

Brushless Motor

EM-401 · EM-405

EM-501 · EM-505

OPERATION MANUAL

OM-K0304E Rev.4

Thank you for purchasing E500Z brushless motor, EM-401, EM-405, EM-501, and EM-505. The EM-401, EM-405 can be connected with 40,000min⁻¹ spindles, and the EM-501, EM-505 can be connected with 50,000min⁻¹. Spindles and control unit are required to use these brushless motors. Read this and E500Z operation manual carefully before use.

1 CAUTIONS IN HANDLING

- Read these cautions carefully to correctly follow the intended use.
 - Safety instructions are intended to avoid potential hazards that could result in personal injuries or damages to the device.
- Safety instructions are classified as follows in accordance with the seriousness of the risk.

| Class | Degree of Risk |
|-----------|--|
| ⚠ WARNING | Existence of a hazard that could result in bodily injury or damage of the device, if the safety instructions are not followed. |
| ⚠ CAUTION | Possibility of a hazard that could result in light or middle degree of bodily injury or damage of device, if the safety instructions are not followed. |

⚠ WARNING

- ① Brushless motors (EM-401, EM-405, EM-501, and EM-505) are not designed as hand tools. Install them on a machine like a machine tool or special purpose machine.
- ② Do not touch the spindle during rotation.

⚠ CAUTION

- ① Wear safety glasses, dust mask and hearing protection and use a protective cover around the spindle whenever spindle is operating.
- ② Do not drop or hit the spindle because the shock can damage internal components.

2 FEATURES

- ① The outside housing is made from precision ground stainless steel (SUS416) and its outside diameter is $\phi 30.0$ mm.
- ② High-speed brushless motor does not require messy brush replacement.
- ③ Can be used at a high output power as 270W.
- ④ Air-cooling system with a small volume of air (30 l/min) is used to prevent heat buildup and allows long continuous operation.
- ⑤ An intermediate motor cord is equipped with EM-405, EM-505 to facilitate cord connection.
- ⑥ Make a choice from power source cord length 5m · 6m · 8m.

※ Motor Cord with Quick Disconnect

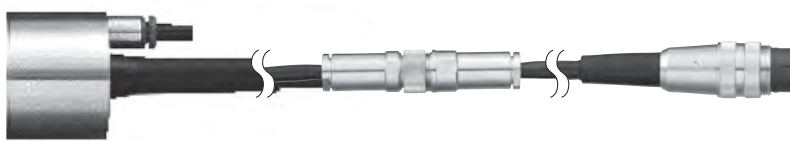


Fig. 1

3 DIMENSIONS AND SPECIFICATIONS

| | |
|------------------|--|
| Speed | 2,000-40,000 min ⁻¹ (EM-401, EM-405) 2,000-50,000 min ⁻¹ (EM-501, EM-505) |
| Max. Output | 270 W |
| Cord | Length 4 m |
| Air Coolant Hose | Length 4 m |
| Weight | 780 g (inc.cord) |

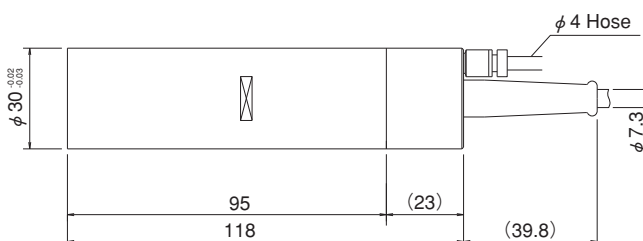


Fig. 2

Accessories

- EM-401 · EM-501····· Motor Cord (provided with motor), Air Coolant Hose ($\phi 4$ mm)
Reducer ($\phi 4/\phi 6$ Adapter), Spanner Wrench (22×27)
- EM-405 · EM-505····· Motor Cord with Quick Disconnect (provided with motor)
Air Coolant Hose ($\phi 4$ mm), Reducer ($\phi 4/\phi 6$ Adapter)
Spanner Wrench (22×27)

Option

- Power source cord····· Length 5m · 6m · 8m

4 TORQUE AND OUTPUT POWER CHARACTERISTIC GRAPH

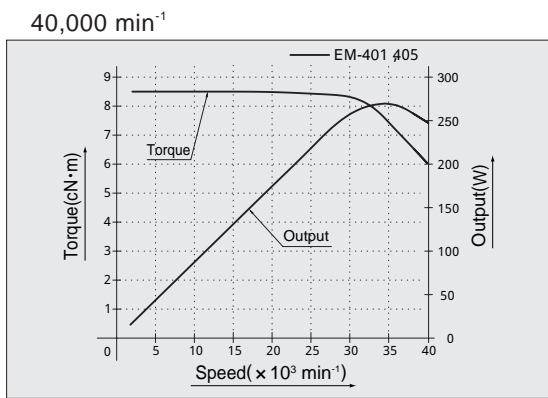


Fig. 3

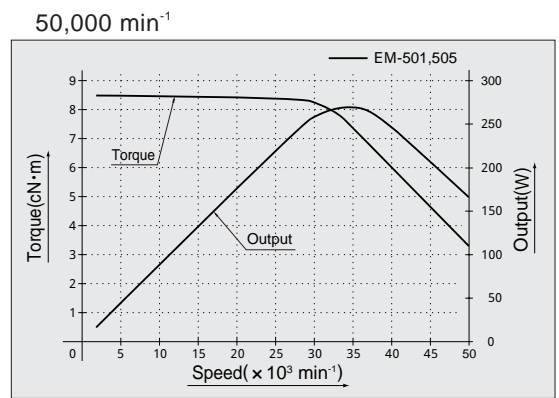


Fig. 4

5 CONNECTION OF MOTOR CORD AND AIR HOSE

Connect the motor cord plug to Connector for Motor Cord at the back of the control unit (NE147) and fasten with the cord nut. Connect 4 air hose of motor to Air Inlet Joint ② by using provided reducer.

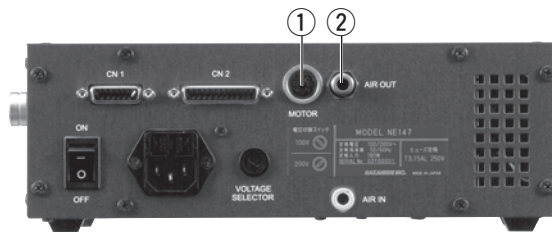


Fig. 5

6 CONNECTION OF SPINDLE

Align the threads on the front end of the motor (EM-401, EM-405, EM-501, EM-505) and the rear end of the spindle, and turn the spindle clockwise. If the drive shaft of the motor does not engage the drive dog on the spindle, you may turn it about 2 turns. DO NOT FORCE. Turn the spindle back a few threads, rotate the cutting tool by hand to engage the drive shaft and the drive dog, and make the final turns with spanner wrench (22 x 27)



CAUTION

Clean the hands and the connecting parts, before connecting the spindle to the motor, to prevent entry of debris into the motor and spindle.

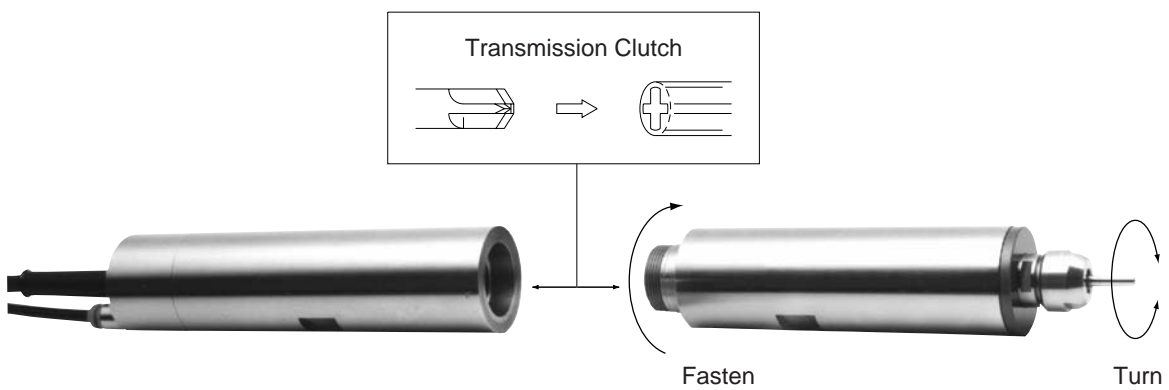


Fig. 6

7 TROUBLESHOOTING

When trouble is found, please check the following items before asking for repair. (Also read the operation manual for E500Z.)

| Trouble | Check Items | Cause | Inspect / Corrective Action | | |
|--|--|---|--|---|--|
| Motor Does Not Run. Power Source Lamp will flash. | Even if power source is put on, power source lamp will not flash. | No voltage in Power Source Line. Power Source Plug is disconnected or not connected firmly. | Check if voltage in outlet by Tester. Insert Power Source Plug into outlet with voltage firmly. Check if insert into the side of unit too. | | |
| | | Fuse is short. | Refer to mentioned "8 Change Fuse", check if fuse (250V-T3.15AL) is short. Even if one fuse is short, need to change another fuse together. | | |
| | | Because over load is taken repeatedly, Thermal Protector is and Electric Current is cut. | Check if heat is gone up at the bottom of unit. If so, the cause may be Thermal Protector working. After leaving for 20min-1h, recover automatically if thermal is down. | | |
| | When Start Switch is put on, motor can't rotate. At AUTO mode, don't start to rotate. | Error Lamp flash to work. After releasing, Error Lamp is not lightened when motor is OFF, but this will flash again when motor is ON. | | If E1, E8, EH flash when error occurs, solve the cause of error, checking if any conditions are concerned. | |
| | | | Error Lamp flash to work, but can't release flashing. | If E3, E4, E7, EA, EE is displayed, can't release each errors after solving error causes. If E4 is displayed, be careful to release because can't release after thermal of radiator will be down. | |
| | | Setting at AUTO mode. | Not Rotate when putting ON. | No voltage (DC24V) in ON Signal. | Set to supply DC24V to ON Signal. |
| | | | Can't Rotate in reverse. | No voltage (DC24V) in Reversed Signal. | |
| | | | Can't control external speed. | No voltage to control external speed. | Check if DC0-10V between Pin10 and Pin23 in CN2. If no voltage, any error may be not concerned with the unit. |
| | | | Can't release error. | EA Error. | EA Error can't be released by START switch of motor. After Motor Signal is put off at AUTO mode, reset to put on power source. |
| EE Error. | When not using external control, and Pin1/Pin9 is not short, use after short because EE error is not released. | | | | |