

## Brushless Motor

# EM-3060J · EM-3060J-2M EM-3030J · EM-3030J-2M

## OPERATION MANUAL

OM-K0561E 002

Thank you for purchasing Brushless Motor " EM - 3060J · EM - 3060J - 2M · EM - 3030J · EM - 3030J - 2M ". The E3000 CONTROLLER, Spindle, Motor Cord 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
<b>⚠ WARNING</b>	A safety hazard could result in bodily injury or damage to the device if the safety instructions are not properly followed.
<b>⚠ CAUTION</b>	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 the Brushless Motor is rotating.
- Never connect, disconnect or touch the Power Cord Plug or Motor Cord Plug with wet hands. This may cause an electric shock.
- Never operate or handle the Brushless Motor until you have thoroughly read the Operation Manuals and safe operation has been confirmed.
  - To prevent injuries / damages, check the Brushless Motor and cutting tool for proper installation, before operating the Brushless Motor.
  - Before disconnecting the Brushless Motor, always turn the control power off and turn the compressed air supply to the CONTROLLER off. Then it is safe to remove the Brushless Motor.
- When installing a Brushless Motor to a fixed base, make sure the fixed base is grounded in order to avoid the risk of an electric shock.

#### ⚠ CAUTION

- Do not drop or hit this Brushless Motor, as shock can damage to the internal components.
- Select suitable products or tools for all applications. Do not exceed the capabilities of the Brushless Motor or tools.
- Carefully direct coolant spray to the tool. Do not spray directly on the Brushless Motor body.
- Stop working immediately when abnormal rotation or unusual vibration are observed. Immediately, please check the content of section " 6 TROUBLESHOOTING ".
- After installation, repair, initial operation, or long periods of non operation, please carry out break-in as follow. Start rotating slowly and over a short period of 15 - 20minutes, increase speed gradually until allowable maximum 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.
- Please use this product below a permissible rotational speed of the spindle and the reducer.
- When using this Brushless Motor for mass production, please consider the purchase of an additional Brushless Motor to be used as a back-up in case of emergency.

### 2. FEATURES

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

### 3. SPECIFICATIONS AND DIMENSIONS

#### 3 - 1 Specifications

Model	EM - 3060J	EM - 3060J - 2M	EM - 3030J	EM - 3030J - 2M
Cord with Quick Disconnect	0.3m	2.0m	0.3m	2.0m
Maximum Motor Rotation Speed	60,000min <sup>-1</sup> (rpm)		32,000min <sup>-1</sup> (rpm)	
Max. Output	350W		280W	
Weight	360g (without Motor Cord)			
Noise Level at 1m distance	Less than 70dB (A)			

	Temperature	Humidity	Atmospheric Pressure
Operation Environment	0 - 40°C	MAX.75% (No condensation)	700 - 1,060hPa
Transportation and Storage Environment	-10 - 50°C	10 - 85%	500 - 1,060hPa

#### Standard Accessories

- Wrench (22 × 27) · · · 1pc.
- Operation Manual · · · 1set.

<Option>

Motor Cord	EMCD - 3000J - □ M	Cord Length : 3m, 3.7m, 5.7m, 7.7m ( The Air Hose ( $\phi$ 4mm) of the same length is attached.)
*Note		

\*Note : Motor Cord is sold separately. Please select the suitable motor cord length for your application.

#### ⚠ CAUTION (Only for EM - 3030J / EM - 3030J - 2M)

- Do not exceed the Maximum Motor Rotation Speed (Refer to " 3 - 1 Specifications " ).
- This Motor Cord <EMCD - 3000J - 8M> is never use for Brushless Motor <EM - 3060J - 2M and EM - 3030J - 2M>.

#### 3 - 2 Outside View

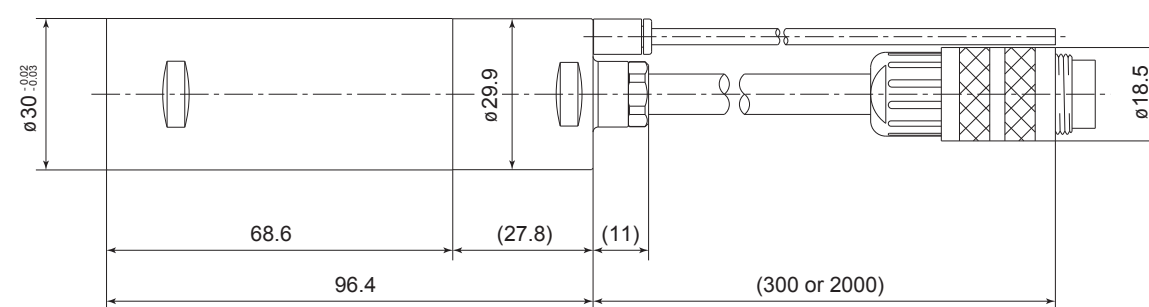


Fig. 1

#### 3 - 3 Torque Characteristics

EM - 3060J / EM - 3060J - 2M

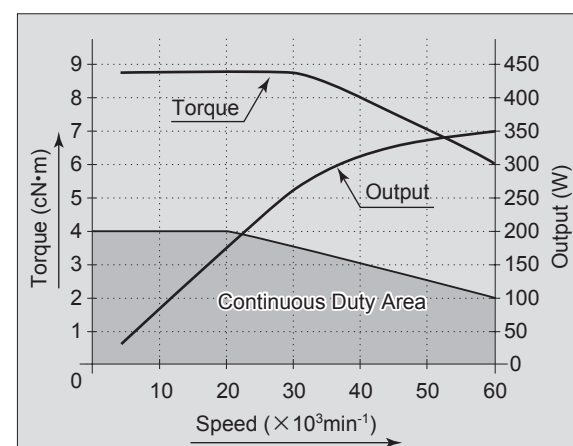


Fig. 2

EM - 3030J / EM - 3030J - 2M

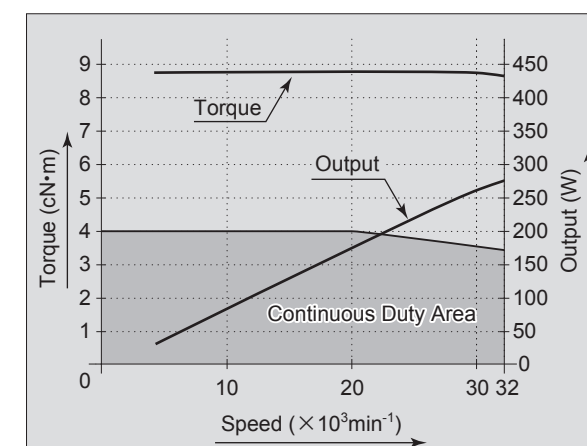


Fig. 3

## 4. CONNECTION OF MOTOR CORD

### ⚠ CAUTION

- Before connecting to the Motor Cord to the Motor and CONTROLLER, verify the Main Power Switch in the CONTROLLER is turned OFF. If the Main Power Switch on the CONTROLLER is ON while connecting the Motor Cord, damage to the CONTROLLER is possible.
- Install the protective cover (Protective Cover etc.) to prevent damage or contamination to the Motor Cord Plug when not in use.

- ① Remove the Protective Cover of the Motor Cord.

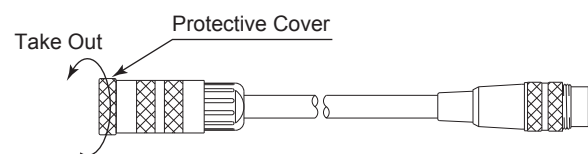


Fig. 4

- ② Carefully insert the alignment pin into the alignment hole and push straight into the Connector of the Motor Cord.

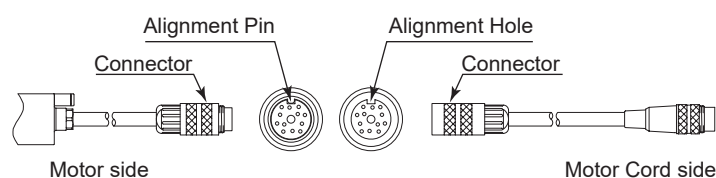


Fig. 5

- ③ Tighten the Connector Nut with clockwise.

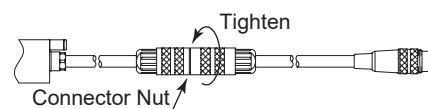


Fig. 6

- ④ Remove the protective air inlet Quick Disconnect Cover.

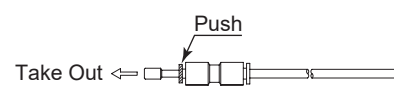


Fig. 7

- ⑤ Insert the provided air hose.

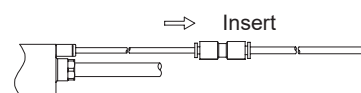


Fig. 8

## 5. CONNECTION OF THE BRUSHLESS MOTOR TO THE SPINDLE

### ⚠ CAUTION

Make sure your hands and all interlocking parts of the spindle and Brushless Motor are clean before connecting the Brushless Motor to the spindle. This is critical to preventing contaminants from entering the Brushless Motor or spindle.

Align the thread on the front 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 THEM TOGETHER. Loosen the spindle from the Brushless Motor, rotate the spindle shaft by hand then re-try. The drive shaft and the drive dog must be fully engaged. When fully engaged, secure the Brushless Motor and spindle using the provided 27mm wrench. (Fig. 9)

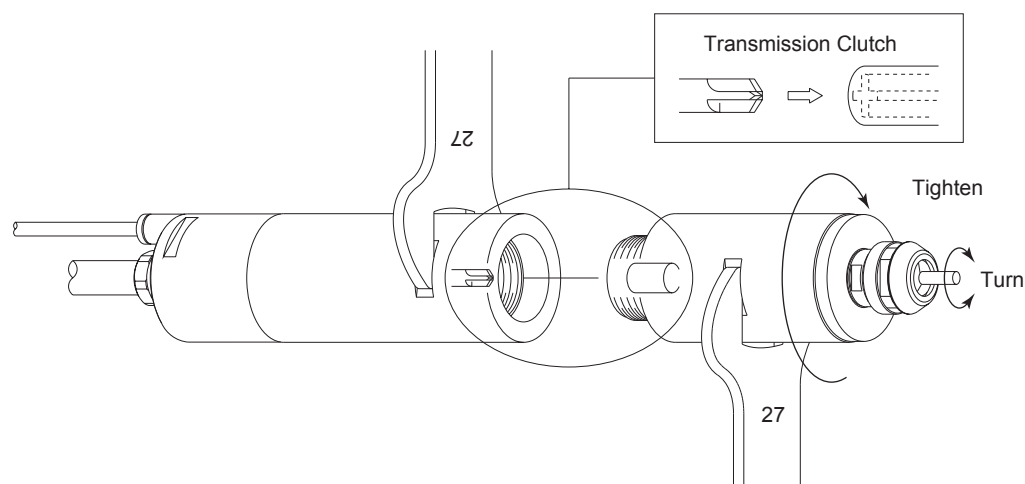


Fig. 9

## 6. TROUBLESHOOTING

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

Trouble	Cause	Inspection / Corrective Action
Motor does not run.	Power is not supplied.	<ul style="list-style-type: none"> <li>• Make sure to turn ON the Main Power Switch on the front of the CONTROLLER.</li> <li>• Insert the Power Cord Plug correctly into the Main Power Inlet with Power Supply Fuses of the CONTROLLER.</li> <li>• Check if a fuse is blown.</li> </ul>
	Motor Cord Plug is not connected to the Motor, CONTROLLER or SELECTOR.	Connect the Motor Cord Plug correctly to the Motor and CONTROLLER.
	Control Button (CTRL) is set to Manual mode but trying to start with an External Command Signal through Input / Output Connector A.	Start with the Start / Stop Button (START/STOP), or set the Control Button (CTRL) on the Control Panel to Auto mode.
	Control Button (CTRL) is set to Auto mode but trying to manually start with the Start Button (START/STOP) on the Control Panel.	Start with an External Command Signal or set the Control Button on the Control Panel to Manual mode.
	Emergency Stop Signal is OFF (Open).	Emergency Stop Signal is ON (Closed).
	An Error has occurred. (Error LED is lit.)	Check and correct the source of the Error Code.
Can not set the increase or decrease of the motor rotation speed.	Low air pressure.	Adjust to the air pressure 0.25 – 0.3MPa.
	Motor Fixed Speed is set in the $P3$ parameter.	Release parameter $P3$ .
Can not set the motor speed to its maximum allowable speed.	Either trying to set the value, more than the rotation speed of the connected motor, or the upper limit of the rotation speed is set by parameter $P4$ .	Set the Maximum Rotation Speed to not less than desired Motor Rotation Speed by parameter $P4$ .
	Air Input Monitoring Override is set in the $P7$ parameter to ON and the motor's maximum speed has been limited to 30,000 min <sup>-1</sup> .	Check the setting of parameter $P7$ .
A blinking dot appears on Digital Speed Indicator. Cannot set the desired rotation speed.	Gear Ratio is set to a value other than "1.0".	Check the setting of Gear Ratio.

Refer to the spindle and the E3000 CONTROLLER Operation Manuals.

## 7. 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.

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