OM-DE0989EN 000

NSK

## Multi-Control Panel for built-in system

# Multi Pad2


OPERATION MANUAL

Rx Only MADE IN JAPAN

# TABLE OF CONTENTS

# 1 Preface

## 1.1 User and indications for use

- User
  Dentist, Dental hygienist
- Indications for use
  The NLZ Built-in Motor System is indicated for use in the field of prophylaxis dentistry, restorative applications including cavity preparation and endodontic therapy, prosthodontics applications such as crown preparations.

## 1.2 Related manuals

| Operation manual title | Operation manual No. |
|---|---|
| Micromotor with LED NLZ OPERATION MANUAL | OM-DE0907EN |
| Built-in module Multi Function OPERATION MANUAL | OM-DE1027EN |
| Multi Pad2<br>NLZ built-in motor system<br>Installation Guide | OM-TM0903EN |

* Refer to "1.4 Symbol" section on page 3 for reference.

## 1.3 Precautions for handling and operation

- Read these safety cautions thoroughly before use and operate the product properly.
- These indicators are to allow you to use the product safely, prevent danger and harm to you and others. These are classified by degree of danger, damage and seriousness. All indicators concern safety, be sure to follow them.

| Class | Degree of Risk |
|---|---|
| ⚠DANGER | Hazard that could result in death or serious injury if the safety instructions are not followed. |
| ⚠WARNING | Hazard that could result in serious injury or damage to the device if the safety instructions are not correctly followed. |
| ⚠CAUTION | Hazard that could result in light or moderate injury or damage to the device if the safety instructions are not correctly followed. |
| NOTICE | General product specification information highlighted to avoid product malfunction and performance reduction. |

## ⚠DANGER

- Do not attempt to disassemble the product or tamper with the mechanism. It may cause an electric shock or fire.

## ⚠WARNING

- Do not use for implant surgery.
- The product is designed only for clinical dental use by qualified personnel.

## ⚠CAUTION

- This product operation panel is not water proof and should not be exposed to water.
- Do not use this product as a handle when you move the dental unit.
- Do not pull the motor cord with excessive force.
- Be sure to touch the touch screen with a finger.
- Connect this product to only NLZ Built-in Motor System.
- When operating this product always consider the safety of the patient.
- Prior to use, always check for vibration, noise, and overheating. If any abnormalities are detected, stop using immediately and contact your authorized NSK dealer.
- Should the product function abnormally, stop its operation immediately and return the product to your authorized NSK dealer for repair.
- Do not exceed the drive motor speed recommended by the bur and handpiece.
- In case of using a motor, ensure the gear ratio on the display matches with the gear ratio of the handpiece. Confirm that the rotation speed is set in stipulated range.
- Do not use or leave the product in a high-temperature environment such as under strong direct sunlight, by a fire or near a stove. It may cause a malfunction for inner circuit or sudden heat generation.
- Do not allow any impact on to the product. Do not drop the product.
- If chemical, solvent or antiseptic solution is adhered to this product, immediately wipe it away. Discoloration or deformation may occur if it is left as it is.
- This product is not suitable for autoclave sterilization. Do not autoclave this product nor sterilize it in any high temperature sterilization methods.
- If this product smokes or smells of burning, turn off the power immediately and disconnect the power plug of the dental chair unit. Contact your authorized NSK dealer.
- The use of harnesses, with the exception of harnesses sold by the manufacturer of this product as replacement parts for internal components, may result in increased EMISSIONS or decreased IMMUNITY of this product.

- This product should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, this product should be observed to verify normal operation in the configuration in which it will be used.
- Users are responsible for applying this product to a patient.
- This product needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information
  (refer to “9 EMC Information (Electromagnetic Compatibility Information)”).
- This product may be affected when used in rooms with electromagnetic interference and portable or mobile RF communication equipment. Do not use this product around any equipment that generates electromagnetic waves such as an ultrasonic generator and electrical scalpel. When using equipment generating electromagnetic waves, turn off the power to the dental chair unit (refer to “9 EMC Information (Electromagnetic Compatibility Information)”).
- The use of accessories, motors and cables other than those specified, with the exception of motors and cables sold by the manufacturer of this product as replacement parts for internal components, may result in increased EMISSIONS or decreased IMMUNITY of this product.
- I U.S. Federal law restricts this device to sale by or on the order of a licensed physician.
- Please report any serious incident that may occur in connection with this device and its accessories to the manufacturer as well as to your national authority.
- This system complies with IEC 60601-1 and 60601-1-2. Also confirm compliance with IEC 60601-1 and IEC 60601-1-2 in the complete product state with this system built-in.
- There is a risk of malfunction in an electromagnetic environment that exceeds the IEC 60601-1-2 test level.

## NOTICE

- Responsibility for operating and maintaining medical devices belongs to the user.
- In case of repair, contact your authorized NSK dealer.

## 1.4 Symbol

Consult operation instructions

Caution

Type B applied part

Marking on the outside of Equipment or Equipment parts that include RF transmitters or that apply RF electromagnetic energy for diagnosis or treatment


Protected against vertically falling water drops

Dispose of this device and its accessories via methods approved for electronic device and in compliance with the Directive 2012/19/EU


Conforms to CE European Directive of “Medical device directive 93/42/EEC”


TUV Rheinland of North America is a Nationally Recognized Testing Laboratory (NRTL) in the United States and is accredited by the Standards Council of Canada to certify electro-medical products with Canadian National Standards

Manufacturer


Medical Device


Caution: U.S. Federal law restricts this device to be used by or on the order of a licensed dental professional


Device Name for Health Canada


Catalog number (Order Code)


Serial No.

| | |
|---|---|
|  | Date of manufacture |
|  | Unique Device Identifier |
|  | GS1 DataMatrix for Unique Device Identifier |
|  | Temperature limitation |
|  | Humidity limitation |
|  | Atmospheric pressure limitation |
|  | Keep dry |
|  | Fragile / handle with care |
|  | This is the correct upright position of the distribution packages for transport and/or storage |

## 1.5 Disposing products

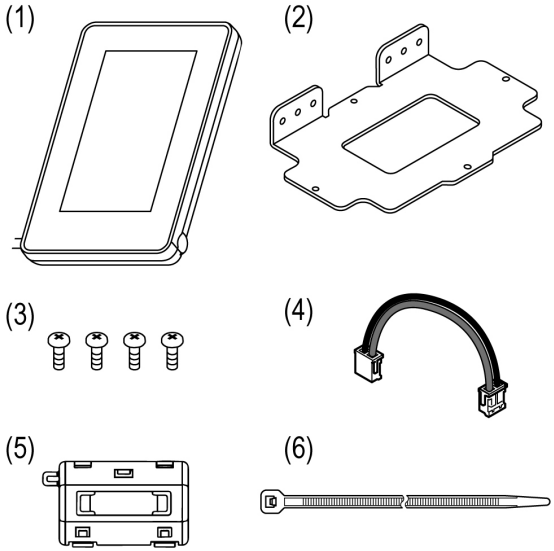
In order to avoid the health risks to operators handling the disposal of medical equipment, as well as the risks of environmental contamination caused thereof, a surgeon or a dentist must to confirm the equipment is sterile.
Ask specialist firms who are licensed to dispose of specially controlled medical wastes to dispose the product for you.

## 1.6 Warranty coverage

NSK products are warranted against manufacturing errors and defects in materials. NSK reserves the right to analyze and determine the cause of any problem. Warranty is voided should the product be not used correctly or for the intended purpose or has been tampered with by unqualified personnel or has had non NSK parts installed. Replacement parts are available for seven years beyond discontinuation of the model. Contact an authorized NSK dealer if repairs are necessary.

# 2 Product Description

## 2.1 Package contents




| No. | Part name | Quantity |
|---|---|---|
| (1) | Multi Pad2 | 1 |
| (2) | Bracket | 1 |
| (3) | Binding Head Screws M2.6-L6 | 4 |
| (4) | NLZ Power Harness | 1 |
| (5) | Ferrite Core | 1 |
| (6) | UNITY BAND | 1 |

## 2.2 Description of the screen

■ **SELECT OPERATION screen**

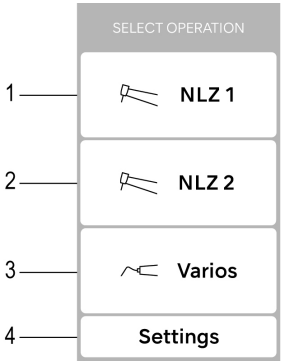



Figure 1.

* You can select the product on the above screen.

| No. | Name | Display | Function |
|---|---|---|---|
| 1 | Product button | NLZ 1 | Goes to NLZ 1 motor operation screen, where the settings of that motor can be changed. |
| 2 | | NLZ 2 | Goes to NLZ 2 motor operation screen, where the settings of that motor can be changed. |
| 3 | | Varios | Reserved |
| 4 | Settings button | Settings | Goes to the settings of Multi Pad2. Refer to “6 Setting”. |

■ **NLZ 1/NLZ 2 Operation screen**

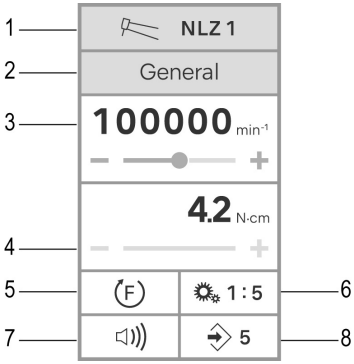
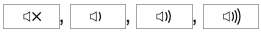



Figure 2.

Normal display when using micromotor

| No. | Name | Display | Function |
|---|---|---|---|
| 1 | Product indication button | NLZ 1 | Goes back to SELECT OPERATION screen. |
| | | NLZ 2 | |
| 2 | Mode indication button | General | Displays the current operation mode. After touching it goes back to SELECT MODE where you can pick one of 3 operation modes. |
| | | Rotary Endo | |
| | | Recipro Endo | |
| — | Mode button | General | Goes to General mode. |
| | | Rotary Endo | Goes to Rotary Endo mode. |
| | | Recipro Endo | Goes to Recipro Endo mode. |
| 3 | Speed button | 100000 min-1 | Set the motor speed by the slider and +/- button.<br>Touching and holding the +/- button increases/decreases the value continuously.<br>Speed range:<br>General Mode :1,000-40,000 min-1<br>Rotary Endo Mode : 100-6,000 min-1 |
| 4 | Torque button | 4.2 N·cm | Set the torque value by the slider and +/- button.<br>Touching and holding the +/- button increases/decreases the value continuously. (In Rotary Endo mode only) |

| No. | Name | Display | Function |
|---|---|---|---|
| 5 | Rotation Direction button |  | One of the following direction of rotation can be selected.<br>(F) : Forward rotation (General mode only)<br>(R) : Reverse rotation<br>Auto Stop : Auto Stop (Rotary Endo mode only)<br>Auto Rev : Auto Reverse (Rotary Endo mode only)<br>Auto Rev-Fwd : Auto Reverse/Forward (Rotary Endo mode only)<br>*Note: (F), (R) the arrow rotates while the motor is rotating. |
| 6 | Gear ratio button |  | One of the following gear ratios can be selected.<br>6:1, 4:1, 1:1, 1:4.2, 1:5<br>*Gear ratio 1:5 and 1:4.2 are General mode only |
| 7 | Buzzer volume button |  | One of the following volume levels can be selected.<br>  |
| 8 | Program number button |  | Setting of the motor (motor speed, torque, rotation direction gear ratio, buzzer volume) can be saved in the following six program numbers.<br>  |

# 3 Preparation for Use

Apply FDA-cleared disposable barrier films to surfaces where you touch, such as touch screen, in order to prevent cross contamination during use.
Recommended size of barrier film: 10 x 15 cm

Figure 3.

## ⚠ CAUTION

- Dispose of films after each patient.
- For prevention of erroneous operation, do not use such films as decreases the visibiltity.
- Refer to the instruction of the Barrier films for detail.

# 4 Operation Procedures

This product can be connected to two motors. Follow the steps below to setting the motor before use. (Figure 4)

## 4.1 Selecting the product

After turning on the power of dental chair unit, the name of available products will be shown after the start-up screen.

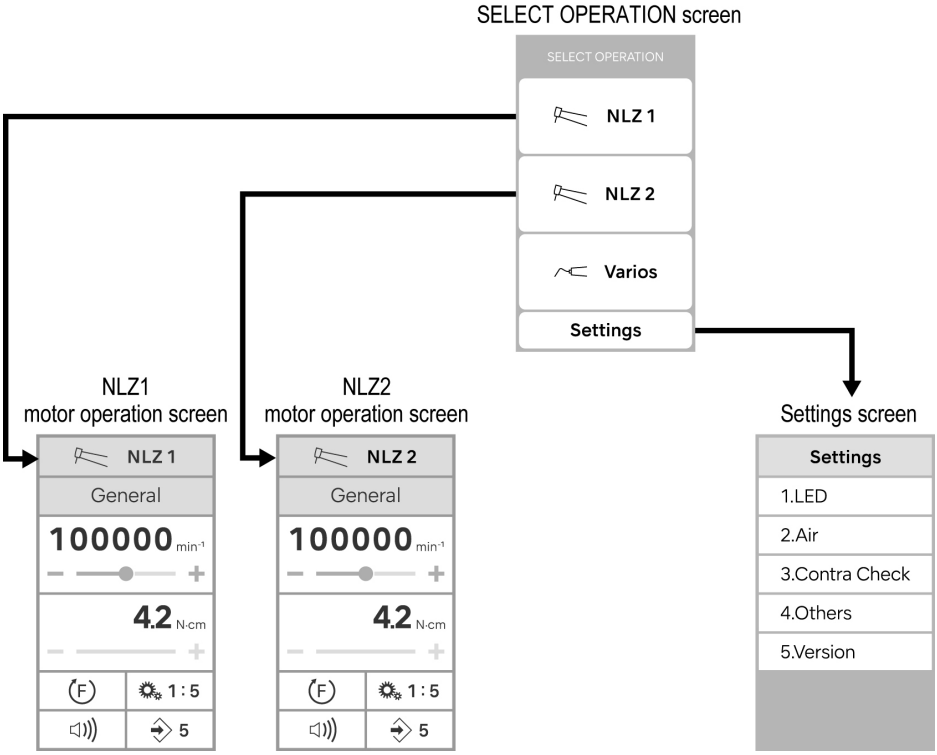



Figure 4.

1. Ensure that each product is set in its holder and not in operation.
2. Turn on the dental chair unit.
3. Touch the product button to be use (Figure 5).
   If you want to re-select the product, touch the NLZ 1, NLZ 2 or Varios to return to the SELECT OPERATION screen.


Figure 5.

SELECT OPERATION screen

## 4.2 Operation procedure

### 4.2.1 NLZ 1 or NLZ 2

1. Touch the NLZ 1 or NLZ 2.
2. Touch General goes to the SELECT MODE screen (Figure 6).
3. Select one of the functions according to your treatment purpose (Figure 6).

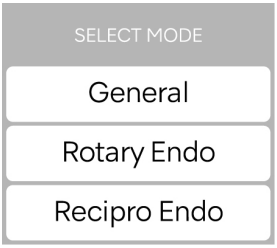



Figure 6.

SELECT MODE screen

■ General mode

* Torque setting is unavailable for General mode.

**_ Setting rotation speed**

Slide the slider (A), or touch [-] (B) or [+] (C) (Figure 7).

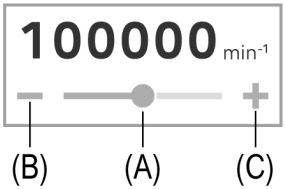



Figure 7.

**_ Selecting rotation direction**

1. Touch (F).
2. Select one of the rotation directions: (F) or (R).

**_ Selecting gear ratio**

1. Touch 1:1.
2. Select the gear ratio of the handpiece to be used (Figure 8).

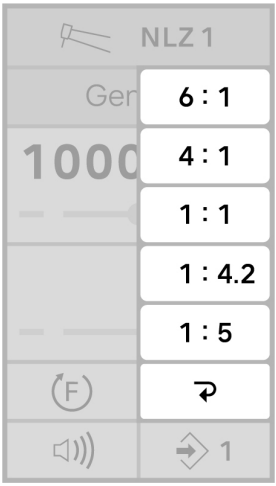



Figure 8.

**_ Selecting buzzer sound volume**

1. Touch .
2. Select one of the following volume level (Figure 9).

Figure 9.

### _ Programming the system operation

Six programs can be memorized and recalled according to treatment procedures.

1. Touch [1] to show all 1 to 6 program numbers (Figure 10).
   e.g.) If you select "5", [5] will be displayed.
2. Change and set all functions as you wish to memorize in that program number.
3. Touch the selected program number for two seconds.
   e.g.) If you select "5", touch [5] for two seconds.
4. The settings will be memorized with a beep sound.

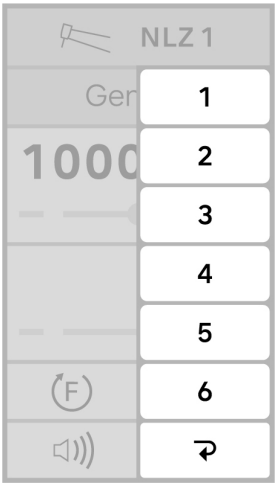



Figure 10.

To recalled program number:

If you want to recall program number, touch program and select the desired program number.

■ Rotary Endo mode

### _ Setting the motor speed

Slide the slider (A), or touch [-] (B) or [+] (C) (Figure 11).

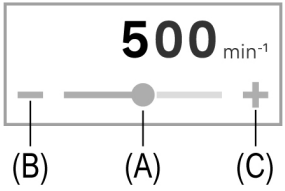



Figure 11.

### _ Setting the torque value

Slide the slider (D), or touch [-] (E) or [+] (F) (Figure 12).

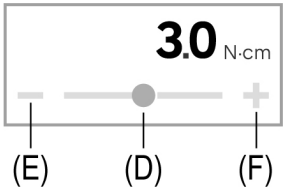



Figure 12.

### _ Selecting the rotation direction

1. Touch  .
2. Select one of the following rotation directions (Figure 13):


Figure 13.

### _ Selecting the gear ratio

1. Touch  .
2. Select the gear ratio of the handpiece to be used (Figure 14).

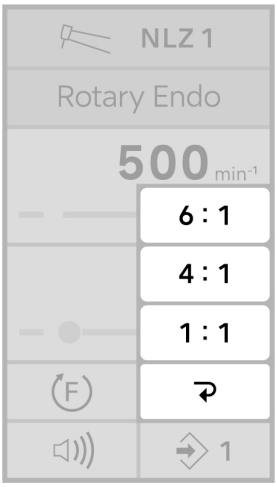



Figure 14.

### _ Selecting the buzzer volume

1. Touch  .
2. Select one of the following volume level (Figure 15).

Figure 15.

### _ Programming the system operation

Six programs can be memorized and recalled according to treatment procedures.

1. Touch [1] to 6 program numbers. (Figure 16).
   e.g.) If you select "5", [5] will be displayed.
2. Set each function so that it can be memorize in the program.
3. Touch the selected program number for two seconds.
   e.g.) If you select "5", touch [5] for two seconds.
4. The settings will be memorized with a beep sound.

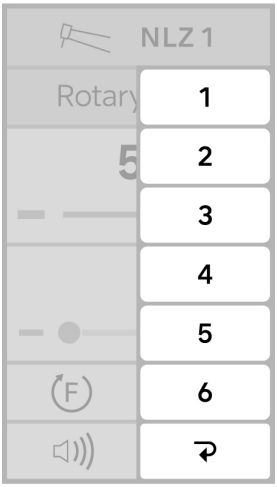



Figure 16.

To recalled program number:

If you want to recall program number, touch program and select the desired program number.

■ Recipro Endo mode

## ⚠ CAUTION

Be sure to use the gear ratio 6:1 which is NLZ End contra angle handpiece when using the Recipro Endo. Select the model to be used.

- Corresponding file : WaveOne®, WaveOne® Gold
- Corresponding file : RECIPROC®, RECIPROC® Blue
- For Recipro Endo, "Setting rotation speed", "Setting rotation direction" "setting torque", "Setting gear ratio", "Setting buzzer volume", and "Saving programs" are not availabe in this function.
- Refer to the operation manual of WaveOne® or RECIPROC® for setting and operation of each product.

* The WaveOne® and RECIPROC® are registered trademarks owned by Dentsply Sirona Inc.

## 4.3 Last Memory Function

If the settings of each function are saved to the program number of each mode:
"Program number and its setting value of each mode just before the dental chair unit is turned off" is memorized. It is displayed the next time the power is turned on and each mode is accessed.

The settings stored in this memory includes:

**_ In <General mode / Rotary Endo mode>**

Rotation speed, torque, rotatin direction, buzzer sound volume, gear ratio, and memory number

**_ In <Recipro Endo mode>**

WaveOne® or RECIPROC®

## 4.4 Motor Protection Function

The torque limiter is operating to limit the maximum torque to reduce the risk of motor failure due to heat generation.
<Motor Protection Function>
When detecting overload or a risk of abnormal heating of the motor, the torque limiter is operating to limit the maximum torque to reduce the risk of motor failure due to heat generation.

# 5 Post-use Maintenance

After each patient, maintain the product as follows.

## ⚠CAUTION

- For cleaning and disinfection, use disinfectant ethanol or disinfectant isopropanol that does not contain any additives (hereinafter referred to as disinfectant alcohol).
  Use of disinfectants other than disinfectant alcohol may cause discoloration or cracking.
- Use appropriate disinfectant alcohol according to the regulations and guidelines of each country.
- Follow local rules, regulations, and guidelines regarding the reprocessing of devices.
- Use ethanol for disinfection that complies with the regulation of each country.
- Perform the following cleaning and disinfection quickly after treatment (within 1 hour) to remove any residue.
- Do not perform steam sterilization this product, motor cord.
- Do not use the following fluids to wipe, immerse or clean the product; strong/super acid water, strong acid/alkaline chemicals, chlorine containing solutions, solvents such as benzine or thinner. It may cause color change of resin part, or corrosion of the metal part of the products.
- For details on maintenance of the handpiece / motor, refer to the Operation Manual of the handpiece / motor. (Refer to 1.2 Related manuals)
- Do not immerse the product in disinfectant or perform cleaning with an ultrasonic washer. Doing so may cause product failure.
- When using disinfectant, follow the instructions given by the manufacturer of the disinfectant.
- Do not spray any liquid directly to the surface of the product.

## 5.1 Preparation for maintenance

Items to prepare

- Eye protection
- Gloves
- Mask
- Cloth dampened with disinfectant alcohol

## 5.2 Cleaning

1. Turn off the power switch of the dental chair unit.
2. Remove the used barrier film (Figure 17).

Figure 17.

3. Wipe the exterior of the product clean using a cloth moistened with disinfectant alcohol (Figure 18).
   * The following disinfectants can be used in the United States and Canada.
     Example) CaviCide®, CaviWipes® (manufactured by Metrex)
     CaviCide® and CaviWipes® are registered trademarks of Metrex Research, LLC.
   * For reprocessing of the motor / handpiece, refer to the operation manual of the motor / handpiece.

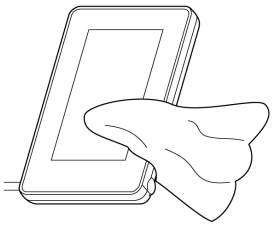


Figure 18.

4. Refer to “3 Preparation for Use” and attach the disposable barrier films to the product before each patient.

## NOTICE

- Wiping is not method of cleaning. Please do not skip the required step of “3 Preparation for Use”.

# 6 Setting

■ **Settings screen**

1. Touch Settings, and Figure 19 screen is displayed.
2. Select one of the settings on the main menu that you want to change.
3. Adjust the value by sliding the slider or touching [-] or [+] to select the desired setting.
4. Touch ➔ for two seconds if ➔ is displayed. The setting will be memorized with a beep sound.
   - ∗ Any changes will be lost when you leave before memorizing.
     To set other sub-sub menu, touch the sub-sub menu displayed.
     To set other sub menu, touch the sub menu displayed.
     To set other main menu, touch the main menu displayed.
5. Touch Settings to finished setting. SELECT OPERATION screen will be displayed.

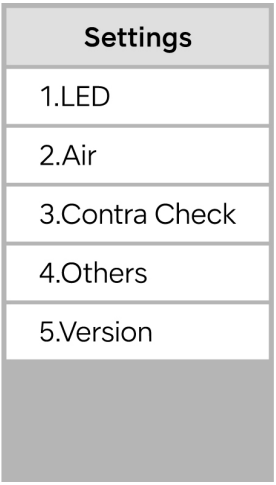



Figure 19. Main menu

<Setting Value>

| Main menu | Sub menu | Sub-sub menu | Setting details | Setting range | Factory setting |
|---|---|---|---|---|---|
| LED | NLZ 1<br>NLZ 2 | Function | Sets the LED lighting on / off during motor operation. | On | On |
| | | | | Off | |
| | | Intensity | Sets the intensity level. | 1-5 | 5 |
| | | Delay Time | Sets the lighting time of the LED time after the motor is stopped. | 1.0-5.0 s | 3.0 s |
| | | Trigger | Sets the trigger to be used. | Holder | Foot |
| | | | | Foot | |
| Air | Display Unit | Sets the unit of measure. | | psi | psi |
| | | | | bar | |
| | | | | MPa | |
| | Max. Pressure | Sets the supply pressure value when the foot control is fully depressed within a certain range. For the setting method, refer to " 6.1 Setting the supply pressure value with pneumatic dental chair unit with foot control". | | psi: 29.00-58.00 | 43.5 psi |
| | | | | bar: 2.00-4.00 | 3.00 bar |
| | | | | MPa: 0.20-0.40 | 0.30 MPa |
| Contra Check | NLZ 1<br>NLZ 2 | Performs operation check of the connected NSK specified handpiece. For the checking method, refer to "6.2 Operation check of the handpiece". | | - | - |

| Main menu | Sub menu | Sub-sub menu | Setting details | Setting range | Factory setting |
|---|---|---|---|---|---|
| Others | Color | Adjusts the color temperature and brightness of the screen in steps. | | Warm - Cool<br>Light - Dark | - |
| | Backlight | The backlight lighting time when there is no operation can be set to save power consumption. | | 1-30 min<br>∞: never turns off If you touch [+] after setting the setting range to 30 min, it becomes ∞ | 10 min |
| | Initialize | Resets to factory settings. | | Start (touch and hold for two seconds) | - |
| Version | - | Displays the version information of the software of each product installed in this product. | | - | - |

## 6.1 Setting the supply pressure value with pneumatic dental chair unit with foot control

The supply pressure value when the foot control is fully depressed can be set within a certain range.

■ **Setting range**

| Unit of measure | Setting range |
|---|---|
| psi | 29.00-58.00 |
| bar | 2.00-4.00 |
| MPa | 0.20-0.40 |

* Values outside the setting range cannot be set.

**⚠CAUTION**

- This setting is required when using a pneumatic dental chair unit with a foot control.
- The motor rotation speed may not reach its maximum if this setting is not done properly.

■ **Setting procedure**

1. Touch the buttons in the following order. (Figure 20)


Figure 20.

2. Fully depress the foot control.
3. ➔ will be displayed if the displayed value is within the setting range. Touch ➔ for two seconds. The supply pressure value will be saved with a beep sound.
   * If ➔ is not displayed, the supply pressure value cannot be saved. Set the supply pressure within the setting range.

| Display | Description |
|---|---|
| Under 01.23 psi<br>Under 0.12 bar<br>Under 0.12 MPa | The connected motor cannot reach the maximum rotation speed. |
| Over 45.67 psi<br>Over 3.45 bar<br>Over 3.45 MPa | The connected motor easily reaches its maximum rotation speed, making it difficult to fine tune the foot control. |

Refer to the operation manual of the dental chair unit, when adjusted method of the air pressure.

## 6.2 Operation check of the handpiece

**⚠WARNING**

- Damaged handpiece, Foreign materials in the handpiece, Inadequate Maintenance, and Water Entrance are risks for overheating/burn event. Those abnormalities appear as vibration, noise or overheating. Check handpiece for those abnormalities before treatment, or it may cause overheating of handpiece and cause burn in patients.
- Contra-Check function neither measures the temperature of overheating handpiece directly nor assures to maintain handpiece safe temperature. As a possible risk of overheating still remains even after Contra-Check, make sure to always check for above abnormalities before treatment.
- If any abnormality, such as vibration, noise or overheating occurs, stop using the handpiece immediately and contact your authorized NSK dealer.
- This function is only available for NSK Contra Angle /Straight Handpiece :

| Models | Gear Ratio |
|---|---|
| Z95L, Z85L, X95EX, X95L, X95, M95L, M95, X85L, X85 | 1:5 |
| Z45L | 1:4.2 |
| Z25L, X25L, X25, X65L, X65, M25L, M25, M65 | 1:1 |
| Z15L, X15L, X15, M15L, M15 | 4:1 |
| NLZ Endo Contra Angle Handpiece | 6:1 |

- Use of incorrect handpieces may cause overheating.

By measuring the weight of the handpiece load, the operation status of the connected handpiece can be checked.

■ **Operation check procedure**

1. Make sure that there is no bur on the handpiece.
   * Do not insert anything in the bur insertion hole of the handpiece. Otherwise, the load cannot be measured correctly and the diagnostic results cannot be displayed correctly.
2. Touch the buttons in the following order. (Figure 21)


Figure 21.

3. Select the gear ratio (Figure 22).

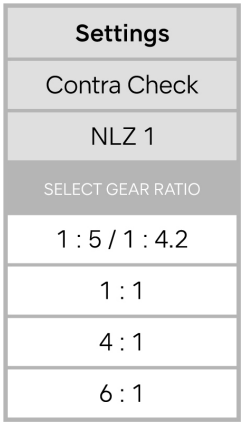



Figure 22.

4. Touch Start for two seconds.
5. The handpiece rotates (for about 15 seconds).


Figure 23.

And then, the handpiece will stop.

6. Touch the buttons in the following order (Figure 23).
7. The confirmatory result is displayed to following.

| Diagnostic result | Action |
|---|---|
| RESULT : OK | Normal. You can use it. |
| RESULT : OIL | Lubrication is required. |
| RESULT : NG | Request repair. |

Refer to the operation manual each handpiece for the lubrication instructions.

Refer to OM-DE0907EN NLZ OPERATION MANUAL on how to purge the handpiece after lubrication.

# 7 Troubleshooting

If an error occurs and the motor stops, an error code is displayed and a beep sounds.
The error code will display until release of the error.

## 7.1 Release of the error code

If the error occured depressing the foot control again will release the error.
If the error cannot be eliminated, it may cause damage to the system, contact your Authorized NSK Dealer.

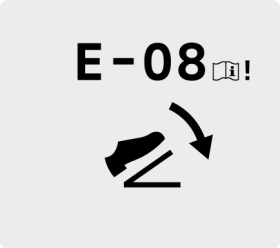
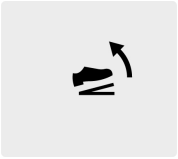
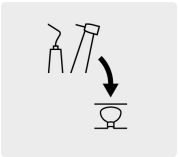



Figure 24.

## 7.2 Error indication and Error code

### 7.2.1 Error indication

| No. | Name | Display | Function |
|---|---|---|---|
| 1 | ALERT indication | ALERT | When the torque limiter is operating to limit the maximum torque to reduce the risk of motor failure due to heat generation is displayed.<br>Refer to “4.4 Motor Protection Function”. |
| 2 | Release the foot control |  | This icon blinks when the power of the dental chair unit is turned on while the foot control is depressed or you remove the motor from holder after the foot control is depressed.<br><Release method><br>Remove your foot from the foot control and then turn on the dental chair unit.<br>Depress the foot control after you remove the motor from holder. |

| No. | Name | Display | Function |
|---|---|---|---|
| 3 | Set the Product |  | This icon blinks when multiple products are removed from holder at the same time.<br><Release method><br>Put the products back on the holder. Remove from holder and operate one product at a time. |

## 7.2.2 Error code list

This system has a self-analysis function to help find the cause of failure. The screen shows an error code and message in failure state.

Details of each error code are listed below.

- NLZ 1 and NLZ 2

| Error Code | Item | Description |
|---|---|---|
| E0 | Communication disconnection error | An error occurs if communication has not occurred for a certain period of time. Check the communication interval and check whether there is a disconnection. |
| E1 | Overcurrent software error | An error occurs if the current value exceeds the specified value when load is placed on the motor. Remove the load. |
| E2 | Rotation speed upper limit exceeded | An error occurs if the specified maximum rotation speed is exceeded. |
| E3 | FAULT error | An error occurs if an FET driver IC problem is detected. |
| E4 | FET overheat error | An error occurs if the FET emits abnormal heat. |
| E5 | Input voltage upper limit exceeded | An error occurs if the maximum input voltage is exceeded. |
| E6 | LED current error | An error occurs if the LED is not connected or the maximum output current is exceeded. |
| E7 | Motor output error | An error occurs if the motor cannot be started for a specified period of time for some reason. |
| E8 | Motor overload | An error occurs if the motor is overloaded and stops to protect the motor. Refer to “4.4 Motor Protection Function”. |
| E9 | EEPROM error | An error occurs if there is invalid EEPROM data. |

| Error Code | Item | Description |
|---|---|---|
| E11 | Communication NACK error | An error occurs if invalid data is received with RS-232C remote communication. Check the communication command. |
| E12 | Motor disconnection error | Detected an attempt to drive the motor while the motor does not connected. |
| E13 | Position sensor failure error (motor 1) | An error occurs if the Position sensor signal of motor 1 cannot be confirmed. Check whether the motor cord is disconnected or broken. |
| E14 | Position sensor failure error (motor 2) | An error occurs if the Position sensor signal of motor 2 cannot be confirmed. Check whether the motor cord is disconnected or broken. |
| E15 | Input voltage lower limit error | An error occurs if the minimum input voltage is not reached. |

## 7.3 Problems and solutions

| Troubles | Cause | Actions |
|---|---|---|
| The LCD does not work. | The power switch is OFF. | Turn on the power of dental chair unit. |
| | The power cord of dental chair unit is not connected. | Check the connection. |
| The LED does not light. | The LED reached the end of its life or failed. | Contact your authorized NSK dealer. |
| | LED function is disabled. | Enable the LED function (refer to "6 Setting"). |
| Touching the LCD does not operation, or a different icon touched. | Cannot operate the device or a different icon responds when touching the LCD. | Wipe the LCD panel of the product clean using a cloth moistened with disinfectant alcohol. |
| | The barrier film with oil, water drop, or foreign matter adhering was attached to the LCD. | Replacing the barrier film according to the below procedure.<br>1) Remove the used barrier film.<br>2) Wipe the LCD panel of the product clean using a cloth moistened with disinfectant alcohol.<br>3) Apply disposable barrier films to the surface of this product. |

| Troubles | Cause | Actions |
|---|---|---|
| The motor does not work. | The harness is not connected. | Contact your authorized NSK dealer. |
| | The air pressure from the dental chair unit is out of normal range when using an pneumatic dental chair unit. | Check the air pressure (refer to “6.1 Setting the supply pressure value with pneumatic dental chair unit with foot control”). |
| | The foot control have been damaged when using the electric dental chair unit. | Contact your authorized NSK dealer. |
| The motor speed does not increase. | The air pressure from the dental chair unit is lower when using an pneumatic dental chair unit. | Check the air pressure (refer to “6.1 Setting the supply pressure value with pneumatic dental chair unit with foot control”). |
| | The foot control have been damaged when using the electric dental chair unit. | Contact your authorized NSK dealer. |
| The buzzer beeps and the icon below is displayed on the LCD continuously when turning on the power.  | Something is depressing the foot control. | Release the foot control.<br><br>Contact your authorized NSK dealer if the buzzer still sounds and the icon is displayed on the LCD. |

# 8 Product Specifications

## 8.1 System specifications

| | |
|---|---|
| Model | Multi Pad2 |
| Rated input | DC 12 V 110 mA 1.32 W |
| Dimensions | W90 x D138 x H16 mm |
| Weight | 240 g (including cable) |
| Use Environment | Temperature : 10-40 °C<br>Humidity : 30-75 %<br>Atmospheric pressure : 700-1060 hPa |
| Transportation and Store Environment | Temperature : -10-50 °C<br>Humidity : 10-85 %<br>Atmospheric pressure : 500-1060 hPa |

## 8.2 Classification of equipment

- Type of protection against electric shock:
  – Class II equipment
- Degree of protection against electric shock:
  – Type B applied part
- Degree of safety of application in the presence of a flammable anesthetic mixture with air or with oxygen ornitrous oxide:
  – EQUIPMENT not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
- Mode of operation:
  – Intermittent operation ( ON:3 min, OFF:10 min.)

# 9 EMC Information (Electromagnetic Compatibility Information)

The environments of use : Professional healthcare facility environment.

| Guidance and manufacturer's declaration - Electromagnetic Emissions. | | |
|---|---|---|
| The product is intended for use in the electromagnetic environment specified below. The customer or the user of the product should assure that is used in such an environment. Guidance and manufacturer's declaration electromagnetic emissions. | | |
| Emissions test | Compliance | Electromagnetic environment - guidance |
| Radiated emissions<br>CISPR 11/EN 55011 | Group 1<br>Class B | The product uses RF energy only for its internal functions.<br>Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment. |
| Conducted emissions<br>CISPR 11/EN 55011 | Group 1<br>Class B | The product is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes. |
| Harmonic emissions<br>IEC 61000-3-2/EN 61000-3-2 | Class A<br>(220-240 V) | |
| Voltage fluctuations/flicker emissions<br>IEC 61000-3-3/EN 61000-3-3 | Complies<br>(220-240 V) | |

| Guidance and manufacturer's declaration - Electromagnetic Immunity | | |
|---|---|---|
| The product is intended for use in the electromagnetic environment specified below.<br>The customer or the user of the product should assure that it is used in such an environment. | | |
| Immunity test | IEC/EN 60601 test level | Compliance level |
| Electrostatic discharge (ESD)<br>IEC 61000-4-2/EN 61000-4-2 | ± 8 kV contact<br>± 2 kV, ± 4 kV,<br>± 8 kV, ± 15 kV air | ± 8 kV contact<br>± 2 kV, ± 4 kV,<br>± 8 kV, ± 15 kV air |
| Electrical fast transient/burst<br>IEC 61000-4-4/EN 61000-4-4 | Input a.c. power PORT<br>± 2 kV<br>Signal input/output parts PORT<br>± 1 kV | Input a.c. power PORT<br>± 2 kV<br>Signal input/output parts PORT<br>± 1 kV |
| Surge<br>IEC 61000-4-5/EN 61000-4-5 | Line to line<br>± 0.5 kV, ± 1 kV<br>Line to ground<br>± 0.5 kV, ± 1 kV, ± 2 kV | Line to line<br>± 0.5 kV, ± 1 kV<br>Line to ground<br>± 0.5 kV, ± 1 kV, ± 2 kV |

| | | |
|---|---|---|
| Voltage dips<br>IEC 61000-4-11/EN 61000-4-11 | 0 % $U_T$ ; 0.5 cycle<br>(0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°)<br>0 % $U_T$ ; 1 cycle<br>and<br>70 % $U_T$ ; 25 (50 Hz) /30 (60 Hz) cycles<br>Single phase ; 0° | 0 % $U_T$ ; 0.5 cycle<br>(0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°)<br>0 % $U_T$ ; 1 cycle<br>and<br>70 % $U_T$ ; 25 (50 Hz) /30 (60 Hz) cycles<br>Single phase ; 0° |
| Voltage interruptions<br>IEC 61000-4-11/EN 61000-4-11 | 0 % $U_T$ ; 250 (50 Hz) /300 (60 Hz) cycle | 0 % $U_T$ ; 250 (50 Hz) /300 (60 Hz) cycle |
| Power frequency (50/60 Hz) magnetic field<br>IEC 61000-4-8/EN 61000-4-8 | 30 A/m | 30 A/m |
| Proximity magnetic field<br>IEC 61000-4-39 | 134.2 kHz (Pulse modulation)<br>2.1 kHz, 50 % Duty, 13.56 MHz (Pulse modulation)<br>50 kHz 50 % Duty | 134.2 kHz (Pulse modulation)<br>2.1 kHz, 50 % Duty, 13.56 MHz (Pulse modulation)<br>50 kHz 50 % Duty |
| NOTE Ut is the a.c. mains voltage prior to application of the test level. | | |

| Guidance and manufacturer's declaration - Electromagnetic Immunity | | | |
|---|---|---|---|
| The product is intended for use in the electromagnetic environment specified below.<br>The customer or the user of the product should assure that it is used in such an environment. | | | |
| Immunity test | IEC/EN 60601 test level | Compliance level | Electromagnetic environment - guidance |
| Conducted RF<br>IEC 61000-4-6/<br>EN 61000-4-6 | 3 V rms<br>0.15 MHz - 80 MHz<br>6 V rms<br>ISM bands between<br>0.15 MHz and 80 MHz | 3 V rms<br><br>6 V rms | WARNING: Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the product, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result. |
| Radiated RF<br>IEC 61000-4-3/<br>EN 61000-4-3 | 3 V/m 80 MHz - 2.7 GHz<br>9 V/m in ISM bands<br>710 MHz, 745 MHz,<br>780 MHz, 5.24 GHz,<br>5.5 GHz, 5.785 GHz<br>27 V/m in ISM band<br>385 MHz<br>28 V/m in ISM bands<br>450 MHz, 810 MHz,<br>870 MHz, 930 MHz,<br>1.72 GHz, 1.845 GHz,<br>1.97 GHz, 2.45 GHz | 3 V/m<br>9 V/m<br><br><br><br>27 V/m<br><br>28 V/m | Interference may occur in the vicinity of equipment marked with the following symbol:<br>((•)) |
| NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies. | | | |
| NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people. | | | |

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the product series is used exceeds the applicable RF compliance level stated above, the product should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the product series.

b Over the 150 kHz to 80 MHz frequency range, the field strength should be less than 3 V/m.

| Cables and accessories | Maximum length | Complies with |
|---|---|---|
| Micromotor with Motor Cord | 2.2 m | RF emissions, CISPR 11: Class B/ Group 1 |

Manufacturer
**NAKANISHI INC.** www.nsk-dental.com
700 Shimohinata, Kanuma, Tochigi 322-8666, Japan

**NSK America Corp.** www.nskdental.com
1800 Global Parkway, Hoffman Estates, IL 60192, USA



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