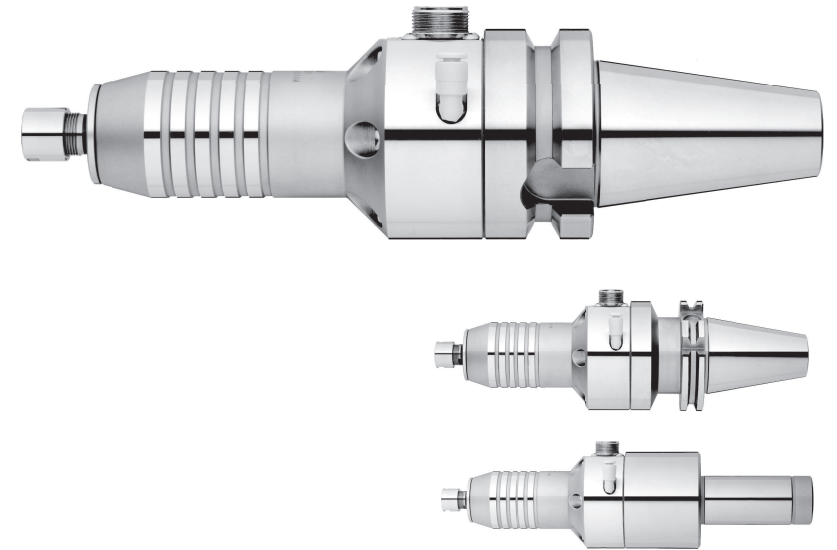




01 Series

MOTOR SPINDLE MZ01

OPERATION MANUAL



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●Specifications and configurations are subject to change without notice.

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 **MINITOR CO., LTD.** JAPAN



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Thank you for buying the SFIDA 01 series Motor Spindle MZ01. This device is a motor spindle for the machine tool usable to machining grinding, a small-diameter end mill and a small-diameter drill etc. When using this device, a Control Pack is necessary. Read this Operation Manual and Operation Manual for the Machining Center, etc. to understand all of its functions. Keep this operation manual in a safe place and read it when required.

1 Safety Precautions

This “Safety Precautions” indicates the important instructions for preventing accidents. Please read the instructions before use and use the machine properly. In “Safety Precautions,” harm or damage arising by improper use are classified into two types: “Warning” and “Caution.” In this manual, symbols are used to highlight warnings and cautions for you to read so that accidents can be prevented. The meanings of these symbols are as follows:

| | |
|--|---|
|  Warning | If users ignore this symbol and the matters appearing in this manual, serious injury or death by fire or electric shock could result. |
|  Caution | If users ignore this symbol and the matters appearing in this manual, bodily injury and damage to the equipment could result. |

Warning

- Attach this device to the machine tool and dedicated-machine and use it. Do not use as a hand tool.
- Do not rotate principal axis of Machining Center when attaching this device to the principal axis.
- Do not touch any rotor of SENTAN tool or collets because it is dangerous during operation.
- Wear safety protective glasses to protect eyes and an anti-dust mask to prevent inhalation of debris.
- Do not attempt to modify or disassemble the machine since this causes serious loss in performance and safety; otherwise, fire and electric shock could result.

Caution

- Do not drop this device, and do not hit or make any impact on this device. It causes failures such as rotation failure, generation of heat or bodily injury, etc.
- Do not use under the condition that powdered dust or chips have stuck to the body or the chuck part of this device. It will cause core deflection or damage to the product or the chuck.
- When irregular rotation or abnormal vibration has occurred during operation, stop work immediately.
- When reusing this device after having rested for a long time, operate it after a proper running-in. Moreover, operate and raise rotation from low-speed rotation gradually so that the highest rotation can be obtained within 15~20 min. and check whether no unusual amount of heat or abnormal noise occurs.
- Do not apply a load more than is necessary. It will cause tool breakage or slipping.
- Use SENTAN tool in proper speed of rotation (less than speed recommended by the manufacturer). When maximum allowable speed is exceeded, it will cause breakage, deflection and failure, etc.
- Clean the shank of the tool to be equipped, since debris causes core deflection when entering the chuck.
- The use of SENTAN tool not recommended by the appliance manufacturer may cause hazards. Do not use poor-quality tools such as tools with damage, cracks, check and shake etc. since this will cause an imbalance and serious core deflection, etc.
- Be sure to carry out pre-operation check everyday and also check for any damage to the SENTAN

2 Equipment Features

- Maximum Speed of Rotation 60,000min⁻¹
This motor spindle of 01 series realizes the maximum speed of rotation at 60,000min⁻¹ through use of a high performance brushless motor, and ceramic angular bearings.
- Spindle Accuracy
Accuracy of the main shaft is within 1μm at tapered section. It is suitable for machining high accuracy topography.
- High Rigidity
The body of the spindle is stainless steel material that has gone under hardening treatment for increased durability.
- Air-Cooling Type
For cooling the spindle, the burner cylinder cooling system is utilized. It prevents heat generation of the motor and allowing prolonged use. Cleanliness of the bearings-part was improved by this forced air-cooling system.
- Rustproof Tool Holder
The holder section had rust proof treatment, it prevent tarnishing such as fretting on taper. Also it is safe with water-soluble coolant.
- Others
Adopting a high performance brushless motor eliminates the need to exchange the brush. We have wide variety of chucks.

3 Specifications and Dimensions

3-1 Specifications

| Model | MZ01 | |
|--------------------------|-------------------------|---|
| Allowable Rotation Speed | 60,000min ⁻¹ | Effective working range is not less than 5,000min ⁻¹ . Continuous duty not more than 50,000min ⁻¹ is recommended. |
| Spindle Accuracy | Within 1 μm | |

Accessories List (Confirm after unsealing)

| | | | |
|----------------------------------|---------|---------------------------|--------|
| • Motor spindle main body (MZ01) | 1piece | • Air hose Φ4x4m (AH4-40) | 1piece |
| • Chuck nut (MCN1) | 1piece | • Operation Manual | 1piece |
| • Wrench (MSP1) | 2pieces | | |

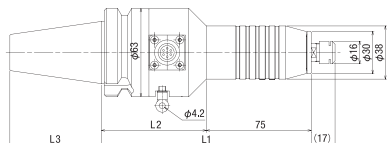
Optional

- Motor cord 3m (MKD-30), 4m (MKD-40), 6m (MKD-60), 8m (MKD-80)
- Collets chuck : every 0.5mm from 1.0mmφ to 6.0mmφ (0.2Φ - 1.0Φ can prepare)

※ Motor cord and collets chuck are not included in this device.
Please order upon selecting appropriate sizes for use.

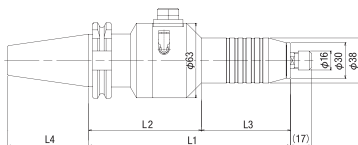
3-2 Dimension of External Appearance

• BT shank



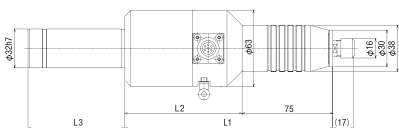
| Product Code | Dimension (mm) | | | Weight (kg) |
|--------------|----------------|----|-------|-------------|
| | L1 | L2 | L3 | |
| MZ01-BT30 | 165 | 90 | 48 | 2.1 |
| MZ01-BT40 | 150 | 75 | 65.4 | 2.2 |
| MZ01-BT50 | 160 | 85 | 101.8 | 4.8 |

• SK shank



| Product Code | Dimension (mm) | | | | Weight (kg) |
|--------------|----------------|----|----|-------|-------------|
| | L1 | L2 | L3 | L4 | |
| MZ01-SK40 | 170 | 95 | 75 | 68.4 | 2.3 |
| MZ01-SK50 | 160 | 85 | 75 | 101.8 | 4.9 |

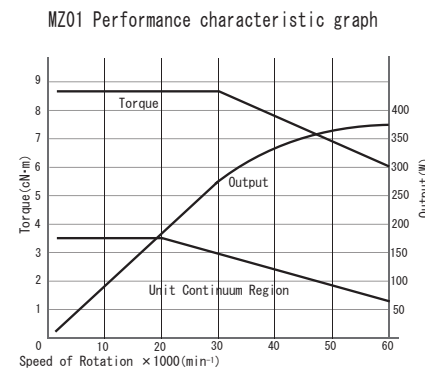
• ST shank



| Product Code | Dimension (mm) | | | Weight (kg) |
|--------------|----------------|----|----|-------------|
| | L1 | L2 | L3 | |
| MZ01-ST32 | 172 | 97 | 60 | 2.8 |

• Fig-1

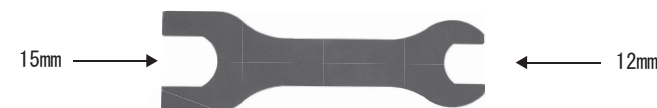
3-3 Torque Output Characteristics



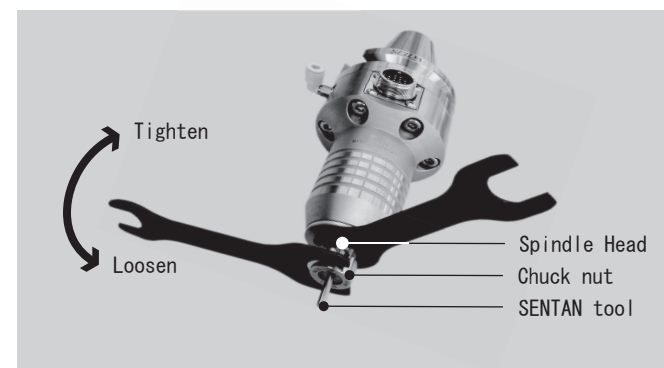
• Fig-2

4 SENTAN Tool Replacement Methods

- ① Hook an attached 12mm wrench to the spindle-head and fix it.
- ② Hook an attached 15mm wrench to the groove of Chuck nut, and turn it counterclockwise for more than 1.5 rotations, loosen the collets chuck and then remove SENTAN tool.
- ③ Insert the SENTAN tool, turn the Chuck nut to clockwise and then fix it with a wrench.



• Fig-3



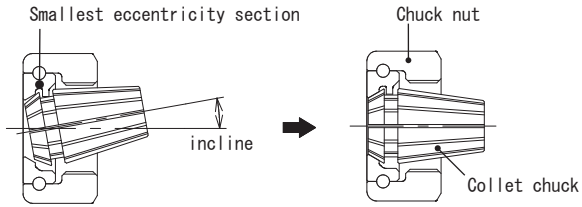
• Fig-4

⚠ Caution

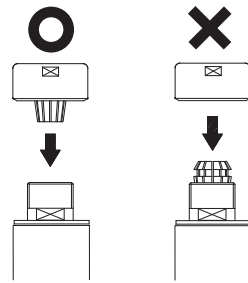
Be sure to confirm that the spindle head is being stopped when the SENTAN tool is replaced.

5 Removal and Mounting of the Collets chuck

- ① Wipe out the chuck nuts.
- ② Incline collet chuck and hook to the smallest eccentricity section in the chuck nut. (Fig.-5)
- ③ Assemble chuck nut to collet chuck correctly, then assemble to the spindle axis.



• Fig-5



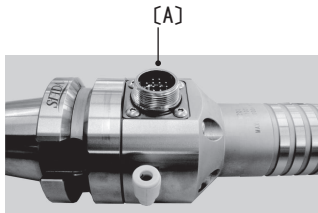
• Fig-6

! Caution

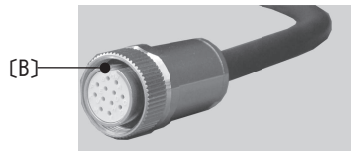
Do not assemble collet chuck to spindle axis before assemble to chuck nut. It will cause breakage accident of principal axis taper and collet chuck. (Fig.-6)

6 Connection Methods of Motor Cord

- ① Connect spindle and connection cable with fitting concave groove of connector [A] (Fig.-7) and and convex of connection cable [B] (Fig.-8).

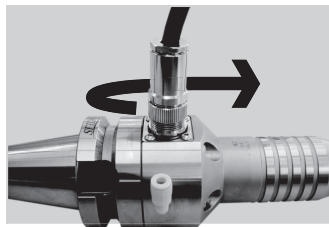


• Fig-7



• Fig-8

- ② Turn knurling parts clockwise and tighten firmly. (Fig.-9)



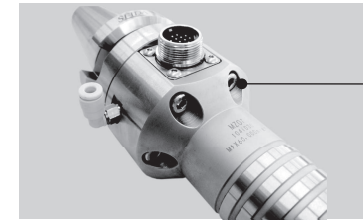
• Fig-9

! Caution

Be sure to turn off the Main switch in case of code connection.

7 Notes of Tool Holder

Spindle and holder had adjusted before its assembled. Do not loose assembling bolts. (Fig-10)



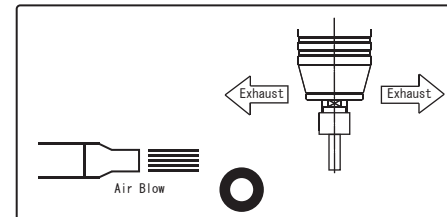
assembling bolts

• Fig-10

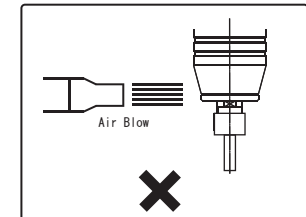
8 Notes of cleaning

This product adopts the labyrinth seal structure and the air purge structure that is noncontact because of the high-speed rotation spindle. This structure hits in the centrifugal force, flies the cutting fluid and the cutting rubbish while rotating, and interrupts the invasion of the foreign body. Moreover, the invasion of the foreign body and the cutting fluid is interrupted by using air for cooling the spindle while stopping. However, it causes the breakdown at the early stage by the following act.

- Air is sprayed directly on the space of the seal due to air cancer etc. (fig-12)
- The cutting oil that turns the heat is sprinkled directly on the space of the seal.



• Fig-11



• Fig-12

! Caution

Please do the point part of the spindle when you blow out air with the spindle cooling air thrown. (Refer to fig-11)

9 Cause of Failure and Trouble shooting

| Failure Condition | Cause | Countermeasures |
|--|--|--------------------------------------|
| Core deflection of the SENTAN tool is large. | Dirt & chips have accumulated in the collets chuck. | Remove dirt and chips, and clean up. |
| | Dirt & chips have accumulated in the clamp-nut. | |
| | Dirt & chips have accumulated in the spindle tape portion. | Exchange the tool. |
| | The tool has bent. | |
| Unusual vibration, heat generation, and noise occur during rotation. | Bearings are worn and damaged. | Send it to our company. |
| | The tool has bent. | Exchange the tool. |
| | Bearings are worn and damaged. | Send it to our company. |