Revision History

Item	Rev	Description	Release date
1	A0	New Issue	2023-05-23

Instructions For Use

Endo Enlarger

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Before using the products, please see the instruction manual as indicated below.

1. Brief of the product

The Endo Enlargers are engine driven instruments intended for root canal preparation (enlargement of the coronal part / preflare / preparation of the entrance). The device is type 5 classification Shape Instrument base on ISO 3630-1.
It is reusable and non-sterile instruments.
For Dental Use Only.

2. Product Structure and materials

The Endo enlargers are one-piece instruments which is integrated with shank, there are cutting blades at working part with different dimensions and number of blades according to different size of Endo Enlargers, pls check item 5 for detailed information of specifications.
The materials of Endo Enlargers made by DENCO company is: **Stainless Steel SUS402**.

3. Safety Notes

<Warnings>

- Strictly follow this Instruction for Use and the General Processing Instructions For Endodontic Products (see section 8) to minimize following risks to the device, the patient and/or the user:
  - ○ Breakage of instrument.
  - ○ Cross-contamination.
  - ○ Heat generation due to insufficient lubrication and irrigation.
  - ○ Swallowing of working part of the instrument.
  - ○ Toxic or allergic reactions caused by processing residues.

<Contraindications and prohibitions>

None Known

<Adverse Reactions>

In the present technical state, no adverse reaction has been reported so far

4. Re-Processing

4.1 The DENCO Endo Compactors are reusable instruments, the maximum number of processing cycles of the DENCO Endo Compactors is 8 (number of processing cycles validated without affecting the functionality and safety of the products).
Pls follow the processing instructions for the disinfection, cleaning and sterilization steps before each reuse as Item 7 of this IFU.
4.2 Do not re-use silicone stoppers. Remove and discard silicone stoppers after each use.
4.3 LIMITATION ON RE-USE

• The products shall not be processed more than the number of maximum cycles indicated in the table in section 4) STEP-BY-STEP INSTRUCTIONS. It is the responsibility of the user to monitor the number of processing cycles. Meanwhile re-use is permitted only when the product is defect free and following a visual inspection (see item below). Since certain applications may cause the instruments to prematurely reach the end of their useful life the "Max number of processing cycles" will not always be reached (e.g. when shaping an extremely curved root canal with a file).

• In any case inspect the products before re-use, and discard them in case of defects. These include but not limited to the following:

- Plastic deformation (bent, unwound, distorsion, sign of twisting, elongation, uneven flutes);
- Breakage;
- Loss of colour coding or marking;
- Bent instrument;
- Untwisted threads;
- Damaged cutting surfaces and edges;
- Dull cutting blades;
- Missing size marking;
- Corrosion (e.g. dull spots);
- Wear.

• For shaping extremely curved canals it is safer to use the file only to shape one canal in order to reduce the risk of breakage. Pay attention to the following good practices:

- Use a new file and discard it after the canal was treated (single canal use).
- Use manual instead of Endo Compactors.
- Use small size, flexible files (this will help avoid canal transportation).
- Visually inspect the active part for all the defects listed in the former paragraph during use (i.e after each wave).
- Avoid the standard reaming continual rotational motion and instead use small angle motions (filing motion, watch winding oscillation motion, or balanced force technique) in order to limit the rotational bending fatigue on the instruments and improve their expected life.

5. Specifications and Method of Use

5.1 The Specification of DENCO Endo Enlargers as the below table

Model Name	Specification	Length (mm）	Tip Diameter (mm)	Ring marking
Gate Drills	#1	28mm 32mm	0.50	I
	#2		0.70	II
	#3		0.90	III
	#4		1.10	IIII
	#5		1.30	IIIII
	#6		1.50	IIIIII
Peeso Reamers	#1	28mm 32mm	0.70	I
	#2		0.90	II
	#3		1.10	III
	#4		1.30	IIII

	#5		1.50	IIIII
	#6		1.70	IIIIII
Drills for Screw Post	L1	32mm	1.05	I
	L2		1.20	II
	L3		1.35	III
	L4		1.50	IIII
	L5		1.65	IIIII
	L6		1.80	IIIIII
Drills for Ouro Post	S0	28mm	0.90	I
	S1		1.10	II
	S2		1.30	III
	S3		1.50	IIII
Straight Drills for Fibre Post	#1	34mm	1.00	I
	#2		1.20	II
	#3		1.35	III
	#4		1.50	IIII
Taper Drills for Fibre Post	F1	32mm	0.80	I
	F2		0.90	II
	F3		1.00	III
	F4		1.10	IIII
Trephine Drills	TD-80	32mm	0.80	Black
	TD-90		0.90	White
	TD-110		1.10	Red
Shapping Reamers	SR-80	32mm	0.80	Black
	SR-90		0.90	White
	SR-110		1.10	Red
Drills for Tapered Scew Post	U1-#008	6.5mm	0.80	Purple
	U1-#108	8mm	0.80	White
	U1-#208	10mm	0.80	Yellow
	U1-#308	12mm	0.80	Red
	U1-#110	8mm	1.00	Blue
	U1-#210	10mm	1.00	Green
	U1-#310	12mm	1.00	Black
	U2-#008	6.5mm	0.80	Purple
	U2-#108	8mm	0.80	White
	U2-#208	10mm	0.80	Yellow
	U2-#308	12mm	0.80	Red
	U2-#110	8mm	1.00	Blue
	U2-#210	10mm	1.00	Green
	U2-#310	12mm	1.00	Black

5.2 The dentists can choose to use different size according to the different case of treatment.

5.3 Allowable engine speed: 800-1200 min^{-1}

5.4 Use the active device which can hold the shank precisely: Diameter of Contra Angle shank: 2.35mm and the active device which could control all allowable engine speed.

5.5 This DENCO Endo Enlargers is under the provisions of ISO 3630 performance test, products' durability for twisting and bending must exceed specified value of our standard

6. Precautions for use

- Use a rubber dam system during the endodontic procedure.
- For your own safety, wear personal protective equipment (gloves, glasses, mask).
- Inspect the packaging before use and do not use the instruments if the packaging is damaged.
- Do not use the instruments after expiration date.
- Check the instrument before each use for signs of defects such as deformations (bent, unwound) breakage, corrosion, damaged cutting edges, loss of color coding or marking.
  With these indications the devices are not able to fulfil the intended use with the required safety level, instruments should be discarded.
- Check instrument and clean working part frequently during instrumentation, inspecting for signs of distortion, elongation or wear, such as uneven flutes, dull spots. With these indications that the devices are not able to fulfil the intended use with the required safety level, instruments should be discarded.
- Instruments should not be fully immersed in a sodium hypochlorite solution (NaOCl). Only the working part of the instrument, which is in contact with the patient should be immersed in a NaOCl solution concentrate at NOT more than 5%.
- Exercise caution in the apical area and in canals that divide, and/or exhibit abrupt curvatures or recurvatures.
- Irrigate abundantly and frequently the canal throughout the procedure and after each instrument used (according to good dental practices).
- Always use minimal apical pressure. Never force the files down the canal.
- When instrument does not easily progress, clean and inspect the cutting flutes, then irrigate, recapitulate with a manual file and reirrigate.
- For shaping extremely curved canals it is safer to use the file only to shape one canal in order to reduce the risk of breakage. Pay attention to the following good practices:
  - ○ Use a new file and discard it after the canal was treated (single canal use).
  - ○ Use small size, flexible files (this will help avoid canal transportation).
  - ○ Visually inspect the working part for all the defects listed in the former paragraph during use (i.e after each wave).
  - ○ Avoid the standard reaming continual rotational motion and instead use small angle motions (filing motion, watch winding oscillation motion, or balanced force technique) in order to limit the rotational bending fatigue on the instruments and improve their expected

7. Cleaning, Disinfection and Sterilization Method

7.1 General Recommendation

7.1.1 Please use cleaning agents suitable for cleaning surgical instruments, rubber, medical plastics,

instruments and other medical instruments, such as multi-enzyme cleaning agents. When using, please strictly abide by the manufacturer's regulations on the concentration, temperature, action time and shelf life of the solution used. Do not use hydrogen peroxide (H2O2) solution.

7.1.2 For your own safety, please wear personal protective equipment (gloves, glasses, masks).

7.1.3 The user should be responsible for the sterilization or disinfection of the product in the first cycle and each subsequent use, as well as the use of damaged or dirty equipment after sterilization.

7.1.4 In the final rinsing step, deionized water must be used regardless of whether an automatic washer sterilizer or manual cleaning method is used. Tap water can also be used for other rinsing steps.

7.1.5 Only immerse the operative part of the instrument in contact with the patient into the NaOCl solution concentrate with a concentration not exceeding 5%.

7.1.6 Before or during disinfection or cleaning, avoid equipment drying out. Dry biological materials may be difficult to remove.

7.1.7 Only use the appropriate support of the device for post-processing.

7.1.8 Do not use labeling systems or identification marks directly on the device.

7.1.9 Only use washer-disinfectors approved in accordance with EN ISO 15883 and regularly maintained and verified.

7.2 Operation Steps of Cleaning, Disinfection and Sterilization

Step-by-Step instructions for processing prior to use/reuse as below table:

Step	Processing instructions
Preparation at the Point of Use and Transportation	Remove gross soiling of the instrument with cold water (<40°C) immediately after use. Don't use a fixating detergent or hot water (>40°C) as this can cause the fixation of residuals which may influence the result of the reprocessing process.
Transportation	Safely store the device in a humid surrounding and transport it to the reprocessing area to avoid any damage and contamination to the environment.
Preparation for Decontamination and Cleaning	The devices must be reprocessed in a disassembled state, as far as possible. Before cleaning, disassemble each instrument to the smallest removable unit according to the instructions. For lumen instrument, ensure that the lumen of device is not clogged. The patency of the lumen can be tested by injecting water into the lumen.
Pre-Cleaning	Do a manual pre-cleaning, until the instruments are visually clean. Submerge the instruments in a cleaning solution. Clean the surfaces with a soft bristle brush.
Cleaning	Regarding cleaning/disinfection, rinsing and drying, it is to distinguish between manual and automated reprocessing methods. Preference is to be given to automated reprocessing methods, especially due to the better reproducibility and standardization, and in personnel protection. Automated Cleaning Use a washer-disinfector meeting the requirements of the ISO 15883

	series. The instruments are placed on the cleaning rack of the WD. A cleaning tray may be used to avoid that the small device is washed away and lost during cleaning. The lumen of device is connected to the flushing port of the WD. The devices in the washer-disinfector are arranged in such a way that there is no rinsing shadow and the water drains off quickly. Note: Demineralised water should be used for the automated cleaning process. Water quality refer to EN 285.
Disinfection	Automated thermal disinfection in washer/disinfector under consideration of national requirements in regards to A0 value (see ISO 15883). A disinfection cycle of 5 min disinfection at 90°C has been validated for the device to achieve an A0 value of > 3000. Here we suggest a disinfection cycle of 5 min disinfection time at ≥ 93 °C due to the normally tolerable temperature fluctuations in WD.
Drying	Drying the instrument through drying cycle of washer/disinfector. If needed, (additional) manual drying can be performed through lint free towel. Insufflate cavities of products by using sterile compressed air.
Functional Testing, Maintenance	Visual inspection for cleanliness of the products and reassembling, if required. All instruments should be checked again for dryness. After cleaning and disinfection, a thorough inspection and maintenance ensures that the products are fit for use. - Check that the product has no dents, cracks, deformations, scratches, etc.; - Check all markings on the product for clear visibility. Discard and replace any non-conform devices as necessary. Do not use the device with following defects: material deformation, cracks on the product, rust, brittle or other change in the material, etc. Before packaging and sterilization, make sure that these devices have been tested and maintained acc. to manufacturer's instruction.
Packaging	Pack the products in an appropriate packaging material for sterilization. The packaging material and system refer to ISO 11607. Make sure that the packaging material is suitable for steam sterilization.
Sterilization	Sterilization of products by applying a fractionated pre-vacuum steam sterilization process (according to EN 285/EN ISO 17665) under consideration of the respective country requirements. Following sterilization parameters are commonly used: 132°C, 4 min or 134°C, 5 min (standard program in EU). Drying time: For steam sterilization, we recommend a drying time of 20 to 40 minutes. Choose a suitable drying time, depending on the autoclave and load. Refer to the autoclave's instructions for use. After Sterilization a. Remove the product from the autoclave. b. Let the product cool down at room temperature for at least 30 minutes.

	Do not use additional cooling. c. Check that the sterilization wraps or pouches are not damaged.
Storage	Storage of sterilized instruments in a dry, clean and dust free environment at modest temperatures, refer to label and instructions for use.

8. Transportation

8.1 To prevent damage to the medical device during transit, use a specific racks, trays or rigid containers may be recommended.

8.2 When the package was broken, then it is non-sterilize, must be cleaned, disinfected and sterilized before using.

9. Storages and duration of use

9.1 Keep products in a dry and clean environment, away from sources of moisture and direct sunlight.

9.2 The shelf time of root canal files are 5 years.

10. Disposal

For proper disposal, always observe national laws and recommendations of the authorities.

11. Packaging

11.1Minimum packaging unit: 6pcs/package in aluminum foil box.

11.2Assortment: 1pcs from each size in one package

12. Explanation of related symbols

Symbols	Explanation
	Medical device
	For Dental Use Only
	Material of the operative part
	Material of the operative part: Nickel Titanium
	Batch code

	Non-Sterile
	Catalogue Number
	Expired Date
	Consult instructions for use
	Authorized representative in the European Community
	Manufacturer
	Can be sterilized at the specified temperature
	Assortment
	6pcs/pack

13. WARRANTY AND LIMITED REMEDY / LIMITATION OF LIABILITY

Disclaimer: The instructions for use have been validated by DENCO. Users are solely responsible for any deviation from these instructions, and/or the use of alternative methods for endodontic treatment and/or processing when applicable. Denco accepts no liability for damage, injury, or any legal responsibility incurred directly or indirectly by the user due to a deviation from the instructions for use set forth above. The user shall observe safe and lawful practices including, but not limited to, those set forth in this document.

<Legal manufacturer>

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