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NSK

Multi-Control Panel for built-in system

Multi Pad

Multi Pad

OPERATION & INSTALLATION MANUAL

Please read this Operation Manual carefully
before use, and file for future reference.

Powerful Partners®



OM-E0538E

MADE IN JAPAN CE

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Thank you for purchasing Multi Pad.
Read this Operation Manual carefully before use for operation instructions and care and maintenance guidelines. Keep this Operation Manual for future reference.

◆ Classifications 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 or nitrous 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:
  – Continuous operation

CONNECT ONLY NLX MOTOR (NLX nano). DO NOT CONNECT OTHER MOTOR.

⚠ CAUTIONS FOR HANDLING AND OPERATION

■ Read these safety cautions thoroughly before use and operate the product properly.
■ These indicators will show you how to operate the product safely and prevent danger to you or others. They are classified by degree and/or severity of danger. All contents relating to safety should be observed.

Classification	Degree and severity of danger or damage
⚠ DANGER	Provides an instruction where death or the instructions may occur.
⚠ WARNING	Provides an instruction where personal injury or physical damage may occur.
⚠ CAUTION	Provides an instruction where minor to medium injury or physical damage may occur.
⚠ NOTICE	Provides an instruction that should be observed for safety reasons.

⚠ 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 to implant surgery.
- The product is designed only for clinical dental use by qualified personnel.

⚠ CAUTION

- The Multi Pad operation panel is not water proof and should not be exposed to water.
- Do not use the Multi Pad as a handle when you want to move the dental unit.
- Do not pull the motor cord with an excessive force.
- Be sure to press the buttons with a finger.
- Connect this product to only NLX BF (NLX nano motor) and Varios 170(OPTION).
- When operating this product always consider the safety of the patient.
- Prior to use, always check for vibration and noise overheating if any abnormalities are detected, stop using immediately and contact your NSK dealer.
- Should the Product function abnormally, cease operation immediately and return the Product to NSK dealer for repair.
- Care should be taken not to place the motor cord near a gas burner. Never attempt to repair a burned motor cord. Always replace it with a new cord.
- Do not exceed the drive motor speed recommended the bur/file manufacturers.
- A motor in the case of use, ensure the Gear ratio on the display and Gear ratio of the handpiece match. Confirm that 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 stove. It may cause a malfunction for inner circuit or sudden heat generation.

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- The motor that Multi Pad can use is only NLX nano motor. Confirm NLX BF's DIP switch settings whether it is settings that use NLX nano motor. When settings are wrong, the motor cannot rotate in the most suitable state, and it causes the damage.
- Do not allow any impact on to the product. Do not drop the product.
- If chemical, solvent or antiseptic solution is deposited on this product, immediately wipe it away. Discoloration or deformation may occur if left as it is.
- Multi Pad non–supports autoclave. Do not autoclave (or any other high temperature sterilization) Multi Pad.
- Multi Pad needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information.
- If the unit smokes or smells of burning, turn off the power immediate and disconnect the power plug. Contact NSK dealer.
- This product needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information.
- The use of ACCESSORIES, transducers and cables other than those specified, with the exception of transducers 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.
- This product should not be used adjacent to or stacked with other equipment and that 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.
- If any water drops remain on the handpiece or handpiece cord after autoclaving, wipe them off. Staining may result if left.
- There is the judgment that applies this product to a patient in the user side.
- Multi Pad need special precautions regarding EMC and needs to be installed and put into service according to the EMC information.
- Portable and mobile RF communications equipment can affect Electrical Medical equipment. Do not use RF equipment in close proximity to the product.

⚠ NOTICE

- Perform periodical maintenance checks.
- If the product has not been used for a long period, check for noise, vibration, and overheating before use.
- Responsibility for operating and maintaining medical devices belongs to the user.
- NLX BF is for cutting / polishing demanded by the general treatment of the tooth.
  Varios 170 generates ultrasonic waves intended for use in dental applications such as scaling, root canal treatment, periodontal and cavity preparation.
- In case of repair, contact the company you purchased from.

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Summary of user setting menu

• Motor

The following menus will be displayed on the LCD screen.

1.Language	▷	English
2.Gear ratio		Español
3.Lamp		Italiano
4.Endo mode		Français
5.Air		Deutsch
6.Endo alert		
7.Others		
8.Version		

1.Language				
2.Gear ratio	▷	Gear ratio 1	▷	1 – 20 : 1 – 5 *
3.Lamp		Gear ratio 2	▷	1 – 20 : 1 – 5 *
4.Endo mode				
5.Air				
6.Endo alert				
7.Others				
8.Version				

* Adjustable range

1.Language				
2.Gear ratio				
3.Lamp	▷	On / Off	▷	On / Off
4.Endo mode		Intensity	▷	1.6 – 3.6 V *
5.Air		Delay timer	▷	1.0 – 5.0 sec *
6.Endo alert				
7.Others				
8.Version				

* Adjustable range

1.Language				
2.Gear ratio				
3.Lamp				
4.Endo mode	▷	Display setting	▷	Ncm
5.Air				Nmm
6.Endo alert				%
7.Others		Auto REV time	▷	0.3 – 1.0 sec *
8.Version		Auto FWD time	▷	1.0 – 3.0 sec *

* Adjustable range

"Endo mode" setting is not reflected in the case of the NLX nano motor.

1.Language				
2.Gear ratio				
3.Lamp				
4.Endo mode				
5.Air	▷	Display setting	▷	psi
6.Endo alert				bar
7.Others				MPa
8.Version		Motor MIN pressure	▷	0.03 – 0.10 MPa *
		Motor MAX pressure	▷	0.20 – 0.40 MPa *

* Adjustable range

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1.Language				
2.Gear ratio				
3.Lamp				
4.Endo mode				
5.Air				
6.Endo alert	▷	Endo mode alert	▷	On / Off
7.Others		Alert setting 1	▷	40 – 80 % *
8.Version		Alert setting 2	▷	80 – 100 % *
		REV alert	▷	On / Off

* Adjustable range

"Endo mode" setting is not reflected in the case of the NLX nano motor.

1.Language				
2.Gear ratio				
3.Lamp				
4.Endo mode				
5.Air				
6.Endo alert				
7.Others	▷	LCD contrast	▷	–2, –1, 0, +1, +2
8.Version		Backlight timer	▷	1 – 30 min or ∞ *
		Acceleration time	▷	0.5 – 3.0 sec *
		Default setting	▷	No / Yes

* Adjustable range

1.Language		
2.Gear ratio		
3.Lamp		
4.Endo mode		
5.Air		
6.Endo alert		
7.Others		
8.Version	▷	LCD XXXX
		NLX XXXX
		VA170 XXXX

• Scaler

In the case of connected to the Varios 170(OPTION), this menu is displayed at the setup.

1.Version	▷	LCD XXXX
		VA170 XXXX
		NLX XXXX

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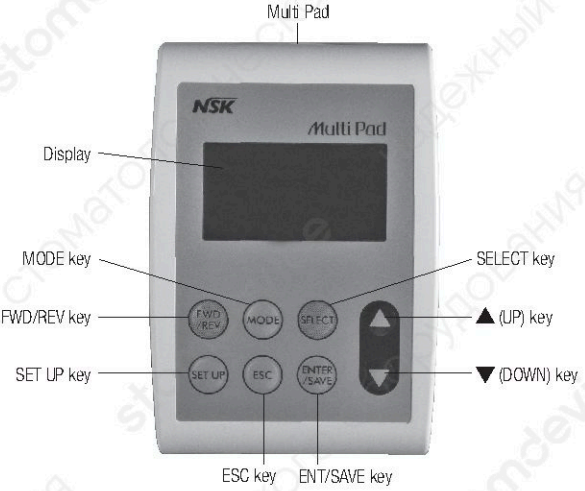
1. FEATURES

- Electric Micromotor Integrated System (NLX BF) and Multi Function Ultrasonic Scaler (Varios 170) can be controlled with the Multi Pad system.
- User settings are achieved via the LCD graphical user interface.
- Visual identification of graphics on the Multi Pad display is possible even during operation of the handpiece.
- The Multi Pad allows up to 8 custom programs for your exacting needs (motor only).
- Multi Pad supports 5 languages (English, Español, Italiano, Français and Deutsch).

2. SPECIFICATION

Model	Multi Pad
Rated input	DC + 12 V 100 mA 1.2 W
Dimensions	W95 x D138 x H31 mm
Weight	286 g (include cable and bracket)
Use Environment	Temperature : + 10 – 40 °C Humidity : 30 – 75 % Atmospheric pressure : 700 – 1060 hPa
Store Environment	Temperature : – 10 – 60 °C Humidity : 10 – 85 % Atmospheric pressure : 500 – 1060 hPa

3. NAME OF EACH PART



4. START UP

When turning the Power On, the name of connecting instruments will be displayed for about 3 seconds along with a beep tone. Then, the LCD display will switch to operation screen automatically.

⚠ NOTICE

When turning the Power On with the foot control is being pushed, the display of the Multi Pad will show the error message with "Release Foot Pedal" along will beep tone.
The error messages will disappear when the foot control is released.

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5. DESCRIPTION FOR DISPLAY

5–1. MOTOR



Fig.1 Normal display when using micromotor

While the display shows the fig.1, you can control a motor by pressing the foot control pedal.

◆ **Rotation display** (Fig1–①)
When the motor is stopping, the display shows the Maximum Rotation Speed. When the Motor is rotating, the display shows the actual rotation speed. When the Motor stops, the display show "0" on the display then turn to the Maximum Rotation Speed originally selected.

Ⓕ Forward Mode : Moves clockwise.

Ⓡ Reverse Mode : Moves counter clockwise.

◆ **Rotation Speed display** (Fig1–②)
200000 min-1 The display shows Rotation Speed you selected. While the Motor is rotating, the actual rotation speed will show on the display.

◆ **SET VALUE display** (Fig1–③)
S.V The pre–programmed Maximum Rotation Speed is indicated on the display.

⚠ NOTICE

S.V icon will go off while the Motor is rotating. When the increasing or reducing the Maximum Rotation Speed while the motor is rotating, S.V icon appears for 1 second.

◆ **Program Number display** (Fig1–④)
PRG 4 The Program Number you selected will be displayed.
For detailed Program setting, refer to "7. USEFUL FUNCTIONS".

◆ **Gear ratio display** (Fig1–⑤)
GEAR 1 : 4 The preset Gear ratios is displayed. A total of 10 different Gear ratios can be selected. 8 Gear ratios are default and cannot be changed. 2 Gear ratios are for customized setting by users.
For detailed Gear ratio setting, refer to "6. SETTINGS".

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5–2. SCALER

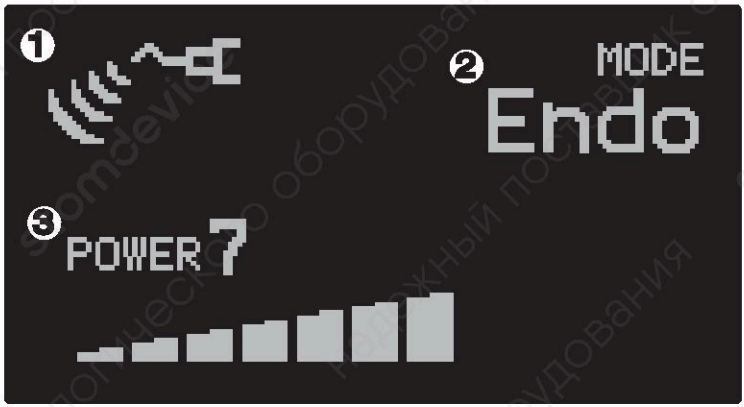


Fig.2 Normal display when using scaler

While the display shows the fig. 2, you can control an ultrasonic scaler by pressing the foot control pedal.

◆ **Ultrasonic Vibration display** (Fig2–①)

When the scaler is vibrating, vibration icon will be displayed.

◆ **Vibration Mode display** (Fig2–②)

Endo Selected Ultrasonic Vibration Mode is displayed. (Perio, Endo or General)

◆ **Power Level display** (Fig2–③)

POWER 7 Selected Ultrasonic Vibration Power Level is displayed. (POWER 0 – 10)

5–3. SELECTS THE INSTRUMENT

If 2 instruments (motor and scaler) are connected in a system, you can select the instrument with the following steps.

1) Ensure the Motor and Scaler have completely stopped.
2) Press [ESC] key at the normal display. The display will go to instrument selection mode when using Motor A or Scaler. The screen shown in Fig.3 is displayed.
3) Use ▲ / ▼ key to select the instrument you would like to use.
4) Press [ENT/SAVE] ENT/SAVE key, then the instrument is selected.

NLX nano motor and Varios 170(Option) are connected

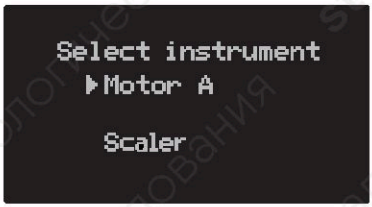


Fig.3 Display when selecting the instrument

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6. SETTINGS

6–1. MOTOR

Functions you can set while the Motor is Rotating: Maximum Rotation Speed, Rotation direction.
Functions you can set while the Motor is Stopping: Maximum Rotation Speed, Rotation direction, Gear ratio, PRG.

◆ Speed setting

Press ▲ / ▼ key to set your desired speed at the normal display.
Speed Range: 1,000 – 40,000 min^{-1}

NOTICE

Speed display changes faster as you press and hold the ▲ / ▼ key.

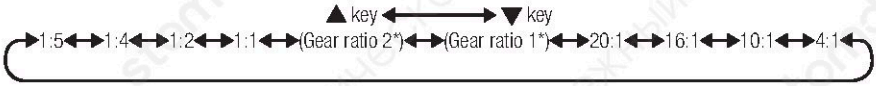
◆ Gear ratio setting

A maximum of 10 different Gear ratio can be set. 8 are fixed default settings, 2 for free settings.

1) Press [SELECT] key until 'Gear ratio' on the display blinks at the normal display.
2) Press ▲ / ▼ key to choose an appropriate Gear ratio.
3) Press and hold [ENT/SAVE] key for 3 seconds or longer to save the set Gear ratio.

NOTICE

The turn selected by ▲ / ▼ key is shown below.



* Gear ratio 1 and 2 are only displayed when you set them in user setting menu.
For user setting menu, refer to "9. OTHER SETTINGS".

◆ Rotation Direction setting

To make the Motor Forward Rotation, [FWD/REV] key until "F" appears at the normal display.
To make the Motor Reverse Rotation, [FWD/REV] key until "R" appears at the normal display.

6–2. SCALER

◆ Treatment Mode setting

Use [MODE] key to select the different treatments at the normal display.
Press [MODE] key, "Perio", "Endo" and "General" modes will be cycled through on every key press.

◆ Power Level setting

Use ▲ / ▼ key to select the Power Level at the normal display.
Press ▲ key for increase, press ▼ key for decrease.(Power 0 to 10)

7. USEFUL FUNCTIONS

7–1. MOTOR

Up to 8 customized settings are available with the following selections.

- Maximum Rotation Speed
- Rotation Direction
- Gear ratio

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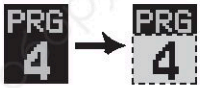
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◆ **Program selection**

1) Press SELECT key until program number is displayed blinks at the normal display.
2) Press ▲ / ▼ key to select the program number that you want to use.
3) Press ENT/SAVE key for 3 seconds or longer, the selection is completed.

⚠ NOTICE

When the program you selected is modified, the color of "PRG" will inverse.



8. ERROR CODES

8–1. MOTOR

The system incorporates an automatic diagnosis feature that can help to diagnose the cause of the problem in the event of failure mode. When the system has failed, the display will show an "E–**" code and message. Details of each error code are listed below.

Error Code	Error Message	Cause	Solution
E–00	Over setting torque value	Too much torque is loaded.	Remove the load from motor.
E–01	Over current (Soft1)	Abnormal electric current applied to motor and circuit.	Release the foot control.
E–02	Over current (Soft2)	Too much current is applied for a given time.	Release the foot control.
E–03	Fault error	Motor driver is over current.	Contact NSK dealer.
E–04	Overheat	Motor is overused.	Leave as the motor is until it will cool down.
E–05	Over input voltage	Over voltage.	Contact NSK dealer.
E–06	Over lamp voltage	Lamp circuit over voltage.	Contact NSK dealer.
E–07	Residual voltage error	Output circuit error.	Contact NSK dealer.
E–08	Over load error	The state of the load that exceeded the limiter continued during the fixed time.	Remove the load from motor/handpiece, and release foot control.
E–09	Motor start is failure	Handpiece/motor cord disconnection.	Check the handpiece cord to be connected with handpiece properly.
		Electric circuit may fail.	Contact NSK dealer.
E–10	Lamp under voltage	Lamp circuit under voltage.	Contact NSK dealer.
E–13	Over control range	Over motor control range.	Remove the load from motor/handpiece, and release foot control.
E–14	EEPROM error	Memory read/write data error.	Contact NSK dealer.

8–2. SCALER

Error Code	Error Message	Cause	Solution
E–09	Poor tool	Handpiece cord disconnection.	Check the handpiece cord is connected to handpiece properly.
E–14	Fatal error	Program error.	Contact NSK dealer.

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9. OTHER SETTINGS

For each setting, follow the process below.

1) Ensure the Motor and the Scaler are completely stopped.
2) For normal display, press and hold [SET UP] key for 3 seconds or longer, then "User setting menu" will be displayed.
3) Use ▲ / ▼ key to select the item you wish to change.
4) Press [ENT/SAVE] key. Then, momentarily to select the item. (Perform this process, in order to decide change after a setup "it indicates from 9–1 to 9–2").
5) Press and hold [ENT/SAVE] key for 3 seconds or longer to save the program.

⚠ NOTICE

At the setting mode, when you move back the previous screen, use the [ESC] key.
If you press [ESC] key without setting, the menu below will apear. Follow the instruction on the display.



9–1. MOTOR SETTINGS

9–1–1 [1.Language] : Setting the display language.

1.Language	▷	English
2.Gear ratio		Español
3.Lamp		Italiano
4.Endo mode		Français
5.Air		Deutsch
6.Endo alert		
7.Others		
8.Version		

9–1–2 [2.Gear ratio] : 2 of 10 Gear ratio settings can be set for customized settings.

To move the cursor, press the [SELECT] key.
The Gear ratio can be set [20 to 1:1] or [1: 1 to 5].
The right side or the left side should be 1.

1.Language				
2.Gear ratio	▷	Gear ratio 1	▷	[1 – 20 : 1] or [1 : 1 – 5]*
3.Lamp		Gear ratio 2	▷	[1 – 20 : 1] or [1 : 1 – 5]*
4.Endo mode				
5.Air				
6.Endo alert				
7.Others				
8.Version				

* Adjustable range

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9–1–3 [3.Lamp] : For setting the function of the LED.

At setup mode, select "Lamp" on the screen. Then you will see the next selection shown below diagram.

- On/Off : Setting the Motor Lamp on/off.
- Intensity : Setting the intensity of the Motor Lamp (1.6 V – 3.6 V). Default is 3.5 V.
- Delay timer : Setting how the duration of tighting after the Motor is used. (1.0 – 5.0 seconds) Default is 3.0 sec.

1.Language			
2.Gear ratio			
3.Lamp	▷	On / Off	▷ On / Off
		Intensity	▷ 1.6 – 3.6 V *
		Delay timer	▷ 1.0 – 5.0 sec *
4.Endo mode			
5.Air			
6.Endo alert			
7.Others			
8.Version			

* Adjustable range

⚠ NOTICE

The setting items of "Intensity" and "Delay timer" will be displayed only the when lamp setting is "On".

9–1–4 [4.Endo mode] : Endo (endodontics) mode setting.

This setting is not applicable to the NLX nano motor.

1.Language			
2.Gear ratio			
3.Lamp			
4.Endo mode	▷	Display setting	▷ Ncm
			▷ Nmm
			▷ %
5.Air		Auto REV time	▷ 0.3 – 1.0 sec *
6.Endo alert		Auto FWD time	▷ 1.0 – 3.0 sec *
7.Others			
8.Version			

* Adjustable range

9–1–5 [5.Air] : Calibration for air driven foot control.

Air presssure may vary on the dental chair unit. The foot control of the Multi Pad system has a feature for synchronizing the motor speed with the air pressure.

Adjusted the air pressure within a range shown below by adjusting foot control. When a message of "under" is displayed, air pressure is too low. When a message of "over" is displayed, air pressure is too high.

- Display setting : Changing air pressure unit display (psi, bar, MPa). Select the unit that you want to use.
- Motor MIN pressure : Setting the air pressure for the motor start–up.
  (4.3 – 14.5 psi or 0.30 – 1.00 bar, 0.030 – 0.100MPa).
- Motor MAX pressure : Setting the air pressure for arrive at the max Motor Rotation.
  (29.0 – 58.0 psi or 2.00 – 4.00 bar, 0.200 – 0.400MPa).

1.Language			
2.Gear ratio			
3.Lamp			
4.Endo mode			
5.Air	▷	Display setting	▷ psi
			▷ bar
			▷ MPa
		Motor MIN pressure	▷ 4.3 – 14.5 psi 0.30 – 1.00 bar 0.030 – 0.100 MPa *
		Motor MAX pressure	▷ 29.0 – 58.0 psi 2.00 – 4.00 bar 0.200 – 0.400 MPa *
6.Endo alert			
7.Others			
8.Version			

* Adjustable range

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9–1–6 [6.Endo alert] : Settings the alarm in Endo (Endodontics) mode.
These settings are not reflected in the case of the NLX nano motor.

1.Language			
2.Gear ratio			
3.Lamp			
4.Endo mode			
5.Air			
6.Endo alert	▷	Endo mode alert	▷ On / Off
7.Others		Alert setting 1	▷ 40 – 80 % *
8.Version		Alert setting 2	▷ 80 – 100 % *
		REV alert	▷ On / Off

* Adjustable range

9–1–7 [7.Others] : Other settings.
At setup mode, select "Others" on the screen. Then you will see the next selection shown below.

- LCD contrast : Setting the contrast of the LCD display.
  Select the LCD contrast that you want to use, "– 2", "– 1", "0", "+ 1", "+ 2". Default is "0".
- Backlight timer : Setting the time upto off of the backlight of the LCD display.
  Select the Backlight timer that you want to use, 1 minute to 30 minutes or infinite. Default is 10 min.
- Acceleration time : Setting the time for the motor rotation speed to arrive at the maximum speed value.
  Select the acceleration time that you want to use, 0.5 seconds to 3.0 seconds. Default is 0.5 sec.
- Default setting : Back NLX BF to the factory default setting.
  When you select "Default setting" by pressing ENT/SAVE key, you will see the menu of Reconfirmation screen.
  Use ▲ / ▼ key to move to "Yes", then ENT/SAVE key for 3 seconds. Then the all settings are initialized.

1.Language			
2.Gear ratio			
3.Lamp			
4.Endo mode			
5.Air			
6.Endo alert			
7.Others	▷	LCD contrast	▷ – 2, – 1, 0, + 1, + 2
8.Version		Backlight timer	▷ 1 – 30 min or ∞ *
		Acceleration time	▷ 0.5 – 3.0 sec *
		Default setting	▷ No / Yes

* Adjustable range

9–1–8 [8.Version] : Display product information.

LCD	:	Software Version
NLX	:	Software Version
Varios 170(OPTION)	:	Software Version

1.Language		
2.Gear ratio		
3.Lamp		
4.Endo mode		
5.Air		
6.Endo alert		
7.Others		
8.Version	▷	LCD XXXX
		NLX XXXX
		VA170 XXXX

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9–2. SCALER SETTINGS

9–2–1 [1.Version] : Display product information.

LCD : Software Version
VA170 : Software Version
NLX : Software Version

1.Version	▷	LCD XXXX
		VA170 XXXX
		NLX XXXX

10. Disposing Product

Consult with dealer from whom you purchased it about waster despoil.

11. Warranty

Manufacture warrants this product to the Original purchaser against defects in material and workmanship under normal practices of installation, use and servicing. Article of consumption (such as O–Rings) is not covering this warranty.

Symbols

Type B applied part. Refer to Operation Manual. Manufacturer.

Follow the waste of electric and electronic equipment (WEEE) Directive (2002/96/EC) to dispose of the product and accessories.

CE 0197 This conforms to CE European Directive of "Medical equipment directive 93/42/EEC."

IPX1 Protected against vertically falling water drops.

Guidance and manufacturer's declaration – electromagnetic emissions		
The Multi Pad is intended for use in the electromagnetic environment specified below. The customer or the user of the Multi Pad should assure that is used in such an environment.		
Emissions test	Compliance test	Electromagnetic environment – guidance
RF emissions EN 55011 CISPR 11	Group 1	The Multi Pad uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions EN 55011 CISPR 11	Class B	The Multi Pad 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 EN 61000-3-2 IEC 61000-3-2	Class A	
Voltage fluctuations / flicker emissions EN 61000-3-3 IEC 61000-3-3	Complies	

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EMC Measurement Conditions			
No.	Interface(s)	Max. cable length, shielding	Cable classifications
1	AC input (with plug)	Un–Specified	AC Power Supply Line
2	AC output (CN400)	4.0m, Shielded	AC Power Supply Line
3	DC power line (CN401 – CN105)	1.0m, Un–shielded	DC Power Supply Line
4	Motor line (CN104 – CN500)	1.0m, Un–shielded	AC Power Line
5	External I/F (CN300)	1.0m, Un–shielded	Input/Output Line
6	Control line for Multi Pad (CN302)	1.0m, Un–shielded	Input/Output Line
7	Lamp line (CN305 – CN501)	1.0m, Un–shielded	DC Power Line
8	Motor select line (CN306 – CN502)	1.0m, Un–shielded	DC Power Line
9	Motor line A (CN503)	2.2m, Un–shielded	AC Power Line
10	Lamp line A (CN504)	2.2m, Un–shielded	DC Power Line
11	Motor line B (CN505)	2.2m, Un–shielded	AC Power Line
12	Lamp line B (CN506)	2.2m, Un–shielded	DC Power Line

Guidance and manufacturer's declaration – electromagnetic immunity			
The Multi Pad is intended for use in the electromagnetic environment specified below. The customer ot the user of the Multi Pad should assure that it is used in such an environment.			
Immunity test	EN/IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) EN 61000-4-2 IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst EN 61000-4-4 IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ±1kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge EN 61000-4-5 IEC 61000-4-5	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	± 1 kV line to line ± 2 kV lines to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines EN 61000-4-11 IEC 61000-4-11	< 5 % Ut (> 95 % dip in Ut) for 0.5 cycle 40 % Ut (60 % dip in Ut) for 5 cycles 70 % Ut (30 % dip in Ut) for 25 cycles < 5 % Ut (> 95 % dip in Ut) for 5 sec	< 5 % Ut (> 95 % dip in Ut) for 0.5 cycle 40 % Ut (60 % dip in Ut) for 5 cycles 70 % Ut (30 % dip in Ut) for 25 cycles < 5 % Ut (> 95 % dip in Ut) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Multi Pad requires continued operation during power mains interruptions, it is recommended that the Multi Pad be powerd from an uninterruptible power supply or a battery.
Power frequency (50 / 60 Hz) magnetic field EN 61000-4-8 IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE : Ut is the a.c. mains voltage prior to application of the test level.			

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Guidance and manufacturer's declaration – electromagnetic immunity

The Multi Pad is intended for use in the electromagnetic environment specified below. The customer or the user of the Multi Pad should assure that it is used in such an environment.

Immunity test	EN/IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the Multi Pad, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance. Where $\sqrt{P}$ is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a], should be less than the compliance level in each frequency range[b]. Interference may occur in the vicinity of equipment marked with the following symbol:
Conducted RF EN 61000-4-6 IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	$d = 1.2\sqrt{P}$
Radiated RF EN 61000-4-3 IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	$d = 1.2\sqrt{P}$ 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz

NOTE 1 At 80MHz 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 mobiles 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 Multi Pad is used exceeds the applicable RF compliance level above, the Multi Pad should be observed to verity normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the Multi Pad.

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

Recommended separation distances between portable and mobile RF communications equipment and the Multi Pad

The Multi Pad is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Multi Pad can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of the transmitter W	Separation distance according to frequency of transmitter		
	150kHz to 80MHz $d = 1.2\sqrt{P}$	80MHz to 800MHz $d = 1.2\sqrt{P}$	800MHz to 2.5GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations, Electromagnetic propagation is affected absorption and reflection from structures, objects and people.

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Introduction

The "Multi Pad" system is featured to integrate with a micromotor (NLX BF) and Multi Function Ultrasonic Scaler (Varios 170(OPTION)) in one system. This manual is for installation and setup of the Multi Pad and the micromotor (NLX BF).
For installation of the Multi Function Ultrasonic Scaler (Varios 170(OPTION)), use the "Varios 170(OPTION) INSTALLATION MANUAL".

⚠ PRECAUTION NOTICE

- To avoid possible damage to the product, before installation.
  - Disconnect power
  - Discharge electric static
  - Make sure the connection of the pin connector is correct
- If the Multi Pad does not activate, or the power turns ON and OFF, check for a potential problem in the connection of cable connectors.
- When installing the motor cord, make sure the cord is safely and securely tied to the dental unit. When securing the cord, make sure the inside tubes are not squeezed. If the cord is secured too tight, the air and water system will not function properly. Use the metal portion of the cord when installing the motor cord.
- Do not bend the water tube and air tube.

1. COMPONENTS

Check all the components before starting installation work.

• Multi Pad Components

Classification	Description	Order Code
Display unit	Multi Pad	10001708
Installation parts	Angle Plate	20000489
	M3 X 6 X 0.5 screw x 2	R042113006
Manual	Multi Pad Operation & Installation Manual	–

• NLX BF Components

Classification	Description	Order Code
Built–in module	NLX BF	10001705
	NLS–A ADP	U1020050
Motor cord	nano CDB (L = 2200 mm)	E1044066

Classification	Description	Order Code
Motor	NLX nano Motor	E1044051
	Autoclave Plug (front)	E211701A
	Motor Cap (rear)	E267340
	O ring (blue)	0313084070
	O ring (black)	0312074080
Installation parts	Magic Fastener (1) (L = 100 mm)	Z249150
	Magic Fastener (2) (L = 100 mm)	Z249151
	Tube (L = 200 mm)	U509560
	Tube Retainer	U427711
	Mini Fitting (Convertion of 2.5 and 1.5 mmϕ)	U522300

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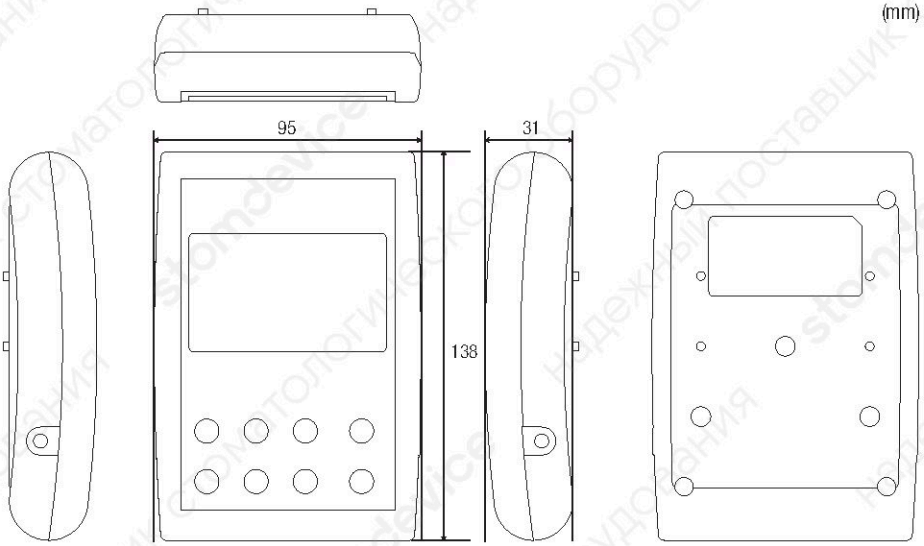
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2. SPECIFICATION

• Multi Pad

Model	Multi Pad
Input voltage	DC + 12 V
Input current	100 mA
Max output power	1.2 W
Dimensions	W95 x D138 x H31 mm
Use Environment	Temperature : + 10 – 40 °C Humidity : 30 – 75 % Atmospheric pressure : 700 – 1060 hPa
Store Environment	Temperature : – 10 – 60 °C Humidity : 10 – 85 % Atmospheric pressure : 500 – 1060 hPa

(mm)



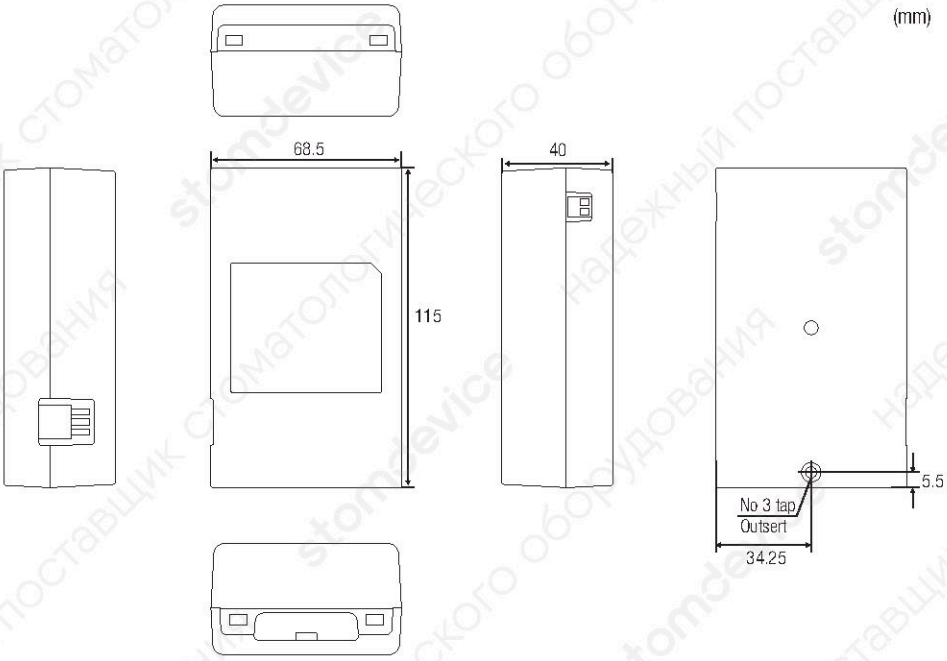
For detailed installation instructions, refer to "3.Multi Pad INSTALLATION".

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• NLX BF Control Board

Model	NLX BF Control Board
Input voltage	DC + 34 ± 10 %
Input current	4 A
Input power	130W over
Max output voltage	29 Vp–p
Max output (motor)	62 W (Measuring condition : DC + 36 V / 4A / 25,000 min^{-1})
Motor speed range	1,000 – 40,000 min^{-1}
Dimensions	W68.5 x D115 x H40 mm (Size of exclusive case)
Use Environment	Temperature : + 10 – 40 °C Humidity : 30 – 75 % Atmospheric pressure : 700 – 1060 hPa
Store Environment	Temperature : – 10 – 60 °C Humidity : 10 – 85 % Atmospheric pressure : 500 – 1060 hPa
External Electrical Power Source	IEC60601–1 and Class II is required

(mm)

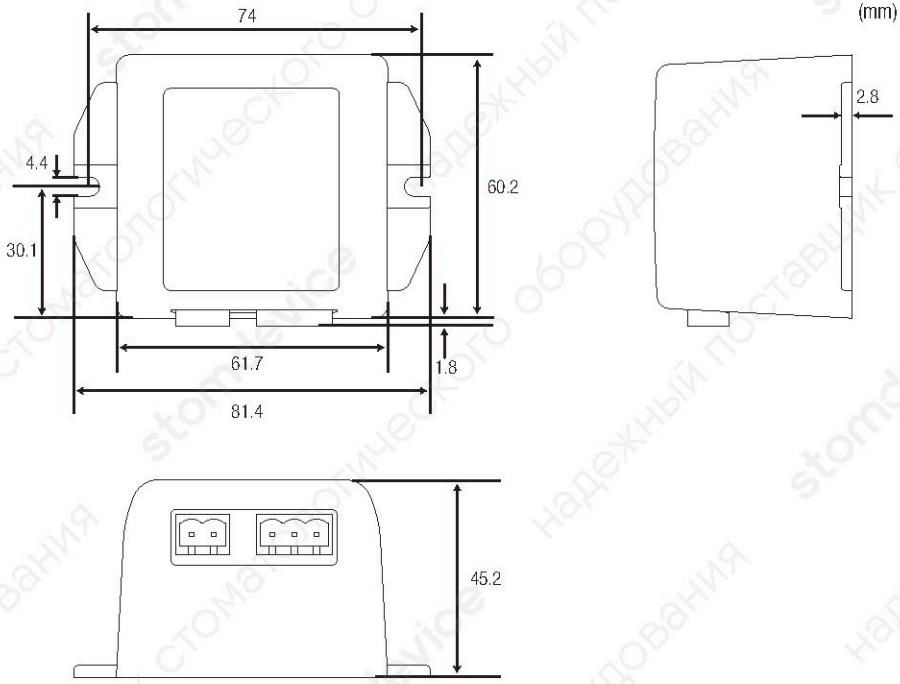


For Installing the NLX BF Control Board with your chair unit, use a screw, or use Velcro (Magic Fastener (1) and (2)).

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• AC–DC Adapter Board

Model	AC – DC Adapter Board
Input voltage	AC 24 V ± 10 %
Input power	150 VA over
Output voltage range	DC + 34 V ± 10 %
Dimensions	W81.4 x D60.2 x H45.2 mm (Size of exclusive case)
External Electrical Power Source	IEC60601–1 and Class II is required

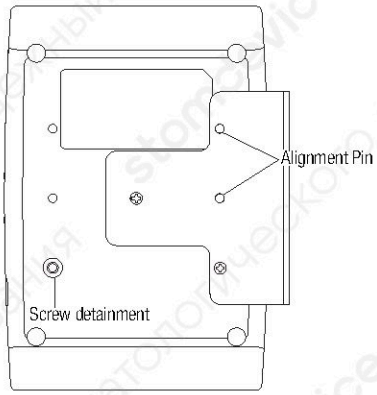


For installing the AC – DC Adapter Board with your chair unit, use the screws.

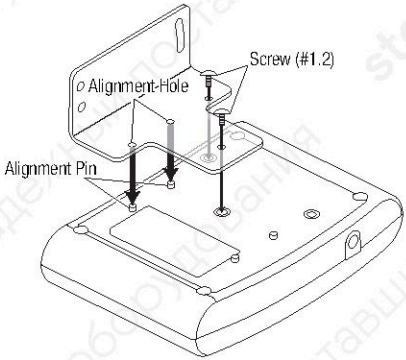
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3. Multi Pad INSTALLATION

• Multi Pad bracket Installation and Mounting



To install the mounting bracket with the Multi Pad, first place and set the bracket along with Alignment Holes (#1 and #2) of the Multi Pad. Then secure using screws in the location as shown (left). Use own screws for installing the Multi Pad with your chair unit.

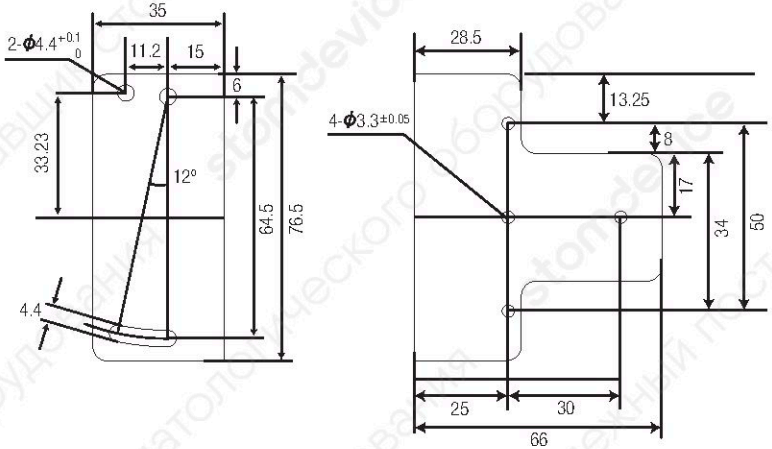


Install bracket in the right or left, direction convenient for your chair unit.

Dimensions of bracket

(mm)





When installing the bracket with your chair unit, use the M3 screws. These screws are not included due to variation of the chair instruments.

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4. Multi Pad CONNECTION

The Multi Pad has 2 connection as shown on the photos.
One is for connetion with micromotor (NLX BF), the other one is for Ultrasonic Scaler (Varios 170 (OPTION)).

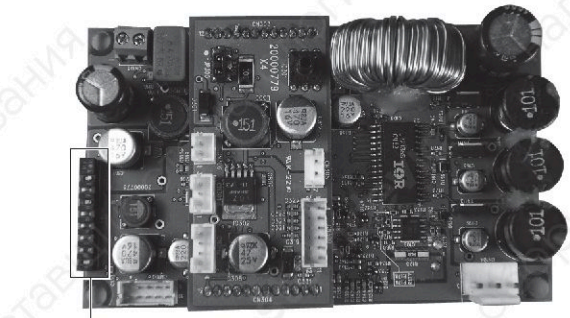


When not use the Varios 170(OPTION), bundle the cord for the Varios 170(OPTION) connection.

5. DIP SWITCH SETTING

- **NLX BF**

NLX BF has a 8 bits DIP switch.
Bit3 switch is for selection for motor speed control, either by external voltage or air pressure from the chair unit.
For detailed settings for speed control, refer to "7. NLX BF SPEED CONTROL SETTINGS".



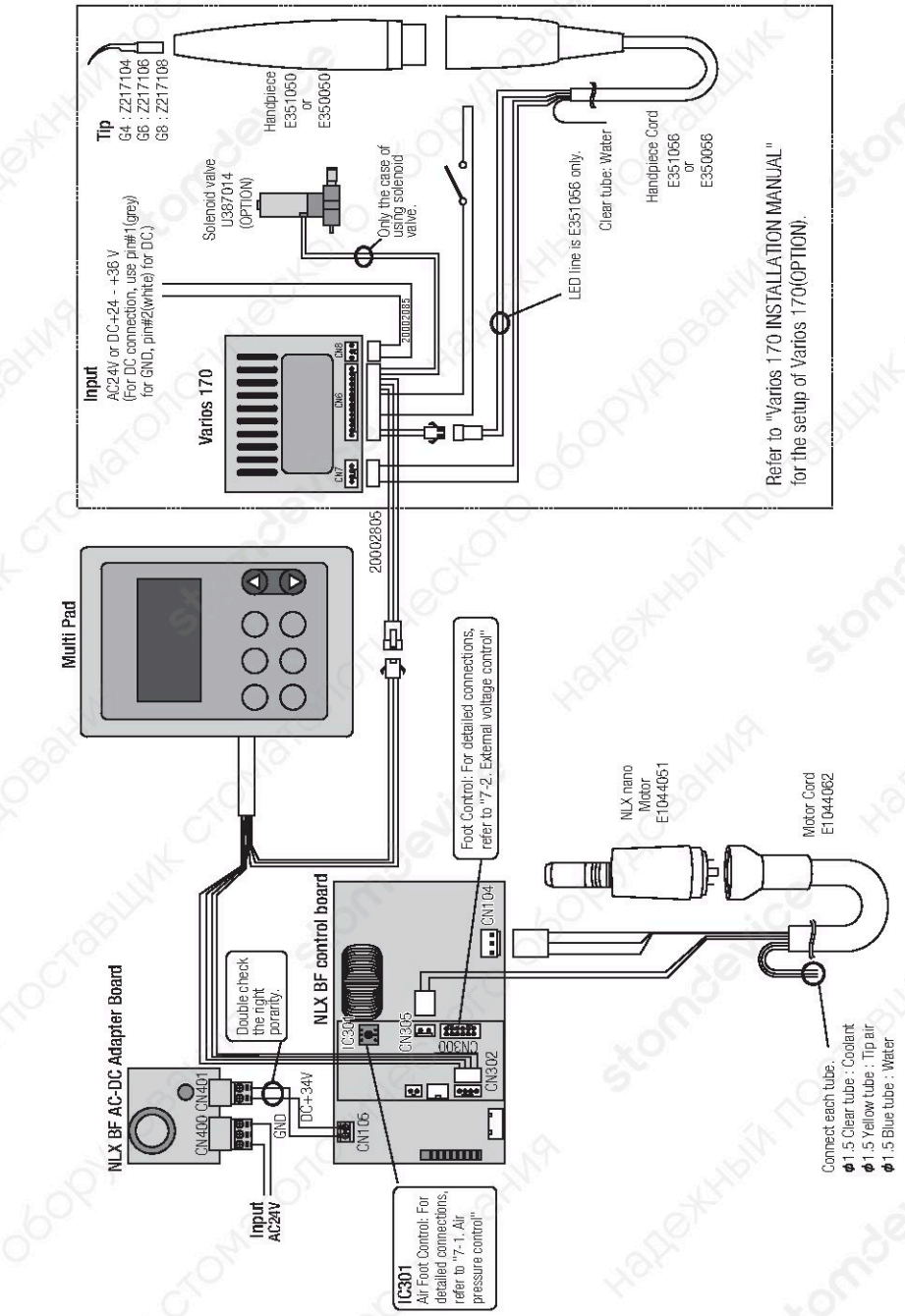


Bit8 - OFF: Fixed (do not change)
Bit7 - ON : Fixed (do not change)
Bit6 - ON : Fixed (do not change)
Bit5 - OFF: Fixed (do not change)
Bit4 - ON : Integration with hook switch
Motor activates with hook switch of delivery table
OFF: No integration with hook switch
Motor activates all time
Bit3 - ON : Speed control by air pressure
OFF: Speed control by external voltage
Bit2 - OFF: Fixed (do not change)
Bit1 - ON : Fixed (do not change)

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6. CORD CONNECTIONS

The connection of the Multi Pad and NLX BF (and Varios 170(OPTION)) is figure below.



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7. NLX BF SPEED CONTROL SETTINGS

The NLX BF has two selection of motor speed control either by an air pressure or an external voltage.

7–1. AIR PRESSURE CONTROL

When you control NLX's motor speed by air, it is necessary to set Bit3 of the DIP switch to ON. Then connect air tube from Drive air to air pressure sensor (IC301) on the NLX BF as shown below.

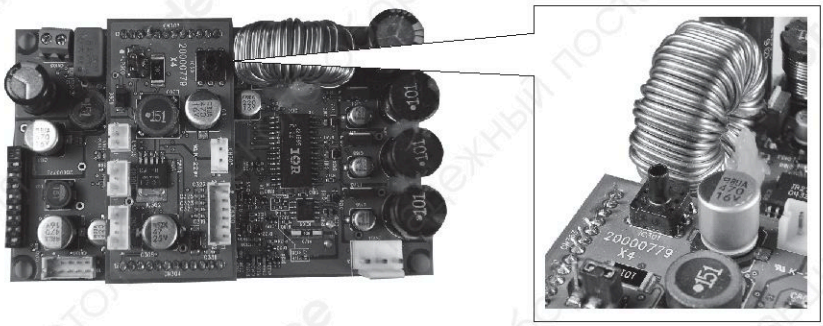


Fig.1

Put the Metal Tube Holder(Tube Retainer(U427711) through tube (Fig.2–1). Make sure the holder is put in the direction shown below (Fig.2–2).
Then, mount the tube onto the sensor. After mounting the tube, move the tube holder over the sensor for secure holding.

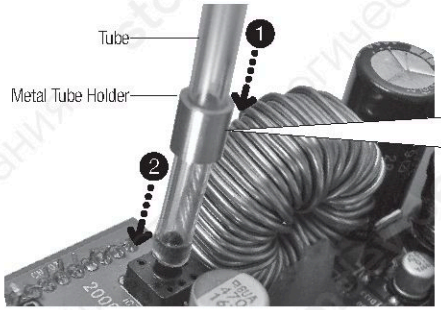
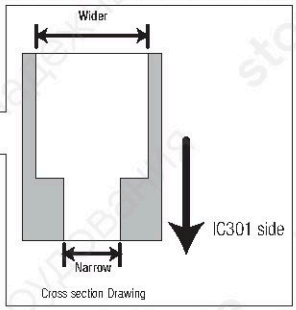


Fig.2–1

Metal Tube Holder cross section drawing



If the connection is loose, there is a risk of air leakage.

Fig.2–2

If you need to use either of 2.5ϕ or 1.5ϕ tube, use the tube relay (Mini Fitting (U522300)) including the product (Fig3).

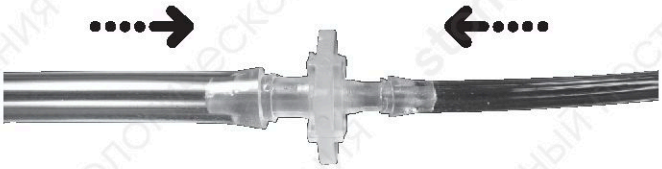


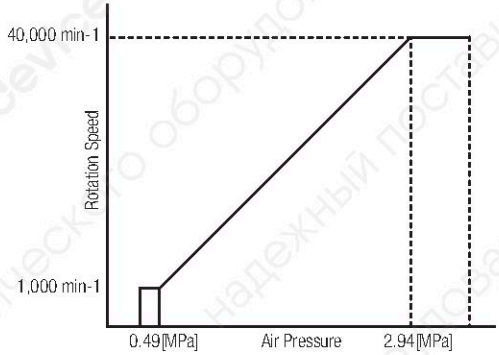
Fig.3

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Air pressure sensor

The default setting for air pressure and motor rotation speed shown as the figure below. This setting can be changed with the Multi Pad.
For the air pressure adjustment, refer to the "P12 9–1–5 Calibration for air drive foot controll".

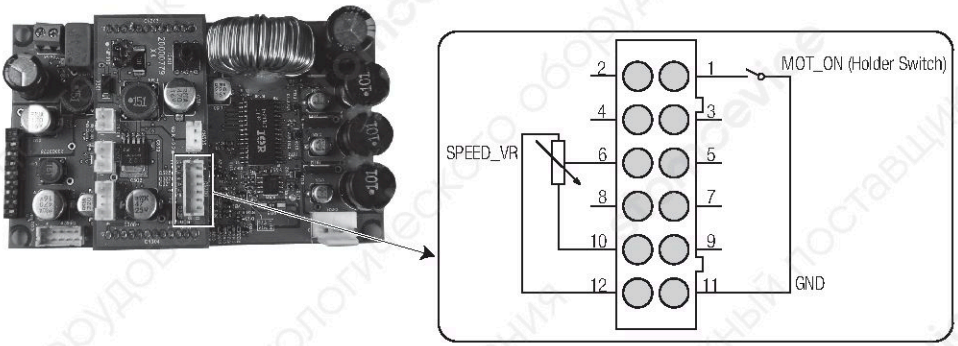


⚠ CAUTION

This product is an air pressure controlled electric motor system. Adjust the air pressure of the chair delivery unit to 0.392 MPa (4 kg/cm²) or less.
Always check moisture condensation from the delivery unit. If too much moisture in the air, the system may not delivery the designed performance. Remove the moisture.

7–2. EXTERNAL VOLTAGE CONTROL

CN300 of the NLX BF is a connection when controlling speed by your chair unit or external switch/potentiometer. Connection cable for the CN300 is an optional. The part number for the cable is 20000903. Make sure to remove or terminate unused cables in order to avoid short–circuit. See the diagram let for details.



The transistor (open collector output type) can also be used instead of the switch and potentiometer.
When your chair unit is controlled by micromotor based, the motor speed control can also be adjusted by installing a DA converter, instead of potentiometer.

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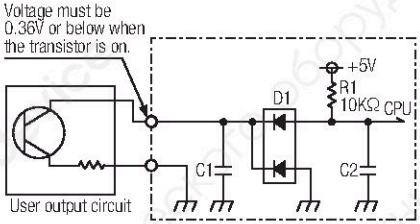
No.	Signal name	Function	Remarks
1	MOT_ON	Motor startup terminal If Bit4 of DIP switch is OFF, this switch is not necessary.	Switch close: on (motor startup) Switch open: off (motor stop)
6	SPEED_VR	Motor speed adjusting voltage input terminal	Variable within a range of DC 0V to + 5 V (refer to About "CN300 Circuit Details")
10	+5V	DC + 5 V terminal *1	For potentiometer connection
11	GND	Ground terminal	–
12	GND	Ground terminal	–

*1 : Terminal #10 of the CN300 is only used for connection of the potentiometer. Do not use the terminal for other purposes.

About CN300 Circuit details

Input circuit of terminal #1, CN300:

Connect open–collector transistor or switch to this terminal #1.
Because 0.43 mA flows to this terminal #1, make sure to use only low current contact switches.
When selecting transistors, follow the specification below and choose an appropriate transistor.



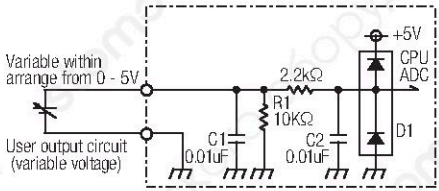
Input Circuit of CN300 terminal #1

No.	Signal name	Input Voltage / Current	Input type	Remarks
1	MOT_ON	DC + 5 V / 0.43 mA	Open collector input type	Pull–in voltage 0.36V max.

Input circuit of Terminal #6, CN300:

Input impedance of the terminal when receiving on external voltage,input impedance has to be 10 kΩ.
When using the potentiometer, connect it to the terminal #10.

- The terminal #10 (+ 5 V) is used only for the potentiometer.
- Use 5 kΩ potentiometer of for input impedance.



Input Circuit of CN300 terminal #6

No.	Signal name	Input Voltage / Current	Input type	Remarks
6	SPEED_AN	DC 0V to + 5 V	External voltage	Input impedance 10 kΩ
10	–	DC + 5 V	–	Only for potentiometer

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8. POWER SUPPLY CONNECTION

The power of Multi Pad is sourced from the NLX BF.

The power connections for the NLX BF and Varios 170(OPTION) are needed separately. For the connection with Varios 170 (OPTION), refer to "Varios 170 INSTALLATION MANUAL".

• Power supply connection to the NLX BF

Use CN105 is for connection with the AC–DC adaptor board CN401.
When you use DC + 34 V for the power source, you do not use the AC – DC adaptor board, and connect the power source to the connector (CN105) directly. The AC – DC adaptor board has a 5A fuse(Wickmann T5A 250V).

• Precaution Notice

- Cord connection must be done while the power is off.
- A surge may flows into the fuse which may result the damages on the PC boards if the connection is made while the power is on.
- Select the right insulated transformer and the switching regulator in accordance with the IEC60601–1 standard because of no insulation of primary side in the AC – DC adaptor board.

AC–DC adaptor board CN400 (AC IN)

No.	Signal name	Function	Remarks
1	AC24_1	AC 24 V input terminal	AC 24 V ± 10 % / 150 VA over
2	–	Not used	–
3	AC24_2	AC 24 V input terminal	–

AC–DC adaptor board CN401 (DC OUT)

No.	Signal name	Function	Remarks
1	DC + 34 V	DC 34 V output terminal	–
2	GND	Ground terminal	–

9. CAUTIONS WHEN INSTALLATING TO DELIVERY TABLE

• Multi Pad

- Ensure correct location for installation of the Multi Pad. Do not install the Multi Pad near the chair/unit handle.
- Make a necessary angle adjustment of the Multi Pad for imporved better visibility.
- When connecting cord, allow extra length. Do not pull the cord tight.

• NLX BF Control Board

- Ensure correct location for installation of the NLX BF. Avoid water and exposure to heat.
- You have 2 choices for installing the NLX BF using a screw or velcro(Magic Fastener(1),(2) (Z249150 and Z249151)) to fix the unit.
- Ensure mounting space is dry and not exposed to water or oil.
- Always keep label side of the NLX BF to the top, or 90 degrees angle for air ventilation. Do not keep label side of the NLX BF to the bottom or more than 90 degrees angle.
- The power supply must be met the IEC60601-1 requirement. Use the power supply for the double insulation type.

• Motor cord

- When connecting cord, allow extra length (service loop). Do not pull the cord tight.
- Fix the cord securely by using cord holder/fixer inside the delivery table.

• AC–DC Adaptor Board

- Make sure to select the right spot to install the AC – DC Adaptor Board. Avoid the AC – DC Adaptor Board for water and space exposing heat.
- To install the AC – DC Adaptor Board, use the screw.

• Varios 170(OPTION)

- Refer to "Varios 170 INSTALLATION MANUAL".

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CE 0123 The EU directive 93/42/EEC was applied in the design and production of this medical device.

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