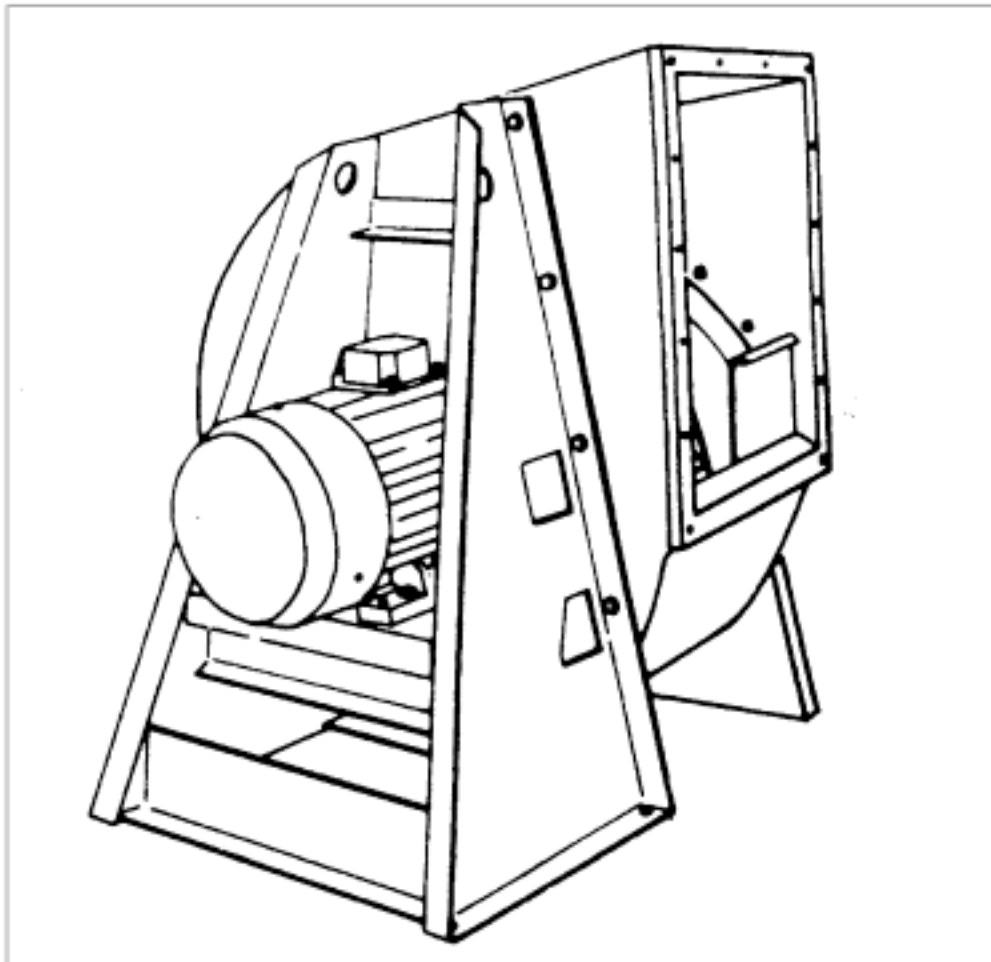


Hked - Hkcd centrifugal fans



1 - MACHINE IDENTIFICATION

Type:
 Manuf. n°.:
 Cust. item ref:
 Max. speed:
 Max. temp.:
 Power:
 Mass:
 Flowrate:
 Pressure:
 Acoustic power: Refer to cost estimate.

This machine's acoustic power level is calculated on the basis of a free field acoustic pressure measurement, in compliance with standard NFS 31021.

2 - CONFORMITY WITH THE MACHINERY DIRECTIVE 98/37/CE AND WITH THE ELECTROMAGNETIC COMPATIBILITY DIRECTIVE 89/336/CE

Representative of the trade of industrial fans French manufacturers, the UNICLIMA fans' section having read the terms of the directive of the June 14 1989 council on the approximation of laws of the member states relating to machinery (98/37/CE, modified by the directives 91/368/CE and 93/44/CE) reminds that:

1. The industrial motor fans

- are machines,
- are intended to be incorporated in a machine, in a system or in a group of parts, or to be put together with other machines with a view to build up a machine (in the meaning of the directive),
- cannot be put into service before the machine in which they will be incorporated be declared in accordance with the clauses of the directive 98/37/CE and with the national legislations implementing it,
- are therefore not allowed to have the "CE" marking,
- but must be accompanied by a declaration of the manufacturer (annex IIB of the directive 98/37/CE the model of which you will find in annex).

2. **The industrial motor fans**, in the meaning of the directive 89/336/CE, are not electrical or electromagnetic apparatuses neither equipment or installation but are components, intended to enter in the setting up of an apparatus and not intended, as they are, to a final user.

They are therefore not subjected to the directive 89/336/CE neither to the CE marking as such.

UNICLIMA: Refrigerating equipment trade association. Aeraulics trade association.

This machine's integration statement is appended to the delivery slip.

3 - SAFETY INSTRUCTIONS

3.1. Integration of the fan within a machine or an installation

The machine or installation in which the fan is integrated must complete the safety provisions made on the fan in order to ensure that the Machinery directive's requirements are fully observed.

Special care must be taken as regards mechanical and electrical risks (refer to Paragraphs 6.3 and 6.4).

3.2. Personnel qualification

The machines must only be handled, installed and operated by qualified and authorised personnel.

3.3. Operating conditions

- The equipment operating conditions specified in the original contract, such as, for example:
 - . the nature or temperature of the fluid conveyed
 - . the rotation speed
 must in no case be modified without first referring to Flakt Solyvent-Ventec.
- Obtaining the specified acoustic pressure level on the site requires perfect knowledge of the installation, and is therefore carried out under the purchaser's responsibility. It can be calculated from the acoustic power level indicated in the cost estimate.
- If a variable speed drive is used, the maximum speed indicated in Paragraph 1 must in no case be exceeded.

3.4. Inspection

The fan must be shut-down and locked-out before any inspections are carried out.

4- HANDLING

Handle the fan carefully, using the appropriate handling equipment:

- . Fork-lift trucks or palette transporters fitted with the appropriate forks,
- . Lifting devices of an adequate capacity,
- . etc, ...

For this purpose, use either the palette supplied with the fan, or the lifting points (diameter 50 mm) located on the pedestal for this purpose.

It is preferable to use flexible slings of an appropriate capacity and length, enabling the fan to be maintained as horizontal as possible.

The motor lifting points can also be used in order to improve the fan handling position (by supporting part of the load).

Important: Under no circumstances should the fan be lifted solely by the motor lifting points, or by the accessories fitted on the fan.

In order to handle the safely, read the fan's mass on the information plate and use the appropriate handling devices accordingly. Always refer to the total net mass of the fan and its accessories.



5- SHORT TERM STORAGE (LESS THAN 3 MONTHS)

If the fan is going to be stored between the date of delivery and actual installation, store in a cool, dry room after plugging its inlets and outlets to avoid any object accidentally entering the fan. This could damage the impeller and will certainly throw it off balance when started.

Important: the fan should be stored in working position.

Note: For long term storage (more than 3 months) a certain number of operations must be carried out before starting the fan up. In such cases, contact our services.

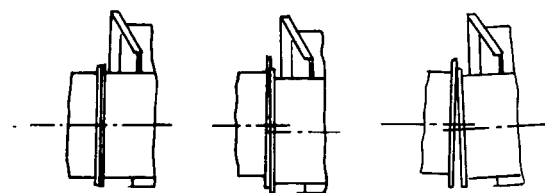
6- INSTALLATION

6.1. Foundations and mountings

- The foundations are prepared and made under the entire responsibility of the purchaser.
The nature of these foundations may be very variable, from very simple floor attachments to very elaborate high metal structures.
- On floor attachments, mass concrete is generally used. The mass concrete/fan contact surface must be perfectly level. This will prevent fan structure distortion after clamping. Indeed, such distortions are liable to cause unusual vibrations.
- When other attachment methods are used, possible resonance with the support structure's natural frequency must be taken into account. The possible transmission of vibrations to the fan's environment must also be considered. In order to limit this risk, anti-vibration mountings are generally used. These mountings must be selected taking various parameters into account (mass of the fan, accessories fitted and rotation speed).

6.2 Connection of the ducts

- In all cases (fan connected with or without flexible sleeves), the ducts must be perfectly in line with the fan's flange and frame.



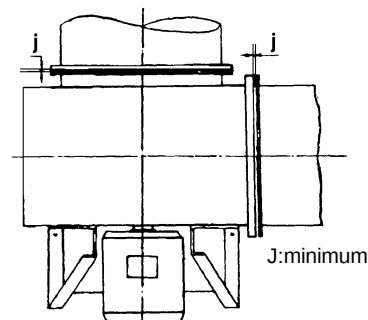
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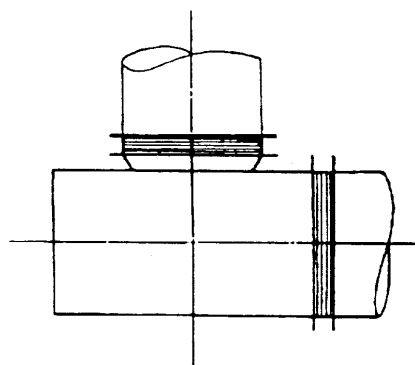
- The fan must in no case bear the weight of the ducts. The ducts must be supported or attached independently from the fan.

- In no case should the attachment bolts be used to stretch the ducts in place. Instead, first reduce the gap to the absolute minimum before assembling the fan's flanges and/or frames with the ducts.



- If anti-vibration mountings are used, or if the fan is operating at temperatures likely to cause expansion, flexible sleeves must be used.

Flexible sleeves will also avoid transmitting vibrations to the duct system and to the fan's environment.



6.3. Protection against mechanical risks

- Protection against mechanical risks involves installing grilles at the fan's inlet and outlet when they are not connected to ducts.
- Flakt SOLYVENT-VENTEC cannot be held responsible for accidents caused by disconnected fan inlets or outlets left without protection grilles.

6.4. Protection against electrical risks

- The fan does not have an electrical power isolating device enabling the equipment to be locked-out or allowing emergency shutdown.
- Such devices shall be integrated in the general electrical power supply under the purchaser's responsibility.

7 - COMMISSIONING

7.1. First-time fan rotation

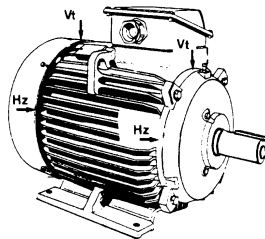
When the fan is switched on for the first time, immediately check that the impeller is rotating in the correct direction (this is shown by the arrow on the flange's backplate).

If the impeller is turning in the wrong direction, stop the fan immediately. To make the fan turn in the correct direction, change round two of the three power supply cables.

Note: If an unusual rubbing noise occurs during the start up (the impeller having reached nominal speed), please contact us as soon as possible so that we can help you make a diagnosis and decide on corrective action to be taken.

7.2. Inspection after start-up

- Check the on-line amperage upstream on the motor and compare with the rated current indicated on the motor plate. If the amperage is significantly higher, stop the fan immediately. If it is significantly lower, check the rotation speed and compare it with the value indicated.
- It is also possible, within the framework of a preventive maintenance programme, to monitor the vibration levels on the machine. In this case, measure the vibration levels at the bearings.



As specified in standard NFE 90300, the vibration levels at the bearings along two directions perpendicular to the motor rotation axis must be lower than or equal to the following global levels (except when specific contractual values are defined on the order).

Motor drive power	Vibration speed
P < 15 kW	V ≤ 4.5 mm/s
P > 15 kW	V ≤ 7.1 mm/s

These vibration levels are valid at the fan impeller's rated rotation speed.

If a variable speed drive system is used, contact our technical support services for more details.

Note: These vibration levels are root mean squared levels between 10 and 1,000 Hz, in compliance with international standards.

8 - MAINTENANCE

8.1. Warning

Before working on the fan, ensure that it is locked-out, or, better, disconnect its power supply cable.

It is not advisable to disassemble/reassemble or repair the fan. Any such operations will be carried out under the purchaser's sole responsibility.

This type of work must only be carried out by specialised personnel from Flakt Solyvent-Ventec's technical support services, unless otherwise agreed formally with the latter.

Flakt Solyvent-Ventec

Département Assistance (technical support service)

Tel.: (33) 04 72 45 13 00

8.2. Advice for maintenance

In a motor driven fan, the following wear parts are generally found:

- motor bearings,
- impeller when abrasive or corrosive fluid is conveyed.

It may also be necessary to replace various accessories such as:

- flexible sleeves,
- filter cartridges,
- anti-vibration mountings,
- seals... .

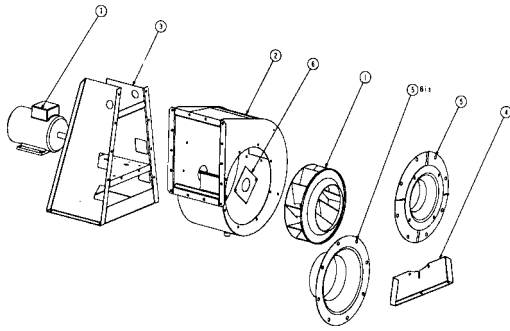
- For motor bearings, refer to the motor's maintenance manual.
- The condition of the accessories must be checked during normal shutdown intervals, and at least once a year.
- If the machine's vibration level increases significantly, inspect the impeller. If necessary, clean the impeller. If, after cleaning, the vibrations continue, or if a crack, corrosion, or reduced thickness is observed contact our technical support services so that corrective action can be taken.

8.3. Fan components and accessories

In order to facilitate contacts with Flakt Solyvent-Ventec's technical support services, you will find a list of the fan's components below:

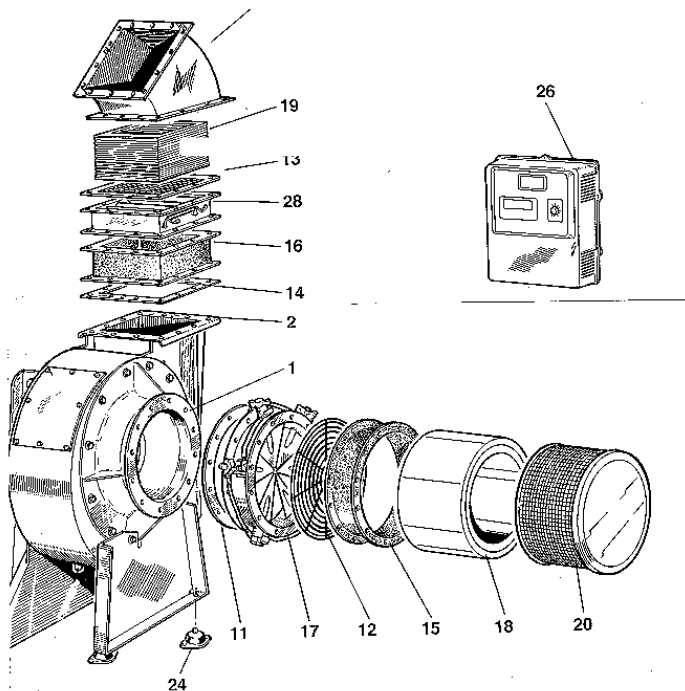
1. Impeller
2. Casing
3. Pedestal
4. Casing stand
5. Inlet cone
6. Shaft seal plate (optional on the Centripal HK)
9. Motor

These components are identified in the diagrams below:



Optional accessories:

- 11. Mating flange
- 12-13. Safety grilles
- 14. Back frame
- 15-16. Flexible connecting sleeves and deflectors
- 17. Inlet guide vane
- 18-19. Silencer
- 20. Cylindrical filter
- 21. 45° elbow
- 22. Cooling disk
- 23. Bearing grease nipples
- 24. Anti-vibration mountings
- 26. Variable speed control
- 28. Damper



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