Responsibility of the Manufacturer and End User

CAUTION  The manufacturer can only accept responsibility for the safety, reliability, and performance of the motor and the handpiece tubing when it is used in compliance with the following directions:

- The motor and the handpiece tubing must be used in accordance with these instructions for use.
- The motor and handpiece tubing cannot be repaired by the end user. Assembly, modifications, or repairs must only be undertaken by A-dec or an authorized A-dec dealer.

CAUTION  The motor is intended for use only with A-dec handpiece tubing and with A-dec delivery systems that have a deluxe or deluxe plus touchpad. Using other manufacturers’ systems or components could lead to unexpected performance or damage to the system.

Regulatory Information and Warranty

For required regulatory information and the A-dec warranty, see the Regulatory Information, Specifications, and Warranty document (p/n 86.0221.00) available in the Resource Center at www.a-dec.com.

Product Service

Product service is available through your local authorized A-dec dealer. For service information, or to locate an authorized dealer, contact A-dec at 1.800.547.1883 in the USA and Canada or 1.503.538.7478 worldwide, or visit www.a-dec.com.
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Notes, Cautions, and Warnings

Always consider the safety of the patient and please note the following before you use the A-dec EA-53 electric motor system.

Introductory Notes

Purpose
Creating customer success is a key foundation to the A-dec quality policy. In support of that effort, this A-dec product has been developed, manufactured, and subjected to final inspection according to legal regulations, quality norms, and industry standards.

For Your Safety and the Safety of Your Patients
Prior to initial use, please read the instructions for use, which explain how to use your A-dec product to help ensure smooth and efficient operation.

CAUTION Always follow the manufacturer’s recommendations for the electric motor and attachment. Misuse may damage the motor, create risks, and pose hazards for patients, users, and others.

Qualifications of the User
We have based our development and design of the electric motor system (includes tubing, electric motor and control unit) on the “dentists, dental hygienists, dental employees (prophylaxis) and dental assistants” target group.

Indications for Use
The A-dec EA-53 electric motor system is comprised of a control unit that drives a direct current (DC) electric micromotor that is activated by means of a footswitch. It is intended for use in general dental applications such as: cutting a tooth for cavity preparation, crown preparation, crown finishing, inlay, filing, polishing, prophylaxis and endodontic treatment, with use of a straight, right-angle or contra-angle ISO E-type handpiece attachment of equal, gear-reducing, or gear-increasing speed.

Skilled Application
The motor and handpiece tubing are intended for use only by trained dental or medical practitioners for the purposes listed under the Indications for Use and in accordance with this document and the applicable health and safety regulations.

The motor and handpiece tubing should be prepared for use and maintained by staff who are trained in procedures for infection control, personal safety, and patient safety. Improper use, (e.g., through poor hygiene and maintenance), non-compliance with our instructions, or the use of accessories and spare parts that are not approved by A-dec invalidates all claims under warranty and any other claims.
Operating Conditions and Environment

⚠ ⚠

• Check that sufficient air and water coolants are supplied (see “Specifications” on page 15 for more details).
• Use only potable water and air from dental units for the supply.
• Use only non-contaminated, filtered, oil-free and dry compressed air to operate the motor and handpiece tubing.

Danger Zones M and G

⚠ ⚠

WARNING In accordance with IEC 60601-1/ANSI/AAMI ES60601-1, the motor is not suitable for use in potentially explosive atmospheres or with potentially explosive mixtures of anaesthetic substances containing oxygen or nitrous oxide where such gases may accumulate in concentration in a closed space.

The motor and handpiece tubing are not suitable for use in oxygen-enriched atmospheres.

NOTE Zone M is defined as “medical environment” and constitutes the part of a room in which potentially explosive atmospheres may form due to the use of anaesthetics or medical antiseptics and antibacterial soaps; such atmospheres are typically localized and temporary. Zone M comprises a truncated pyramid below the operating table which is tilted outwards at a 30° angle.

Zone G, also known as an “enclosed medical gas system,” does not necessarily include areas enclosed around all sides, in which explosive mixtures are continuously or temporarily generated, directed or used in small quantities.

Risks Due to Electromagnetic Fields

⚠ ⚠

WARNING Do not use any high frequency (HF) communication equipment (e.g. mobile telephones) during operation. These devices may affect electrical medical equipment.

⚠ ⚠

WARNING Implantable systems, such as cardiac pacemakers and ICDs (implantable cardioverter defibrillators) can be affected by electric, magnetic, and electromagnetic fields. This motor system emits electromagnetic fields, which means there are some potential risks. For instance, interference may occur and a malfunction of these devices is possible. A-dec recommends the following:

◦ Ask patients and users if they have an implanted device before using this product.
◦ Explain the circumstances to them.
◦ Weigh the risks and benefits.
◦ Keep this product away from implanted devices.
◦ Make appropriate emergency provisions and take immediate action if patients become ill. Symptoms including a raised heartbeat, irregular pulse, and dizziness may signal problems with a cardiac pacemaker or ICD.
Safety Notes Before You Begin

Hygiene and Maintenance Prior to Initial Use

- Ensure that the motor and handpiece tubing are in clean condition and sealed in polyethylene (PE) film when the product is first delivered.
- Disinfect the handpiece tubing prior to initial use. See “Clean and Disinfect the Motor” on page 9.
- Sterilize the motor prior to initial use. See “Usage Notes for Electric Motor Sterilization” on page 10.

Final Equipment Checks

- Before using the motor and handpiece tubing for the first time, ensure that the operating conditions are met.
- Always ensure that adequate cooling is delivered (except in endodontic applications). In case of a coolant supply failure, the motor must be stopped immediately.
- Check the motor, handpiece tubing, and O-rings for damage, loose fit, and leaks prior to each use. Ensure that the handpiece tubing is not kinked. Do not use the motor if damage is detected. Service or replace as necessary.
- Perform a test run prior to each treatment.

Usage Warnings

**WARNING** Do not look directly into the optic outlet, which could lead to vision impairment.

**WARNING** Operate the electric motor with care. Rapid deceleration of the bur, especially during high-speed procedures, can overload the torque limit and injure the patient’s surrounding hard and soft tissue.

- The dental motor is designed for intermittent operation with an operating time of 2 minutes and an idle time of 3 minutes.
Install the Motor

**WARNING** Do not touch the handpiece tubing terminal and patient at the same time. Patient shock or injury may occur.

**WARNING** Never step on the foot control while installing or removing the motor. Damage may occur.

To install the motor on the handpiece tubing:

1. Align the motor connection tubes with the connection openings on the handpiece tubing.
2. Screw the motor and the handpiece tubing coupling together.

**CAUTION** Do not twist, kink, or squeeze the handpiece tubing, which may cause damage.

3. Visually inspect the connection to ensure that the motor is securely connected to the tubing. The motor and tubing coupling must sit flush to one another.

**NOTE** If the motor fails to connect, carefully unscrew it from the tubing coupling, then repeat Steps 1-3. If it still fails to connect, contact your authorized A-dec dealer or A-dec customer service.
Install the Attachment

![Attachment installation image]

**WARNING** Do not install or remove the attachment while the motor is running. Product damage and/or injury can occur.

**CAUTION** Only use E-style attachments (20 mm diameter, gear driven) that conform with ISO standard 3964.

**IMPORTANT** Follow the instructions for use that came with your attachments.

To install the attachment on the motor:
1. Push the attachment onto the motor. If the attachment is fiber optic, be sure to correctly align the notch.
2. Verify that the attachment is properly connected and has a secure hold on the motor. The attachment should not come off with a gentle pull.

Touchpad Controls

![Touchpad controls image]

A-dec deluxe touchpads offer a standard mode and an endodontics mode for use with the A-dec EA-53 electric motor. For specific touchpad functions and settings, see the Instructions for Use that came with your delivery system.
Test the Electric Motor System

WARNING  Do not hold the motor and attachment at eye level when testing to avoid possible injury.

WARNING  Ensure that the motor and attachment are completely dry before operating. Moisture in the motor can lead to a malfunction.

To test the complete electric motor system:

1. Verify that the attachment is properly connected and has a secure hold on the motor. The attachment should not come off with a gentle pull.
2. Step on the delivery system foot control disc.
3. If you observe problems, such as vibrations, unusual noise, overheating, smell, or leakage, stop the motor immediately and contact your authorized A-dec dealer or A-dec customer service.
Clean / Maintain

Please note the following before cleaning and disinfecting the A-dec EA-53 electric motor:

**CAUTION** The electric motor should be maintained according to these instructions and in line with infection control procedures for the safety and well-being of patients. Improper maintenance, non-compliance with the instructions, or the use of accessories and service parts that are not approved by A-dec invalidates all claims under warranty and any other claims.

**NOTE** Clean and disinfect the motor and handpiece tubing immediately after each patient. Sterilize the motor following cleaning and disinfection.

**DANGER** Failure to turn off the power before you perform maintenance can lead to electrical shock.

**WARNING** Failure to turn off the power before you perform maintenance can lead to product damage and result in serious injury or death.

- Follow your local directives, standards, and guidelines for cleaning, disinfection, and sterilization.
- Wear protective clothing and personal protective equipment (PPE).
- Always turn off the power to the system before maintenance.
- Remove the attachment from the motor before maintenance.
- Do not remove the motor from the handpiece tubing for cleaning and disinfecting.
- Do not use disinfectants that contain chlorine or protein fixatives.
- Ensure that no liquid enters the motor during cleaning and disinfection.
- Do not use a thermal washer disinfector to clean the motor or handpiece tubing.
- Do not lubricate the motor, which is permanently lubricated.
Clean and Disinfect the Motor

CAUTION Do not place the motor or handpiece tubing in liquid disinfectant or an ultrasonic bath.

NOTE Use only disinfectants that are certified by officially recognized institutes and do not contain chlorine or protein fixatives. Follow the disinfectant manufacturer’s specifications for proper use.

1. Disconnect the attachment from the motor.
2. Use disinfecting wipes or a soft cloth and commercially available surface disinfectants to carefully clean the exterior surfaces of the motor and handpiece tubing.
3. Wipe the optic outlet with cleaning/disinfectant fluid and a soft cloth.
4. Dry the optic outlet with an air syringe or soft cloth.

CAUTION Clean the motor with care and avoid scratching the optic outlet.

CAUTION Perform a visual inspection after each cleaning process. Do not use the motor if the optic outlet is damaged.

NOTE Sterilize the motor after each patient. Follow the sterilization notes and instructions starting on page 10.
Usage Notes for Electric Motor Sterilization

Please note the following when sterilizing the motor:

- Follow your local directives, standards, and guidelines.
- Clean and disinfect before sterilizing.
- Do not sterilize the handpiece tubing.
- Sterilize the motor in a USFDA-cleared paper/foil laminate sterilization wrap, compliant to ISO 11607-1.
- Ensure that you only remove dry sterile goods from the sterilizer.
- Store sterile goods dust-free and dry.
Sterilize the Motor

Prior to sterilization:
1. Purge the water lines with air.
2. Unscrew the motor from the handpiece tubing coupling and pull the motor straight out from the tubing terminal.

   **CAUTION** Do not twist, kink, or squeeze the handpiece tubing, which may cause damage.

3. Seal the motor in a USFDA-cleared paper/foil laminate sterilization wrap, compliant to ISO 11607-1.

4. Sterilize the motor at 270°F (132°C) for the following times*:
   - Dynamic-air-removal sterilizers: 4 minutes
   - Gravity displacement sterilizers: 15 minutes

   **WARNING** Do not exceed 277°F (136°C) during sterilization.

5. Allow the load to dry for approximately 20–30 minutes before removing from the sterilizer. Ensure that the motor is completely dry before using.

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**NOTE** A-dec recommends sterilization according to ANSI/AAMI ST79 and EN 13060 (class B). Other sterilization methods may reduce the life span of your motor.*

**IMPORTANT** Follow the manufacturer’s instructions for use that came with your sterilizer.

* For more information about sterilization standards, refer the medical device regulations specific to your location.
Replace the Motor O-Rings

**CAUTION** Replace leaking or damaged O-rings immediately. Do not use sharp instruments to remove the O-rings.

To replace the motor O-rings:
1. Squeeze the O-ring together between your thumb and forefinger to form a loop.
2. Pull the O-ring off the motor.
3. Repeat steps 1 and 2 for the other two O-rings.
4. Slide on the new O-rings.

**NOTE** Always replace all three O-rings to ensure a secure connection between the motor and attachment.

Replace the Motor Gasket

To replace the small gasket at the motor connection:
1. Lift up the gasket with a pair of tweezers and remove the gasket.
2. Carefully insert the new gasket.

**CAUTION** Ensure that the gasket is properly positioned.
Replace the Handpiece Tubing O-Ring

CAUTION Replace leaking or damaged O-rings immediately. Do not use sharp instruments to remove the O-rings.

To replace the small O-ring on the handpiece tubing terminal:
1. Pull the damaged O-ring off of the tubing terminal.
2. Slide on the new O-ring.

Common Service Parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-Rings, EA-53 Motor (package of 3)</td>
<td>01862300</td>
</tr>
<tr>
<td>Gasket, EA-53 Motor</td>
<td>06893400</td>
</tr>
<tr>
<td>O-Ring, EA-53 Tubing</td>
<td>07072400</td>
</tr>
</tbody>
</table>

Contact your authorized A-dec dealer for available A-dec EA-53 electric motor service parts.

CAUTION Use only original A-dec service parts.
A Few Notes About Service

CAUTION  Regular servicing of the motor for function and safety, including the attachments, is necessary and should be carried out at least once every three years, unless shorter intervals are prescribed by law.
This service should be performed by an authorized A-dec dealer or A-dec customer service.

NOTE  The ISO 11498 standard stipulates a durability of at least 250 sterilization cycles. We recommend that you have the EA-53 motor serviced after 500 sterilization cycles or one year, whichever comes first.
## Specifications

### EA-53 Electric Motor

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required handpiece tubing</td>
<td>VE-10</td>
</tr>
<tr>
<td>Motor/attachment standard</td>
<td>ISO 3964, E-style</td>
</tr>
<tr>
<td>Operation mode, optional</td>
<td>forward / reverse rotation</td>
</tr>
<tr>
<td>Speed range in standard mode</td>
<td>100–40,000 rpm</td>
</tr>
<tr>
<td>Speed range in endo mode</td>
<td>100–5,000 rpm</td>
</tr>
<tr>
<td>Maximum torque at the motor</td>
<td>0.02 ft-lb (3 N cm)</td>
</tr>
<tr>
<td>Adjustment cooling air</td>
<td>0.2–0.3 CFM (6–8 NL/min)</td>
</tr>
<tr>
<td>Drive air pressure</td>
<td>65 psi minimum (4.5 bar)</td>
</tr>
<tr>
<td>Air coolant pressure*</td>
<td>7–43 psi (0.5–3.0 bar)</td>
</tr>
</tbody>
</table>

*Adjust the actual pressure with an attachment in place.*

### VE-10 Handpiece Tubing

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handpiece tubing model</td>
<td>VE-10</td>
</tr>
<tr>
<td>Dental motor connection</td>
<td>EA-53</td>
</tr>
<tr>
<td>Air coolant at ~36 psi (250 kPa)</td>
<td>&gt; 0.3 CFM (&gt; 8 NL/min)</td>
</tr>
<tr>
<td>Water coolant at ~29 psi (200 kPa)</td>
<td>&gt; 0.007 CFM (&gt; 200 ml/min)</td>
</tr>
<tr>
<td>Internal handpiece tubings (max pressure)</td>
<td>58 psi (400 kPa)</td>
</tr>
<tr>
<td>Environmental conditions: Temperature</td>
<td>-40°F up to +158°F (-40–70°C)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>between 15% and 80%</td>
</tr>
</tbody>
</table>

**NOTE** Specifications are subject to change without notice. Requirements may vary depending on your location. For more information, contact your authorized A-dec dealer.

**IMPORTANT** For required regulatory information and the A-dec warranty, see the Regulatory Information, Specifications, and Warranty document (p/n 86.0221.00) available in the Resource Center at [www.a-dec.com](http://www.a-dec.com).