MICROMOTOR HANDPIECE

USER'S MANUAL

Read this User's Manual thoroughly for safety before preparing the Control Unit for use.

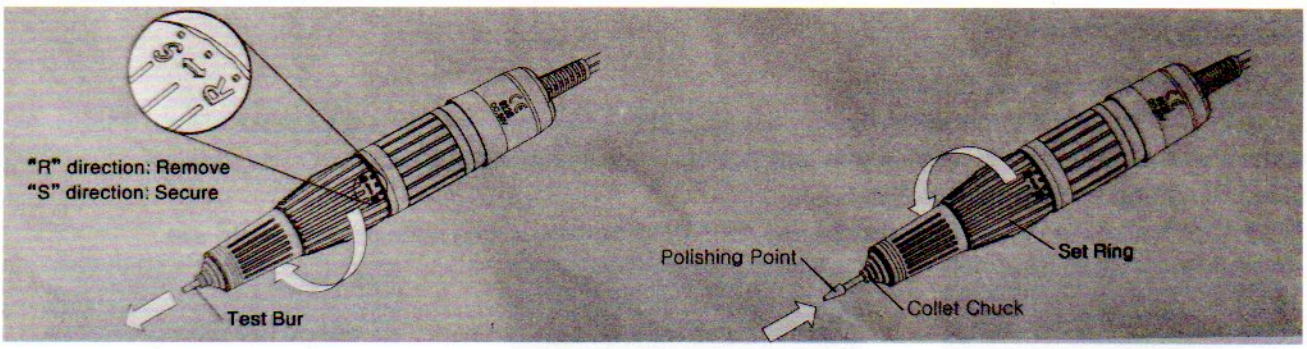
Wear the safety glasses for protecting eyes.

How to operate

1. Connect the Motor Cord and Foot Pedal Cord to the Control Unit(refer to seperated sheet of Control Units).
2. After confirm the permission power of the Control Unit, plug the Power Cord into an electric outlet.
3. Set the Speed Control Knob to the slowest position.
4. Turn on the power of the Control Unit.
5. If operate the Speed Control Knob clockwise, the rotation speed of the Micromotor increases.
6. When wish to turn a rotating direction, after halt the Micromotor, operate the Forward/Reverse Selector Switch.
7. When wish to regulate a rotating speed using the Foot Pedal, after operate the Hand/Foot Selector Switch as "FOOT", use.

Mounting and removing a bur

1. After turn the Set Ring of the Handpiece for "R" direction to open the Collet Chuck, extract a old bur
2. After insert perfectly a new bur until reach in the back of the chuck, turn the Set Ring for "S" direction to lock the Chuck.



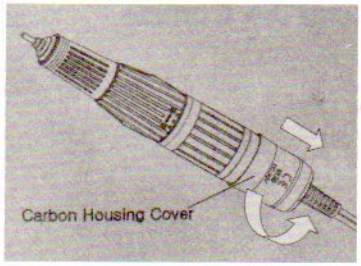
Checking items in case of not working

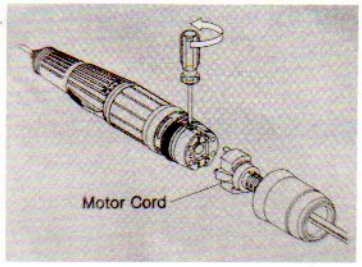
1. **Confirm whether the power of an electric outlet is suitable in the permission power of the Control Unit.**
2. Confirm whether the built-in Fuse is blown.
3. Confirm whether the Power Cord, the Motor Cord and the Foot Pedal Cord are connected correctly.
4. Check that the Collet Chuck of the Handpiece is opened.
5. Confirm whether Carbon Brushes of the Micromotor are worn away since replace need.
6. In case electron equilibrator operated by overload, press the Reset Switch(some models are exception) or restart running the Control Unit after turning off the power.

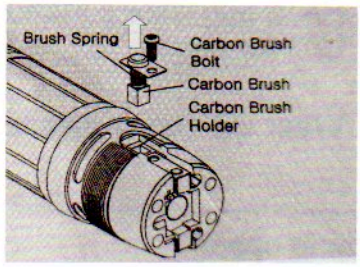
Replacing Carbon Brushes

1. After turn off the power of the Control Unit, remove the Carbon Housing Cover and the Motor Cord from the rear of the Handpiece.
2. Remove worn-out Carbon Brushes after taking off Carbon Brush Bolts using a screwdriver(+).
3. Replace by new ones with observing the Brush Spring should get jammed in the Carbon Brush Holder.
4. Assemble the Handpiece.
5. After run the Handpiece under no load state about 20,000RPM for 30 minutes, then use.

※ Replacing cycle of Carbon Brushes being about one year, can be depending on working hours and loading conditions.



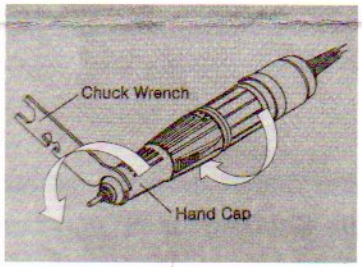


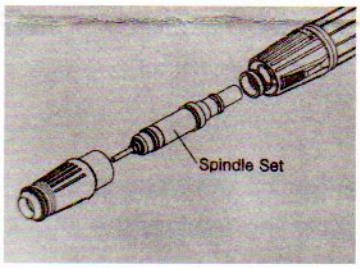


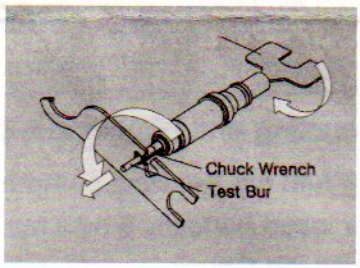
Replacing the Collet Chuck

1. The Hand Cap and the Spindle Set are disjointed by continuously turning the Hand Cap countclockwise using the Chuck Wrench.
2. The Collet Chuck is disjointed by continuously turning it countclockwise using tools.
3. After replace by new Collet Chuck, assemble the Handpiece.
4. After run the Handpiece under no load state and confirm something wrong nonexistence, then use.

※ Replacing cycle of the Collet Chuck being 2~3 years, can be depending on working hours and loading conditions.

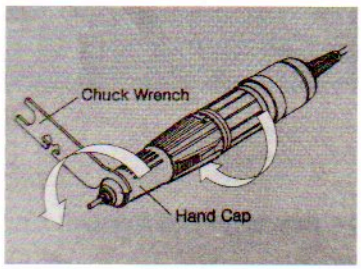


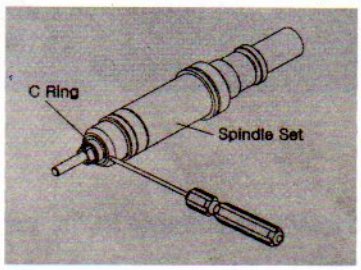


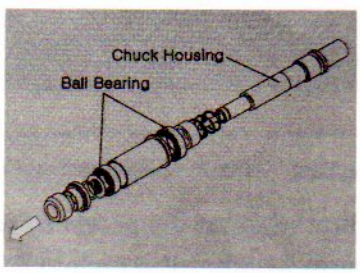


Replacing Ball Bearings

1. Disjoint the Hand Cap and the Spindle Set.
2. If remove the C Ring from the front of the Chuck Housing, Ball Bearings and other parts are disassembled.
3. After assemble other parts and replace with new Ball Bearings sequentially, install the C Ring again.
4. Joint the Hand Cap and the Spindle Set.
5. After run the Handpiece under no load state and confirm something wrong nonexistence, then use.







Control box & Micro-motor

USER'S MANUAL

※ Please be sure to read this manual before operation.

※ Model

: Champion / Mighty / M4 / E - III / E II Pro / Combi24 / K-35 / K-35 Cube / N2 / N7 / N1

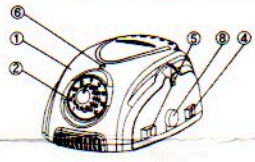
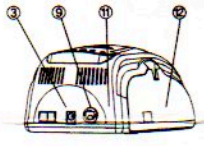
1. Precaution

- Install the unit at the working place and do not use it in a dirty or very hot and humid place. (-20℃ ~ 40℃, 0 ~ 90% RH)
- Please be careful not to drop the handpiece. It will damage ball bearing or weaken durability of motor.
- Please do not allow water or other liquids to spill onto and into the handpiece and control box.
- After replacing a bur, please make sure to close the chuck handle. Also, do not to open the chuck handle, while the handpiece is operating.
- While the handpiece is not in operation, it is recommended to keep the bur into the collet chuck after cleaning up.
- Please plug the power cord after checking the unit power is off. This unit is made for dental laboratory work, nail care and other drilling work.
- It's only used for by specialists who is trained of electric micro-motor.

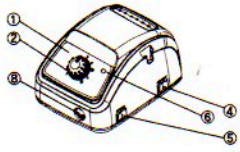
2. Part introduction & Specification

Components

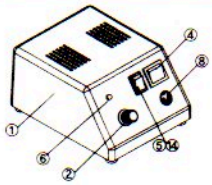
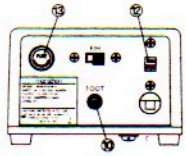
① Control Unit
② Speed Control Knob
③ Hand / Foot Selector
④ Foward / Reverse Selector
⑤ Power Switch
⑥ Pilot Lamp
⑦ Overload Lamp
⑧ Motor Connector
⑨ Foot Pedal Connector
⑩ On/Off Foot Pedal Connector
⑪ Power Cord
⑫ Input Voltage Selector
⑬ Fuse Holder
⑭ Reset Switch
⑮ Output Selector

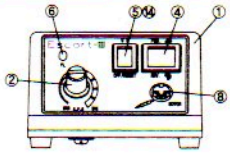
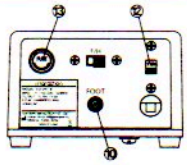
	Input Voltage	Cycle	Output	Weight(g)	Dimension(mm) W	D	H
Marathon-3 Champion	AC 110/220V	50/60Hz	DC 30V, 0.5A	1,250	118	156	78



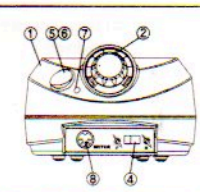
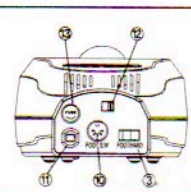

	Input Voltage	Cycle	Output	Weight(g)	Dimension(mm) W	D	H
Marathon-3 Mighty	AC 110/220V	50/60Hz	DC 30V, 0.5A	1,260	118	156	78

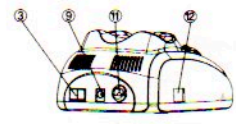
	Input Voltage	Cycle	Output	Weight(g)	Dimension(mm) W	D	H
Marathon-4	AC 110/220V	50/60Hz	DC 30V, 0.5A	1,130	120	120	75

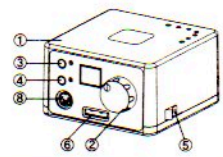
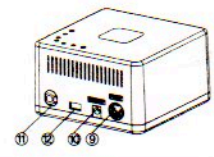
	Input Voltage	Cycle	Output	Weight(g)	Dimension(mm) W	D	H
Escort-III	AC 110/220V	50/60Hz	DC 30V, 0.5A	1,250	112	147	78

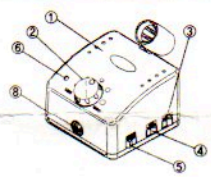
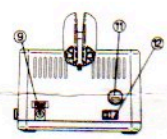
	Input Voltage	Cycle	Output	Weight(g)	Dimension(mm) W	D	H
Escort-II pro	AC 110/220V	50/60Hz	DC 30V, 0.5A	1,450	140	155	90

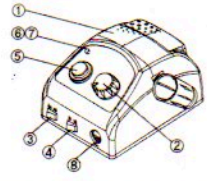
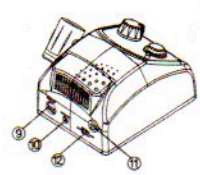
	Input Voltage	Cycle	Output	Weight(g)	Dimension(mm) W	D	H
Combi 24	AC 110/220V	50/60Hz	DC 24V, 0.5A	882	117	154	72

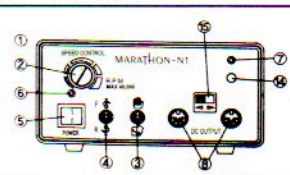
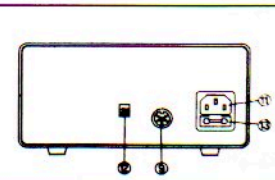
	Input Voltage	Cycle	Output	Weight(g)	Dimension(mm) W	D	H
K-35	AC 110/220V	50/60Hz	DC 30V, 0.5A	1,130	120	120	75

	Input Voltage	Cycle	Output	Weight(g)	Dimension(mm) W	D	H
K-35 Cube	AC 110/220V	50/60Hz	DC 30V, 0.5A	1,250	120	120	85

	Input Voltage	Cycle	Output	Weight(g)	Dimension(mm) W	D	H
Marathon-N2	AC 110/220V	50/60Hz	DC 30V, 0.8A	1,200	115	147	96
Marathon-N7	AC 110/220V	50/60Hz	DC 30V, 1.2A	1,600	115	147	96

	Input Voltage	Cycle	Output	Weight(g)	Dimension(mm) W	D	H
Marathon-N1	AC 110/220V	50/60Hz	DC 30V, 1.4A	3,960	180	140	88

3. Installation & Operation

3-1.Installation

1) Motor cord plug is required to be well connected into the motor cord connector on the control box.
2) Foot pedal switch cord plug is required to be well connected into the foot switch connector on the control box

3) Power cord plug is required to be well connected into the power outlet only after making sure that all cords have been connected properly and safely.
4) Handpiece connection (In case of E-type micro-motor)

* Insert a straight or a contra angle handpiece into E-type micro-motor.
* In case of the first use after purchasing a straight handpice or a contra angle, please run the handpiece under no load state, then use.

3-2. Operation by Hand

1) Connect a handpiece to a control box.
2) Turn on the power switch.
3) Turning the speed control knob clockwise will increase the speed of handpiece.
4) Switching on the Forward/Reverse selector will change the direction of handpiece.

3-3. Operation by Foot

1) Connect a foot switch to the control box.
2) Turn on the power switch.
3) To change as the Foot mode, switch on the Hand/Foot selector.
4) In the Foot mode, a handpiece will be operated within the limit of set speed.

4. Bur/Bit insertion and removal

1) To remove a bur, please turn the chuck handle clockwise until it clicks to stop and then, pull out the bur/bit.
2) To insert a bur, please turn the chuck handle counterclockwise until it clicks to stop.
3) Please keep clean the collect chuck and bur before reassembled.
4) Please be sure not to use bent, asymmetrical or damaged burs. Always use standard burs.

5. Safety protection system : Overload protection function

1) To protect the units from excessive temperature rise caused by overloading such as by failure of ball bearing, greater loading to the bit, etc.. A temperature sensor activates by the preset value to be shut off the power supply.
2) If a control unit gets overloaded, the control unit will be stopped after 5 seconds. Turn off the unit and after over 30 seconds, restart.

Overload message

1) K-35 : Two warning lights (Foot light & Reverse light) blink at the same time.
2) N2 : The color of overload lamp changes from green to red.
3) N7 : The overload lamp turns on and sounds a beeping alarm.
4) How to restart : Turn a speed control knob to MIN to restart the unit after the overload stop.

6. Trouble shooting

Trouble	Cause	Remedy
Although a control box is fully charged, a handpiece fails to run.	Loose connection of a motor cord with the motor connector of control box.	Correctly plug the motor cord to the motor connector of control box.
	Defect in the motor cord.	Replace the motor cord.
	Worn carbon brushes.	Replace the carbon brushes.
	Trouble in the motor part.	Check the motor and repair if the motor has a problem.
Motor stops suddenly in use.	Overloaded or a chuck is open in operation.	See No.5 Safety protection system. Check the chuck and close the chuck.
Motor fails to run during a foot mode.	Foot switch fails to function.	Set it on "F". Check and replace the foot switch.

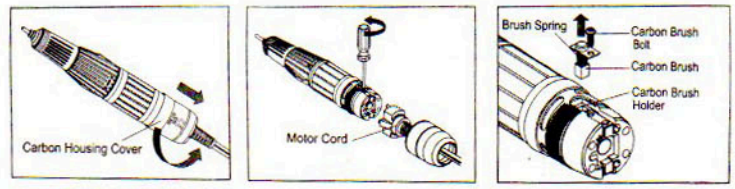
※ In case any malfunction is found, consult with an official dealer.

7. Maintenance

7-1. Replacing carbon brushes

1) After turning off the power, remove a carbon housing cover of motor cord from the motor.
2) Take off carbon brush bolts by a screwdriver(+) and then remove worn-out carbon brushes.
3) Replace new carbon brushes carefully, a brush spring should get jammed in a carbon brush holder.
4) Assemble the handpiece.
5) After running the handpiece under no load state around 20,000 rpm for 30 minutes, and then use.

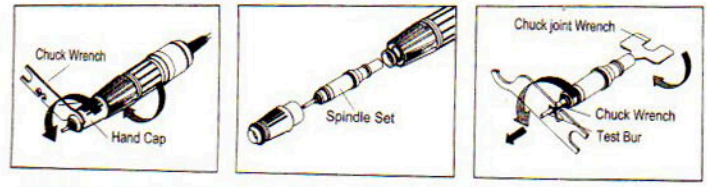
* Replacement cycle of carbon brushes will depend on working hours and loading conditions.



7-2. Replacing colletchuck

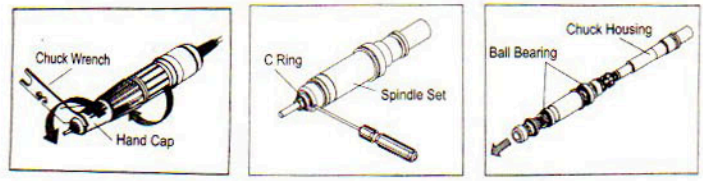
1) A handcap and a spindle assembly will be disassembled by turning the handcap countclockwise with a chuck wrench.
2) The collet chuck is disassembled by turning it countclockwise with a chuck joint wrench and the chuck wrench.
3) Replace the old collet chuck with a new one and then assemble a handpiece.
4) Run the handpiece under no load state and confirm proper replacement, then use.

※ Replacement cycle of collet chuck will depend on working hours and loading conditions.



7-3. Replacing ball bearing

1) Disassemble a handcap and a spindle assembly from the front part of a handpiece.
2) If a C-ring is picked out of the front chuck housing, ball bearings and other suppo rting parts will be disassembled.
3) Assemble other supporting parts and replace to new ball bearings sequentially, install the C-ring again.
4) Assemble the hand cap and the spindle assembly.
5) Run the handpiece under no load state and confirm proper replacement, and then use.

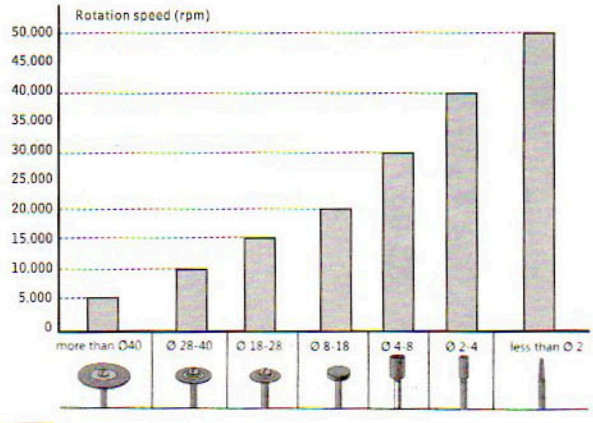


8. Allowable rotation speed

* This chart is a general guide for a maximum speed with conventional burs. The allowable rotation speed can be slightly different, depending on bur materials or types.

※ Notice

1) Make sure not to extend the maximum speed specified by a manufacturer or distributor.
2) Large burs, even being operated below maximum speed, will vibrate. Speed should be reduced immediately to prevent damage to a bur, a handpiece or operator.
3) Be sure to insert the bur shank all the way, until it touches the back of the collet chuck. Then tighten collect chuck. If the bur is used not inserted completely, it is very dangerous.



9. Warranty

* We do not guarantee its quality in case of users' carelessness.

Precautions when using the Handpiece

1. Install the Control Unit in the room of suitable temperature(0~40°C). Using it in an excessively dusty, warm or humid location damages to the Control Unit.

2. The Control Unit should rest on a flat steady place which is not disturbed by other things.

3. Never plug or unplug the Power Cord with wet hands to avoid electric shock.

4. Never use bent, asymmetrical or damaged burs. Always use standard burs.

5. Do not operate exceeding the maximum rotation speed specified by the manufacturer or distributor for the bur being used.

6. Set the rotation speed of bur after refer to the allowable rotion speed chart in the User's Manual.

7. Always thoroughly clean the Collet Chuck and a bur before reassembled.

8. Make sure to insert the bur shank all the way, until it touches the back of the Collet Chuck. Then tighten the Collet Chuck. If the bur is used while not inserted completely, it is very dangerous because it may come out by the vibration of itself.

9. After replace a bur, it is necessary to make sure that the Collet Chuck is securely held before running the Handpiece.

10. While the Handpiece is running, DO NOT try to adjust the Set Ring to prevent the Control Unit from being damaged.

11. Before operating the Forward/Reverse Selector Switch to turn a rotating direction, it is surely required to make sure that the Micromotor has been stopped.

12. **Take every possible care not to drop the Handpiece. It may be damaged a Ball Bearing or weaken durability of the Handpiece.**

13. When work cutting or drilling, wear always goggles and mask.

14. Always put the Handpiece of its stand while in use.

15. Only the skilled engineer is authorized to disassemble the Spindle Set and the Micromotor in order to avoid any damage to them.

16. When the Handpiece is not in use, it is recommended for a test bur or a polishing point to be kept inserted into the Collet Chuck of the Handpiece.