

NAKANISHI

Brushless Motor

EM25-5000

OPERATION MANUAL

Thank you for purchasing the Brushless Motor "EM25-5000". The Brushless Motor which can be connected with 50,000mm² spindles, The E2280 CONTROLLER, spindles and Air Line Kit are required to drive this Brushless Motor. Read this and all the associated component Operation Manuals carefully before use. Always keep this Operation Manual in a place where a user can refer to for reference at any time.

1. CAUTIONS FOR HANDLING AND OPERATION

- Read these warnings and cautions carefully and only use in the manner intended.
- These warnings and cautions are intended to avoid potential hazards that could result in personal injury to the operator or damage to the device. These are classified as follows in accordance with the seriousness of the risk.

Class	Degree of Risk
⚠ WARNING	A safety hazard could result in bodily injury or damage to the device if the safety instructions are not properly 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.

⚠ WARNING

- This Brushless Motor is not a hand tool. It is designed to be used on CNC machines or special purpose machines.
- Do not touch the cutting tool while it is running. It is very dangerous.
- Wear safety glasses, dust mask, and use a protective cover around the Brushless Motor whenever you are working with the Brushless Motor.
- Never connect, disconnect or touch the Power Cord or Motor Cord Plug with wet hands. This may cause an electric shock.
- Never operate or handle the Brushless Motor and spindle until you have thoroughly read the Operation Manuals and safe operation has been confirmed.
- To prevent injuries / damages, check the Brushless Motor, spindle and cutting tool for proper condition before using the Brushless Motor and spindle.
- Before connecting the Brushless Motor and spindle, turn the control power off and disconnect the compressed air supply to the CONTROLLER off. Then it is safe to remove the Brushless Motor and spindle.
- Whenever installing a Brushless Motor to a fixed metal base, ensure that the fixed metal base is grounded in order to avoid risk of an electric shock.

⚠ CAUTION

- Do not drop or hit the Brushless Motor, as shock can damage to the internal components.
- When cleaning a Brushless Motor, stop the Brushless Motor and remove debris with a soft brush or a cloth. Do not blow air into the Brushless Motor with compressed air as foreign particles or cutting debris may get into the ball bearing.
- Select suitable products or tools for all applications. Do not exceed the capabilities of the Brushless Motor.
- Do not stop the supplied cooling air to the Brushless Motor during operation of the machine. Removing the air pressure from the Brushless Motor causes a loss of purging, allowing the Brushless Motor to ingest coolant and debris. This will cause damage to the Brushless Motor.
- Stop working immediately when abnormal rotation or unusual vibration are observed. Immediately, please check the content of section "10. TROUBLESHOOTING".
- After installation, repair, initial operation, or long period of non operation, please carry out break-in as follows. Start rotating slowly and over a short period of 15 ~ 20 minutes. Increase speed gradually until Maximum Allowable Motor Rotation Speed.
- Do not disassemble, modify or attempt to repair this Brushless Motor. Additional damage will occur to the internal components. Service must be performed by NSK NAKANISHI or an authorized service center.
- When this Brushless Motor for mass production, please consider the purchase of an additional Brushless Motor to be used as a backup in case of emergency.
- Securely connect the compressor supply connection hose to the Air Line Kit, and connect the air hose to the Air Line Kit, the CONTROLLER and the Brushless Motor to avoid accidental disconnection during use.

2. BASIC PACKAGE

When opening the package, check if it includes all items listed in "Table. 1 Packing List Contents". In the event of any shortage, please contact either NAKANISHI (see the "4. CONTACT US" section) or your local dealer.

Table. 1 Packing List Contents	Brushless Motor (with motor cord)	1 Ppc.	Hose (For Cooling Air)	1 Ppc.	Wrench (22 x 27)	1 Ppc.
						
		Reducer (ø18 - ø4 Conversion Adapter)		Spiral Tube		Operation Manual
		1 Ppc.		1 Ppc.		1 Ppc.

* The quick disconnect card is attached to the EM25-5000 - J4 / J5 / J8.

3. WARRANTY

We provide a limited warranty for our products. We will repair or replace the products if the cause of failure is due to the following manufacturing defects. Please contact us or your local distributor for details.

- Defect in manufacturing.
- Any shortage of components in the package.
- Where damaged components are found when initially opening the package.
(This shall not apply if the damage was caused by the negligence of a customer.)

4. CONTACT US

For any inquiry and/or assistance when purchasing our products, we welcome your questions. If you have any questions about operation, maintenance and repair of the product, please contact us.

● Contact US

- For U.S. Market
Company Name : **NSK America Corp**
Industrial Div.
Business Hours : 8:30am to 17:00pm (CST)
Telephone No. : 800-585-4675
Fax No. : 847-243-7684
Web Address : www.nskamericacorp.com
- For Other Markets
Company Name : **NAKANISHI INC.**
Industrial Div.
Business Hours : 8:30am to 17:00pm
Telephone No. : (410) 289-84-3520
e-mail Address : webmaster@nsk-nakanishi.co.jp

5. FEATURES

- The Brushless Motor housing is made from precision ground, hardened, stainless steel (SUS) with an outside diameter of ø25mm.
- Excellent durability and high reliability are obtained by using a high-speed Brushless Motor, which eliminates the need for brush replacement and frequent maintenance.
- A quick disconnect cord is available for easy Brushless Motor removal (Fig. 1).
- The maximum output is 200W.
- Air-cooling system with a small volume of air (30 l / min) is used to prevent heat buildup and allows long continuous operation.



Fig. 1 Quick Disconnect Cord (EM25-5000 - J4 / J5 / J8)

6. SPECIFICATIONS AND DIMENSIONS

6-1 Specifications

Model	EM25-5000-J4 / EM25-5000-J5 / EM25-5000-J6 / EM25-5000-J7 / EM25-5000-J8
Motor Rotation Speed	1,000 - 50,000min ⁻¹ (rpm)
Applicable CONTROLLER	E2280 CONTROLLER
Motor Cord Length	4m
Air Hose Length	5m
Weight	250g (without Motor Cord)
Noise Level at 1m distance	Less than 70dB (A)
Temperature	0 - 40°C
Operation Environment	MAX75% (No condensation)
Transportation and Storage Environment	-10 - 50°C 500 - 1,000hPa
Atmospheric Pressure	1,000hPa

6-2 Outside View

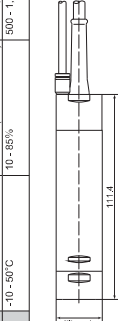


Fig. 2

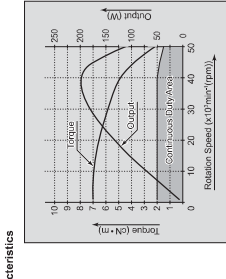


Fig. 3

7. CONNECTION OF MOTOR CORD

⚠ CAUTION

Before connecting the Motor Cord to the Brushless Motor and CONTROLLER, verify the Main Power Switch is turned OFF. If the Motor Cord is connected to the CONTROLLER is ON while connecting the Motor Cord, damage to the CONTROLLER is possible.

- Ensure the Alignment Pin of the Motor Cord Plug is located (12 o'clock) upward.
- Carefully insert the Alignment Pin of Motor Cord Plug into the Alignment Hole on the front of the CONTROLLER.
- Tighten the Connector Nut with doctwrench.
- If you are using only one Brushless Motor, attach the Connector Cap on the unused Motor Connector on the front of the CONTROLLER.

Fig. 4

8. CONNECTION OF THE AIR HOSE AND SETTING OF THE AIR PRESSURE

⚠ CAUTION

- When not using NAKANISHI Air Line Kit, make sure that the incoming air supply is dry, clean and properly regulated.
- When using NAKANISHI Air Line Kit, the single Motor to the CONTROLLER be same to attach the Connector Cap (CONTROLLER prevention. Failure to do so may cause ingest of foreign particles into the CONTROLLER, or motor rotation problems by the air leaking.

8-1 One Motor Spindle is connected to the CONTROLLER (Fig. 5)

- Insert the provided ø6mm Air Hose with Filter from the front of the CONTROLLER into the Air Input Joint on the front of the CONTROLLER.
- Insert one end of the provided ø4mm cooling Air Hose into the back of the motor.
- Insert the other end of the ø4mm cooling Air Hose into the Air Output Joint on the front of the CONTROLLER using the provided Reducer (ø6mm - ø4mm Conversion Adapter).
- Regulate air pressure between 0.25 ~ 0.3MPa (36.3 ~ 43.5psi).



Fig. 5

8-2 Two Motor Spindles are connected to the CONTROLLER (Fig. 6)

- Insert the provided ø6mm Air Hose with Filter from the Air Line Kit (AL-CL) into the Air Input Joint on the front of the CONTROLLER.
- Insert the Air Branching Joint (standard accessories) to the Air Output Joint.
- Insert one end of the ø4mm cooling Air Hoses (motor cord's standard accessories) into the Air Input Joint on the back of the motor.
- Insert the other end of the ø4mm cooling Air Hoses into the Air Output Joint on the back of the motor.
- Regulate air pressure between 0.25 ~ 0.3MPa (36.3 ~ 43.5psi).

Fig. 6

9. CONNECTION OF THE MOTOR TO THE SPINDLE

⚠ CAUTION

- Make sure your hands and all interlocking parts of the spindle and the Brushless Motor are clean before connecting the Brushless Motor to the spindle. This is critical in preventing contaminants from entering the Brushless Motor or the spindle.
- The provided spindles were designed to be used with (1) drive brushless motors and speed reducers (Fig. 7).

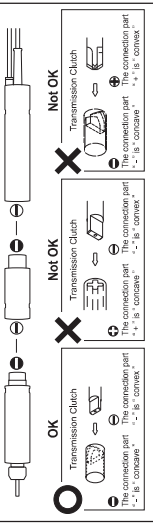


Fig. 7

Align the thread at the left end of the Brushless Motor and the rear of the spindle, and turn the spindle clockwise. If the drive shaft of the Brushless Motor does not engage properly to the drive dog on the spindle, it may only turn approximately two threads before stopping. DO NOT FORCE THE TOGETHER. Loosen the spindle shaft by hand then re-tighten. The drive shaft and the drive dog must be fully engaged. When fully engaged, secure the spindle and Brushless Motor using the provided 22mm wrench (Fig. 8).

Fig. 8

10. TROUBLESHOOTING

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

Triable	Cause	Prevention / Remedial Action
Brushless Motor does not rotate.	Power is not supplied.	1. Make sure to turn the Main Power Switch on the CONTROLLER. 2. Insert the power cord connector correctly into the Main Power Inlet with Power Supply Fuses of the CONTROLLER. 3. Check if a fuse is blown.
	Motor Cord is not connected to the Motor and CONTROLLER.	1. Make sure Motor Cord connects to the Motor and CONTROLLER. 2. Start with the Start / Stop Button (START / STOP) or set the Control Button (CTR) on the Control Panel to Auto mode.
	Start with an External Command Signal or set the Control Button (CTR) on the Control Panel to Manual mode (When Start with an External Command Signal. (Refer to "16-1 (1) Details of External Input / Output Connector A / I Signal Table, 6 Pin No. 14" of the E2280 CONTROLLER Operation Manual).	1. Set the External Command Signal or set the Control Button (CTR) on the Control Panel to Manual mode (When Start with an External Command Signal. (Refer to "16-1 (1) Details of External Input / Output Connector A / I Signal Table, 6 Pin No. 14" of the E2280 CONTROLLER Operation Manual).
	Emergency Stop Signal is "OFF" (Open).	1. Check the Emergency Stop Signal of the E2280 CONTROLLER Operation Manual.
	An Error has occurred (Error LED is lit).	1. Check the "17-3 Reading System after Error Codes Table, 9" of the E2280 CONTROLLER Operation Manual. 2. Error will not be released until cause of the error has been removed.
	Low air pressure.	1. Adjust to the air pressure (0.25 ~ 0.3MPa (36.3 ~ 43.5psi)).
Cannot set the increase or decrease of the motor rotation speed.	When using Motor No. 1: Motor Fixed Speed is set in the (P) or (M) parameter.	1. Cancel the parameters for "Fixed Motor Speed Setting" and "Maximum Motor Speed Setting". 2. When using Motor No. 2: Motor Fixed Speed is set in the (P) or (M) parameter.
Cannot set the motor speed to its maximum allowable motor rotation speed.	Either the required speed value is higher than the maximum rotation speed of the motor, or the upper limit of the rotation speed has been set in parameter (P).	1. Set the Motor Rotation Speed to a value less than the Motor Rotation Speed set in Parameter (P) or (M). (Refer to "16-1 (4) Setting Maximum Motor No. 1 Speed" or "18-4 (4) Setting Maximum Motor No. 2 Speed" of the E2280 CONTROLLER Operation Manual.)
	Air Input Monitoring Overhaul is set in the (P) or (M) parameter.	1. Check the setting of parameter. (Refer to "16-4 (4) Setting Air Input Monitoring Overhaul" of the E2280 CONTROLLER Operation Manual.)
Overheating during rotation.	Cutting debris has contaminated the ball bearings, and the ball bearings are damaged.	1. Replace the ball bearings. (Return to NAKANISHI dealer service.)
	Check air hose connection and air pressure.	1. Check air hose connection and air pressure.

Refer to the spindle and the E2280 / E2598 CONTROLLER Operation Manuals.

11. DISPOSAL OF THE BRUSHLESS MOTOR

When disposal of a Brushless Motor is necessary, follow the instructions from your local government agency for proper disposal of industrial components.