
Centrifugal Fan

Turbofan Type KT/KTS/KP

Note

Thank you for selecting a Atai Fan.

To ensure safety and maximum service life of the fan, please read this instruction manual thoroughly prior to operation, inspection and maintenance. Keep this manual carefully at hand so that it can be consulted anytime when operating, inspecting or maintaining the fan.

For contractors who carry out equipment work:

Please be sure to deliver this manual to user(s) who will carry out operation, inspection and maintenance of the fan.

Limited warranties

1. In the event of failure or breakage under proper use of the product during the warranty period, equipment supplied by Atai Fuji Motor. will be repaired or replaced free of charge within the scope of the relevant part, provided that such failure or breakage is attributable to inadequacy of the design or workmanship of the equipment.
2. The warranty mentioned in the above clause shall be only the mechanical warranty of the defective part, and shall not cover any expenses or other damage arising from the failure or breakage.
3. In the event of the following failures and breakage, the costs of the repairs shall be for the account of the user.
 - (1) Failures and breakage attributable to equipment that was not delivered by Atai Fuji Motor.
 - (2) Failures and breakage after the expiration of the warranty period
 - (3) Failures and breakage caused by disasters or force majeure, such as fire, acts of God or earthquakes
 - (4) Failures and breakage resulting from repairs or modifications made without the consent of Atai Fuji Motor.
 - (5) Failures and breakage when parts other than those designated by Atai Fuji Motor. are used
4. Atai Fuji Motor. shall not be liable for the damage caused by incorrect or reckless use of the fan. Cost and expenses incurred for sending engineer(s) in such a case shall be borne by the user.
5. If the cause of the failure is unclear, necessary actions shall be determined through mutual consultation.

Purpose of this manual

The purpose of this manual is to provide the user with detailed information necessary to properly operate, maintain and inspect the fan.

This manual contains the following information and is intended for persons experienced in the operation of fans, or for those who have been trained by such experienced persons. Only qualified personnel such as electrical engineers are allowed to carry out the electrical wiring work.

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1. Safety precautions

1.1 Types and meanings of warning terms

This instruction manual divides precautions into the following four categories according to the level of hazards (or the severity of the accident).

Be sure to understand the meanings of the following terms and comply with the content (instructions) of the instruction manual.

Safety sign	Meaning
	Indicates an imminently hazardous situation. Failure to observe the procedures or instructions will result in death or serious injury.
	Indicates a potentially hazardous situation. Failure to observe the procedures or instructions may result in death or serious injury.
	Indicates a potentially hazardous situation. Failure to observe the procedures or instructions will result in minor or moderate injury or cause damage to equipment or devices.
<u>Note</u>	Indicates information that is in particular to be noted or emphasized.

1.2 Safety precautions

1.2.1 Precautions for placement and installation

- (1) Move and place the fan considering the center of gravity and its mass.
- (2) Install it according to the instruction manual.
- (3) Do not install it anywhere exposed to high temperature or direct flame.
- (4) Do not install it anywhere with high humidity.
- (5) For the type of standard specifications, do not install the fan in machine or chemical factories etc which may contain acids, alkalis, organic solvents, toxic gases such as paint fumes, or corrosive gases.
- (6) Install the outdoor air intake in a position far away from the exhaust vents of combustion gas, etc.
- (7) Be sure to install a ground fault interrupter to the main power.
- (8) Only qualified personnel such as electrical engineers are allowed to carry out the electrical wiring work. Before working, be sure to turn off the main power.
- (9) Do not bend, pull or trap the motor connection cables or forcibly push them into the casing. Doing so may result in electric shock.
- (10) Do not expose the motor to water (for indoor types).
If it gets wet, the resulting short circuit and/or insulation degradation of the electric circuit may damage the fan.
- (11) Do not place any obstacles that may hinder ventilation or any combustibles around the motor.
- (12) For the type which provided with drain outlet, arrange its piping properly.
- (13) Install a protective wire mesh etc. to the open air intake.

1.2.2 Precautions for operation

- (1) Before starting the fan, ensure that all the relevant workers are informed of the operation and that there are no workers in the dangerous zone.
- (2) Only those who are authorized by the site manager are allowed to operate the fan.
- (3) Be sure to attach the terminal box cover of the motor before turning on the power.
- (4) When the fan is running, never touch any parts of the unit unless it is absolutely necessary.
- (5) Do not put your fingers or other objects into the air intake or exhaust vents.
- (6) Do not put your fingers or other objects into the opening of the motor. Failure to observe this may cause an electric shock, injury, or fire.
- (7) Do not place any objects around the air intake or exhaust vents of the fan.
- (8) Remove any tools and other objects from the top of the fan before operation.
- (9) Be sure to attach a belt guard or a shaft coupling to the fan during operation.
- (10) If the gas is hot, do not touch the fan body as it can also be hot.

1.2.3 Precautions for maintenance and inspection

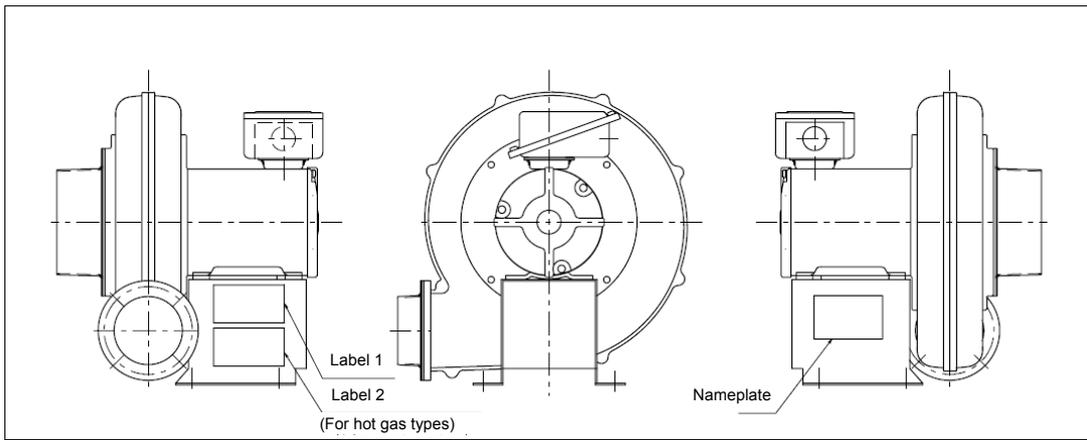
- (1) Maintenance and inspection must be carried out only by personnel who have been trained to handle the fan.
- (2) Before starting maintenance or inspection, ensure to inform the relevant personnel of the operation.
- (3) Before starting the maintenance or inspection work, ensure to stop the fan and turn off the main power on the operation panel.
If you carry out the maintenance or inspection work with the power on, you may suffer an electric shock and/or get injured by unexpected activation of the fan during the work.
- (4) In case dust or oil components adhere to the fan, clean the fan regularly.
Failure to observe this may cause malfunctions, damage, or accident.
- (5) Consult Atai Fuji Motor. or a service company before moving, repairing, or modifying the fan.

1.3 Location of the warning labels

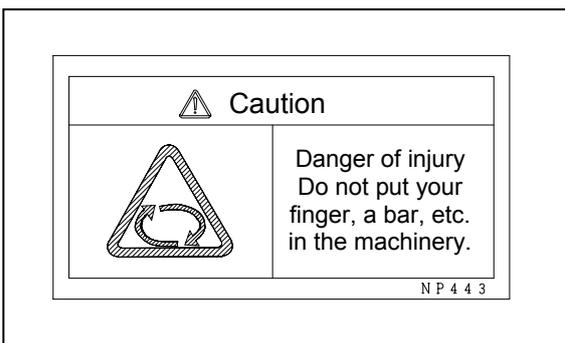
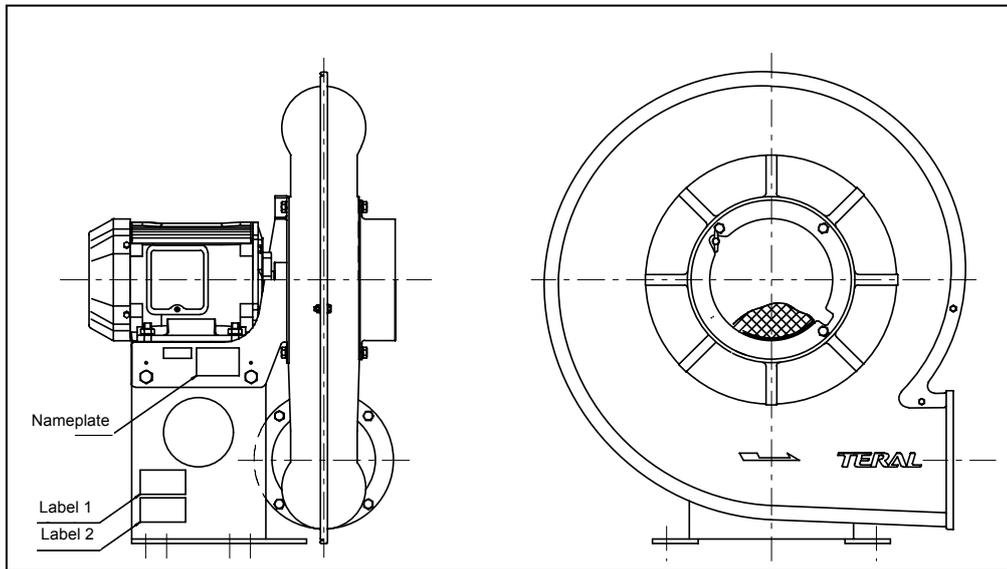
The figure below shows the locations to which each warning label should be affixed. If these labels become dirty and hard to read or if they are peeled off, replace with a new one.



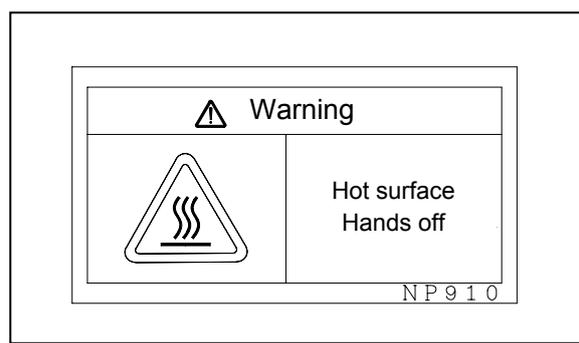
KT-010S/010T/020S/020T/040S/040T/100T (same positions also for heat resisting types)



KT-*075/*150/*220/*370 (The asterisks "*" are replaced by "5," "6," or "B.")



Label 1



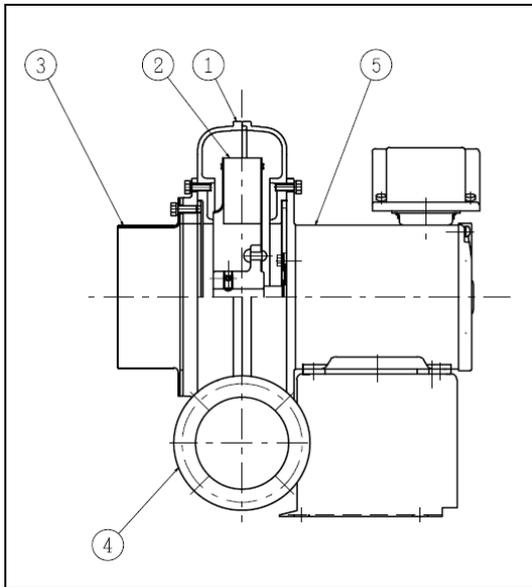
Label 2

Fig-1

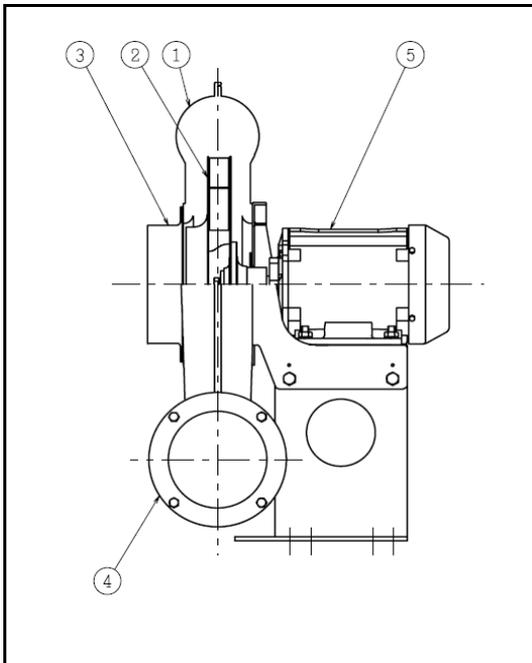
2. Configuration and overview of the fan

2.1 Structure and part names of the fan

KT-010S/010T/020S/020T/040S/040T/100T



KT-*075/*150/*220/*370



No.	Part name
①	Fan casing
②	Impeller
③	Suction flange *1
④	Discharge flange *1
⑤	Motor

*1: It is not included in model KTS.

2.2 Specifications and accessories of the blower

If you purchased a standard product, refer to the standard specifications in the following table. For a custom-made product with special specifications, refer to the specifications including the external dimensions drawing.

 Caution
<p>Do not use this product under any conditions other than those provided in the specifications. Failure to observe this may cause an electric shock, fire, and/or product failure.</p>

(1) Standard specifications and special specifications

KT-010S/010T/020S/020T/040S/040T/100T

Standard specifications	Air	Clean air 0°C to 60°C	
	Installation location	Indoor (ambient temperature: 0°C to 40°C)	
	Installation method	Floor mount (only in the orientation where the shaft is placed horizontally)	
	Motor	Type	Totally enclosed type (0.1/0.2kW), Totally enclosed fan-cooled type (0.4/1.0kW)
		Phase, voltage	50Hz, single phase 100V, 3 phases 200V (1.0kW output is only achieved at 3 phases 200V.) 60Hz, single phase 100V, 3 phases 200V (1.0kW output is only achieved in 3 phases 200V.)
Coating	Inside ····· Modified alkyd resin coating (silver color) Outside ··· Polyurethane resin coating (silver color)		

Special specifications	Structure modifications	Outdoor type Hot gas type (Gas at over 60°C and up to 250°C) Special orientation of discharge flange
	Motor modifications	Different voltage

KT-*075/*150/*220/*370

Standard specifications	Air	Clean air 0°C to 150°C (Except for motors of enhanced safety or explosion-proof type)	
	Installation location	Indoor (ambient temperature: 0°C to 40°C)	
	Installation method	Floor mount (only in the orientation where the shaft is placed horizontally)	
	Motor	Type	Totally enclosed fan-cooled
		Phase, voltage	50Hz, 3 phases, 200V 60Hz, 3 phases, 200/220V
Coating	Inside ····· Heat resisting coating (silver color) *2 Outside ··· Heat resisting coating (silver color) *2		

Special specifications	Structure modifications	Outdoor type Hot gas type (Gas at over 150°C and up to 250°C) Special orientation of discharge flange
	Motor modifications	Different voltage Enhanced-safety, pressure-resisting or explosion-proof type, corrosion resisting type and high efficiency type

*2: As model KTS is made of stainless steel, only acid pickling is available without coating.

(2) Standard and special accessories

Standard accessories	Special accessories
Companion flange	Vibration insulating base
Shaft seal	Vibration insulating liner
Suction wire mesh	Foundation bolt
Suction damper	Expansion joint
Discharge wire mesh *3	Filter
-	Silencer
-	Cable gland for outdoor use *4

*3: Provided only with models KT-010S/010T/020S/020T.

*4: If the models KT-010S/010T/020S/020T/040S/040T/100T are used outdoors, connect a cable gland for outdoor use to the terminal box of the motor, and carry out wiring with a cable for outdoor use. Also use a cable with suitable outer diameter to the cable gland. (It also applies to heat-resistant products.)

3. Placement and installation

3.1 Before using the fan

When you receive the fan, check the following points first.

If there are any problems, contact the sales agent you purchased the product from.

Handle the motor according to the instruction manual of the motor.

Incorrect handling may result in an accident or failure.

- (1) Check the nameplate to verify that the unit is the one you ordered.
In particular, check the information on the rated current (50Hz or 60Hz).
- (2) Check if the orientation of discharge flange and direction of rotation are as ordered.
- (3) All the accessories that you ordered have been delivered.
- (4) No part of the product is damaged during transportation.
- (5) All fastening parts including bolts and nuts are securely tightened.

3.2 Precautions during transportation and storage

3.2.1 Precautions for transportation

Note

- Do not get under the lifted fan. The fan may fall onto you.
- Ask a specialist company to move and place the fan in consideration of the center of gravity and its mass.
- Before hoisting the unit, refer to the catalogue or external dimensions drawing etc. to confirm that the mass of the fan does not exceed the load limit of the hoisting equipment.
- Do not hoist the entire fan using the hook on the motor or any other parts not intended for the purpose.

- (1) When hoisting the fan, wind rope or wire rope on the motor base or the fan casing.
- (2) Use as long ropes and wires as possible so that the fan can be lifted at an angle of 90° or less, which prevents the fan from being deformed/damaged by the lifting load.

3.2.2 Precautions for storage

- (1) Protect the unit so that rust does not form during storage before installation, assembly or starting operation. In particular, take measures to protect the bearings from rain water and dust, for example by covering them with a vinyl sheet.
- (2) Store indoor-type motors and other electrical devices indoors.
Also for equipment for outdoor use, protect its wiring and cable openings against moisture.

3.3 Precautions for the location of installation

Install the fan in a place where the following conditions are satisfied:

- (1) The fan of standard type is intended for the indoor use. To install it outdoors, choose a place not exposed to wind or rain water. Furthermore, install the fan in a location where it will not suck in rain water.
- (2) Well-ventilated place with minimum exposure to dust or moisture
If you install the unit in a fully enclosed room, such as a machine room, install a ventilator so that the room temperature does not increase due to the heat generated by the motor.
- (3) Place with an ambient temperature of 0°C to 40°C
- (4) Place that is not accessible by unauthorized persons or that is impossible for them to operate the fan at.
Take measures to prevent unauthorized persons from having access to the fan, for example by installing a barrier.
- (5) Place where the fan can be easily and safely inspected and repaired.
Ensure that there is enough space for assembly, disassembly and repairs of the impeller and other parts. If fan is installed indoors, make sure there is a doorway large enough to carry the fan in and out of the room.
- (6) In case of installing the fan indoors, provide the margin at the entrance so that the fan can be moved or transferred.
- (7) If it is necessary to frequently replace or repair fans or impellers due to corrosion or wear, consider using minimal hoisting equipment.

Caution

Do not place any objects that may obstruct ventilation or any combustibles around the motor.

They may prevent heat from escaping, thus resulting in overheating or fire.

Note

If the coating film is flawed, perform repair coating to prevent the generation of rust.

3.4 Foundation

- (1) The foundation must be strong enough to support the weight and the load and vibration produced by the fan during operation.
- (2) The foundation concrete should be constructed so that it remains level and is not affected by ground subsidence. Reinforce the ground with driving piles if it is soft or weak.
- (3) The weight of the foundation must be 2 to 4 times the mass of the fan including the motor.
- (4) The unit's foundation should be constructed so that vibrations are not transmitted through the structure's pillars or floor.
- (5) When constructing foundations for two or more units, space each unit appropriately to prevent the transmission of vibration.
- (6) Construct void holes in the foundation concrete the foundation bolt hole.
Refer to the external dimensions drawing for the positions for the foundation bolt holes.
When setting the foundation bolts before installing the fan, use a template to ensure that the positions are correct.
- (7) If the foundation is constructed on the second floor or higher, align the foundation with a beam and keep it as close as possible to the walls.

3.5 Installation

Floor-mount type

Guidelines for setting the foundation bolts (void type) are noted below.
(When setting the bolt before installation, follow only the applicable directions below.)

- (1) Clean the foundation concrete surface and check the levelness. Chipping may be necessary.
- (2) Clean the foundation bolt hole and remove any debris.
Although the foundation bolt hole must be wet, water must not pool in the holes. Remove any excess water.
- (3) Set one flat liner and two tapered liners on both sides of the fan foundation bolt holes as shown in the figure-2.
If necessary, use auxiliary liners (at least 3 mm thick).
If there is a distance of more than one meter between foundation bolts, set liners in that space.
- (4) Place the fan or vibration insulating base on the liners and insert the foundation bolts through the fan base or vibration insulating base foundation bolts holes and lower them into the void holes.
When making the installation earthquake-resistant, weld the foundation bolts to the reinforcing iron bars of foundation concrete.
- (5) Use the tapered liners to adjust the fan position and height.
- (6) As a guide, the levelness should be within 0.1 mm per meter.
- (7) After making the inner surface of foundation bolt holes rough, fill them with non-shrink mortar. Set the foundation bolts perpendicularly in the center of the hole.
- (8) After the mortar has fully cured, firmly tighten the foundation bolts.
Tighten the bolts uniformly.
Weld the liners to prevent them from moving during operation.
- (9) Fill the space between the fan base or vibration insulating base and the foundation concrete with mortar to make a concrete structure.

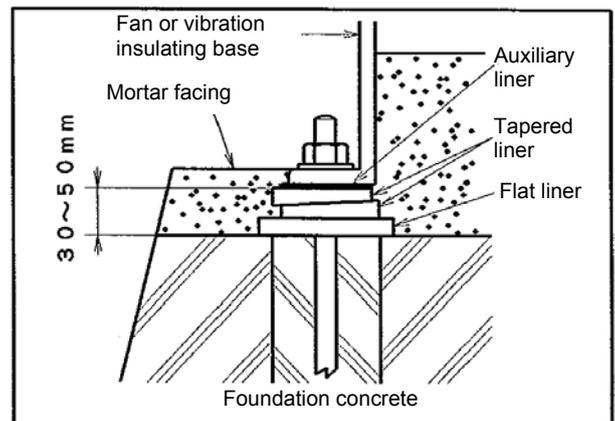


Fig-2 Liner setting

- (10) Check that the mortar has not contracted or cracked.
If drain pipes are necessary, provide a drain pit.
- (11) When installing a vibration insulating device, fasten the vibration insulating base with the foundation bolts.

3.6 Precautions for connecting the ducts

 **Caution**

Do not allow the ducts to exert any load on the fan.
Doing so may result in malfunctions, damage or vibration.

- (1) Connect the fan's flanges and ducts using expansion joints to avoid the transmission of vibration or noise to the exterior.
Particularly when the fluid is hot, ensure to install the expansion joint to protect the fan from stress of duct caused by thermal expansion.
- (2) Before connecting the ducts, check inside the ducts and fan, and remove any foreign matter, such as waste cloth and tools.

 **Warning**

Be sure to install a protective wire mesh on any open air intakes of the fan.

- (3) To prevent foreign matter from being sucked into, install a protective wire mesh to the duct inlet or the air intake of fan where air is sucked directly. If dust or water is expected to get inside the fan, install a filter to protect against it.
- (4) If an inactive (not running) fan is exposed to air in the reverse direction, it rotates in reverse. Avoid exposure to such air because it takes longer to start a fan that is rotating in reverse.
- (5) In general, unexpected pressure loss may occur due to the connection to (a) ducts that are much smaller than the port diameter of the fan, (b) ducts with a series of bends, or (c) ducts with bends just before or after the connection to the fan.
- (6) When connecting the discharge duct to the product that equips a discharge wire mesh as standard, remove the discharge wire mesh to connect the duct.
- (7) If the intake air is swirling, install guide vanes or increase the radius of the bends.
If necessary, take the same precautions in the suction chamber.

Note

If there is a wall in front of the fan suction inlet, secure the clearance between the suction inlet and the wall equal to or longer than the diameter of the fan suction inlet.

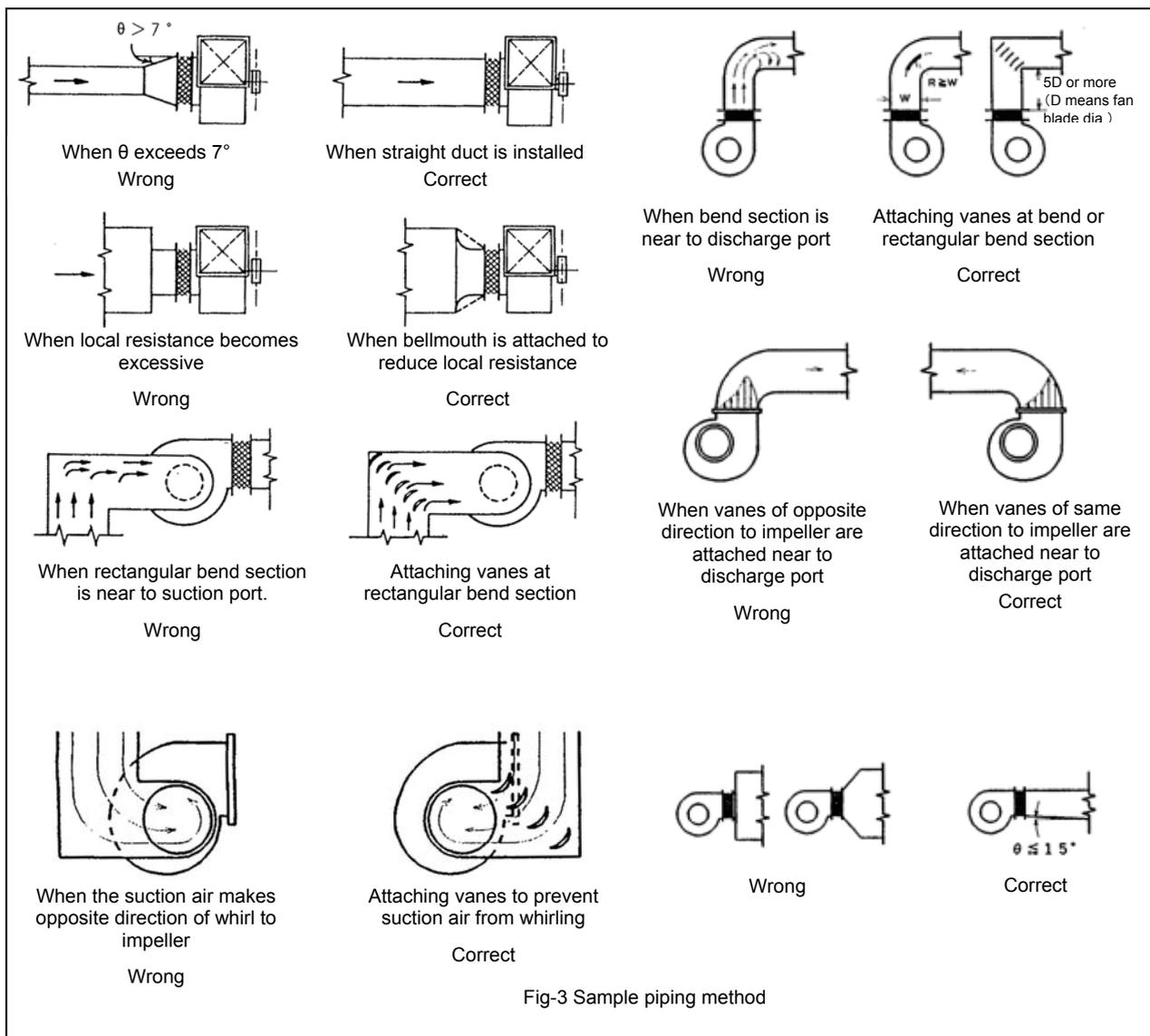


Fig-3 Sample piping method

3.7 Precautions for wiring work

 Warning

Use high-quality wiring equipment and devices, and carry out wiring work safely and securely according to the technical standards for electrical facilities, as well as the indoor wiring regulations.

Only qualified personnel such as licensed electrical engineers are allowed to carry out electrical wiring work.

Unqualified persons are prohibited by law from performing wiring work and it is very dangerous.

- (1) Be sure to install a ground fault interrupter and an overload protection device on the primary power side of the fan. In case that a thermal relay is used as an overload protection device, the fan may trip at a start-up due to its starting characteristics.
 - * The starting current of premium efficiency (equivalent to IE3) motor-equipped products tends to become higher than that of standard efficiency (IE1) motor-equipped products. It is necessary to verify the applicability of its ground fault interrupter and overload protection device. If you have any questions, contact us.
- (2) Be sure to install a ground wire to prevent an electric shock.
 - Connect the ground wire to the ground terminal inside the terminal box of the fan.
 - Do not connect the ground wire to gas pipes, water pipes, lightning arresters, or ground wires for telephone.

 Warning

It is prohibited by law to perform incomplete wiring work, which exposes personnel to a great danger.

- (3) Control the fluctuation of the voltage within $\pm 10\%$ of the rated voltage, and the frequency within $\pm 5\%$ of the rated frequency.

Note that a sharp fluctuation in voltage and/or frequency may cause damage to the fan as described in JIS C 4034-1.
- (4) Before running the fan, check the following points again:
 - ① An appropriate fuse (ground fault interrupter) is installed.
 - ② Wiring is correct.
 - ③ The product is securely connected to a ground.
 - ④ None of the two or three terminals of the motor has come loose or is disconnected.

 Caution

As for models using three-phase power supply, do not operate the unit with only two terminals connected.
Failure to observe this may cause the motor to burn out.

4. Preparation for operation

4.1 Points to be checked before test running

4.1.1 Checking the electrical system

- (1) Check that the fan is correctly wired.
- (2) Check the frequency.
Running the fan at other than designated frequency may cause performance degradation, or motor burnout, and damage to impeller and main shaft.
- (3) Check that the terminals are securely connected.
- (4) Check that the equipment is securely grounded.
- (5) Check that the settings of the overload protection device match the rated current value of the motor being used.

4.1.2 Checking the fan system

- (1) Check that water has not accumulated in the fan and that no foreign objects or materials such as tools have been left inside.
- (2) Check that all the connections on foundation bolts, the fan, accessories and pipe joints are securely tightened.
- (3) Check that the dampers and valves can fully open and close, and that they operate normally.



Always turn OFF the main power before rotating the fan by hand.

- (4) Rotate the fan by hand or by inching a motor to check that it can rotate smoothly without any internal obstructions.
- (5) Place an operator in advance so that the fan can be turned OFF immediately after the instructions of the person in charge of the operation.



Do not operate the fan if it is not running properly, for example if it is making a strange noise. Contact a specialist company or the service company designated by the manufacturer.

4.2 Trial run

4.2.1 Precautions at the time of starting the fan

- (1) Close the damper and turn the unit ON and OFF once or twice to confirm that the unit is operating normally without any unusual noise or vibrations. At that time, check the rotation direction of the fan through the external fan of the motor. To rotate the fan with three phase power supply in the reverse direction, swap two of the three wires of the power supply cable.

 **Warning**

Be sure to turn off the main power before changing the wiring of the fan.

Failure to observe this may cause an electric shock.

- (2) Turn on the power, and watch the unit closely until it reaches full speed. At that time, carefully check for unusual noise, vibrations, current, or any other abnormal condition.
- (3) In the meantime, check that there is no defective condition, including abnormal noise, abnormal vibration, and abnormal current. Start the continuous operation, and gradually open the damper. 2 In order to check the condition of each part, keep the fan running at a low flow rate (light load) for 20 to 30 minutes. At that time, ensure that the fan does not run at a rate where surging may occur.
- (4) Gradually open the damper until the fan reaches the full load operation. Keep it running under the condition for 1 to 3 hours, and check for any vibrations and noise at each section of the fan. In addition, check that the motor current value is normal. Note that the (electrical) current value of the models that handle high temperature air becomes high during the operation using the room temperature air.

 **Warning**

If the temperature of handling air is high, do not touch the fan main body or ducts. Failure to observe this may cause burn on the skin.

Also set apart from flammable gas.

4.2.2 Precautions during the operation

 **Warning**

In the event of a power failure, be sure to turn off the main power. Otherwise, when the power is restored, the fan suddenly starts, and it is dangerous.

Frequently starting and stopping the fan quickly damages it. Use the following values as a guide for the frequency of starting the fan.

Motor output	Startup frequency
7.5kW or less	Up to 6 times an hour
11kW to 22kW	Up to 4 times an hour
26kW or more	Up to 3 times an hour

 **Warning**

In the event of power failure during operation, be sure to turn off the power switch. The fan may suddenly start up on restoration of the power, which leads to a danger.

4.2.3 Precautions when stopping the operation

- (1) When stopping the fan, close the damper slowly and then turn the power switch off.
- (2) If air exceeding 200°C is used, cool down the inner casing slowly and completely by closing the damper and running the fan for a certain period. At that time, ensure that the fan does not run at a rate where surging may occur.

5. Stopping the fan

5.1 Precautions when stopping the use

If you do not use the fan for a long time (more than one month), observe the following points:

 **Warning**

When you leave the fan unused for a long period of time, be sure to turn off the main power.

- (1) When you leave the fan unused for a long period of time, apply appropriate anti-corrosive agent to the areas prone to rust.
- (2) Do not allow any dust or other contaminants to deposit on the fan main body and motor.
- (3) Block the inlet at suction side and the outlet at discharge side to prevent deposition of dust or to prevent intrusion of foreign matters in the connecting duct. If a damper is installed, close it.
- (4) Protect the motor and other electrical devices from moisture.
- (5) When you restart using the fan after a long period of shutdown, inspect all parts of the fan before use.
- (6) Manually rotate the impeller shaft once or twice a month to protect the bearing.
- (7) During stopping the fan, take measures of providing enclosures or entry lock to prevent unnecessary access by unauthorized personnel.

6. Maintenance and inspection

6.1 Daily inspection

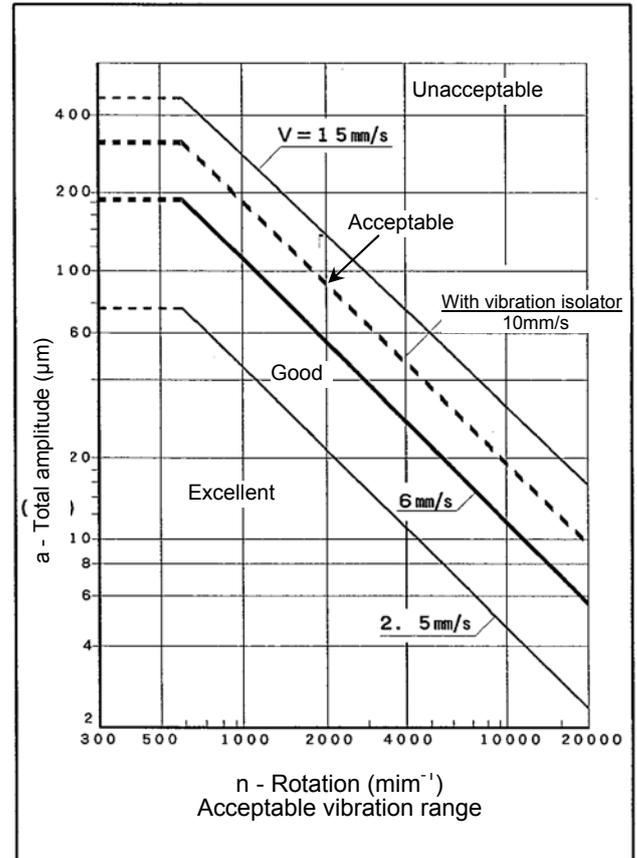
- (1) Check the vibration, noise, current value, etc. of the fan.
If there is any unusual condition, it may be a sign of failure; therefore, take the appropriate measures as soon as possible. For this purpose, it is recommended to keep an operation log.

- (2) If strong vibrations occur, stop operation and inspect improper duct connections, tightening of the installation bolts and foundation bolts, and check for accumulation of dust on the impeller and damage to the bearings.
If the vibration is within the range specified as "Good" in JIS B 8330, it is considered normal (see the figure on the right).
If a vibration insulating device is installed on the fan, vibration of the fan itself becomes slightly stronger although the vibration is not transmitted to the foundation. In such a case, a vibration lower than the broken line is considered normal.

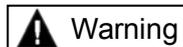
- (3) In addition to vibrations, noise is an important factor in judging the operating condition.
If you hear a metallic sound possibly made by contact into the rotor, stop the operation immediately.

- (4) Bearings generate noise even in normal condition.
Although it is difficult to identify an abnormal noise because bearings produce complicated noise, try and detect it at an early stage with careful attention.

(On the motor casing or the bearing housing)



6.2 Periodic inspection



Warning

Before carrying out the inspection of the fan, be sure to turn off the main power. Otherwise the fan may suddenly start up during automatic operation etc., exposing personnel to great danger.

Carry out the periodic inspection at least once a year.

The periodic inspection items include the following points, in addition to the daily inspection items.

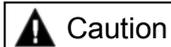
- (1) Check if there is no extra backlash in the coupling between impeller and motor shaft.
- (2) Inspect the impeller and the shaft for corrosion and wear.
- (3) Clean the inside of the fan, and apply anti-corrosive agent or otherwise repair the part.
- (4) Check that the insulation resistance of the motor has not decreased. At least 1MΩ is required.

7. Troubleshooting

7.1 Troubleshooting

Even if the same failure occurs, the cause and action may be different. In addition, there may be two or more causes.

If the cause and action cannot be determined using the following table, stop the operation immediately and contact a specialist company or the service center specified by the manufacturer.



Caution

Part replacement and repairs should only be performed by specialist companies.
Improper procedures may lead to malfunctions or accidents.

Failure	Cause	Action
Strong vibration	Corrosion or wear in the impeller, or foreign matter on the impeller Poor connection between the boss and shaft of the impeller Bend of the shaft Contact between the rotor and casing Resonant vibration by improper foundation Insufficient tightening of the mounting bolt Damage to the bearing	Remove the foreign matter adhered to the impeller, and correct the balance of the impeller. Replace the impeller or shaft of the motor. Replace the motor. Reassemble the casing. Reinforce the foundation. Retighten the bolt and nut. Replace the bearing.
Abnormal noise	Damage to the bearing Intake of foreign matter Contact between the rotor and casing	Replace the bearing. Inspect the inside of the casing. Correct the contact between the rotor and casing.
Low performance	Decrease in rotational speed or frequency Reverse rotation Corrosion or wear in the impeller, or foreign matter on the impeller Clogging of the suction filter Failure in opening/closing of the damper Dust deposited inside the casing and duct Excessive resistance Errors in calculating the specific weight of gas	Regulate the power supply. Swap the wires of the motor. Clean, repair, or replace the impeller. Clean the suction filter. Repair the damper. Clean the place. Consider installing a booster fan. Measure the specific weight, or perform a gas analysis.
Motor overload	Underestimation of actual resistance Miscalculation of gas density	Adjust with damper Reduce the rotational speed.

8. Special accessories

8.1 Dampers

- (1) Refer to the external dimensions drawing (supplied separately), and install the dampers in the designated locations paying attention to the direction of the air flow.
- (2) Open and close the vane to check that the blade does not contact the casing or ducts.
- (3) For electric, pneumatic or other driving systems, carefully read their instruction manuals.

8.2 Expansion joints

Make the distance between the sides the same as that shown on the external dimensions drawing, and take care not to pull or compress the joints excessively. Do not use the expansion joints to correct the fan or duct alignment.

8.3 Filter

Consider installing the fan with short ducts in order to make it easier to disassemble the fan. Install filters after thoroughly cleaning the inside of the fan and ducts. Inspect the filter soon after beginning the operation as it tends to clog easily at this time. Periodically remove the filter element and wash it if possible, or replace with new one.



Atai Fuji Motor Co., Ltd.

No. 32, Sec. 2, Chang-hsing Rd., Lu-Chu Hsiang, Taoyuan Hsien, Taiwan

TEL: +886-3-321-3030 / FAX: +886-3-321-7890

<http://www.ataifuji.com.tw/>