### IMPORTANT INSTRUCTIONS AND WARNING - Electric Devices

**WARNING**

When using electric tools, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and personal injury, including the following.

- **WARNING**
  - Read all these instructions before operating this product and save these instructions.
  - When using electric tools, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and personal injury, including the following.

**Grounding**

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  - Use only 3-wire extension cords that have 3-prong grounding plugs and 3-pole receptacles that accept the tool's plug.
  - Be sure to replace fuse with the correct type and rating.
  - Avoid using extension cords and adaptors to replace the grounded cord, but if used, only if a properly grounded outlet is not available.

**B. OTHER WARNING INSTRUCTIONS**

1. For your own safety read instruction manual before operating tool.
2. Wear eye protection.
3. Replace cracked wheel immediately.
4. Always use guards and eye shields.
5. Equipment to be sent back to manufacturer for servicing / repair.
6. If dropped, care should be taken to prevent foreign particles from entering the motor through the cover.
7. Risk of accidental starting. Do not use in an area where children may be present.
8. Use recommended accessories. Consult the owner’s manual for recommended accessories. The use of improper accessories may cause risk of injury to persons.
9. Don’t use in dangerous environment. Don’t use power tools in damp or wet locations, or expose them to moisture.
10. Risk of electrical shock. Only use extension cords and adaptors to replace the grounded cord, but if used, only if a properly grounded outlet is not available.

**C. Important Instructions and Warning on VOLVERE Vmax.**

- **Minimum gauge for cord**
  - **More Than 70m (230ft.):** #12
  - **More Than 30m (100ft.):** #14
  - **More Than 15m (50ft.):** #16

**Specifications**

<table>
<thead>
<tr>
<th>Control Panel</th>
<th>Speed (min⁻¹)</th>
<th>Amperage Rating</th>
<th>More Than 70m (230ft.)</th>
<th>More Than 30m (100ft.)</th>
<th>More Than 15m (50ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC35V 0.6A</td>
<td>4.1cN-m</td>
<td>71W (892oz)</td>
<td>#16</td>
<td>#14</td>
<td>#12</td>
</tr>
<tr>
<td>10-1060hPa</td>
<td>60-1000psi</td>
<td>2500-10600Pa</td>
<td>#16</td>
<td>#14</td>
<td>#12</td>
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</tbody>
</table>

**Manufacturer:**

NSK Micromotor Laboratory

**Model:**

NE-120

**Dimensions:**

W95 (3.74") x D190 (7.48") x H180 (7.09")mm
Installation

1. Connecting Motor Cord Plug
   Insert the motor cord plug in Output Connector. (Fig. 3)

2. Connecting Power Cord
   Insert Power Cord plug in AC Power Fuse Box at the back of the control unit, aligning the fuse box and plug. (Fig. 4)

3. Connecting Foot Control
   Insert Foot Control plug in Foot Control Connector at the back of the control unit. (Fig. 5)

4. Mounting Handpiece Holder
   Mount Handpiece Holder at either side of the control unit. Adjust the angle and tighten the screw. (Fig. 6) *Handpiece Holder can be mounted at either side of the control unit.

5. Assembling and Mounting Suspension Handpiece Cradle (Option)
   Mount Handpiece Cradle Mount the handpiece cradle and other parts at the end of the suspension arm as shown in Fig. 7 and secure with the nut.

   Mounting on Control Unit
   Mount the suspension arm on either side of the Control Unit, on which the handpiece holder is not attached, and secure with the screw. (Fig. 8)

   Adjusting Length of Suspension Arm
   Loosen the fastening ring of the suspension arm to extend the arm and secure with screw. (Fig. 9)

   Setting Motor Cord
   Place the motor handpiece on the handpiece cradle on the work bench. Take enough cord length for work, and lock the motor cord in the cord clamps on the suspension arm. (Fig. 10)

   Adjusting Angles of Suspension Arm
   Angles of A and B are freely adjustable. (Fig. 11) If adjusting the angles repeatedly, the joint parts might become loose. Tighten the screws with Phillips screwdriver on both sides. (Fig. 12)
Operation Procedures
(1) Insert Power Cord plug into an outlet.
(2) Make sure that Speed Control Knob is set to the lowest position.
(3) Turn on Power Switch, and check if Speed display shows.
(4) Select either forward or reverse direction by FWD/REV Selector Switch. Every pressing alternates FWD and REV.
(5) Select either hand or foot operation by HAND/FOOT Selector Switch. Every pressing alternates HAND and FOOT.

Operation-1
Manual Operation
After (1)-(4) operations above, go to the following procedures.
(5) Select hand operation by HAND/FOOT Selector Switch (HAND LED lights). (HAND LED lights)
(6) Operate Motor Handpiece, press Motor ON/OFF Switch (Motor ON/OFF LED lights).
(7) Adjust the rotation speed by turning Speed Control Knob.
(8) To stop Motor Handpiece, press Motor ON/OFF Switch (Motor ON/OFF LED stops lighting).

Operation-2
Foot Control Operation
After (1)-(4) operations above, go to the following procedures.
(5) Select foot operation by HAND/FOOT Selector Switch. (FOOT LED lights.)
(6) Operate Motor Handpiece and apply pressure to Foot Control. (Fig. 14)
(7) Adjust the maximum speed by turning Speed Control Knob. The rotation speed can be adjusted by foot up to the maximum speed, that is preset by Speed Control Knob. (Variable operation)
(8) To stop Motor Handpiece, step applying pressure to Foot Control.

Auto Cruise Mechanism
To operate Motor Handpiece at a constant speed below the maximum speed preset by Speed Control Knob, press Auto Cruise Switch when the motor handpiece rotates at the required speed. Auto Cruise LED (lights) and the rotation speed would not change even if the foot Control is released. To cancel auto cruise operation, press Auto Cruise Switch or Foot Control once again.

Caution
Make sure that the chuck control lever or the bur lock ring is at lock position when starting the motor handpiece.

Protective Circuit
When the control unit is overloaded or the motor is to operate in spite of the chuck control lever or the bur lock ring is in open position, the protective circuit functions to stop the motor and Speed Display shows error codes.
To reset the protective circuit,
- At manual operation, press Motor ON/OFF Switch.
- At foot control operation, release Foot Control.

Error Code
When the motor stops operation, Speed Display shows error codes, which instruct what is problem.

Replacing AC Power Fuse
There is a fuse in AC Power Fuse Box. Push links at the either side of the fuse case and remove to check.
If the fuse is blown, replace with a new fuse of same rating (AC120V: 3.15AH 125V) (AC230V: T800mA 250V) (Fig. 14)

Replacing Motor and Handpiece
1. Replacing Tool
a) Ring type handpiece
To unlock the collet chuck and remove the tool, turn the bur lock ring to OPEN with a click. To tighten the collet chuck and mount the tool, turn the bur lock ring to LOCK with a click. (Fig. 15)
b) Lever type handpiece
To unlock the collet chuck and remove the tool, a quarter turn of the chuck control lever to OPEN. To tighten the collet chuck and mount the tool, turn the chuck control lever back to LOCK. (Fig. 16)

2. Cleaning and Replacing Collet Chuck
(1) Removal of Chuck
To remove the tool, open the bur lock ring or the chuck control lever, insert the dummy bur or the bur in use into the chuck, and turn the chuck clockwise by hand until it stops. Then, lock the bur lock ring or the chuck control lever, and the chuck could hold the bur securely. (Fig. 18)
(2) Insertion of Chuck
Thiny apply oil before insertion. Open the bur lock ring or the chuck control lever, insert the dummy bur or the bur in use into the chuck, and turn the chuck clockwise by hand until it stops. Then, lock the bur lock ring or the chuck control lever, and the bur is caught insecurely, causing runout.

3. Connecting and Disconnecting Motor Cord and Motor
To remove the motor cord, loosen the joint nut at the back of the motor.
To connect, align the marks of the motor and the joint nut. Insert the pins completely and tighten the joint nut. (Fig. 19)
*If connecting inversely, the motor will run in the reverse direction.

Troubleshooting
When the control unit is overloaded or the motor is to operate in spite of the chuck control lever or the bur lock ring is in open position, the protective circuit functions to stop the motor and Speed Display shows error codes.
To reset the protective circuit,
- At manual operation, press Motor ON/OFF Switch.
- At foot control operation, release Foot Control.

Error code
When the motor stops operation, Speed Display shows error codes, which instruct what is problem.

- Detection of overcurrent Long-time use at excessive load. (Overcurrent).
- Detection of overshorting \ Short-circuited motor winding.
- Detection of overvoltage \ Short-circuited power cord.
- Detection of overcurrent \ Handpiece trouble.
- Detection of overshorting \ Short-circuited motor winding.
- Detection of overvoltage \ Open collet chuck.
- Detection of overshorting \ Faulty PC Board.
- Detection of overshorting \ No signal from Speed Control Knob.
- Detection of overvoltage \ No signal from Foot Control.
- Motor lock error \ Faulty PC Board.

Refers to Troubleshooting for action taken when the error code shows.

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- Detection of overshorting \ No signal from Speed Control Knob.
- Detection of overvoltage \ No signal from Foot Control.
- Motor lock error \ Faulty PC Board.

Handpiece trouble.
Short-circuited power cord.
Long-time use at excessive load (Overcurrent).
Starting or the shut-down circuit trouble.
Abnormal voltage in the starting or the shut-down circuit.
Internal memory faulty.

Fusion is burned out when a short circuit occurs or when over-voltage flows into the primary current source. If the cause is uncertain, return the product to an authorized NSK’s service shop for inspection.
Specifications are subject to change without notice. 2014.10.20   005

Check followings before requesting repair.

The service tool and the collet chuck can be mounted on the bottom of the handpiece stand.

To replace carbon brushes, refer to "Replacing Carbon Brush" in the operation manual of new carbon brush.

Overheating during rotation. Foreign objects inside the ball bearings or the bur lock ring is locked. Foreign objects inside the ball bearings, or bearings frozen. Ask for repair.

No rotation when the chuck control lever or the bur lock ring is in open position.

Tool walks out. Loose collet chuck.

Heavy tool run-out. 

Foot Control does not turn on motor.

LED Speed Display does not show.

Problem Cause Action Taken

Foot Control does not turn on motor.

Error code E8 shows.

The speed cannot be increased.

Error code E7 shows.

Error code E6 shows.

Error code E5 shows.

Error code E4 shows.

Error code E3 shows.

Error code E2 shows.

Error code E1 shows.

Error code E0 shows.

The max speed can be set with Speed Control Knob.

Check if the tool can be rotated with fingers.

Repeat starting and stop by Power Switch.

Stop operation for approximately 10 minutes in a cool place and check the operation.

Set HAND/FOOT Selector Switch to HAND.

Motor does not rotate.

Motor rotates at high speed.

Check if the tool can be rotated with fingers.

The chuck control lever or the bur lock ring is in open position.

HAND/FOOT Selector Switch is set to HAND.

Foot Control is loose or disconnected.

Faulty Power Switch.

Blown fuse.

Power Cord is disconnected.

Check if the tool can be rotated with fingers.

There is no problem if it operates normally. If the error code still shows, ask for control unit repair.

There is no problem if it operates normally. Make sure that it is not hot in the surroundings and storage location.

There is no problem if it operates normally. If the error code frequently shows, ask for control unit repair.

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If the drive shaft of the motor does not engage the drive dog on the handpiece, do not force them to turn. It would break the motor.

Plug the drive shaft on the motor side into the motor side.

If the error code still shows, ask for motor and handpiece repair.

If replaced motor operates normally, original motor and handpiece repair.

If any abnormalities are found during rotation, ask for motor and handpiece repair.

If the tool does not rotate normally, ask for motor and handpiece repair.

If the error code still shows, ask for control unit repair.

If the error code frequently shows, ask for control unit repair.

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LED Speed Display does not show.

The speed cannot be increased.

Error code E7 shows.

Error code E6 shows.

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Error code E0 shows.

The max speed can be set with Speed Control Knob.

Check if the tool can be rotated with fingers.

Repeat starting and stop by Power Switch.

Stop operation for approximately 10 minutes in a cool place and check the operation.

Set HAND/FOOT Selector Switch to HAND.

Motor does not rotate.

Motor rotates at high speed.

Check if the tool can be rotated with fingers.

The chuck control lever or the bur lock ring is in open position.

HAND/FOOT Selector Switch is set to HAND.

Foot Control is loose or disconnected.

Faulty Power Switch.

Blown fuse.

Power Cord is disconnected.

Check if the tool can be rotated with fingers.

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