-condense the most coronal aspect of the gutta-percha within the apical one-third.
9. Select the Calamus® Flow delivery system to optimally backfill the canal.

Calamus® Downpack: Hybrid Technique

(A combination of Vertical Condensation & Continuous Wave Techniques)

1. Activate the Calamus® EHP and sear off the master cone at the level of the orifice.
2. Select the larger size, prefit Calamus® manual plugger and step its working end around the circumference of the canal using short, firm strokes to move gutta-percha apically, clean the canal walls and flatten the material.
3. Use this larger Calamus® manual plugger and press for 5 seconds to compact warm gutta-percha vertically and laterally into this region of the root canal system (First Wave of Condensation).
4. Activate the Calamus® EHP and plunge 3 to 4 mm deeper into the heat softened gutta-percha, deactivate, then maintain firm apical pressure for 5 seconds to compact the warm mass into this region of the root canal system.
5. Activate the Calamus® EHP and, again, plunge another 3 to 4 mm deeper into the heat softened gutta-percha, deactivate, then maintain firm apical pressure for 5 seconds to three-dimensionally compact the warm mass into this region of the root canal system.
6. Continue to activate and progressively pack warm gutta-percha deeper into the canal until the silicone stop is 2 mm short of the reference point, then deactivate and maintain firm apical pressure until the predetermined working depth is reached.
7. Maintain firm apical pressure for 10 seconds to compact the mass of warm gutta-percha into the apical one-third of the root canal system and to offset shrinkage during the cooling phase.
8. Activate the Calamus® EHP for 1 second, then deactivate and remove the plugger from the root canal using a back and forth motion. This procedure separates and removes gutta-percha from the coronal two-thirds of the canal without disturbing the gutta-percha in the apical one-third.
9. Select the small size, prefit Calamus® manual plugger and step its working end around the circumference of the canal using short, firm strokes to clean the canal walls and re-condense the most coronal aspect of the gutta-percha within the apical one-third.
10. Select the Calamus® Flow delivery system to optimally backfill the canal.

Calamus® Backfill

1. Position the tip of the warm cannula against the previously packed gutta-percha material for 5 seconds.
2. Hold the Flow handpiece lightly so it will back out of the canal during use. Press the 360° activation cuff and dispense a small 2 to 3 mm segment of warm gutta-percha into this region of the canal.
3. Select the small, pre-fit Calamus® manual plugger and step its working end circumferentially around the canal using short firm strokes to clean the canal walls and flatten the dispensed warm gutta-percha.
4. Use the same small Calamus®manual plugger and press for 5 seconds to three dimensionally compact warm gutta-percha into this region of the canal and to offset shrinkage during the cooling phase.
5. Position the tip of the warm cannula against the previously packed filling material for 5 seconds.
6. Activate the Flow handpiece and dispense a little longer, 3 to 4 mm, segment of warm gutta-percha into this region of the canal.
7. Select the medium, pre-fit Calamus® manual plugger and step its working end circumferentially around the canal using short, firm strokes to clean the canal walls and flatten the dispensed warm gutta-percha.
8. Use the same medium Calamus®manual plugger and press for 5 seconds to three dimensionally compact warm gutta-percha into this region of the canal and to offset shrinkage during the cooling phase.
9. Continue the backfill technique in the manner described, until the canal is completely filled or to the required level if accommodating a post for restorative needs.

Troubleshooting

Device does not turn on:

- Verify that power cord is plugged into the device and into wall outlet.
- Unplug device and check fuse. If fuse is blown, replace it. See Directions For Use: Fuse Replacement Instructions.

Pack Handpiece does not work:

- Ensure that the EHP is fully seated on the handpiece, rotate slightly in either direction until you feel the plugger 'click' into place, then try activating again.
- Remove the EHP and reseat in the handpiece.
- Ensure the handpiece is connected fully into the device console.
- Replace plugger with a new EHP.

PACK - EHP does not heat:

- Ensure that the plugger is fully seated on the handpiece, rotate slightly in either direction until you feel the plugger 'click' into place, then try activating again.
- Check temperature settings.
- Replace the EHP with a new one.

FLOW - Cannot remove handpiece cartridge nut:

- Allow the handpiece to cool for a few moments and try again.
- Press the  button and allow the plunger to recede; this will relieve pressure on cartridge nut.

FLOW - Gutta-percha does not flow through cannula:

- Make sure the cartridge is new and not from a previous use.
- Verify that the cannula is not kinked – only use the Bending Tool to create the desired curve.
- Verify that the device has reached an operational temperature for gutta-percha to flow.
- Increase temperature if needed.
- Replace cartridge with a new one.

FLOW - Gutta-percha extrudes from the cartridge when not in use:

Gutta-percha extruding from the cannula is called 'weeping' – and will occur with the device. This is a physical property of gutta-percha, the flow characteristic will occur when heated, causing the gutta-percha to flow into any openings, including the cannula. However, there are steps you can take to reduce the amount of gutta-percha extruded.

- Load the cartridge into the FLOW handpiece just prior to use.
- Only heat the cartridge when ready to use – do not leave the device on when not in use.
- Fully retract the plunger from the cartridge by pressing the  button, when the handpiece is not in use.
- Place the handpiece in its holster – up right – when not in use.

FLOW - Delivery plunger does not retract:

- Shut device off, and then turn back on.
- Press the  button.
- Press the activation cuff to move the plunger forward then press the  button.

FLOW - Motor stops turning:

- The cannula may have been placed too firmly in the canal, replace the cartridge.
- Reduce the pressure applied to the cannula.
- Check to make sure the cartridge nut has not been over-tightened.

Frequently Asked Questions

What size is the smallest EHP? What is it made from?

- The black EHP is a 40/.025, which is the smallest size in the Calamus® line. The EHPs are stainless steel.

How hot can a tip get?

- A tip can reach 400°C. The heat can be adjusted as low as 100°C, the default temperature for the Pack handpiece is 200°C.

What is the normal PACK power setting?

- The maximum heat setting should only be used only when searing off gutta-percha or an obturator. For warm vertical compaction or any other downpack technique, we recommend starting at 200°C.

How long will an EHP last?

- It depends on how well the EHP is care for. The life of an EHP will be reduced by:
    - Running it for long periods of time.
    - Working constantly at maximum temperatures.
    - Bending or putting too much mechanical force on the EHP.
- The EHPs should be used only to transfer heat – not to exert manual force!
- TDS recommends that a manual plugger be used when manual force is necessary.
- All tips will gradually lose their heating efficiency over time. This is strongly dependent on the user and will vary.

Can the Calamus® Dual be placed in my medical cart?

- The Calamus® Dual is not designed to be taken out of the UL approved console.
- Doing so, can alter or even negate the efficacy and safety designs that the Calamus® Dual was manufactured under. Furthermore, removing the Calamus® Dual from its UL approved housing will void the warranty.

Warranty

Dentsply Tulsa Dental Specialties (TDS) warrants the Calamus® Dual against defects in material or workmanship for a period of one year from date of original invoice. TDS does not warrant any other products that come along with the device, such as Electric Heat Pluggers or cartridges for example, as they are consumables.

TDS's sole obligation under product warranty is (at its sole option and discretion) to repair or replace any defective component or product in part or whole. TDS shall be the sole arbiter of such action.

In the event of alleged defect under warranty, the purchaser is to notify TDS Customer Complaint Department promptly.

Customer Complaint will provide instructions, usually directing that the product be returned for service. Shipment to TDS and the cost thereof is always the responsibility of the purchaser.

Accidental or intentional misuse, inappropriate installation, or failure to perform directed maintenance voids the warranty.

TDS does not assume, under this warranty, any risks or liabilities arising from the clinical use of its products, whether or not such use involves coincidental utilization of products manufactured by others.

TDS makes no warranty other than that stated above, expressed or implied.

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608 Rolling Hills Drive
Johnson City, TN 37604
1-800-662-1202

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