OPERATION MANUAL
(FAN & BLOWER)

DAEHAN FAN & BLOWER INDUSTRIAL CO.,LTD.

CONTENTS

1. OUTLINE

Blower is classified various way by forms, uses and application conditions, etc.
Generally consist of casing of main parts, impeller, shaft, bearing, coupling(or V-Pulley) bed, air flow control devices.
It should be noticed that before the installation by attached assembly external drawing about performance of supplied blower, forms, materials of parts, layout of bearing, using lubricating oil.
Fallowing is description of installation, operation, repair.

2. Notice from Import to installation

2-1 Import

If blower is imported, check difference between assembly external drawing and imported product.

2-2 Unloading

1) Be careful not to scratch to the shaft by hanging the lope with carelessness when holding fixed impeller to shaft.

2-3 Custody

1) If parts are temporary assembled, do not unpack the temporary assembly for to prevent breakdown or missing.
2) In case of keeping outside protect devices from rain perfectly.
3) Please keep inside electric parts
4) Check damage during transportation and unloading
(Check appearance, mechanical abnormality by rotating the V-pulley)
5) Install product imported by assembled state without disassembly unless special cases.
6) Keep basic size, layout of parts, direction of blower, etc and fix tightly no to occur separate distance or vibration.
(If basic is inferior this will cause vibration and accident.)

3. Foundation

3-1 Method of foundation

Foundation of blower should be constructed to proper location by concrete or steel for load of blower and mechanical vibration
Concrete needed to foundation should be prepared by considering load of blower.
If foundation is unstable, this will cause vibration, noise, rising of temperature of bearing and other abnormal action.
Ratio of mixture of concrete is 'cement : sands : gravel = 1 : 2 : 4'.
Holes of foundation bolts should be finished by having hardness and fully intensity concrete.
In case of location of foundation bolt is unclear, make space about height 20cm, width 10cm to insert foundation bolts and then concrete work is started.

3-2 A check size of foundation

Check difference between size of foundation, location bolts, layout of parts and assembly external drawing.

3-3 Mediation of foundation

Set base frame on the foundation line and make exact horizontality with putting liner between foundation base and frame.

4. Installation of the blower

4-1 It is good to install blower inside of the building where has clean air or dust free.

If install outside, sufficient safety devices is attached to moving parts motors, V-belts, etc.

And sufficient space or location is needed to regular check and disassembly and assembly.

4-2 Set blower on the foundation pad and maintain exact horizontality between pad and base by using liner and fix foundation bolts tightly.

Use spring washers to prevent little distance gap.

4-3 When fix motor base, both side of sheave need to adjust horizontality by using straightedge or fly thread to set a straight line between blower pulley and motor pulley.

Either shaft of electric motor approach to shaft of blower or not maintaining horizontality cause bearing wear of abnormal vibration occur.

4-4 Adjustment method

(1) Pulley verticalness adjustment is controlled by both side of electric motor.

And V-belt distance adjustment is controlled by bolt of side electric motor.

5. Installation of the preventing vibration device

Some cases needs to be prevented vibration of blower through foundation to entire building.

In this case set preventing vibration device between foundation and blower.

Preventing vibration materials are used lubber, cork, spring, etc. and generally use rubber products.

Rubber products are plate form and circular stick form and decided by weight or rotation of blower.

Vibration of blower is transported by inlet or outlet pipes.

Connected parts with blower prevent this by inserting canvas, lubber, etc.

6. Operation and a Stop

6-1 A check before operation

Please check fallowing factors before operation

1) Check abnormal material in casing
2) Check again a gap between casing of impeller, casing of inlet, shaft of bearing case, circular parts and shaft.
3) Check exactly bolt tightness especially bearing case bolt by knocking test hammer.
4) Check again damper, main control devices are working smoothly and set to full close.

5) If bearing is used lubricating oil, charge up to center of oil level gage of bearing case. And In case of water cooling check number of tub.

6) When grease lubricating or coupling is used, check again proper quantity is oiled to charger.

7) In case of sliding bearing oil film can break. Do manual oil charge or inching of electric motor from oil hole of top bearing case before operation.

8) Set operating hours by adequate discussion with related department. Also establish emergency stop abnormal situation after operating.

Notice) about lubricating oil for bearing

a. lubrication is grease

No need to charge because ship with charged during the test in the factory.

b. lubrication is oil

Ship with charging grease or rust preventive oil so clean by kerosene and fill oil marked on external drawing to center of flow meter of bearing case.

6-2 A check after operation

Check following factors right after operation.

Abnormal vibration or noise or rising temperature of bearing occurs then stop immediately and check parts again.

6-3 A check during operation

If start regular operation, fill out following factors after checking regularly.

1) Temperature of bearing

Bearing temperature is regulated not to exceed over 40℃ than surrounded air temperature. But there is no trouble if operation temperature is lower than 70℃.

2) Vibration of bearing

Vibration is measured at center of bearing case to 3 point of up, down, left, right of shaft direction. And allow operation measured values are lower than standard.

3) When bearing uses oil lubrication, check flow rate is normal by using oil gage and check oil leakage.

A cause of leakage

a. over flow rate.

b. Location of bearing case and oil film of shaft is not normal.

c. Deflate air of bearing case is chocked.

d. Loss of liquid packing or insufficiency to apply to surface of partition in case of split type bearing case.

4) Check oil ring rotation is normal in case of sliding bearing.

6-4 Stop

1) Cut power switch of electric motor after closing discharge damper in case of stopping the fan.

2) Keep cooling several minutes cooling devices of bearing case during stop operation.

3) Stop operation temperature of casing approach 100℃ on high temperature blower.

4) Rotate impeller by hand 4~5 times a week or inching of electric motor when operation stop happens a lot.
5) Check bearing lubrication depletion by heat when stop operation.

6-5 A regular check

1) Check wear of impeller, corrosion, crack of fan and clean sufficiently.
2) Check bent from vibration or wear conditions and clean sufficiently.
3) Adjust balance by equal test after clean impeller, shaft.
4) Measure gap of bearing housing and change to preliminary parts if wear is big and handle again bearing housing connection is abnormal. And check oil hole of bearing housing.
5) Clean abnormal materials in casing.
6) Adjust after checking droop of belt.
7) Check lubrication is sufficient or charge lubrication.
8) If state of noise, vibration, etc, is bad, observe carefully and handling this at regular check.
9) Adjust connecting state and check test operation during 5~10 minutes to make operation and time.

7. Repair guidelines

7-1 Impeller

1) Corrosion of impeller, hard wear, attached dust can cause imbalance and this will cause heavy vibration.
Check impeller, casing, shaft regularly all of blower.
Vibration caused by attached abnormal materials eliminate by removal of abnormal materials.
But corrosion or wear should be replaced or changed.
Revision of imbalance is done during repair. This work should be operated by skilled engineer unless crack can occur to material during welding of balance weight.
2) When assemble impeller to shaft, put boss to end of flange of shaft with carefully about relation of key and key.
Check gap between boss and flange of shaft. Set rotation stop washer, nut.
Nut should be tight again after boss is putted fully to the shaft and end of washer fold and put to the groove of nut.
(Washer which has no end bends both side of washer to side nut.)

7-2 Shaft

Shaft of blower extend to direction of shaft during operation by compressed teat or temperature of dealing gas.
So designed to fix bearing of electric motor shaft and extend to opposite direction of bearing of electric motor shaft.

7-3 Bearing

When disassembly of bearing, notice that protect ball and cover from impact after loosen screw of bearing stop because produced as unit.

No matter to use cover only with changing unit ball change bearing.

Especially fix exactly stop screw and shaft when assembly.

Incomplete fix cause noise and vibration by wear of shaft in case of large tolerance.

7-4 Guidelines at disassembly

When disassembly, not scratch to shaft and boss by using hammer or lubber hammer.

Especially notice that unreasonable force is loaded and then balance is broken when disassembly of impeller.

7-5 Assembly

1) Clean all parts and accessories with wasing oil and remove rust inhibitor.

Notice dust and metal powder are not putted between gear and gear.

And all parts, joint bolts, nuts, etc, use as beginning standard.

Also use same weight to beginning standard if unavoidably other parts are used.

2) Check following factors temperature of bearing is rapidly raised.

a. Check contact strongly to shaft if belt is used to shaft of cylindrical area or gap between shaft of cylindrical area and shaft is uniformity.

b. Adjust either overcharge grease in case of grease lubrication or porper flow rate in case of lubrication oil.

c. check again cover of free shaft push circumference of bearing in case of non-split type bearing case.

d. Check again number of tub in case of water cooling.

e. Check over lengthen of V-belt or imbalance in case of V-belt drive.

3) Open damper(or main control) slowly with notice to ammeter after operation is normal.

Rise gas temperature slowly to avoid rapid temperature rising of ather temperature or rotation parts of high temperature blower.

7-6 Lubricating oil and exchange of lubrication oil

1) Either oil or grease recharge or change every 6 months.

If difficult to do this change whole quantity once a year.

2) Method of pouring

Pour grease sufficiently both internal and external until thread is not seen.

Assemble external form and combine both side of coupling after pouring into a gap.

Pour proper quantity by using grease gun from hole of oil ater combine.

(Pouring quantity is decided by coming out of grease)

3) About bearing lubrication

Charge of grease is poured from grease nipple of cover upper part of bearing case.

Over pouring of grease cause abnormal temperature rising.

7-7 V-BELT

1) When V-belt is worn or damaged replace entire set not changing on part or this will cause imbalnce.
2) Center of belt pulley is fitted.
   If center is not fitted, durability of belt is shortended by heavy wear of one side.
3) Use same standard of PULLEY and V-BELT
4) BELT is easily wore of PULLEY has rough surface or defect.
5) If ventilation is not working by completely close of belt cover, this will cause breakdown of belt so keep being well ventilated.
6) When exchange belt, slide base of motor.
   If put belt by a lever unreasonably, PULLEY or belt is broken.
7) Put PULLEY of motor side and fix PULLEY of blower side.
8) Check loosing or twisting of belt by regular check after belt exchange.

7-8 BEARING HOUSING

1) Check before attachment
   When change BEARING of BEARING HOUSING , prepare tools and lubrication oil and check necessary parts such as BEARING, PLUMMER BLOCK location determination eccentric (SPRING) SEAL.
   Use each counterpart because upper and lower body of PLUMMER BLOCK is not exchanged to other PULMMER BLOCK.
2) Check processing of shaft.
3) Check surface roughness(blower 35) contact parts between SHAFT and SEAL and apply lubrication oil after cleaning the SHAFT.
4) Clean dust or abnormal materials inside of PLUMMER BLOCK.
5) Measure distance of radial before attach automatic self-aligning bearing.
   When measure bearing, put feeler gauge between bearing and upper bearing paddle wheel after set horizontal place.
6) Indentation
   Indent small bearing of short shaft by PRESS after lay to inner race by using tools.
   Work is easy if apply lubrication oil or molybdenum dioxide to SHAFT or BEARING inner race before indentation.
7) Shrink fit
   Generally medium or large bearing uses shrink fit.
   Temperature of shrink fit can get from standard of bearing and stop at 120℃.
   Oil of shrink fit uses clean MACHINE oil number 1 or transformer oil number 1.
   Heating furnace can use other way else indicated but need enough size to sink BEARING entirely not to contact container.

8) Put LOCK WASHER and fix NUT.

Check BEARING is adhered closely to SHAFT. Put and fix washer and NUT by using spanner or hammer.

Bend and put WASHER to KEY of NUT after tight NUT.

9) Apply grease to BEAIRNG when use grease.

10) Fixed side bearing and Free side bearing

When use above 2 bearings at 1 SHAFT, use one on fixed side bearing and the other on free side bearing.

Free side bearing prevent to load directly to shaft by expansion working prouced from temperature changes.

11) Assembly of PLUMMER BLOCK

a. Joint PLEUMMER BLOCK temporary after safe unloading to BASE to install.

b. Put fixed side bearing to lower part of PLUMMER BLOCK body.

c. adjust location of attachment of lower part of PLUMMER BLOCK to free side bearing and make bearing to center of left side.

d. When location of bearing is decided, check obstacle to rotation and fully joint temporary jointed bolt.

Large error of attachment makes friction and wear to OIL SEAL LABYRINTH SEAL and diameter part of PLUMMER BLOCK indirectly.

In this case, attach after modify the location to make right function.

e. Put lubrication into PLUMMER BLOCK.

It is proper to fill bearing and 1/3~1/2 of HOUSING inside in case of GREASE.

If put GREASE too much, this will cause heat generation.

Apply grease to contact part of OIL SEAL.

Oil level is set to center of lowest moving part in case of using OIL as lubrication.

12) Operation test

Operation test is needed to check normal operation after assembly.

If assembly is inferior, this will cause breakdown of bearing by sudden rapid rotation.

If lubrication is not normal, bearing get dry. So check by procedure before operation.