

Muto Inner Fan

Instruction Manual

Read this manual carefully before using the product.
Wrong operations deviating from this manual may lead to serious accidents or damages.
Keep this manual convenient location for easy access.



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1. Introduction

Thank you for purchasing the Muto Inner Fan.

This manual contains the information you need for handling, installing, operating and maintaining your new equipment correctly, to ensure trouble-free operation and long service life. Please read it thoroughly. After reading this manual, keep it in convenient place for easy access.

2. Safety precautions

Before starting any work such as handling, installing, operating and maintaining, carefully read this manual and all documents attached to the product for proper use. Use the product after thorough understanding of all product information, safety information and precautions.

In this manual, safety precautions are classified as "Warning" and "Caution".



This tag indicates that wrong operation or use may lead to fatal loss or serious injury.



This tag indicates that wrong operation or use may lead to human injury or loss of property.

Even the items under  **Caution** may lead to serious results depending on the circumstances.

Those precautions include very important information and it is strongly recommended to follow them strictly.

Warning

(Place to install)

- The product with non-explosion proof type motor shall not be installed in explosive or inflammable atmospheres. Under those atmospheres, install the product with explosion proof type motor conforming to the degree of danger in that place. Otherwise injuries, explosions or fires may occur.

(Gas)

- Unless otherwise agreed separately, the product can handle only normal air. It is cannot be handled any other gas (explosive, toxic, corrosive, high temperature and so on), liquid or solid materials. Otherwise injuries, explosions or fires may occur.

(Wiring)

- Refer to the instruction manual of motor. Otherwise fires, electrical shocks or explosions may occur.
- Do not touch the wiring. Shut off the power before checking the wiring. Otherwise electrical shocks may occur.

(Operation)

- Do not insert finger(s) or hand(s) into the opening of the safety covers such as belt cover and cooling fan cover. Do not remove the safety cover during the product is running. Otherwise injuries may occur.
- Shut off the main power switch in case of power failure. Otherwise injuries may occur.

Warning

(Disassembly and Reassembly)

- Before disassembly and reassembly, make sure to shut off the main power and prevent power to be turned on. Otherwise injuries or electrical shocks may occur.

(Others)

- Follow the labels attached to the product. Otherwise serious results may occur.

Caution

(Transportation)

- Check the weight of the product with the specifications, drawing or catalogue before transportation, and be careful not to drop or tip over the product during transportation. Otherwise injuries or breakages may occur.

(Installation)

- Remove all of the inflammable from the product and its vicinity. Otherwise fires may occur.
- Ventilate the room to keep the ambient temperature below 40 deg. C. Otherwise burns, fires or bearing-damage may occur.

(Operation)

- Stop operating as soon as abnormality is found. Otherwise injuries, electrical shocks or burns may occur.
- Operate the Fan in correct direction for rotation. Otherwise breakages may occur.

(Disassembly and Reassembly)

- Disassembly and reassembly should be done by experts. Otherwise injuries or breakages may occur.
- Do not use the parts of the product on other equipment. Do not use unauthorized parts for the product. Otherwise injuries or breakages may occur.

3. Receiving Checkups

Check if the products received are what have been ordered by referring to the order sheet, drawings, invoices and so on

- (1) Check the nameplates on the Inner Fan and the motor, and confirm if it matches what have been ordered.
- (2) Count the number of products received, confirm if it agrees with what have been ordered.
- (3) Confirm whether there is any breakage during transportation.

4. Transportation and Handling

When transporting the Inner Fan, lift the products with eye bolts. Be careful not to give shocks to any parts.

5. Storage

If the Inner Fan is stored before installation, be careful as follows:

- (1) Store the Inner Fan in a room where ventilated, not humid nor dusty. Otherwise the Inner Fan may have any troubles.
- (2) Before operating the Inner Fan which had been stored for long period of time, check that the bearing and the insulation of the motor have no problem.
- (3) While the Inner Fan is stored, rotate the fan shaft several times by hand every month. If this procedure is not performed, the life of the bearing may become short.
- (4) After stored for long period of time, check carefully that the Inner Fan has no abnormality before operating.

6. Installation

Bolt the flange of the Inner Fan to the equipment to be installed.

Connect tube to supply cooling water only for water cooled model.

7. Connection to Power and Test run

- (1) Turn the fan by hand to verify free rotation without rubbing or noise.
- (2) Check belt tension and pulley alignment referring to "11. Instructions for belt tension Adjusting and/or belt Replacing".
- (3) Check the nameplates on the Inner Fan and the motor. And confirm if they agree with the specification for power supply, then connect to power line under instruction by electrical engineer as per electric technical standards and wiring regulation.
- (4) Supply cooling water only for water cooled model. (flow rate : 3 liter/min)
- (5) Turn the power on and confirm the rotational direction is the same as the mark. If the rotational direction is opposite, change the wiring connection. The direction can be reversed by exchanging 2 wires of 3 wires. If the Fan runs continuously with reverse rotational direction, it cannot perform as specified and may cause a serious accident.
- (6) Run the Fan and measure the electric current (average of each of 3 phase) of the motor and confirm that it does not exceed the rated current. After running for a while, if there is no

abnormal vibration or noise, test run can be completed. If abnormality were found during test run, corrective action should be taken referring to the “10. Troubleshooting”.

8. Precautions for Operation

Before operating the Inner Fan, understand the following thoroughly.

- (1) The Inner Fan is designed to handle clean air. It cannot handle for gases containing particulates and dust, corrosive gases nor inflammable gases.
- (2) The Inner Fan is driven by motor through the belt. Initial elongation of the belt occurs within a few days from the start of operation, and it is necessary to adjust the belt tension at earliest time possible.

9. Maintenance

The following maintenance is recommended to keep the Inner Fan in good condition.

- (1) Pay attention to ventilation to keep the ambient temperature in the range of -15 to 40 deg. C.
- (2) Pay attention to abnormal noise, abnormal vibration, abnormal temperature and air leakage. If abnormality is found, take actions referring to “10. Troubleshooting”.
- (3) Periodically stop the Inner Fan, and check the tension and condition of the belt. If the tension is too low or the belt is damaged, adjust the tension or replace belt referring to “11. Instruction for belt tension Adjusting and/or belt Replacing”.

(4) Lubrication

Note: For motor, refer to the nameplate or the manual of the motor.

- (a) Grease type, Lubrication amount and Lubrication interval

Refer to the nameplate on the Inner Fan.

- (b) Lubrication procedure

Lubrication can be done during the Inner Fan is running, but be careful for rotating object. Turn the shaft by hand when lubricating during the Inner Fan is stopped. Inject the grease using a grease gun.

10. Troubleshooting

The following table is for trouble shooting during test run and operation.

Trouble	Cause	What to do
Blown fuse or Tripped circuit breaker	Abnormal voltage or frequency	Consult with power company.
	Inappropriate capacity of power source equipment	Replace with appropriate one.
	Missing phase	Check wiring.
	Imbalanced voltage of phase	Consult with power company.
	Excessive voltage drop	Check the thickness and length of wiring.
	Excessive current	Consult with Muto.
	Reversed rotation	Change wiring. (exchanging 2 wires of 3 wires)
	Fan touch	Repair.
	Abnormality of bearing	Repair.
Insufficient air pressure or volume	Improper frequency	Consult with Muto.
	Missing phase	Check wiring.
	Loose belt, damaged belt	Adjust belt tension, replace belt.
	Damaged fan, etc.	Repair.
	Reversed rotation	Change wiring. (exchanging 2 wires of 3 wires)
	Lowered motor speed	Consult with Muto.
	Foreign material on the fan	Clean up.
Abnormal noise and/or vibration	Touching or broken fan	Repair.
	Reversed rotation	Change wiring. (exchanging 2 wires of 3 wires)
	Loose belt, damaged belt	Adjust belt tension, replace belt.
	Foreign material in the pulley groove	Get rid of foreign material.
	Bad pulley alignment	Adjust the alignment.
	Imbalance of fan	Repair.
	Bad bearing	Repair.
	Imbalanced voltage between phase	Consult with power company.
Missing phase	Check wiring.	

11. Instructions for belt tension Adjusting and/or belt Replacing

⚠ Warning Turn the power off before adjusting belt tension or replacing belt.

Following is instructive to adjust belt tension and/or to replace belt as referring to “13. Structural drawing”.

- (1) Remove belt cover (A) ⑤.
- (2) After loosen nuts of motor adjuster ⑱, move motor ① closer to fan stand ⑨. And remove the old belt ③.
- (3) Install the new belt ③. If multiple belts are used, it is recommended to use “matched set” of which the circumference length is the same.
- (4) Adjust the parallelism and offset with motor adjuster ⑱ as putting a ruler on motor pulley ② and fan pulley ④, at the same time, adjust deflection as you give tension at the center of the span to the belt. (Fig.1 and 2)

Note: The deflection and the tension are shown on the nameplate (BELT SPEC.) on the Inner Fan.

- (5) Put back belt cover (A) ⑤.

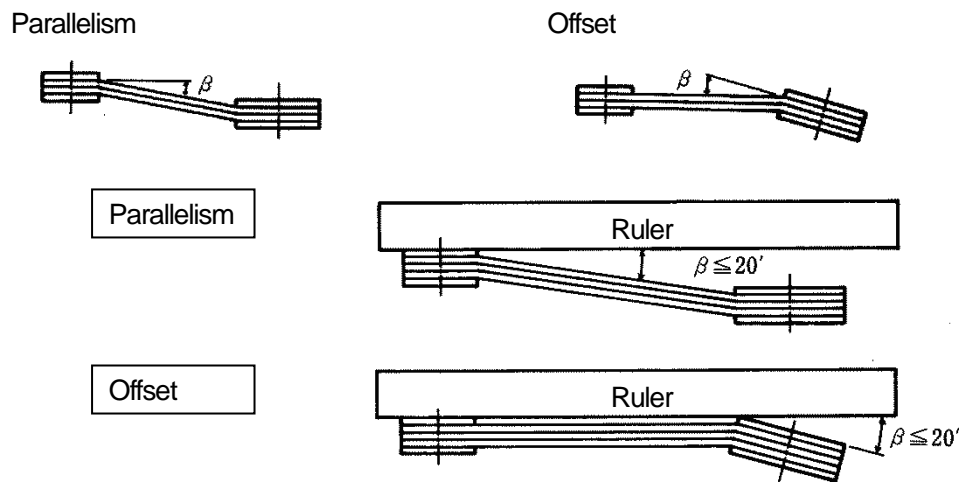


Fig.1 Parallelism and Offset

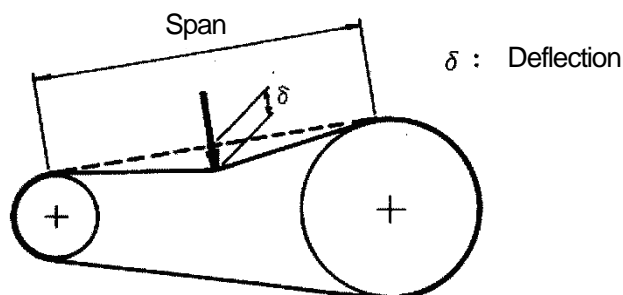


Fig.2 Tension

12. Instructions for Disassembly and Reassembly



Warning Turn the power off before disassembly and reassembly.

Following is instructive to disassemble and/or to reassemble the Inner Fan as referring to “13. Structural drawing”. (It is very difficult to explain all of details of the work thoroughly in writing and by sketches. Therefore it is recommended to understand and record that the parts put together or direction while disassembled.)

12-1. Disassembly

- (1) Remove the Inner Fan from the equipment in which it is installed, lift it up, and place it in an appropriate location so that shaft ⑧ is level and the Inner Fan is stable.
- (2) Remove belt cover (A) ⑤, and remove belt ③. (See “11. Instructions for belt tension Adjusting and/or belt Replacing”)
- (3) Remove the nut and the washer securing fan pulley ④, and remove the pulley using a puller.
- (4) Loosen the set screw of motor pulley ②, and remove the pulley.
- (5) Remove belt cover (B) ⑥ and fan stand cover (A) ⑩.
- (6) Loosen the set screw securing cooling fan ⑪, pillow block unit (pulley side) ⑦ and pillow block unit (fan side) ⑫, and pull out shaft ⑧ while striking it from the pulley side to the fan side with a plastic hammer.

Caution : When shaft ⑧ is removed from the pillow block, be careful not to damage fan ⑬ by dropping, etc.

- (7) Remove pillow block unit (pulley side) ⑦ and pillow block unit (fan side) ⑫.

Note : Fan ⑬ cannot be removed from the shaft ⑧ as it is because fan stop bolt and collar ⑰ are welded to it. If it is necessary to remove fan ⑬, shave off the welded parts of fan stop bolt and collar ⑰, and then remove the bolt and collar.

12-2. Cleaning

Clean the disassembled parts.

12-3. Reassembly

Reassembly is basically the reversed order of disassembly.

Note : If fan ⑬ has been removed from shaft ⑧, insert the fan into the shaft and secure it with fan stop bolt and collar ⑰, and then weld the bolt and collar as before disassembly to prevent them from loosening.

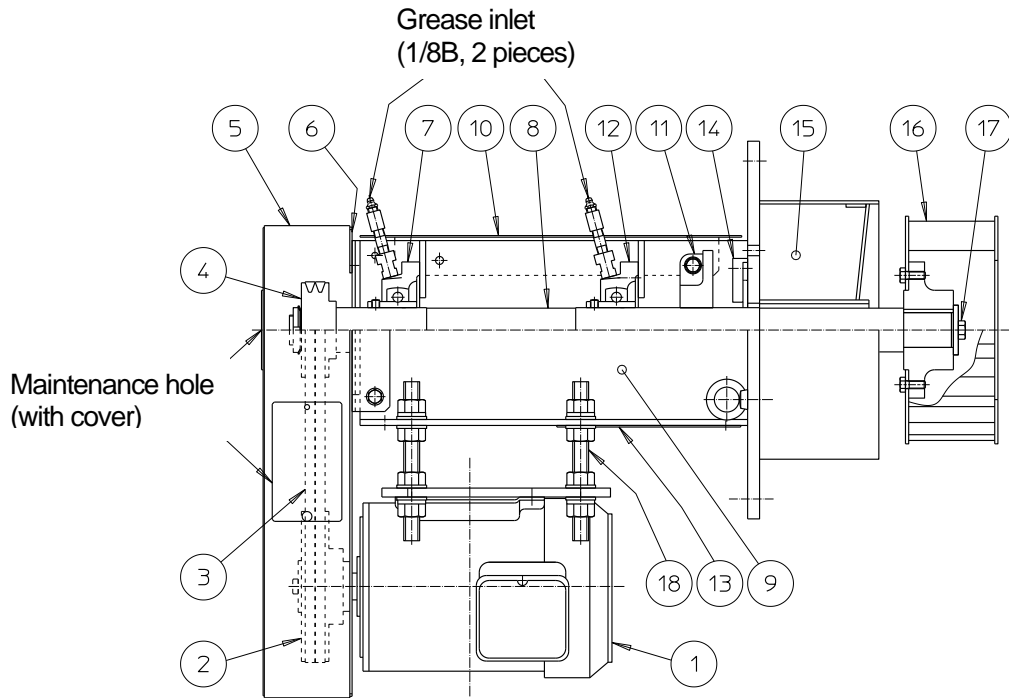
- (1) Install pillow block unit (pulley side) ⑦ and pillow block unit (fan side) ⑫
- (2) Insert shaft ⑧ through the flange of fan stand ⑨, and pass cooling fan ⑪, pillow block unit (fan side) ⑫ and pillow block unit (pulley side) ⑦.
- (3) Fine-tune the position of shaft ⑧ so that the hole for the set screw on each pillow block fits into the bore (or groove) of shaft ⑧, and then secure shaft ⑧ with the set screw. Align cooling fan ⑪ with the seating hole on the shaft (8) and fix it with the set screw.

Caution : The tips of the set screw on pillow block unit (fan side) ⑫ and pillow block unit (pulley side) ⑦ are spike-shaped and rod-shaped, respectively.

- (4) Install belt cover (B) ⑥ and fan stand cover (A) ⑩.
- (5) Install fan pulley ④ and motor pulley ② on their respective shafts.
- (6) Install belt ③. (See “11. Instructions for belt tension Adjusting and/or belt Replacing”)
- (7) Install belt cover (A) ⑤ as before.

13. Structural drawing

This drawing is main model. (Some models may be different.)



No.	Description	Qty.
1	Motor	1
2	Motor pulley	1
3	Belt	1~
4	Fan pulley	1
5	Belt cover (A)	1
6	Belt cover (B)	1
7	Pillow block unit (pulley side)	1
8	Shaft	1
9	Fan stand	1
10	Fan stand cover (A)	1
11	Cooling fan	1
12	Pillow block unit (fan side)	1
13	Fan stand cover (B)	1
14	Packing box	1
15	Insulation	1
16	Fan	1
17	Fan stop bolt and collar (fixed to Fan ⑯ by welding)	1
18	Motor adjuster	4

14. Motor

Regarding motor, refer to the instruction manual of the motor.

15. Inquiry

If you need to contact us regarding this product, please kindly inform us the information on the nameplate such as CAT. No. , PROD. No. , DATE. In case of troubles, additionally inform us the broken portion, running time (days) and condition used and others.

16. Limited Warranty

The warranty period of this product is one year from the day of shipment unless otherwise specially agreed. Within the period, the malfunctions induced by defects of material or technical reasons will be repaired free of charge. But under following situation, this warranty will not apply to any products.

- (1) Malfunctions that occur past the warranty period
- (2) Malfunctions that occur due to inappropriate usage
- (3) Malfunctions or breakage due to inevitable event such as fire, severe weather, earthquake or such
- (4) By except us, the product has been repaired or modified.

We shall not be responsible for any incidental or consequential damages.

This warranty is valid only for the product used within Japan.

Muto Products

- Muto Wide Blower
- Muto Turbo Blower
- Muto Spencer Blower (Under technical license)
- Muto KF Blower
- Muto Scroll Blower
- Muto Central Vacuum System