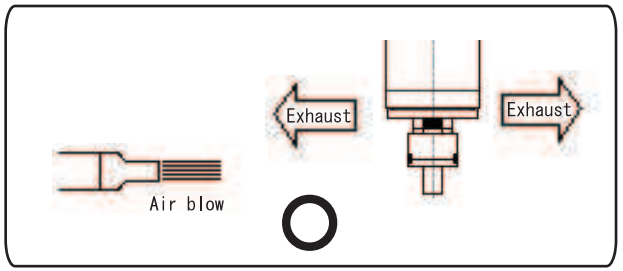
8 Notes of cleaning

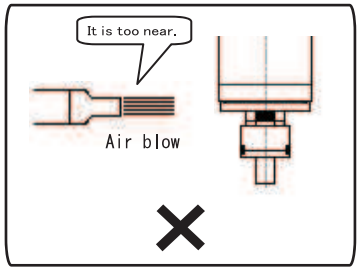
This product adopts the labyrinth seal structure and the air purge structure that is noncontact because of the high-speed rotation spindle.
This structure hits in the centrifugal force, flies the cutting fluid and the cutting rubbish while rotating,and interrupts the invasion of the foreign body.
Moreover, 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.

①Air is sprayed directly on the space of the seal due to air cancer etc. (fig-13)
②The cutting oil that turns the heat is sprinkled directly on the space of the seal.

> **Caution**
> Please do the point part of the spindle when you blow out air with the spindle cooling air thrown.(Refer to fig-12)



・fig-12



・fig-13

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2023.06.30 IME-MS01

SFIDA®

01 Series

MOTOR SPINDLE
MS01

OPERATION MANUAL

MINITOR CO.,LTD. JAPAN

Contents

Thank you for buying the SFIDA 01 series Motor Spindle MS01. 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 robot/NC machine tools, 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 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 installing this device, be careful not to tighten the bolt much, as it causes failures such as rotation failure, generation of heat or bodily injury, etc.
- 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 tool, chuck and chuck-nut, etc.

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.

●Others
Exchange of the motor and equipping to the machine can be easily performed by adopting the intermediate connector to the rear-end of the motor. Adopting a high performance brushless motor eliminates the need to exchange the brush.

3 Specifications and Dimensions

3-1 Specifications

Accessories List (Confirm after unsealing)

- Motor spindle main body (MS01)
- Chuck nut (MCN1)
- Wrench 1set:2pieces (MSP1)
- Air hose Φ4x4m (AH4-40)
- Operation Manual

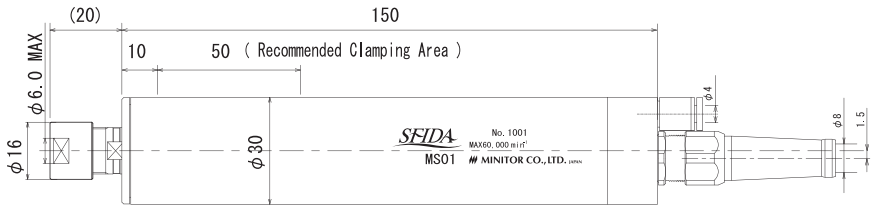
Optional

- 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.

Model	MS01	
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	
Contour	30mmϕ	
Gravity	696g (including the intermediate connector)	

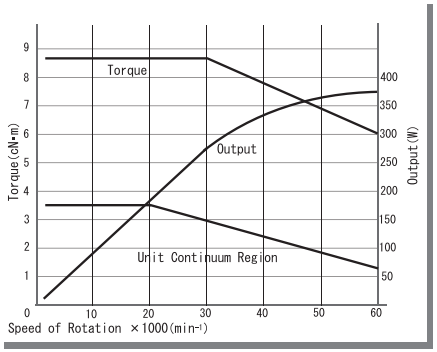
3-2 Dimension of External Appearance



▪ Fig-1

3-3 Torque Output Characteristics

MS01 Performance characteristic graph



▪ Fig-2

4 SENTAN Tool Replacement Methods

① Hook an attached 12mm wrench to the spindle-head and fix it.

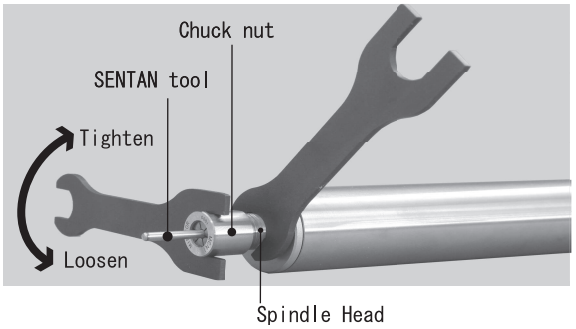
② Hook an attached 15mm wrench to the groove of Chuck nut, and turn it counterclockwise for more than 1.5 rotations, loosen the collets chuck and then remove SENTAN tool.

(A Chuck nut shall be loosened after turning about one rotation. Pull the collets chuck out by the rest about 0.5 rotation.)

※ In case of less rotations, the collets is not pulled out. In that case, carry out mounting the Chuck nut again and take the same procedure as ②.)

③ Insert the SENTAN tool, turn the Chuck nut to clockwise and then fix it with a wrench.

▪ Fig-3



▪ Fig-4

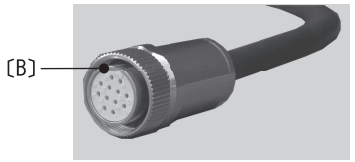
Caution

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

5 Connection Methods of Motor Cord

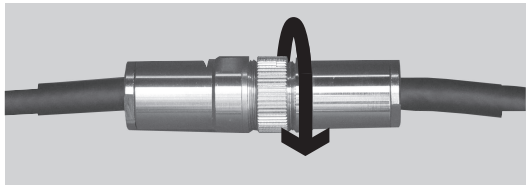
① Join [A] (Fig.-5) 凹groove of the connector connected from the motor-end with [B] (Fig.-6) 凸 protrusions of the motor cord and insert into each other.

・Fig-5



・Fig-6

② Turn knurlizing parts clockwise and tighten firmly. (Fig.-7)



・Fig-7

Caution

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

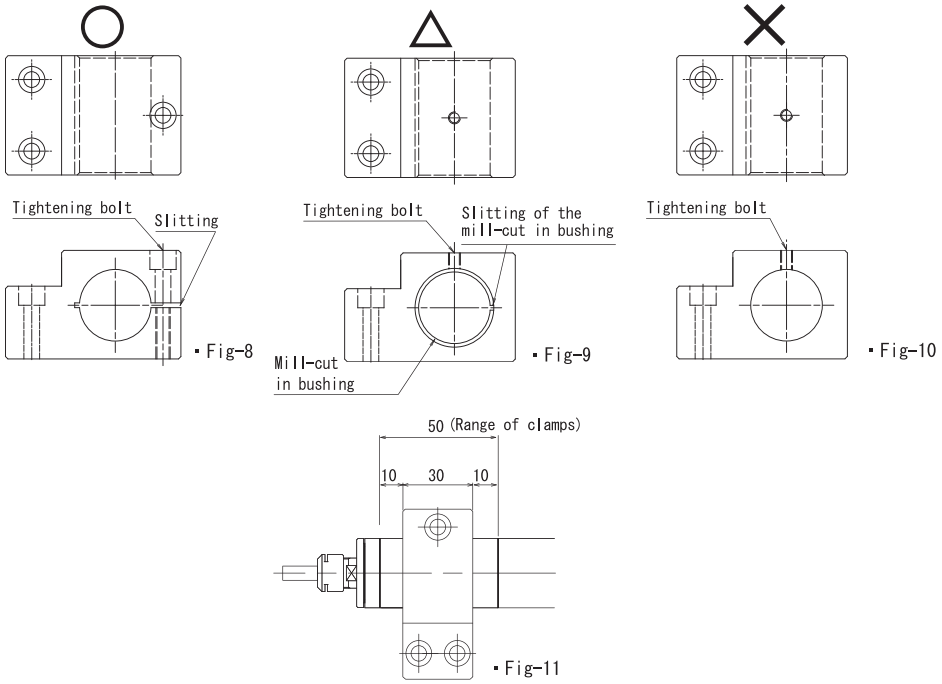
6 Spindle Mounting Methods

When attaching the spindle to a holder, mounting method of Fig.-8 is recommended.

＊Less than 5μm accuracy of the inner diameter holding the spindle is the ideal circularity and cylindricity. If possible, adjust it to be able to tighten about 5μm～10μm (reference values) using the shim.

Installing the spindle directly with screws as in Fig.-10 deforms the spindle external-cylinder causing rotation failure and heat generation. Installation of the spindle should be performed within range of the clamps. Installation of the spindle beyond the range will influence bearings, and it may cause rotation failure.

Moreover, install the spindle in the middle as shown in Fig.-11 when the width of a holder is small. As for tightening torque to the spindle, torque control using the torque wrench etc. is required. Verify and set up the most appropriate torque-values at users side, since tightening torque depends on the holder's configuration and accuracy.



・Fig-8 ・Fig-9 ・Fig-10

・Fig-11

Caution

・Do not fix the spindle directly with screws, as it causes deformation of spindle's external-cylinder, rotation failure and heat generation, etc.

・When installing the spindle in a holder, be careful of over-tightening the bolt. Over-tightening causes bad influence to the external-cylinder parts and lifespan of the bearings.

・When installing the spindle, perform installation within range of the clamps. Installation beyond range may cause the rotation failure.

7 Cause of Failure and Troubleshooting

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.	
	The tool has bent.	Exchange the tool.
	Bearings are worn and damaged.	Send it to our company.
Unusual vibration, heat generation, and noise occur during rotation.	The tool has bent.	Exchange the tool.
	Bearings are worn and damaged.	Send it to our company.