

EmaxPROgress

OPERATION MANUAL

English : P1 - P31 / French : P33 - P38



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1 Preface

Thank you for purchasing EmaxPROgress. This is a high-precision, extremely high-speed micromotor rotary hand tool system. This system is designed for high-precision, small-diameter deburring, grinding and a wide variety of other applications. Keep this Operation Manual near the EmaxPROgress system so that operators can refer to it whenever they operate the system. Please read this Operation Manual carefully prior to use.

1.1 Precautions for handling and operation

- Read these cautions carefully and only use in the manner intended.
- Safety instructions are intended to avoid potential hazards that could result in personal injury or damage to the device. Safety instructions are classified as follows in accordance with the seriousness of the risk. All instructions concern safety and must be followed.

Class	Degree of Risk
⚠WARNING	A hazard that could result in bodily injury or damage to the device if the safety instructions are not followed.
⚠CAUTION	A hazard that could result in light or moderate bodily injury or damage to the device if the safety instructions are not followed.
NOTICE	General information needed to operate the device safely.

⚠WARNING

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

Read all these instructions before operating this product and save these instructions.

■ GROUNDING INSTRUCTIONS

- In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This tool is equipped with a power cord having an equipment grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.
- Do not modify the plug provided. If it will not fit the outlet, have the proper outlet installed by a qualified electrician.
- Improper connection of the equipment-grounding conductor can result in a risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment grounding conductor. If repair or replacement of the power cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.
- Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded.
- Use only 3-wire extension cords that have 3-prong grounding plugs and 3-pole receptacles that accept the tool's plug.
- Repair or replace a damaged or worn cord immediately.

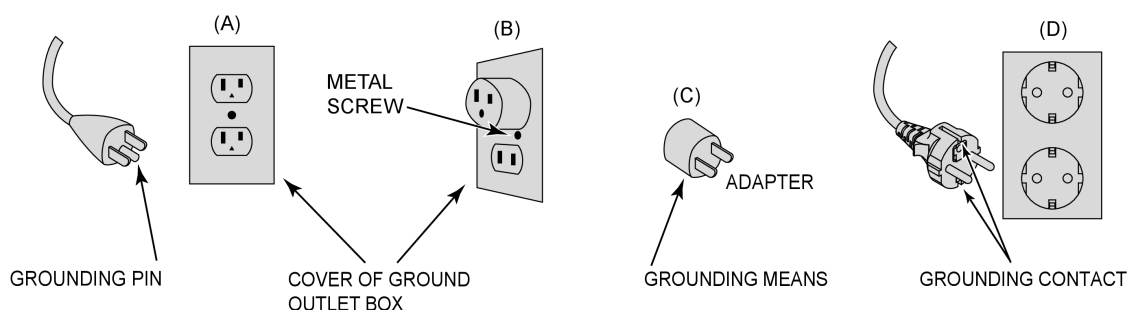
1 Preface

- (120V) This tool is intended for use on a circuit that has an outlet that looks like the one illustrated in Sketch A in Figure (below). The tool has a grounding plug that looks like the plug illustrated in Sketch A in Figure (below). A temporary adapter, which looks like the adapter illustrated in Sketches B and C, may be used to connect this plug to a 2-pole receptacle as shown in Sketch B if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician. The green-colored rigid ear, lug, and the like, extending from the adapter must be connected to a permanent ground such as a properly grounded outlet box.

Note: The adapter shown in Figure B is not for use in Canada.

- (240V) This tool is intended for use on a circuit that has an outlet that looks like the one illustrated in sketch D in figure.

Grounding Method



- **USE PROPER EXTENSION CORD.** Make sure your extension cord is in good condition. When using an extension cord, be sure to use one heavy enough to carry the current your product will draw. An undersized cord will cause a drop in line voltage, resulting in loss of power and overheating. Table (below) shows the correct size to use depending on cord length and nameplate ampere rating. If in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord.

Minimum gauge for cord

Ampere Rating		Volts	Total length of cord			
		120 V	7.5 m (25 ft.)	15 m (50 ft.)	30 m (100 ft.)	45 m (150 ft.)
		240 V	15 m (50 ft.)	30 m (100 ft.)	60 m (200 ft.)	90 m (300 ft.)
More Than	Not More Than					
0	6		18	16	16	14
6	10		18	16	14	12
10	12		16	16	14	12
12	16		14	12	Not Recommended	

Use the table above for your correct voltage.

■ OTHER WARNING INSTRUCTIONS

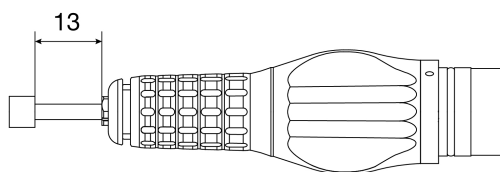
- Supply power from a grounded outlet.
- Do not plug in or unplug the power cord with wet hands. Doing so may result in electric shock.
- Do not drop the motor, controller, or other components. Impact from a fall may damage internal parts. Install the controller on a flat, stable surface.
- After installing the tool, turn the ring in the LOCK direction indicated by the arrow until it clicks into place to secure the tool. If the ring is not turned to the specified position, the tool may come out during rotation, resulting in injury.
- Use a tool with a shank diameter within the allowable tolerance for the nominal collet diameter. Using a tool outside the recommended tolerance may cause problems such as runout or insufficient holding force.

- Do not use tools that have scratches, chips, cracks, poor bonding, bent shanks, or other defects. Do not use tools that do not conform to the applicable standards or are of poor quality. The shank may break, or the grinding stone may break and scatter, resulting in injury. When using a tool for the first time, or when using a tool with a large head, first rotate it at low speed and gradually increase the rotation speed while confirming safety.
- Do not disassemble or modify the product except as described in this operation manual. If the product is disassembled or modified, its performance cannot be guaranteed. In addition, repair may be refused.
- For safety, wear a protective cover, safety glasses, and a dust mask during use.
- Do not wear cotton work gloves during operation. Also, do not place cloths or similar items near the work area. Cotton work gloves, cloths, or similar items may become caught in rotating parts.
- Motors equipped with a hand switch may start or stop rotating if the hand switch is pressed accidentally during handling. Take care not to touch the hand switch while handling the motor.
- If the attachment becomes hot during use, reduce the machining load or lower the input-side rotation speed (motor rotation speed). If the attachment continues to generate heat, stop operation immediately and confirm that the product has cooled sufficiently before resuming use.
- If any abnormality occurs, such as smoke emission or a smell like burning resin, immediately turn off the power switch and unplug the power plug. Stop using the product and request repair.
- Do not apply excessive pressure that may cause the tool to bend during operation. The shank may break or come out. In addition, applying pressure strong enough to reduce the motor rotation speed will not only shorten the service life of the motor, attachment, and other components, but also reduce work efficiency.
- Do not bring your hands or body close to, or touch, rotating cutting tools or other rotating parts. You may become caught in them, resulting in injury.
- Use the attachment at a motor rotation speed that does not exceed the maximum input-side rotation speed. Using the attachment above the maximum input-side rotation speed may damage the attachment. For the maximum input-side rotation speed, refer to 8 Optional Items or 9.1 Specifications.
- The maximum operating rotation speed or maximum operating peripheral speed is specified for each tool. If a tool is used above the maximum operating rotation speed or maximum operating peripheral speed specified by the tool manufacturer, the tool may be damaged, resulting in injury. Use the tool at or below the maximum operating rotation speed specified by the tool manufacturer. When adjusting the rotation speed with the foot pedal, also set the maximum motor rotation speed in advance so that the maximum operating rotation speed of the tool is not exceeded.
- The maximum operating rotation speed and maximum operating peripheral speed of mounted points are values when the overhang is 13 mm. Overhang refers to the distance from the tip of the collet to the tip of the grinding stone. When using a mounted point with an overhang longer than 13 mm, such as for deep-hole machining, reduce the operating rotation speed according to Table 1. Using the mounted point at a rotation speed higher than the specified value may cause it to break, resulting in injury.

Table 1. Overhang versus Speed

Overhang (mm)	Maximum Operating Speed (min^{-1})
20	$N \times 0.5$
25	$N \times 0.3$
50	$N \times 0.1$

N : Max. operating speed at 13 mm overhang.



CAUTION

- Install the Controller so that the power cord can be unplugged without obstruction in the event of an emergency. Also, install the Controller in a location where it will not be exposed to liquids such as cutting oil or water. Exposure to liquids may cause malfunction, electric shock due to a short circuit, or fire.
- Use the Controller in an environment with an ambient temperature of 10 °C to 40 °C and humidity of 30% to 75%, with no condensation. Condensation may cause a short circuit or electric shock.
- Do not use the Controller or motor near flammable gases, flammable liquids, or other flammable materials. Before use, check that no such materials are present in the surrounding area. Use near flammable materials may result in fire.
- Do not use this product near equipment that generates strong electrical noise, such as high-frequency equipment, welding machines, or large motors. Electrical noise may cause malfunction or failure.
- Before use, perform a trial run of this product and check that there is no looseness, abnormal vibration, abnormal noise, or temperature rise (heat generation). If any abnormality is detected, stop using the product immediately and request repair.
- Do not turn the Tool Lock Ring in the OPEN direction while the motor is rotating. Turning the Tool Lock Ring may damage the motor or attachment. Do not replace the cutting tool until the motor has completely stopped rotating.
- When using a cutting tool with an outer cutting-edge diameter of $\varnothing 4$ mm or larger, set the rotation speed lower to reduce the machining load.
- If the protection circuit operates frequently, the machining load may be too high. Reduce the machining load before use. Continuing operation under a high machining load may cause damage to the cutting tool or premature wear of the motor and attachment.
- Be sure to turn off the Controller before cleaning or performing periodic inspection.
- Never lubricate the bearings of the motor or attachment. The bearings are pre-greased, and lubrication may cause heat generation or failure.
- Remove and clean the collet at least once a week. Failure to clean the collet may cause debris to accumulate inside the collet, resulting in cutting tool runout or reduced collet holding force.
- Store the Controller in an environment with a temperature of -10 to 50 °C, humidity of 10% to 85% RH, and atmospheric pressure of 500 to 1060 hPa. Also, store it in a location where it will not be affected by air containing dust, sulfur, or salinity.
- Do not tighten the collet unless a cutting tool or test bar is installed. Doing so may damage the collet or attachment.

NOTICE

- Use only the supplied genuine power cord.
- Keep a cutting tool or test bar mounted even when this product is not in use.
- Do not press the surface of the operation panel with a sharp-pointed object such as a pencil. Doing so may damage the operation panel.
- Before turning off the power, make sure that the motor has completely stopped. Turning off the power while the motor is rotating may cause a malfunction.
- The user is responsible for managing the operation, maintenance, and periodic inspection of this product.

1.2 Symbols



Caution



Products compliant with EU safety and health standards



United Kingdom Conformity Assessed



Conforms to North American safety standards (UL, CSA)



Manufacturer



Authorized representative in the European Community



Serial No.

1.3 Conformity standards

(1) The EmaxPROgress conforms to the following overseas safety standards.

- North American safety standards (UL, CSA) 

UL 61010-1

CSA 61010-1

- EC Directive



Low Voltage Directive

IEC / EN 61010-1

EMC Directive

EMS : EN 61000-6-2

EMI : EN 55011

(2) The controller, motor, and attachments comply with the RoHS Directive, which is an EU directive restricting the use of certain hazardous substances.

1.4 Customer support

To ensure you can use our products with confidence, we are available to answer any questions or concerns you may have. For inquiries regarding product usage, maintenance, or repairs, please contact our Customer Support.

Customer support

- For U.S. Market

Company Name : **NSK America Corp.**
Industrial Div.
Business Hours : 8:00 to 17:00 (CST)
(closed Saturday, Sunday and Public Holidays)
U.S. Toll Free No. : +1 800 585 4675
Telephone No. : +1 847 843 7664
Fax No. : +1 847 843 7622
Website : www.nskamericacorp.com

- For Other Markets

Company Name : **NAKANISHI INC.** 
Business Hours : 8:00 to 17:00 (JST)
(closed Saturday, Sunday and Public Holidays)
Telephone No. : +81 289 64 3520
e-mail : webmaster-ie@nsk-nakanishi.co.jp

1.5 Product disposal



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

This product is subject to the WEEE Directive within the EU, and therefore subject to separate collection; it is forbidden to dispose of it as unsorted household waste.

Using proper disposal via a specialized collection system, you help avoid environmental contamination risks associated with disposal, promote the re-use and recycling of resources, and contribute to a sustainable society.

To prevent environmental contamination risks associated with disposal, please contact your nearest dealer or branch to confirm the appropriate procedures.

Refer to the link below:



1.6 Warranty

We do not provide a warranty for our products; however, we will provide product replacement or free repair in the following cases (1)–(3). Please contact "1.4 Customer support" or your purchasing dealer.

- (1) Manufacturing defects by our company.
- (2) Shortage of package contents.
- (3) Product damage found when opening the package.

(However, product replacement and free repair do not apply if the package was dropped due to customer negligence.)

2 Product Information

2.1 Package contents

After opening the package, confirm that all items listed in "Table 2 Package Contents List" are included. If any package contents are missing, please contact "1.4 Customer support" or your purchasing dealer.

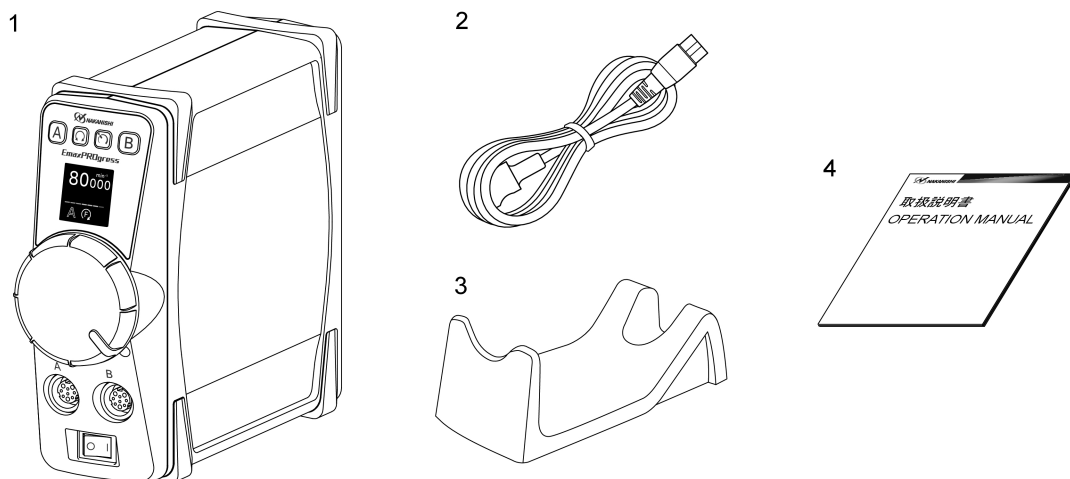


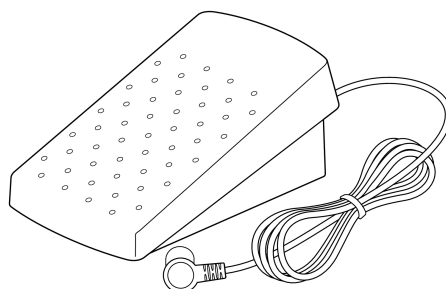
Table 2. Package Contents List

No.	Name	Qty.
1	Controller	1
2	Power Cord (2 m)	1
3	Handpiece Stand	1
4	Operation Manual	1

Table 3. Optional Item

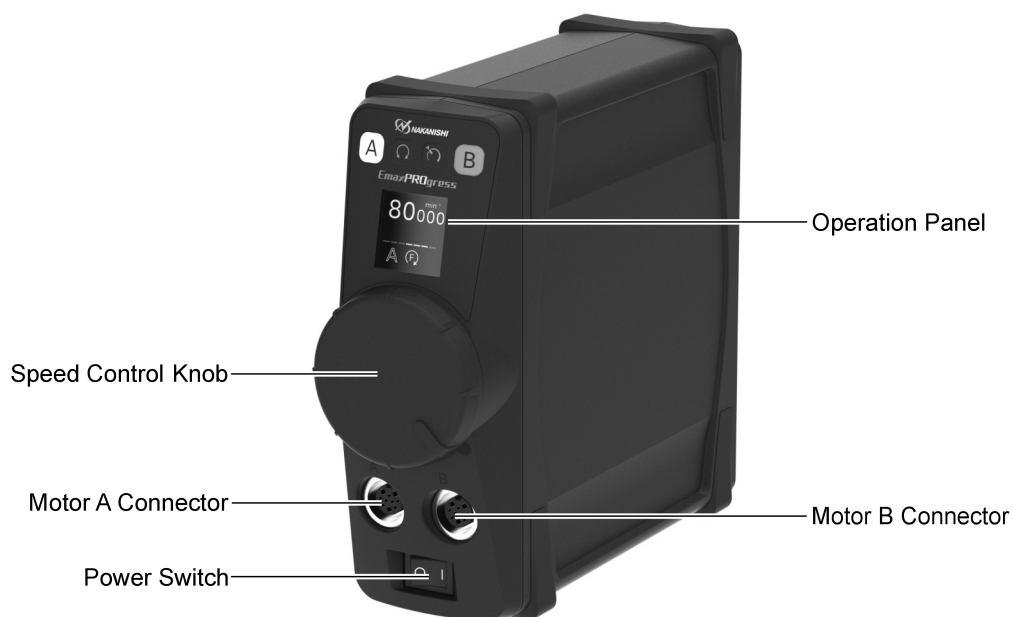
Name	Model
Foot Pedal	FC-64

■ FC-64

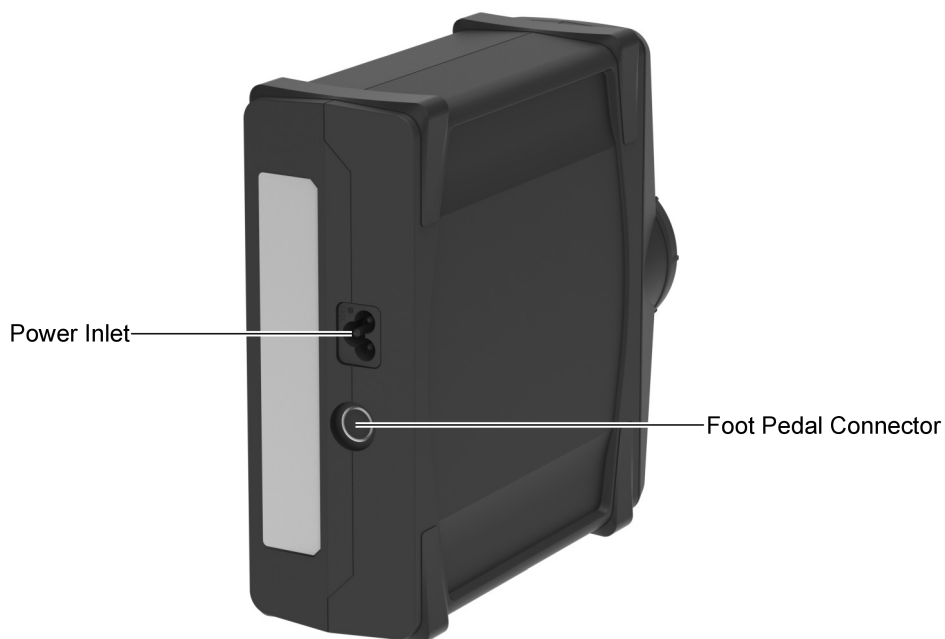


2.2 Part names

■ Front

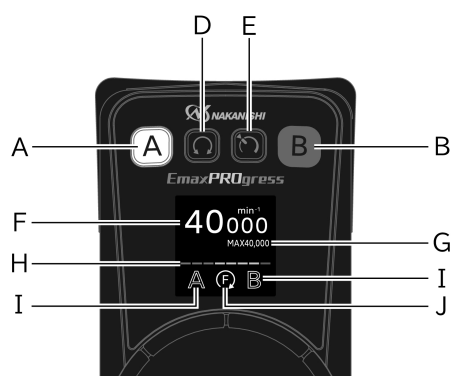


■ Rear



■ Operation panel

■ Motor handpiece



No.	Display	Name	Function
A		Motor A Key	Switching to Motor A: Press the [A] key when the rotation is stopped and the [B] key is lit. The [A] key is lit, and motor A is selected.
			Starting Motor A: Press the [A] key when the rotation is stopped and the [A] key is lit. Motor A will start rotation and the [A] key flashes.
			Stopping Motor A: Press the [A] key when motor A or B is rotating. The motor will be stopped.
B		Motor B Key	Switching to Motor B: Press the [B] key when the rotation is stopped and the [A] key is lit. The [B] key is lit, and motor B is selected.
			Starting Motor B: Press the [B] key when the rotation is stopped and the [B] key is lit. Motor B will start rotation and the [B] key flashes.
			Stopping Motor B: Press the [B] key when motor A or B is rotating. The motor will be stopped.
C		Hand Switch A *1	Switching to Motor A: Press the [Hand Switch A] key when the rotation is stopped and the [B] key is lit. The [A] key is lit, and motor A is selected.
			Starting Motor A: Press the [Hand Switch A] key when the rotation is stopped and the [A] key is lit. Motor A will start rotation and the [A] key flashes.
			Stopping Motor A: Press the [Hand Switch A] key when motor A is rotating. The motor will be stopped.
		Hand Switch B *1	Switching to Motor B: Press the [Hand Switch B] key when the rotation is stopped and the [A] key is lit. The [B] key is lit, and motor B is selected.
			Starting Motor B: Press the [Hand Switch B] key when the rotation is stopped and the [B] key is lit. Motor B will start rotation and the [B] key flashes.
			Stopping Motor B: Press the [Hand Switch B] key when motor B is rotating. The motor will be stopped.
D		Rotation Direction Key	Press the key when the rotation is stopped. The Rotation Direction display will switch between “F” and “R”.
			Press the key when the motor is rotating. The motor will be stopped.

2 Product Information

No.	Display	Name	Function
E		Memory-Speed Key	If FIXPEED is selected in User Settings, you can operate the FIXPEED (Memory-Speed) Function. (For the operation details, refer to "4.3 Memory-Speed Function (FIXPEED)".)
			If SPDLIMIT is selected in the User Settings, you can operate the Rotation speed limit function. (For the operation details, refer to "4.4 Memory-Speed Function (SPDLIMIT)".)
F		Rotation Speed Display	Displays the maximum motor rotation speed setting by Speed Control Knob when the rotation is stopped.
			Displays the actual motor rotation speed when the motor is rotating.
G		Status Display	Displays each status. Due to the Safety Function, "MAX40,000" indicates that the limit is set at 40,000 min ⁻¹ .
H		Load Meter Display	The motor load status is displayed on a load meter in 7 or 8 levels (blue, yellow, red).
I		Motor A/B Display	This displays the selected motor (A/B). It is displayed in a bordered font when stopped and in white text when rotating.
J		Rotation Direction Display	Displays the motor's rotation direction with [F] (forward) or [R] (reverse). When the rotation is started, the rotation direction arrow [F] or [R] will be displayed rotating.

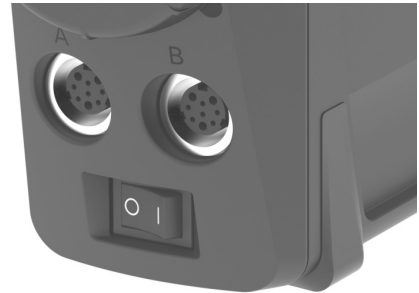
*1 The Hand Switch function is available on the following products. It is not available on the ESP-800.

Applicable Motor Models : ENK-500T, ENK-500C, ENK-410S, ENK-250T

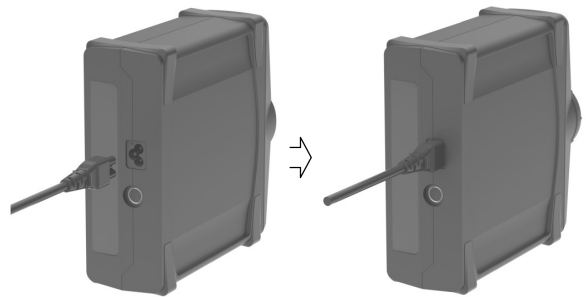
3 Preparation for Use

3.1 Connecting the Power Cord

- (1) Check that the Power Switch is OFF.

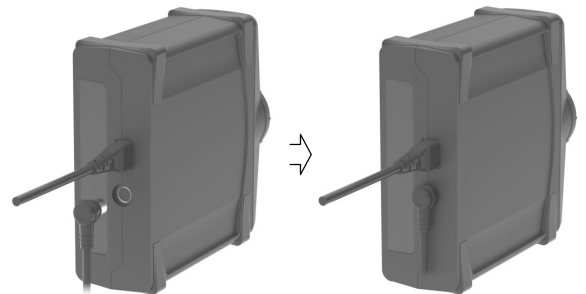


- (2) Insert the Power Cord into the inlet.



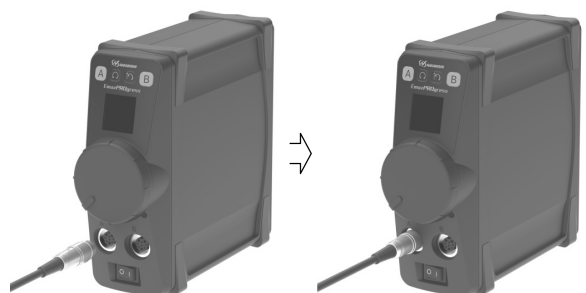
3.2 Connecting the Foot Pedal

When using the foot pedal, align the foot pedal plug with the socket and insert it.



3.3 Connecting the Motor Handpiece

Align the motor handpiece's plug with the Motor A Connector and/or Motor B Connector of the Controller and insert it. Tighten the motor handpiece's plug nut.



4 How to Use

4.1 Basic operations

1. Connecting the Power Cord

Insert the Power Cord Plug in a grounded wall outlet.

2. Setting the Speed Control Knob

Make sure the Speed Control Knob is set at the lowest speed position.

3. Turning the Power Switch to ON

Check if the Speed Display shows 1,000 min⁻¹.

4. Selecting the direction of rotation

Use the  Key.

5. Selecting the motor A or motor B to be used

Check which motor you are using. The  Key or  Key is lit as it is selected. In the right figure,  is selected. If you want to use the motor B, press the  to select motor B. If the key for the motor you want to use is lit, the motor is already selected. Therefore, do not press the Motor  Key or Motor  Key.

6. Starting and stopping the motor

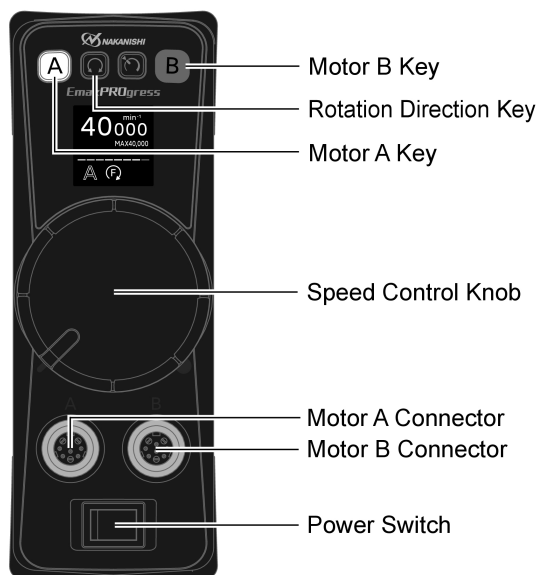
There are 3 ways to start the motor.

- (1) Motor Key  / : If the Key  /  for the motor you want to use is lit, press the lit key to start the motor. To stop the motor, press the key again.
- (2) Hand Switch: If the Key  /  for the motor you want to use is lit, press the Hand Switch for the lit motor to start the motor. To stop the motor, press the Hand Switch again.
- (3) Foot Pedal : If the Key  /  for the motor you want to use is lit, depress Foot Pedal to start the motor. To stop the motor, release the Foot Pedal.

7. Adjusting the Maximum Rotation Speed

The controller recognizes the maximum rotation speed according to the connected motor, and the motor rotation speed can be set with the Speed Control Knob. Adjust the knob to the desired speed. The motor speed adjustment increments are as follows.

Maximum Speed	Adjustment Increment
80,000 min ⁻¹	500 min ⁻¹ increments
50,000 min ⁻¹ or less	200 min ⁻¹ increments



⚠ CAUTION

- Motors A and B cannot run simultaneously.
- To stop a motor started using the Foot Pedal, release the Foot Pedal. Pressing Motor Key  or  does not stop the motor.

4.2 Auto Cruise Function

When using the Foot Pedal, the rotation speed can be maintained at a constant level within the range set using the Speed Control Knob. While the motor is rotating at the desired speed, press Motor Key **[A]** or **[B]** or the Hand Switch. "CRUISE" appears on the Status Display, and the motor maintains the current rotation speed even after the Foot Pedal is released. To cancel this function, press the Motor Key **[A]** / **[B]** or Hand Switch, or depress the Foot pedal again.

The Auto Cruise Function is not available when the foot pedal operating mode is set to ON/OFF in 6.6 (FOOT CTRL) Foot Pedal setting.

4.3 Memory-Speed Function (FIXPEED)

This function allows you to store frequently used rotation speeds in advance. A stored rotation speed can be recalled by pressing the Memory-Speed Key.

(1) Setting the Memory-Speed Function

First with the motor stopped, preset the desired speed with the Speed Control Knob. Next, hold down the Memory-Speed Key for more than 1 second. A 'beep' will sound and "FIXPEED" will appear. The motor is now set to run at the FIXPEED setting.

To change the FIXPEED memory, clear the Memory-Speed Function first, and then repeat the procedure above.

FIXPEED memory cannot be set over 30,000 min⁻¹.

(2) Using Memory-Speed Function

Select the desired motor by pressing either Motor Key **[A]** or **[B]**.

After selecting the motor, press the selected Motor Key or the Hand Switch. The motor will rotate at the memorized speed.

During Foot Pedal operation, the memorized speed acts as the upper limit, and the Foot Pedal can be used to adjust the rotation speed.

(3) Cancelling the Memory-Speed Function

When you press the Memory-Speed Key, a 'beep' will sound and "FIXPEED" will disappear. The FIXPEED function is cancelled.

(4) Reactivating the Memory-Speed Function

When you press the Memory-Speed Key, "FIXPEED" will appear. The FIXPEED memory has been restored.

The factory default FIXPEED setting is 20,000 min⁻¹ for both Motor A and Motor B.

4.4 Memory-Speed Function (SPDLIMIT)

For safe use, this function allows you to set an upper limit for the rotation speed.

If the Memory-Speed Function is set to "SPDLIMIT" on User Settings (details on "6 Setup"), the saved rotation speed acts as a rotation speed limit. The speed setting via the Speed Control Knob will be limited. The method of saving, recalling, and cancelling rotation speed memory is the same as in the case of "FIXPEED".

4.5 Safety Function

(1) MAX40,000 Mode (Select "MAX40,000" in User Settings.)

This function limits the maximum rotation speed to 40,000 min⁻¹ if the motor's maximum rotation speed exceeds 40,000 min⁻¹ when the power is turned on or when the motor is connected, and the Speed Control Knob is not set to the minimum position. When the Speed Control Knob is set to the minimum position, this mode will be cancelled.

4 How to Use

(2) **Prohibited Mode** (Select “PROHIBIT” in User Settings.)



When the power is turned on or when the motor is connected, and the Speed Control Knob is not set to the minimum position, the motor operation will be prohibited. “PROHIBIT” will appear in yellow and a buzzer will sound (PiPiPi). Also, “VR→1000” will appear as a prohibition factor. When the Speed Control Knob is set to the minimum position, this mode will be cancelled.

The Prohibited Mode also activates the MAX40,000 protection function that limits the rotation speed to a maximum of 40,000 min⁻¹.

After cancelling the Prohibited Mode, “MAX40,000” will appear for the motor with a maximum rotation speed exceeding 40,000 min⁻¹. Keep the Speed Control Knob at the minimum position, or return it to the minimum position. MAX40,000 Mode will then also be cancelled.

4.6 Load Meter Display

The load on the motor attachment and Controller is displayed in 7 levels (3 blue, 3 yellow, and 1 red) or 8 levels (3 blue, 4 yellow, and 1 red). As a guideline, use the product with no more than 3 blue indicators lit.

4.7 Last Setting Memory Function

When the power is turned on, the rotation direction and settings such as FIXPEED are retained from the last time the power switch was turned OFF. Before use, always check that the rotation direction and rotation speed are set as intended.

4.8 Overheating Protection Function

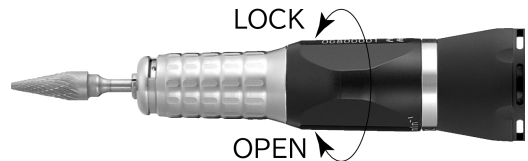
The motor temperature is estimated from the motor current and rotational speed. If an abnormal temperature rise is detected, “OVERHEAT” (yellow) is displayed and an audible alarm sounds. At the same time, the motor output torque is limited to suppress further temperature rise. When the motor temperature decreases, the indication and audible alarm are automatically cleared.

This function can be disabled in 6.7 (HEAT) Overheating Protection Function setting. However, even when the Overheating Protection Function is disabled, the ERROR 008 (Motor Overheat Error) detection function remains active at all times.

5 Motor and Attachment Operation

5.1 Installation and removal of tools

Open the collet by turning the Tool Lock Ring to the open position. The collet is open and the tool can be removed. Install the new tool and turn the Tool Lock Ring in the Lock direction. Finally turn the Tool Lock Ring all the way to the Lock position until it clicks.



⚠ CAUTION

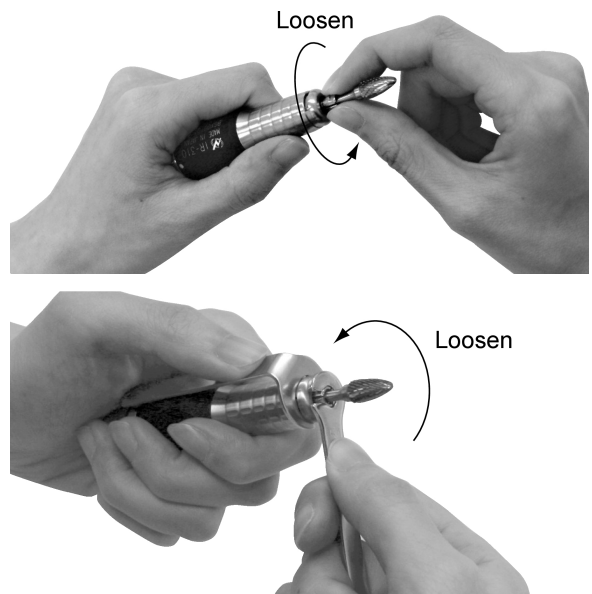
- Never turn the Tool Lock Ring while the motor is rotating. Turning the Tool Lock Ring while the motor is rotating may cause injury and damage the motor and attachment.

5.2 Cleaning and replacement of the collet

(1) Removal of the Collet

Open the Tool Lock Ring, and turn the collet counterclockwise to remove it. The collet can normally be removed and installed by hand. If the collet is too tight, remove it using the wrenches supplied with the attachment and motor while a tool is installed.

- * The collet or tool may become difficult to remove by hand when a tool with a large cutting-edge diameter is used under high torque or when the attachment rotates in the direction that tightens the collet. In this case, align the wrench flats on the attachment with the slits in the nose, and hold the attachment with the L-shaped wrench. Then turn the Tool Lock Ring in the OPEN direction, loosen the collet by turning it counterclockwise with the collet wrench, and remove the collet or tool.



(2) Cleaning the Collet

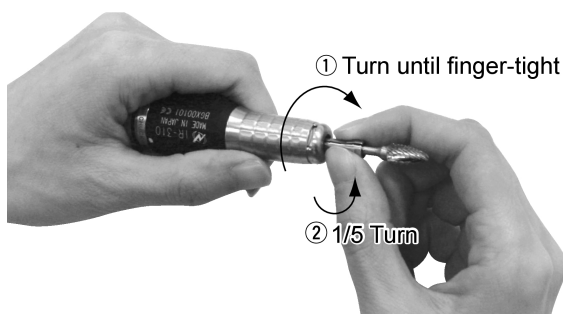
Remove the collet frequently and clean it to maintain accuracy. Cleaning at least once a week is recommended.

5 Motor and Attachment Operation

(3) Installation and Adjustment of the Collet

Before installing the collet, apply a thin film of grease to it. With the Tool Lock Ring in the OPEN position, insert a test bar or the tool to be used into the collet, and turn the collet clockwise by hand until it stops. Then turn the collet counterclockwise approximately 1/5 of a turn so that the tool can be removed easily. Turning the Tool Lock Ring to the LOCK position will provide sufficient collet clamping force.

- * The collet clamping force can be adjusted as shown in the figure on the right. If the tool slips out or cannot be removed, adjust the collet as described above.



CAUTION

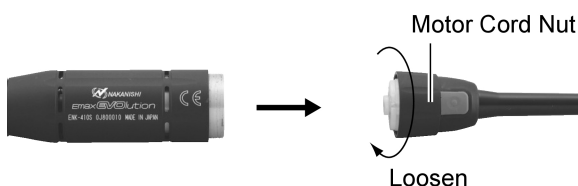
- This manual describes the operation of the ring-type attachment IR-310 as an example. For instructions on how to use other attachments, refer to the instruction manual for each attachment.

5.3 Disconnecting and connecting the motor cord to the motor

Applicable Motor Models: ENK-500T, ENK-500C, ENK-410S, ENK-250T

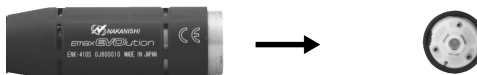
Removal

Loosen the nut on the rear of the motor by turning it counterclockwise, then hold the nut and pull the motor cord straight out to disconnect it. Do not pull on the cord itself.



Connecting

- Carefully align the pins on the motor with the holes on the motor cord connector and gently push the motor cord connector onto the motor.
- Tighten the motor cord nut by turning clockwise until it is tight.



CAUTION

- Products with an integrated motor and cord, such as the ESP-800, cannot be disconnected. Do not attempt to forcibly disconnect them, as doing so may cause damage or malfunction.
- Do not remove the motor cord except when exchanging the motor cord.
- Be careful not to lose an O-ring between the motor and the motor cord when exchanging the motor cord.
- Be very careful to push the motor cord connector straight into the motor.
The motor pins can be bent easily and cannot be bent back.

5.4 Removing and attaching the attachment to the motor

Applicable Motor Models: ENK-500T, ENK-500C, ENK-410S, ENK-250T

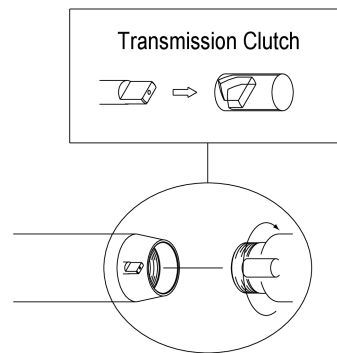
The attachment and motor are screwed together at the rear of the attachment. Hold the motor body and engage the pin wrench for the attachment and motor with the rear of the attachment. Turn the pin wrench counterclockwise to unscrew the attachment.



⚠ CAUTION

When attaching the attachment to the motor, the thread may suddenly become difficult to tighten. This indicates that the drive clutch between the motor and the attachment is not properly engaged. Do not forcibly tighten the thread in this condition, as doing so may cause improper rotation.

Loosen the thread once, then turn the collet or tool of the attachment by hand and confirm that the drive clutch is properly engaged. After that, tighten the threaded section again, and finally tighten it using the pin wrench.



5.5 Handpiece stand

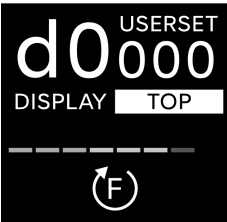
On the bottom of the Handpiece stand, the tools necessary for attachment maintenance and a spare collet (optional) can be mounted.



6 Setup

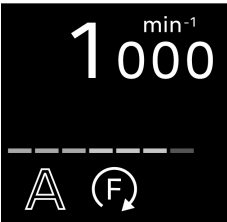
According to your usage, configure the following settings.

6.1 Entering User Settings Mode



Turn the Speed Control Knob to the minimum position, and then turn the power on while holding down the Motor Key **[A]**. When "USERSET" appears in the lower right corner while the logo is displayed, release the Motor Key **[A]** to switch to User Settings mode. In User Settings mode, "USERSET" will appear on the status display.

6.2 Exiting User Settings Mode



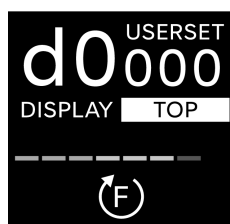
Turning the power OFF and then ON again exits User Settings Mode and switches the controller to normal operation mode. After exiting User Settings Mode, if the Speed Control Knob is not set to the minimum position when the power is turned on, operation is prohibited. At this time, "PROHIBIT" appears in yellow and a buzzer sounds (PiPiPi). Turn the Speed Control Knob to the minimum position. The buzzer will stop and the prohibited state will be cleared.

6.3 Selecting a User Setting

To select an item, turn the Speed Control Knob.
The display switches in the following order: [d0] > [A1] > [F0] > [H1] > [b1] > [S1] > [M0] > [C0].

Display	Name	Details
d0	DISPLAY	Display setting
A1	ACCELERATE	Acceleration setting
F0	FOOT CTRL	Foot Pedal setting
H1	HEAT	Overheating Protection Function setting
b1	LD_BUZZER	Load buzzer setting
S1	SAFETY	Safety Function setting
M0	SPDMEM	Rotation Speed Memory setting
C0	CORD LEN	Motor cord length setting

6.4 (DISPLAY) Display setting



Press the  key to change the setting value.

Display changes in the order [d0] > [d1] > [d2] > [d0] > [d1] > ...

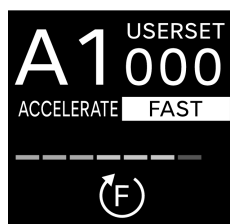
[d0]: (TOP) When the controller is placed vertically

[d1]: (LEFT) When the controller is placed horizontally (the display on the left side)

[d2]: (RIGHT) When the controller is placed horizontally (the display on the right side)

The default setting is [d0] (TOP).

6.5 (ACCELERATE) Acceleration setting



Press the  key to change the setting value.

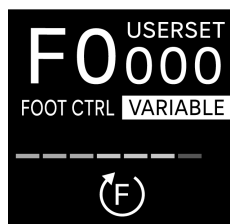
Display changes in the order [A0] > [A1] > [A0] > [A1] > ...

[A0]: (SLOW) Low acceleration

[A1]: (FAST) High acceleration

The default setting is [A1] (FAST).

6.6 (FOOT CTRL) Foot Pedal setting



Press the  key to change the setting value.

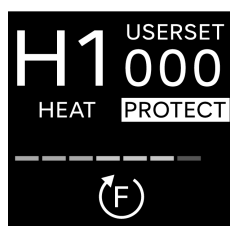
Display changes in the order [F0] > [F1] > [F0] > [F1] > ...

[F0]: (VARIABLE) Linear operation

[F1]: (ON/OFF) ON/OFF operation

The default setting is [F0] (VARIABLE).

6.7 (HEAT) Overheating Protection Function setting



Press the  key to change the setting value.

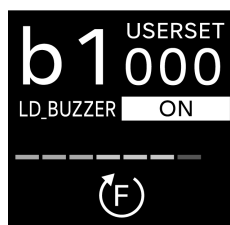
Display changes in the order [H0] > [H1] > [H0] > [H1] > ...

[H0]: (UNPROTECT) Overheating protection is disabled.

[H1]: (PROTECT) Overheating protection is enabled.

The default setting is [H1] (PROTECT).

6.8 (LD_BUZZER) Load buzzer setting



Press the  key to change the setting value.

Display changes in the order [b0] > [b1] > [b0] > [b1] > ...

[b0]: (OFF) Without buzzer

[b1]: (ON) With buzzer

The default setting is [b1] (ON).

6.9 (SAFETY) Safety Function setting



Press the  key to change the setting value.

Display changes in the order [S0] > [S1] > [S2] > [S0] > ...

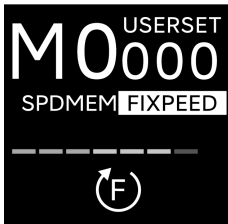
[S0]: (OFF) Safety Function is disabled.

[S1]: (MAX40,000) Maximum rotation speed is limited to 40,000 min⁻¹.

[S2]: (PROHIBIT) The rotation will be prohibited.

The default setting is [S1] (MAX40,000).

6.10 (SPDMEM) Rotation Speed Memory setting



Press the  key to change the setting value.

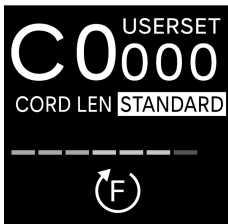
Display changes in the order [M0] > [M1] > [M0] > [M1] > ...

[M0]: (FIXPEED) FIXPEED Function is enabled.

[M1]: (SPDLIMIT) The rotation speed will be limited.

The default setting is [M0] (FIXPEED).

6.11 (CORD LEN) Motor cord length setting



Press the  key to change the setting value.

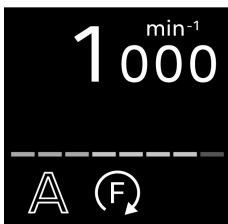
Display changes in the order [C0] > [C1] > [C0] > [C1] > ...

[C0]: (STANDARD) When using 1.5 m motor cord

[C1]: (LONG) When using 3.0 m or 4.0 m motor cord

The default setting is [C0] (STANDARD).

6.12 Resetting to factory default settings



The following procedure restores the settings to the factory defaults.

Turn the Speed Control Knob to the minimum position, and then turn the power on while holding down the Motor Keys  and  simultaneously. When "INITIAL" appears in the lower right corner while the logo is displayed, release the Motor Key  and . The controller will then start in normal mode.

7 Troubleshooting

7.1 Error code

If an abnormal condition occurs, the motor stops and an error code appears on the operation panel display.

- (1) Stop the operation immediately.
- (2) Press the Motor Key **[A]** or **[B]**, or release and depress the foot pedal again, or turn the power off and then on to check whether the error is cleared.
- (3) If the error code is displayed again, refer to the table below and take the appropriate corrective action.

Error display	Description	Remedy
ERROR 000 FATAL_MEM ----- A F	Fatal controller error (CPU memory error)	Request repair of the controller.
ERROR 001 DRV_IC_ERR ----- A F	Controller drive IC fault error (Abnormal overcurrent/undervoltage/dead time)	If the same error occurs even after resolving the error, there may be a malfunction inside the controller. Request repair of the controller.
ERROR 002 M_OVERSPD ----- A F	Motor speed exceeding limit (Exceeding maximum motor speed)	If the same error occurs even after resolving the error, there may be a malfunction inside the controller. Request repair of the controller.
ERROR 003 HALL_OPEN ----- A F	Motor sensor signal open (Motor identification / foot pedal error)	Check the motor connector or foot pedal connection. If there is no problem with the connection, there may be a break in the motor wire or a malfunction in the sensor. Request repair.
ERROR 004 BD_OVERHT ----- A F	Controller overheating (Motor drive circuit overheating)	Using the motor under overload for extended periods may cause errors. Reduce the motor load during use.
ERROR 005 PAM_V_ERR ----- A F	Abnormal internal controller voltage (Detection of residual voltage in PAM circuit)	If the power is turned off while the motor is rotating, voltage may remain in the capacitor inside the controller, potentially causing an error. Wait several tens of seconds before restarting the motor.
ERROR 006 M_LOCK ----- A F	Motor shaft lock (If locked while the motor is rotating)	If the motor remains stopped due to overload while rotating, it will stop with an error. Reduce the motor load during use.

7 Troubleshooting

Error display	Description	Remedy
ERROR 007 M_STARTERR  	Abnormal motor startup (If the motor does not start)	Check if the attachment's collet is in the open position. If it is, turn it to the lock position. Rotate the tip with your fingers to ensure it rotates smoothly. If there are any abnormalities in the rotation, request repair of the motor attachment.
ERROR 008 M_OVERHEAT  	Motor overheating (Predicting heat generation from motor current and rotation speed)	It may be caused by motor overload. Enable Overheating Protection Function (HEAT) in User Settings.
ERROR 009 M_OVERCUR  	Motor overcurrent (Software detection error for motor current)	If the same error occurs even after clearing it, it may indicate a malfunction inside the controller. Request repair of the controller.
ERROR 010 VDD_OVERV  	Overvoltage (The power supply voltage is higher than +48 V.)	If the same error occurs even after clearing it, it may indicate a malfunction inside the controller. Request repair of the controller.
ERROR 011 VDD_UNDRV  	Undervoltage (The power supply voltage is lower than +48 V.)	If the same error occurs even after clearing it, it may indicate a malfunction inside the controller. Request repair of the controller.
ERROR 012 EEPROM_ERR  	Controller memory error	If the same error occurs even after clearing it, it may indicate a malfunction inside the controller. Request repair of the controller.
ERROR 013 M_UNDERCUR  	Current loop error (Motor 3-phase current imbalance)	Reinsert the motor attachment plug into the motor connector. If the error persists, request repair of the motor attachment.
ERROR 014 M_OPEN  	Motor disconnection (Motor 3-phase current open)	Reinsert the motor attachment plug into the motor connector. If the error persists, request repair of the motor attachment.

7.2 Failure causes and countermeasures

If a problem or concern occurs, please check the following prior to consulting your dealer.

■ Controller / Motor

Trouble		Check	Inspection/Corrective Action
A warning sounds and “FOOT CTRL PROHIBIT” is displayed when the power is turned on.		Check that the Foot Pedal is not being depressed.	Release the Foot Pedal.
A warning sounds and “M_SWITCH PROHIBIT” is displayed when the power is turned on.		Check that the motor hand switch is not being pressed.	Release the motor hand switch.
Operation Panel does not light up.		Power Cord Plug is disconnected.	Connect Power Cord Plug correctly.
		Power Cord Plug is connected.	The Power Switch may be faulty, or the fuse may be blown. Request repair.
The motor or attachment does not run.	Foot Pedal does not work.	The connection of the foot pedal cord plug is loose.	Connect the foot pedal cord plug correctly.
	Error 003 appears.	The motor cord is disconnected.	Connect the motor cord correctly.
	Error 004 appears.	The ambient temperature in the operating environment or storage location is outside the specified range, or the Controller has overheated.	Stop operation and allow the product to cool in a cool location for approximately 10 minutes. Then restart the product. If the product operates normally, there is no malfunction. If the error code appears frequently, request repair of the controller.
	Error 005 appears.	If the power is turned off while the motor or attachment is rotating, this problem occurs.	Wait about 10 to 20 seconds, then start the motor.
	Error 007 appears.	The collet is open.	Lock the collet.
		With the motor stopped, lightly turn the tip with your finger and check that it rotates smoothly.	If the rotation is abnormal, request repair of the motor attachment.
	Error 008 appears.	The motor or attachment may be overloaded.	Enable "HEAT (Overheating Protection Function)" in User Settings.
	Error 013 appears.	Check that the motor cord plug is connected to the motor connector.	Reinsert the motor cord plug. If the error persists, request repair.
Error 014 appears.	Check that the motor cord plug is connected to the motor connector.	Reinsert the motor cord plug. If the error persists, request repair.	
The rotation speed does not rise.		The Speed Control Knob is set to the minimum position.	Set the maximum rotation speed using the Speed Control Knob.

7 Troubleshooting

■ Attachment

Trouble	Check	Inspection/Corrective Action
Attachment does not rotate when the collet is closed.	Bearings are contaminated or seized.	Request repair of the attachment.
Attachment gets hot during use.	Foreign matter has entered the ball bearings, causing the bearings to wear.	Request repair of the attachment.
Vibration or noise occurs during use.	Foreign matter has entered the ball bearings, causing the bearings to wear.	Request repair of the attachment.
	Tool is bent or damaged.	Replace the tool.
High Runout	Contaminants in collet or attachment.	Clean the collet and the inside of the attachment.
	Collet is worn.	Replace the collet.
	Bearings are worn.	Request repair of the attachment.
Tool slips out	Collet is loose.	Adjust the collet.
Attachment cannot be removed from the motor.	Use the provided pin wrench.	Remove the attachment using the pin wrench supplied with the attachment and motor. Refer to "5.4 Removing and attaching the attachment to the motor". If the provided pin wrench does not work, wrap a cloth around the attachment and motor to avoid damage, and use pliers or a similar tool to remove the attachment. If the attachment still cannot be removed, request repair.

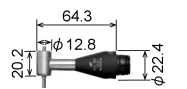
8 Optional Items

8.1 Optional Motors and Attachments

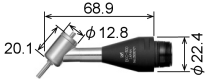
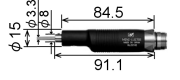
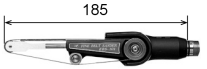
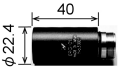
■ EmaxPROgress System

Product	Model No.	Specification
	High-Speed Motor Handpiece ESP-800	Lightweight, compact one-piece micro grinder supporting up to 80,000 min ⁻¹ .

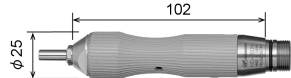
■ Espert500 System

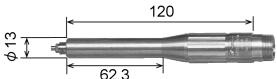
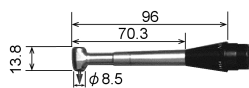
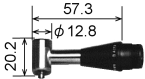
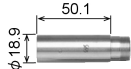
Product	Model No.	Specification
	Torque Type Motor ENK-500T	1,000 – 50,000 min ⁻¹ Brushless Motor. ON/OFF switch. 200 W high-torque type. Ideal for tools with a $\Phi 6$ mm shank and large-diameter tools.
	Compact Type Motor ENK-500C	1,000 – 50,000 min ⁻¹ Brushless Motor. ON/OFF switch. Lightweight, compact, and versatile type for precision micro-machining applications.
	Ring Type Attachment EHR-500	Maximum operating speed: 50,000 min ⁻¹ or less. Ring type chucking system allows for reliable, one-touch tool changes.
	Lever Type Attachment EHL-401	Maximum operating speed: 50,000 min ⁻¹ or less. Lever type chucking system allows for reliable, one-touch tool changes.
	6 mm Torque Type Attachment EHG-400	Maximum operating speed: 40,000 min ⁻¹ or less. Collet Diameter: $\phi 6.0$ mm or $\phi 6.35$ mm
	90° Angle Torque Type Attachment ERA-270	Maximum operating speed: 27,000 min ⁻¹ or less. Designed for high torque with enlarged internal gear and improved durability. Using shafted tools makes it easy to process bottom corners.
	90° Angle Attachment EIC-300	Maximum operating speed: 30,000 min ⁻¹ or less. Ideal for high-speed surface polishing with abrasive disc pads. The internal gear reduces the rotation speed to 3/4 of the input speed.

8 Optional Items

Product	Model No.	Specification
	50° Angle Attachment EKC-300	Maximum operating speed: 30,000 min ⁻¹ or less. Useful for machining bottom corners using mounted tools. Internal gear reduces speed by 3/4. Rotates in the opposite direction to the motor's rotation.
	LUSTER ELS-100	Maximum operating speed: 25,000 min ⁻¹ or less. Stroke range: 0 – 6 mm Reciprocating Stroke (variable): Approx 0 – 6,300 times/min.
	MINI-LUSTER EML-8	Maximum operating speed: 25,000 min ⁻¹ or less. Lightweight, pencil-like design makes it easy to use. Reciprocating Stroke (variable): Approx 0 – 10,000 times/min.
	Fine Belt Sander EBS-101	Maximum operating speed: 30,000 min ⁻¹ or less. Belt speed: 0 – 705 m/min. Belt width: 4, 6, 8 mm (circumference 300 mm)
	1/4 Reduction Gear ERG-01B	Maximum operating speed: 30,000 min ⁻¹ or less. The rotation speed is reduced to 1/4, and the torque is increased by four times.

■ EmaxEVolution System

Product	Model No.	Specification
	Standard Type Motor ENK-410S	1,000 – 40,000 min ⁻¹ Brushless Motor. Excellent combination of high speed, light weight, small-diameter, high torque and FWD/REV rotation.
	Torque Type Motor ENK-250T	1,000 – 25,000 min ⁻¹ Brushless Motor. Power-type motor with higher torque than the standard motor ENK-410S.
	Ring Type Attachment IR-310	Maximum operating speed: 40,000 min ⁻¹ or less. Ring type chucking system makes it easier to change tools.
	Lever Type Attachment IH-300	Maximum operating speed: 40,000 min ⁻¹ or less. The collet nut can be easily replaced by hand. Tools can be changed using the one-touch lever system, which provides strong clamping force with a special structure.
	6 mm Torque Type Attachment HG-200	Maximum operating speed: 30,000 min ⁻¹ or less. Collet Diameter: ø6.0 mm or ø6.35 mm (1/4")

Product	Model No.	Specification
	Long Attachment BMH-300	Maximum operating speed: 35,000 min ⁻¹ or less. The unique slim body is ideal for cutting and grinding the bottom surfaces of deep ribs or holes. Collet diameter: ø3.0 mm or ø3.175 mm (1/8") Optional collet diameter: ø2.35 mm
	90° Angle Attachment MFC-300S	Maximum operating speed: 15,000 min ⁻¹ or less. 90° high-speed mini angle attachment. Two precision ball bearings are used in the head. Only ø1.6 mm collets can be used.
	90° Angle Attachment MFC-300M	
	90° Angle Attachment IC-300	Maximum operating speed: 30,000 min ⁻¹ or less. 90° Angle attachment with ø3.0 mm or ø3.175 mm (1/8") Collet. When using a rubber pad or felt buff at low speed, use the RG-01 reducer together with this attachment.
	50° Angle Attachment KC-300	
	Reciprocating Type Compact Grinder LUSTER LS-100	Maximum operating speed: 25,000 min ⁻¹ or less. The grinding surface can be set at any angle between 0° and 360°. Stroke range: 0 – 6 mm.
	Reciprocating Type Compact Grinder (Built in motor) LUSTER NLS-110	
	MINI-LUSTER ML-8	Maximum operating speed: 25,000 min ⁻¹ or less. Stroke range of 0.8 mm, Reciprocating Stroke (variable): Approx 0 – 6,380 times/min. Suitable for polishing narrow grooves, corners, ribs, slits, and other detailed areas.
	Fine Belt Sander KBS-101	Maximum operating speed: 30,000 min ⁻¹ or less. 8 mm Belt (Grits #120, #240, #400) 6 mm Belt (Grits #120, #240, #400) 4 mm Belt (Grits #120, #240, #400)
	1/4 Reduction Gear RG-01	Maximum operating speed: 30,000 min ⁻¹ or less. The rotation speed is reduced to 1/4, and the torque is increased by four times.
	Extension Joint CN-01	Maximum operating speed: 35,000 min ⁻¹ or less. Joint used to connect the attachment and motor to extend the length.

9 Specifications

9.1 Specifications

■ Controller

Model	NE364
Power Requirements	AC100 V - AC240 V, 50/60 Hz
Max. mains voltage fluctuation	±10%
Power consumption	35 W
Overvoltage category	II
Pollution degree	Class 2
Net weight	1.25 kg
Dimensions	W71 × D212 × H197 mm

■ Handpiece Stand

Model	K-274
Net Weight	120 g

■ Motor

Series	EmaxPROgress	
Motor Type	80,000 min ⁻¹ Motor	
Model	ESP-800	
Motor Rotation Speed	1,000 – 80,000 min ⁻¹	
Max. Output	125 W	
Max. Torque	4 cN·m	
Net Weight	excluding cord	132 g
	including cord	220 g
Cord Length	1.5 m	

Series	Espert500	
Motor Type	Torque Motor	Compact Motor
Model	ENK-500T	ENK-500C
Motor Rotation Speed	1,000 – 50,000 min ⁻¹	
Max. Output	200 W	140 W
Max. Torque	8.7 cN·m	6 cN·m
Net Weight (excluding cord)	160 g	115 g
Cord Length	1.5 m	

Series	EmaxEVolution	
Motor Type	Standard Motor	Torque Motor
Model	ENK-410S	ENK-250T
Motor Rotation Speed	1,000 – 40,000 min ⁻¹	1,000 – 25,000 min ⁻¹
Max. Output	73 W	76 W
Max. Torque	4.3 cN·m	4.8 cN·m
Net Weight (excluding cord)	90 g	147 g
Cord Length	1.5 m	

9.2 Operating, Transportation, and Storage Environment

	Temperature	Humidity	Atmospheric Pressure
Operation Environment			—
Transportation and Storage Environment			

Installation Area	Indoor use
Height above Sea Level	Less than 2,000 m

*Using this product under conditions other than those specified above may result in malfunction or failure.

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1 Préface

Nous vous remercions d'avoir acheté EmaxPROgress. Il s'agit d'un système d'outil manuel rotatif à micromoteur de haute précision et à très grande vitesse. Ce système est conçu pour l'ébavurage de haute précision et de petit diamètre, le meulage et une grande variété d'autres applications. Conservez ce manuel d'utilisation à proximité du système EmaxPROgress afin que les opérateurs puissent le consulter lors de chaque utilisation du système.

Veuillez lire attentivement ce manuel d'utilisation avant utilisation.

1.1 Précautions de manipulation et d'utilisation

- Lire attentivement ces mises en garde et utiliser uniquement selon l'usage prévu.
- Les consignes de sécurité visent à éviter les dangers potentiels pouvant entraîner des blessures ou des dommages au dispositif. Elles sont classées comme suit selon la gravité du risque.

Classe	Degré de risque
⚠ AVERTISSEMENT	Un danger pouvant entraîner des blessures corporelles ou des dommages au dispositif en cas de non-respect des consignes de sécurité.
⚠ ATTENTION	Un danger pouvant entraîner des blessures corporelles légères ou modérées ou des dommages au dispositif si les consignes de sécurité ne sont pas respectées.
REMARQUE	Informations générales nécessaires pour utiliser le dispositif en toute sécurité.

⚠ AVERTISSEMENT

Lors de l'utilisation d'outils électriques, les précautions de sécurité de base doivent toujours être respectées afin de réduire les risques d'incendie, de choc électrique et de blessures.

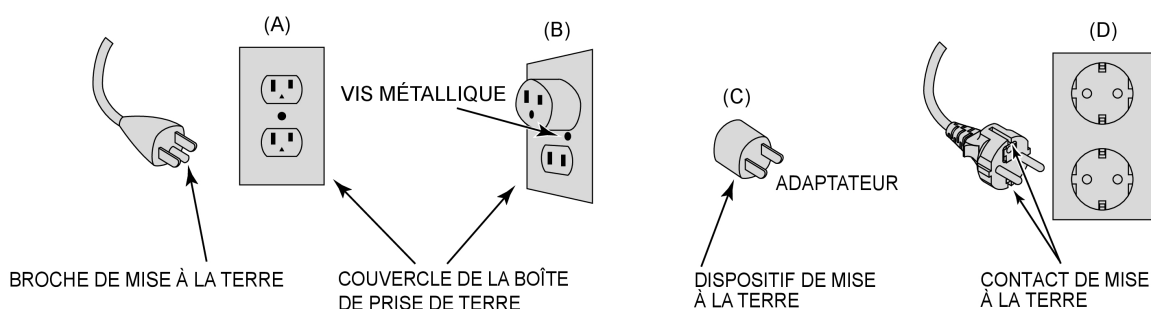
Lire toutes ces instructions avant d'utiliser ce produit et les conserver.

■ INSTRUCTIONS DE MISE À LA TERRE

- En cas de dysfonctionnement ou de panne, la mise à la terre offre un chemin de moindre résistance au courant électrique afin de réduire le risque de choc électrique. Cet outil est équipé d'un cordon d'alimentation doté d'un conducteur de mise à la terre de l'équipement et d'une fiche de mise à la terre. La fiche doit être branchée sur une prise correspondante correctement installée et mise à la terre conformément à tous les codes et réglementations locaux.
- Ne modifiez pas la fiche fournie - si elle ne s'adapte pas à la prise, faites installer une prise appropriée par un électricien qualifié.
- Une connexion incorrecte du conducteur de mise à la terre de l'équipement peut entraîner un risque de choc électrique. Le conducteur dont l'isolation présente une surface extérieure verte, avec ou sans rayures jaunes, est le conducteur de mise à la terre de l'équipement. En cas de réparation ou de remplacement du cordon d'alimentation ou de la fiche, ne connectez pas le conducteur de mise à la terre de l'équipement à une borne sous tension.
- Consultez un électricien qualifié ou le personnel de maintenance si les instructions de mise à la terre ne sont pas entièrement comprises, ou en cas de doute quant à la mise à la terre correcte de l'outil.
- Utilisez uniquement des rallonges à 3 fils équipées de fiches de terre à 3 broches et de prises à 3 pôles acceptant la fiche de l'outil.
- Réparer ou remplacer immédiatement un cordon endommagé ou usé.

- (120 V) Cet outil est destiné à être utilisé sur un circuit équipé d'une prise semblable à celle illustrée sur le schéma A de la figure (ci-dessous). L'outil est doté d'une fiche de mise à la terre semblable à celle illustrée sur le schéma A de la figure (ci-dessous). Un adaptateur temporaire, semblable à celui illustré sur les schémas B et C, peut être utilisé pour brancher cette fiche à une prise bipolaire, comme indiqué sur le schéma B, si aucune prise correctement mise à la terre n'est disponible. L'adaptateur temporaire ne doit être utilisé que jusqu'à ce qu'une prise correctement mise à la terre puisse être installée par un électricien qualifié. L'oreille rigide, la cosse ou tout élément similaire de couleur verte dépassant de l'adaptateur doit être connecté à une terre permanente, telle qu'un boîtier de prise correctement mis à la terre.
Remarque : L'adaptateur illustré à la figure B n'est pas destiné à être utilisé au Canada.
- (240 V) Cet outil est destiné à être utilisé sur un circuit équipé d'une prise similaire à celle illustrée sur le schéma D de la figure.

Méthode de mise à la terre



- UTILISER UNE RALLONGE APPROPRIÉE. S'assurer que la rallonge est en bon état. Lors de l'utilisation d'une rallonge, veiller à en utiliser une de section suffisante pour supporter le courant absorbé par le produit. Un cordon sous-dimensionné provoque une chute de tension de ligne, entraînant une perte de puissance et une surchauffe. Le tableau (ci-dessous) indique la section correcte à utiliser en fonction de la longueur du cordon et de l'intensité nominale indiquée sur la plaque signalétique. En cas de doute, utiliser le calibre supérieur. Plus le numéro de calibre est petit, plus le cordon est épais.

Calibre minimum pour le cordon

Courant nominal		Volts	Longueur totale du cordon			
		120 V	7,5 m (25 ft.)	15 m (50 ft.)	30 m (100 ft.)	45 m (150 ft.)
		240 V	15 m (50 ft.)	30 m (100 ft.)	60 m (200 ft.)	90 m (300 ft.)
Plus de	Pas plus de					
0	6		18	16	16	14
6	10		18	16	14	12
10	12		16	16	14	12
12	16		14	12	Non recommandé	

Utilisez le tableau ci-dessus pour la tension correcte.

■ AUTRES INSTRUCTIONS D'AVERTISSEMENT

- Brancher le produit sur une prise de courant mise à la terre.
- Ne pas brancher ou débrancher le cordon d'alimentation avec les mains mouillées. Cela peut provoquer un choc électrique.
- Ne pas laisser tomber le moteur, le contrôleur ou tout autre composant. L'impact d'une chute peut endommager les pièces internes. Installer le contrôleur sur une surface plane et stable.

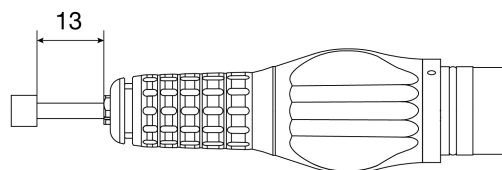
1 Préface

- Après l'installation de l'outil, tournez la bague dans le sens LOCK indiqué par la flèche jusqu'à ce qu'elle s'enclenche pour verrouiller l'outil. Si la bague n'est pas tournée sur la position spécifiée, l'outil risque de se détacher pendant la rotation et de provoquer des blessures.
- Utilisez un outil dont le diamètre de tige est compris dans la tolérance admissible pour le diamètre nominal de la pince. L'utilisation d'un outil en dehors de la tolérance recommandée peut entraîner des problèmes tels qu'un faux-rond ou une force de serrage insuffisante.
- Ne pas utiliser d'outils présentant des rayures, des éclats, des fissures, une mauvaise adhérence, des tiges tordues ou d'autres défauts. Ne pas utiliser d'outils non conformes aux normes applicables ou de mauvaise qualité. La tige peut se casser ou la meule peut se briser et être projetée, entraînant des blessures. Lors de la première utilisation d'un outil ou de l'utilisation d'un outil à tête large, le faire d'abord tourner à faible vitesse et augmenter progressivement la vitesse de rotation tout en s'assurant de la sécurité.
- Ne pas démonter ni modifier le produit, sauf comme décrit dans ce manuel d'utilisation. En cas de démontage ou de modification du produit, ses performances ne peuvent être garanties. De plus, la réparation peut être refusée.
- Par mesure de sécurité, utiliser un capot de protection et porter des lunettes de sécurité et un masque anti-poussière pendant l'utilisation.
- Ne pas porter de gants de travail en coton pendant le fonctionnement. De plus, ne pas placer de chiffons ou d'objets similaires à proximité de la zone de travail. Les gants de travail en coton, les chiffons ou les objets similaires risquent d'être happés par les pièces en rotation.
- Les moteurs équipés d'un interrupteur manuel peuvent commencer ou s'arrêter de tourner si l'interrupteur manuel est actionné accidentellement pendant la manipulation. Veillez à ne pas toucher l'interrupteur manuel lors de la manipulation du moteur.
- Si l'accessoire chauffe pendant l'utilisation, réduire la charge d'usinage ou diminuer la vitesse de rotation côté entrée (vitesse de rotation du moteur). Si l'accessoire continue de chauffer, arrêter immédiatement le fonctionnement et vérifier que le produit a suffisamment refroidi avant de reprendre l'utilisation.
- En cas d'anomalie, telle qu'un dégagement de fumée ou une odeur de résine brûlée, mettez immédiatement l'interrupteur d'alimentation sur arrêt et débranchez la fiche d'alimentation. Cessez d'utiliser le produit et demandez une réparation.
- Ne pas exercer de pression excessive susceptible de faire plier l'outil pendant le fonctionnement. La tige risque de se rompre ou de se détacher. De plus, exercer une pression suffisante pour réduire la vitesse de rotation du moteur réduit non seulement la durée de vie du moteur, de l'accessoire et des autres composants, mais aussi l'efficacité du travail.
- N'approchez pas vos mains ou votre corps des outils de coupe ou autres pièces en rotation, et ne les touchez pas. Vous risquez d'y être happé et de vous blesser.
- Utilisez l'accessoire à une vitesse de rotation du moteur ne dépassant pas la vitesse de rotation maximale côté entrée. L'utilisation de l'accessoire au-delà de la vitesse de rotation maximale côté entrée peut endommager l'accessoire. Pour connaître la vitesse de rotation maximale côté entrée, reportez-vous aux sections 8 « Optional Items » et 9.1 « Specifications » du manuel anglais.
- La vitesse de rotation maximale de fonctionnement ou la vitesse périphérique maximale de fonctionnement est spécifiée pour chaque outil. Si un outil est utilisé au-delà de la vitesse de rotation maximale de fonctionnement ou de la vitesse périphérique maximale de fonctionnement spécifiée par le fabricant de l'outil, il risque d'être endommagé et de provoquer des blessures. Utilisez l'outil à une vitesse inférieure ou égale à la vitesse de rotation maximale de fonctionnement spécifiée par le fabricant de l'outil. Lors du réglage de la vitesse de rotation avec la pédale, réglez également au préalable la vitesse de rotation maximale du moteur afin de ne pas dépasser la vitesse de rotation maximale de fonctionnement de l'outil.

- La vitesse de rotation maximale de fonctionnement et la vitesse périphérique maximale de fonctionnement des meules sur tige sont des valeurs données pour un porte-à-faux de 13 mm. Le porte-à-faux désigne la distance entre l'extrémité de la pince de serrage et l'extrémité de la meule. Lors de l'utilisation d'une meule sur tige avec un porte-à-faux supérieur à 13 mm, par exemple pour l'usinage de trous profonds, réduisez la vitesse de rotation de fonctionnement conformément au Tableau 1. L'utilisation de la meule sur tige à une vitesse de rotation supérieure à la valeur spécifiée peut provoquer sa rupture et entraîner des blessures.

Table 1. Dépassement en fonction de la vitesse

porte-à-faux (mm)	Vitesse de fonctionnement maximale min ⁻¹
20	$N \times 0,5$
25	$N \times 0,3$
50	$N \times 0,1$



N : Vitesse de fonctionnement max. avec un dépassement de 13 mm.

⚠ ATTENTION

- Installez le Contrôleur de manière à ce que le cordon d'alimentation puisse être débranché sans obstacle en cas d'urgence. Installez également le Contrôleur dans un endroit où il ne sera pas exposé à des liquides tels que l'huile de coupe ou l'eau. L'exposition à des liquides peut provoquer un dysfonctionnement, un choc électrique dû à un court-circuit ou un incendie.
- Utilisez le Contrôleur dans un environnement présentant une température ambiante de 10 °C à 40 °C et une humidité de 30 % à 75 %, sans condensation. La condensation peut provoquer un court-circuit ou un choc électrique.
- N'utilisez pas le Contrôleur ni le moteur à proximité de gaz, de liquides ou d'autres matériaux inflammables. Avant utilisation, vérifiez l'absence de tels matériaux dans la zone environnante. L'utilisation à proximité de matériaux inflammables peut provoquer un incendie.
- Ne pas utiliser ce produit à proximité d'équipements générant de fortes interférences électriques, tels que des équipements à haute fréquence, des postes de soudage ou de gros moteurs. Les interférences électriques peuvent provoquer un dysfonctionnement ou une défaillance.
- Avant utilisation, effectuez un essai de fonctionnement de ce produit et vérifiez l'absence de jeu, de vibrations anormales, de bruits anormaux ou d'élévation de température (dégagement de chaleur). Si une anomalie est détectée, arrêtez immédiatement d'utiliser le produit et demandez une réparation.
- Ne pas tourner la bague de verrouillage de l'outil dans le sens OUVERT pendant la rotation du moteur. La rotation de la bague de verrouillage de l'outil peut endommager le moteur ou l'accessoire. Ne pas remplacer l'outil de coupe avant l'arrêt complet du moteur.
- Lors de l'utilisation d'un outil de coupe avec un diamètre extérieur d'arête de coupe de $\varnothing 4$ mm ou plus, réduisez la vitesse de rotation pour diminuer la charge d'usinage.
- Si le circuit de protection se déclenche fréquemment, la charge d'usinage peut être trop élevée. Réduisez la charge d'usinage avant utilisation. Une utilisation continue sous une charge d'usinage élevée peut endommager l'outil de coupe ou entraîner une usure prématurée du moteur et de l'accessoire.
- Veillez à éteindre le Contrôleur avant le nettoyage ou l'inspection périodique.
- Ne jamais lubrifier les roulements du moteur ou de l'accessoire. Les roulements sont pré-graissés et la lubrification peut provoquer un dégagement de chaleur ou une défaillance.
- Retirez et nettoyez la pince au moins une fois par semaine. Le non-nettoyage de la pince peut entraîner l'accumulation de débris à l'intérieur, provoquant un faux-ronde de l'outil de coupe ou une réduction de la force de serrage de la pince.

1 Préface

- Conserver le Contrôleur dans un environnement avec une température de -10 à 50 °C, une humidité de 10 à 85 % HR et une pression atmosphérique de 500 à 1060 hPa. Le conserver également dans un endroit à l'abri de l'air contenant de la poussière, du soufre ou de la salinité.
- Ne serrez pas la pince de serrage si aucun outil de coupe ou outil factice n'est installé. Cela pourrait endommager la pince de serrage ou l'accessoire.

REMARQUE

- Utilisez uniquement le cordon d'alimentation d'origine fourni.
- Laissez un outil de coupe ou une barre d'essai en place même lorsque ce produit n'est pas utilisé.
- Ne pas appuyer sur la surface du panneau de commande avec un objet pointu tel qu'un crayon. Cela risque d'endommager le panneau de commande.
- Avant de mettre hors tension, s'assurer que le moteur est à l'arrêt complet. La mise hors tension pendant la rotation du moteur peut provoquer un dysfonctionnement.
- L'utilisateur est responsable de la gestion de l'utilisation, de la maintenance et de l'inspection périodique de ce produit.

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