

# Muto Direct 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 Direct 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 get close to or look into the open inlet or outlet manifold during the product is running as it is very dangerous as follows.

Inlet : Clothing which you are wearing or a part of your body will be sucked in. As a result, injuries may occur.

## Warning

Outlet : A strong wind or flown things may cause injuries.

- Do not insert finger(s) or hand(s) into the opening of the safety covers such as external fan 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.

( Safety components )

- The product is shipped with metal mesh attached to the inlet and outlet manifold, or otherwise the optional parts are included. If these parts are removed by some reason, take equivalent safety measures. Otherwise injuries may occur.

( 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 mass 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 )

- If any abnormalities are found, stop the machine immediately. 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 this 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 you have received are what have been ordered by referring to the order sheet, drawings, invoices, etc.

- (1) Check the nameplates on the Fan and the motor, and confirm if it matches what have been ordered.
- (2) Count the number of the product, and confirm if it agrees with what have been ordered.
- (3) Confirm that there is no breakage during transportation.

### 4. Transportation and Handling

When transporting the Fan, lift the casing and the motor together. Be careful not to give shocks to any parts of the Fan.

### 5. Storage

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

- (1) Store the Fan in a room where ventilated, not humid nor dusty. Otherwise the Fan may have any troubles.
- (2) Before operating the Fan which had been stored for long period of time, check if the bearing and the insulation of the motor have no problem.
- (3) While the 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, carefully check if the Fan has no abnormality before operating.

### 6. Installation

The blower should be placed on a flat and rigid foundation with vibration isolator pads. If there are gaps between the pad and foundation, fill the gaps with thin steel sheets (shimming).

Clear some space around the blower for the maintenance.

When anchor bolts are used, do not fasten nuts tightly so that the pads will be effective. (Fig.1.)

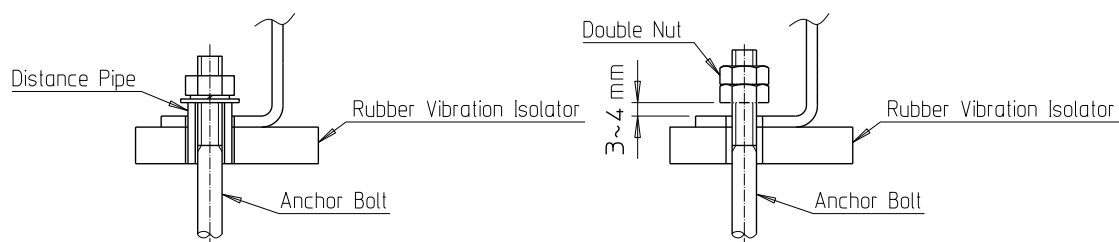


Fig.1 Anchor bolt

## **7. Piping**

Use rubber sleeves or flexible joints to connect to piping to avoid unnecessary force to the Fan and to isolate the vibration from the Fan. If direct connection to piping is inevitable, do not give the force to the Fan by dimensional tolerances, weight of piping, thermal expansion of piping, etc.

## **8. Connection to Power and Test run**

- (1) Turn the fan by hand to verify free rotation without rubbing or noise.
- (2) Check the nameplates of Fan and 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.
- (3) Jog the Fan 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 lead to serious accident.
- (4) Run the Fan and measure the electric current (average of each of 3 phase) of the motor. If it exceeds the rated current, use at below the rated current by adjusting the air volume with damper and so on. After running for a while, if there is no abnormal vibration or noise, test run can be concluded. If any abnormality were found during test run, corrective action should be taken by referring to "11. Troubleshooting".

## **9. Precautions for Operation**

Before operating the Fan, understand the following thoroughly.

- (1) Continuous use at small air volume will lead to Fan durability problem.
- (2) The Fan is designed to handle clean air. It cannot handle for air containing particulates and dust, corrosive gases nor inflammable gases. Temperatures of air which standard model can handle are in the range of -15 to 50 deg. C.

## **10. Maintenance**

The following maintenance is recommended to keep the 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 "11. Trouble shooting".
- (3) Lubricate only that the motor has bearings requiring the lubrication.
- (4) If the Fan has air filter at the inlet, check the cleanliness of the air filter periodically. Replace or clean the filter if and when the air filter is not clean, as it causes pressure loss. The air filter made by Muto can be washed by soaking into water or neutral detergents. (Wash it gently, do not rub or do not squeeze it.) Lay the cleaner side up to dry. It can be cleaned for a few times with this method.

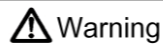
## 11. Troubleshooting

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

Trouble	Cause	What to do
Tripped fuse or breakers	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	Reduce air volume by damper.
	Reversed rotation	Change wiring. ( exchanging 2 wires of 3 wires)
	Fan touch	Repair.
	Water in the casing	Drain and take some preventive measure.
	Abnormality of bearing	Repair.
Insufficient air pressure or volume	Improper frequency	Consult with Muto.
	Too high ambient air temp.	Improve air ventilation of the room.
	Leakage or clogged piping	Check piping.
	Missing phase	Check wiring.
	Damaged fan, etc.	Repair.
	Reversed rotation	Change wiring. ( exchanging 2 wires of 3 wires)
	Dirty or clogging air filter	Clean or replace.
	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)
	Imbalance of fan	Fan cleaning. If vibration still remains, repair it.
	Bad bearing	Repair.
	Foreign object or water	Clean up and protect.
	Imbalanced voltage between phase	Consult with power company.
	Missing phase	Check wiring.
	Air leakage	Check piping and repair.
Weight of piping or force induced by thermal expansion	Get rid of any force to the Fan.	



## **12. Instruction for Disassembly and Reassembly**



Warning

**Turn the power off before disassembly and reassembly.**

Following is instructive to disassemble and/or to reassemble the Fan as referring to “13. Structural drawing”. (It is very difficult to explain all of details of the work perfectly 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 inlet ②.
- (2) Remove fan stopper bolt ⑤ and fan stopper collar ④, and remove fan ③ from motor ⑦.
- (3) 【 Foot-mounted motor 】 Remove packing plate ⑧ and spacer ⑨, and remove packing ⑩.
- (4) Remove motor ⑦.

Caution : 【 Foot-mounted motor 】 If there are the liners (shims) under motor ⑦, their original location should be recorded for reassembly.

### **12-2. Cleaning**

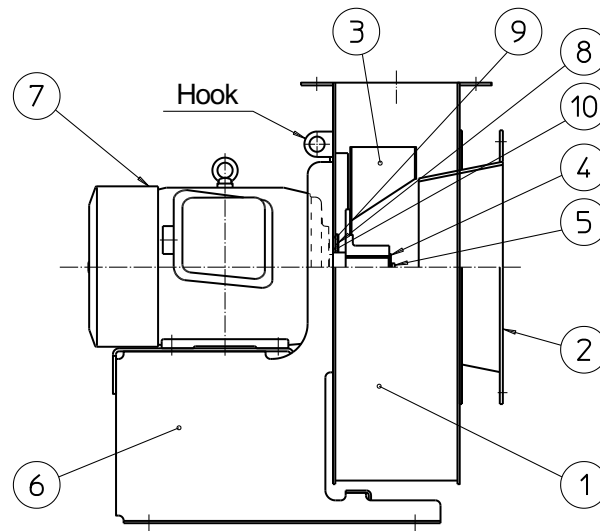
Clean the disassembled parts.

### **12-3. Reassembly**

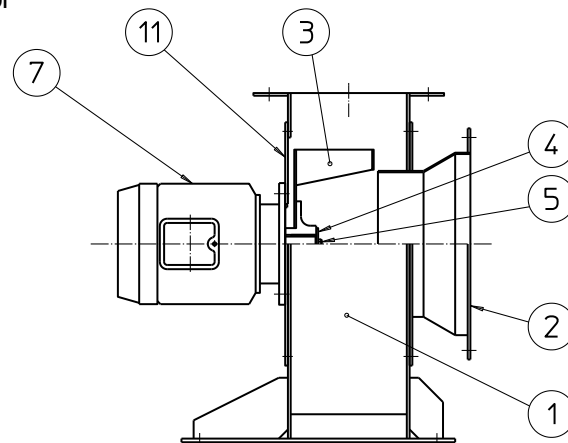
Reassembly is basically the reversed order of disassembly.

### 13. Structural drawing

Foot-mounted motor



Flange-mounted motor



No.	Description	Qty.	
		Foot-mounted motor	Flange-mounted motor
1	Casing	1	1
2	Inlet	1	1
3	Fan	1	1
4	Fan stopper collar	1	1
5	Fan stopper bolt	1	1
6	Motor base	1	-
7	Motor	1	1
8	Packing plate	1	-
9	Spacer	1	-
10	Packing	1	-
11	Motor flange	-	1

#### **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, inform us the broken portion, running time (days) and condition used and others additionally.

#### **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