ELECTRIC
MICROMOTORS
INTEGRATED SOLUTIONS
ELECTRIC REVOLUTION
TAKE THE ADVANTAGE

5 TIMES MORE POWER AND 20 TIMES MORE TORQUE THAN AN AIR TURBINE

A Bien-Air electric micromotor delivers 5 times more power and 20 times more torque compared to an air turbine. The electric micromotor can achieve full speed (40,000 rpm with a 1:1 handpiece), with constant torque (MX2 = 3.5 Ncm) and more than 100 Watt’s (mechanical power).

The speed will not decrease as the bur is applied to the tooth because the system compensates by automatically increasing the torque. This yields constant speed regardless of the pressure applied, over the entire speed range, and provides the ability for the micromotor to be used on today’s hardest restorative materials.

- High torque at low speeds = No vibrations, allowing for precise control
- High torque at high speeds = Reduced finishing and polishing times

The faster preparation with the electric handpiece creates less heat buildup at the tooth surface.

What this means to the dentist:
- Endodontics: Reduce time while increasing accuracy in root canal procedures
- Periodontics: Superior controlled removal of soft and hard tissue
- Treatment of cavities: Reduce time while increasing accuracy in tooth preparation
- Oral surgery: Reduce time while increasing accuracy in sectioning bone
- Implantology: Reduce time and ability to use the same micromotor to place implants because of the high torque (max = 70 Ncm)

Role of Speed vs. Torque

Torque is the «force» necessary to maintain a certain speed. For example, an air turbine has very low torque but operates at a very high speed. When a load is applied, the speed decreases due to the low torque. An electric handpiece is able to maintain constant speed even with a high load applied.
NOISE LEVELS REDUCED AND LESS VIBRATION

A Bien-Air electric micromotor reduces noise levels by 2 compared to an air turbine. This greatly decreases patient anxiety and discomfort and allows the dentist to work more efficiently. It also vibrates considerably less. This offers greater cutting precision and a smoother finish.

Micromotor (with handpiece) ~ 57 dBA  
Turbine ~ 65 dBA

Noise is measured in decibels (dB) on a logarithmic scale, however, dental instruments are measured using a specific scale (dBA) adapted to the sensitivity of the human ear. A 10dBA increase represents a doubling of perceived loudness (i.e. 60 dBA sounds twice as loud as 50 dBA to the human ear).

BRUSHLESS TECHNOLOGY
A NEW DIMENSION

ADVANTAGES OF BRUSHLESS MICROMOTORS

Simple micromotor design.
Better technology providing more power and torque.

Torque and speed control: The electronic drive precisely regulates the speed and the torque, allowing for applications like endodontics to be performed with the same micromotor (auto-reverse, auto-forward). The torque is stable over the entire speed range.

Less noise and vibration free at low speed: There is no electrical sparking from carbon brushes and much less noise.

Easy and economical to maintain: There are no brushes to wear out or regularly replace.

Better hygiene: The micromotor can be sterilized.

24-month Warranty: Bien-Air offers a 24-month warranty for the brushless micromotor.

![Graph showing torque and speed for Brushless Micromotor (MX2) and Brush Micromotor (MC3)]
**BRUSHLESS MICROMOTORS**

**Optima MX2 control unit**
- 80-240 Vac transformer with 5 m 32 Vdc cable
- Converter, 24 Vac/32 Vdc, 24 Vdc

**DMX2 Pro electronic control**

**Options**
- Hose for MX2 micromotor
- Hoses for MX2 micromotor

**DMX2 Hose for MX2 micromotor**

**BRUSH MICROMOTORS**

**Optima MCX control unit**
- 80-240 Vac transformer with 5 m 32 Vdc cable
- Converter, 24 Vac/32 Vdc, 24 Vdc

**DMX electronic control**

**Options**
- Hose for MCX micromotor
- Hoses for MCX micromotor

**DMX Hose for MCX micromotor**

**ELECTRONIC DRIVE FOR LIGHTING POWER SUPPLY, AIR DRIVEN**

**DMX-i electronic control**

**Options**
- Peristaltic pump (without electronic drive)

**PLMP 021 electronic control**
- + 4VR400 Hose

**Options**
- + Hose for MC2 micromotor

**Applications**
- Restorative
- Prophylaxis

**Type**
- With brushes, internal spray
- With brushes, internal spray, autoclavable

**Speed range**
- 60-40,000 rpm
- 60-40,000 rpm

**Max torque**
- 2.3 Ncm
- 2.8 Ncm

**Torque control**
- No
- No

**Weight**
- 73 gr
- 77 gr

**Dimensions**
- Ø 23.5 x 81 mm
- Ø 24 x 93 mm

**Light**
- No
- No

**Max noise level, compliant with ISO 11498**
- 50 dBA
- 57 dBA

**Sterilisable**
- No
- No

**Hose rotation**
- 0°

**References**
- 1600073-001
- 1600075-001
- 1600075-001
HOW DO MCX, MX2 AND MX-i BRUSHLESS MICROMOTORS WORK?

Like any other electric micromotor, brushless micromotors consist of a rotor and a stator. Unlike the brush micromotor, the rotor consists of a permanent magnet, while the coils are mounted to the stator. The mechanical switching function, implemented by the brush and collector combination in a carbon brush-type micromotor, is replaced by a sophisticated electronic drive that became possible only with the development of high-speed and powerful microprocessors. The electronic drive creates a rotating electric field in the stator that interacts with the permanent.

HOW DO THE MC2 AND MC3 CARBON BRUSH MICROMOTORS WORK?

All electric micromotors are made up of a rotor and a stator. The rotation is generated by magnets interacting with an electric current flowing through a wire coil. In the case of brush micromotors, the coils are located on the rotor. Electrical power is supplied to the coils through carbon brushes located on the stator. The electrical current in the coil interacts with the magnets of the stator, thus generating rotation.

ADVANTAGE OF BRUSH MICROMOTORS:
Simple electronic drive.

COMPLEXITY OF BRUSH MICROMOTORS

Complex mechanical design (rotor: multiple windings, collector and brushes, stator: permanent magnet).
The brushes wear out so they must be regularly replaced (approximately 18-24 months in a dental micromotor).
The carbon dust from the brushes disperses in the micromotor and can reduce the life of the micromotor bearings.
The carbon brushes can cause interference with other electronic devices because of their constant interaction with the electrical components in the micromotor.
The carbon brushes cannot be washed or sterilized as they absorb moisture generated from an air compressor.
<table>
<thead>
<tr>
<th>Applications</th>
<th>Restorative Prophylaxis</th>
<th>Restorative Prophylaxis</th>
<th>Implantology Surgery</th>
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<tbody>
<tr>
<td>Type</td>
<td>Brushless, internal spray</td>
<td>Brushless, internal spray</td>
<td>Brushless, autoventilated</td>
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<td>Speed range</td>
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<td>1000-40,000 rpm</td>
<td>100-40,000 rpm</td>
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<tr>
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<td>Ø 21 x 50 mm</td>
<td>Ø 21 x 42 mm</td>
<td>Ø 23 x 91 mm</td>
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<td>Light</td>
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<td>51 dBA</td>
<td>53 dBA</td>
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<td>Yes+ thermal disinfecter</td>
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<td>Ball bearings</td>
<td>Life-time lubricated ball bearings</td>
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<tr>
<td>Hose rotation</td>
<td>± 200°</td>
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<td>1600677-001</td>
<td>1600751-001</td>
<td>1600755-001</td>
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<td>MCX without light: 1600780-001</td>
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## BRUSH MICROMOTORS

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<tr>
<td>Speed range</td>
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<td>Max torque</td>
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<td>Torque control</td>
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<td>MC3 LED: 1600680-001</td>
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<td>MC3 LK with light: 1600077-001</td>
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<td>MC3 IR without light 1600071-001</td>
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## BRUSH MICROMOTORS

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<td>Hose rotation</td>
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<td>References</td>
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