

CENTRIFLOW PLUS PLUG FAN

>> INSTALLATION AND MAINTENANCE

 AIR COMFORT
CENTRIFLOW PLUS



IMPORTANT INFORMATION, SAFETY NOTES, TECHNICAL DESCRIPTION



1. IMPORTANT INFORMATION

Fläkt Woods fans comply with the requirements for health and safety of the EG Machinery Directive.

All fans leave the factory after being subjected to testing.

These instructions are intended for use by professional service staff. The installation, commissioning and operation of the fans must be carried out by professional staff who are familiar with the safety regulations.

Tools and protective equipment necessary for preventing accidents from occurring while installing and operating the fan must be used/worn in accordance with the local safety regulations.

All personnel involved with the product must carefully study this operating manual and diligently comply with all orders and instructions.

Fläkt Woods does not accept responsibility for any damage that can be attributed to non-observance of these instructions.

The warranty issued by the manufacturer will be forfeited if any changes to the product are made without the manufacturer's consent.

2. SAFETY NOTES

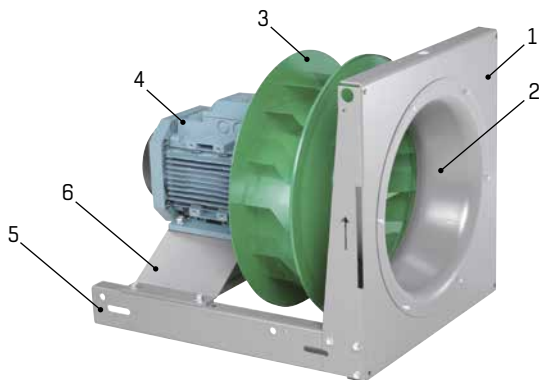


This symbol is designed to point out all safety and danger related information regarding danger on the operating personnel's lives and health.

3. TECHNICAL DESCRIPTION

The fan is used to generate a desired air volume at a given pressure rise that corresponds to the pressure losses in the duct system, to which the fan is connected. This is achieved by means of rotating the fan impeller.

3.1 DESIGN



- | | |
|---------------------------------|------------------|
| 1. Front frame | 4. Motor |
| 2. Inlet cone | 5. Base frame |
| 3. Impeller (hub in the middle) | 6. Motor bracket |

3.2 OPERATING CONDITIONS

Plug-in fans are designed to transport dust-free air in explosive atmosphere applications.

The standard operating temperature range of the fan is -20°C - $+60^{\circ}\text{C}$. The maximum permissible ambient temperature of the motors is $+40^{\circ}\text{C}$.

If they are operated in conditions where the ambient temperature is higher, the rated output will as a rule have to be reduced. See the instructions of the motor manufacturer



The fans are designed to be used as parts of equipment or plant construction. They are not ready for use as a stand-alone product and the standard version does not have protection against body contact, the appropriate protective measures are to be taken according to EN 292/294.

Only operate the fan up to the maximum permissible speed given in the information on the fan rating plate.

3.3 MOTORS

The motors are three-phase motors to IEC-standard with degree of protection IP55 and can be equipped with thermal overload protection consisting of a thermoswitch or thermistor. The motors meet the requirements of IEC-standard, VDE and DIN norms. The motors are suitable for operation across the frequency converter. The max permissible control frequency is specified on the motor rating plate. The minimum control frequency is 10 Hz.

Integral motors are 3-phase 400 VAC motors with integrated frequency converter. Degree of protection is IP 55 and allowed ambient temperature is $-10\dots+40^{\circ}\text{C}$. Max control frequency is specified on the motor plate, min control frequency is 10 Hz.

TRANSPORT, MOUNTING INSTRUCTIONS, COMMISSIONING



4 TRANSPORT

4.1 TRANSPORT INSPECTION

Check the fan immediately after you receive it and make sure that it has not been damaged during transport. If you discover any damage, get in touch with the transportation company without delay. Briefly rotate the fan impeller to see that it rotates easily. Check the information on the fan rating plate.

Proper procedures must be followed when transporting the product!

Faulty conditions in transporting may result in serious damage on the product

4.2 TRANSPORT SAFETY

The transport material is to be selected according to the packaging and the weight of the product. Loading must be carried out as instructed.

4.3 INTERMEDIATE STORAGE

If the fan is to be stored before or in between uses, the following needs to be taken in account:

- Original packaging is to be used. If the storage conditions require it, additional protection may be added
- The storage environment must be dry, dust-free and not have a high level of humidity (<70%)
- Storage temperature must be in between -25°C and +60°C

Before commissioning, the respective instructions must be studied thoroughly.

5 MOUNTING INSTRUCTIONS

5.1 INSTALLATION OF THE FAN

The fan is secured to a base by bolts in mounting holes across anti-vibration mountings. The base must be level and stable. The fan must only be mounted in a horizontal plane. Either the fan or the base is mounted on anti-vibration mountings.

5.2 FITTING THE ACCESSORIES

The fan should normally be connected to the air handling unit by means of flexible connection or other type of gasket to eliminate vibration transfer from fan to AHU casing.

Providing necessary grounding for the accessories is within the constructor's field of responsibility.

Inlet protective screen can be fitted directly to the front frame or outside AHU to the inlet opening.

5.3 SAFETY REGULATIONS

The fan does not meet the provisions of CE labelling (i.e. it has an impeller without guard). The fan must be installed in accordance with EN 292/294.

5.4 ELECTRICAL CONNECTIONS

All electrical connections must be wired by authorised personnel only. The necessary electrical and safety precautions must be taken into account. If the motor is operated across a frequency converter, the connections must be made according to the instructions of the frequency converter manufacturer. The motor must be grounded.

6 COMMISSIONING

6.1 SAFETY CHECKING

- Rotate the shaft and check that the impeller can move freely.
- Make sure that there are no foreign objects in the fan or in the ducting.
- Also check that there is no unusual noise in the fan.
- Check that the installation work has been carried out in accordance with the relevant regulations.
- All necessary protective devices must be installed.
- The fan may only be commissioned after all proper procedures have been followed and all necessary inspections have been carried out.

6.2 TEST RUN

Briefly switch on the power supply to the motor to check whether the fan impeller rotates in the correct direction. If the impeller is rotating in the correct direction, the fan may be switched on.

Check that no abnormal mechanical sound and no surging occurs.

MAINTENANCE



7. MAINTENANCE

7.1 WARRANTY

A precondition of the warranty is that regular maintenance has been carried out. Defects under warranty must immediately be notified to the manufacturer or the importer. The warranty does not cover service work or indirect damages.

7.2 MAINTENANCE

7.2.1 BEFORE MAINTENANCE

Switch off the power supply to the fan at the safety isolating switch and wait until the impeller has come to a full halt.

7.2.2 INSPECTION

The fan is to be inspected at least once a year.

7.2.3 CHECKING THE MOTOR BEARINGS

The motors are meant to be operated in dry or humid air at a normal ambient temperature. The motor bearings have to be lubricated in accordance with the instructions that accompany the motor. Replacements of bearings are to be done in accordance with the motor manufacturers instructions.

7.2.4 IMPELLER

The maximum permissible vibration level measured from the motor bearing is 7.1 mm/s

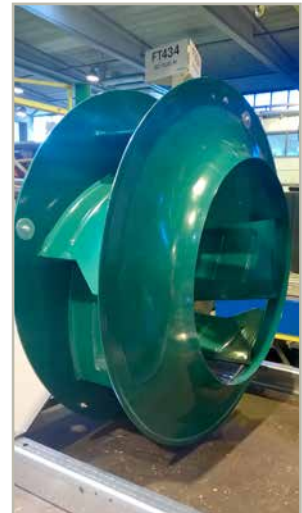
The impeller can be cleaned using a vacuum cleaner, compressed air or by brushing. If the impeller is coated with greasy dirt, it can be washed with a detergent or a solvent.

The cleaning is done if necessary, but a control inspection should be done at least once a year. Badly tarnished impeller will result in lower efficiency of the fan and increases energy consumption.

7.3 REPLACING THE MOTOR AND THE IMPELLER

The fan will have to be disconnected from the unit before the motor can be replaced.

1. Disconnect the electrical cables from the motor terminals.
2. Dismantle the fan (including the anti-vibration mountings, if needed) from the unit.
3. Dismantle the motor from the motor mount.
4. Dismantle the front plate



5. Remove the impeller from the motor shaft by removing the clamp screw and top screw.





MAINTENANCE, CONT.

6. Use an extraction tool to pull the impeller off the shaft (the motor can be moved backwards if needed, take care so the motor won't drop down). Use the groove on the hub to pull the impeller.

The bigger the impeller the stronger the puller should be.

The same applies in humid conditions



7. When using an extraction tool please follow the general instructions for the removal tool (correct work methods, tighten and knock the head of the tool to check if it is tight, use of heat).
8. Mount a new motor on the motor bracket, do not tighten.
9. Mount the fan impeller on the motor shaft (if necessary, clean shaft and hub inside).
10. Mount the front plate
11. Tighten the supporting bars.
12. Mark the needed overlap in the inlet cone.
13. Check the gap between the fan impeller and inlet cone.
14. Align the fan impeller.
15. Tighten the motor on the motor bracket and lock the impeller.

Check that the fan impeller does not touch the inlet cone.

7.4 FINAL INSPECTION

Check that:

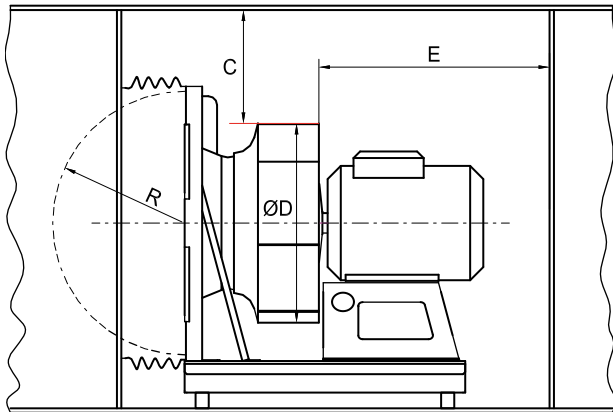
- The impeller is mounted for the correct direction of rotation.
- All screws and nuts have been tightened.
- No foreign objects have been left in the fan or in the ducting.



RECOMMENDED DISTANCES TO OTHER COMPONENTS, AIR FLOW MEASUREMENT DEVICE



8. RECOMMENDED DISTANCES TO OTHER COMPONENTS



$$R \geq 0.5 \times D$$

$$E \geq 1 \times D$$

$$C \geq 0.4 \times D$$

9. AIR FLOW MEASUREMENT DEVICE

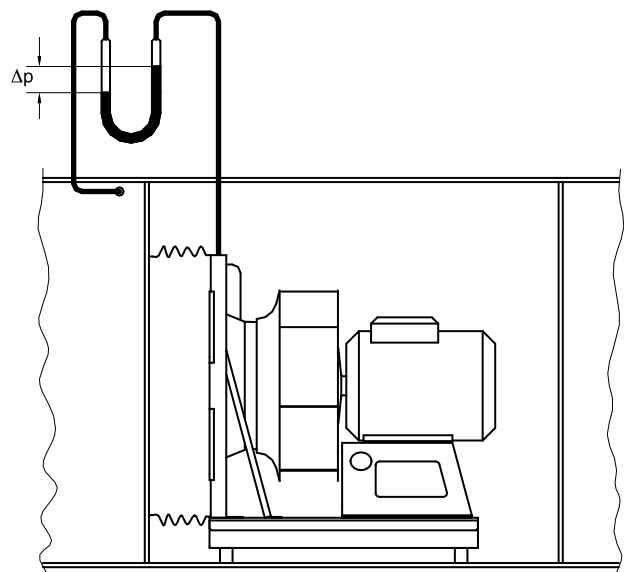
The airflow sensor is used for measuring the airflow of the plug fans. The method is based on differential pressure. The pressure is measured at a specific point in the inlet cone and the reference pressure is measured upstream of the inlet cone. The air flow sensor is supplied factory mounted in the inlet cone. The air flow is calculated as a function of the coefficient k and the differential manometer reading Δp_m from the equation:

$$q_v = \frac{1}{k} \times \sqrt{\Delta p_m}$$

q_v = air flow (m³/s)

k = k-factor of each fan

Δp_m = differential pressure reading (Pa)



Centriflow Plus	k-factor
GPEB-1-022	68,87
GPEB-1-025	54,81
GPEB-1-028	41,27
GPEB-1-031	36,22
GPEB-1-035	29,05
GPEB-1-040	22,05
GPEB-1-045	18,21
GPEB-1-050	14,88
GPEB-1-056	11,81
GPEB-1-063	9,21
GPEB-1-071	7,28
GPEB-1-080	5,84
GPEB-1-090	4,46
GPEB-1-100	3,54



10. DECLARATION OF CONFORMITY

MANUFACTURER'S DECLARATION

As defined by the EC Council Directive on machinery 98/37/EEC

concerning the machinery, which is intended to be assembled with other machinery/machinery components to constitute machinery.

Manufacturer: Fläkt Woods Oy

Address: Kalevantie 39
FIN-20520 Turku
Finland

We declare herewith that

Products: Radial fan GPLB, GPEB
Driven by motor APAL

Apply following directives:

- Consolidated Directive for Machinery 98/37/EEC
- Consolidated EMC Directive 89/336/EEC
- Consolidated Low Voltage 73/23/EEC
- ATEX Directive 94/9/EC, TC 305/WG2/SG1 WI 00305066 Doc N107-2

This machinery shall not be put into service until the assembled machinery has been declared in conformity with the provisions of above mentioned directives.

Date: 27.5.2004

Signature:

Heikki Stenberg

Position of signatory: R&D Manager

FläktWoods

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A HISTORY OF INNOVATION AND RELIABILITY

Fläkt Woods is a global leader in air management. We specialize in the design and manufacturing of a wide range of air climate and air movement solutions. Our product brands such as SEMCO®, eQ, eQ PRIME, Econet®, Veloduct®, Optivent®, Econovent® and Cleanvent® are well-known and trusted by customers all over the world to deliver Air Comfort and Fire Safety. We are constantly aiming to provide systems that precisely deliver required function and performance, as well as maximum energy efficiency.

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