GEOVENT

# INSTRUCTION MANUAL


# FAN

## LEF/MEF 250 - 630

Version 2.3 04.02.16

www.geovent.dk

## Table of content



## 1.0 General safety precautions

IMPORTANT - Please study all the instructions before mounting and commissioning.

This instruction manual is valid for MEF/LEFfans. LEF/MEF is standard motor where an external frequency inverter can be connected. More specific data regarding frequency inverters can be found in the specific manual for the inverter.

Please keep these instructions in a safe place and instruct all users in the function and operation of the product.
Do not dismantle any factory-mounted parts, as it impedes the commissioning of the equipment.
All electrical installations must be carried out by an authorised electrician

## 1.1 Danger

Explosive media – The fan is not suitable for the extraction of aluminium dust, flour, textile dust nor for sawdust or other media, which are connected with danger of explosion, without specific approval from Geovent A/S.

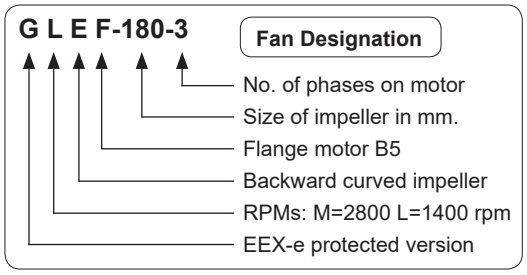
Removing the protection net on the fan whilst in operation involves a risk of mutilation.

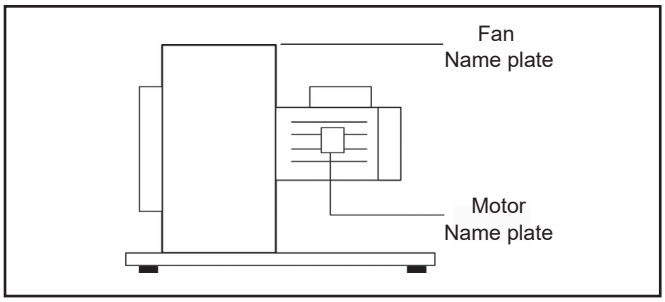
Always switch off the current when mounting something on the Fan or when servicing it.

## 1.2 Field of application

The GEOVENT fan LEF is typically used for general ventilation as well as for smaller process extraction jobs, where a high pressure is not required. The fan MEF is applied for process extraction within the industry for the extraction of welding smoke, exhaust gasses, grinding dust and vapours.
The fan is neither suitable for the extraction of aluminium dust, flour, textile dust nor for sawdust or other media, which are connected with danger of explosion, without prior, written approval from Geovent A/S.

## 1.3 Technical data



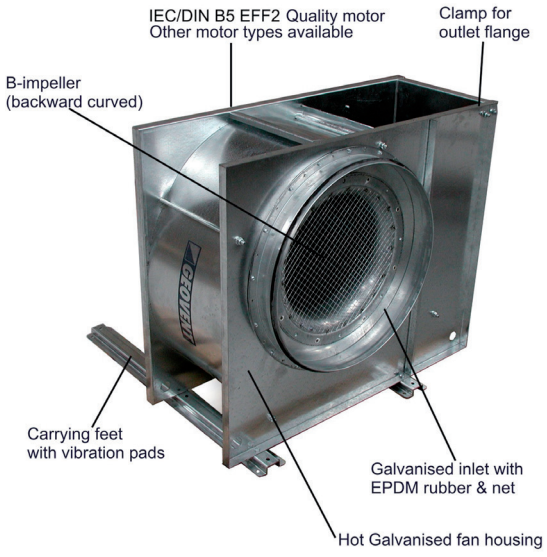




Temperature extracted air Max 80°C
Temperature surroundings Max 40°C

If the temperature of the extracted air exceeds 80°C, special bearings must be used. Please contact your dealer.
The sound level depends on various factors under various circumstances. For instance, where in the room the Fan has been installed, the size of the room, the temperature in the room, the sound of the room and also the connection (hose><pipe) of the Fan influences the sound level of the fan.
As a main rule, a sound box will reduce the actual sound level to only half the level without a sound box.

The actual ampere consumption and the kW of the motor are shown on the metal sign on the fan.

## 1.4 Construction

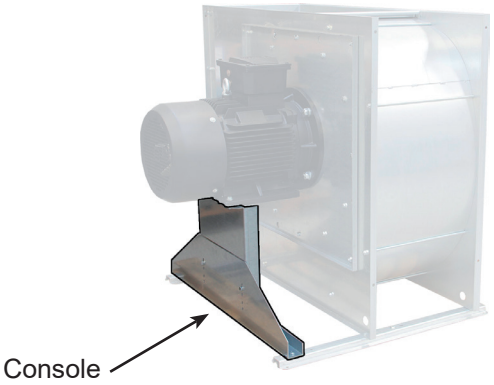


Fan housing: 100% galvanized steel for optimal corrosion resistance. Brackets are standard on all fans as well as inlet nozzle with safety net.

Impeller: Backward curved B-impeller in painted Domex sheet metal.

Motor: B5 flange motor, directly driven IEC/DIN B5 EFF2 quality motor in painted die cast aluminium in protection class IP-55. Other motor types available on request.

Console:
5.5kW motors and above or heavy custom motors come with a supporting console to carry the weight.

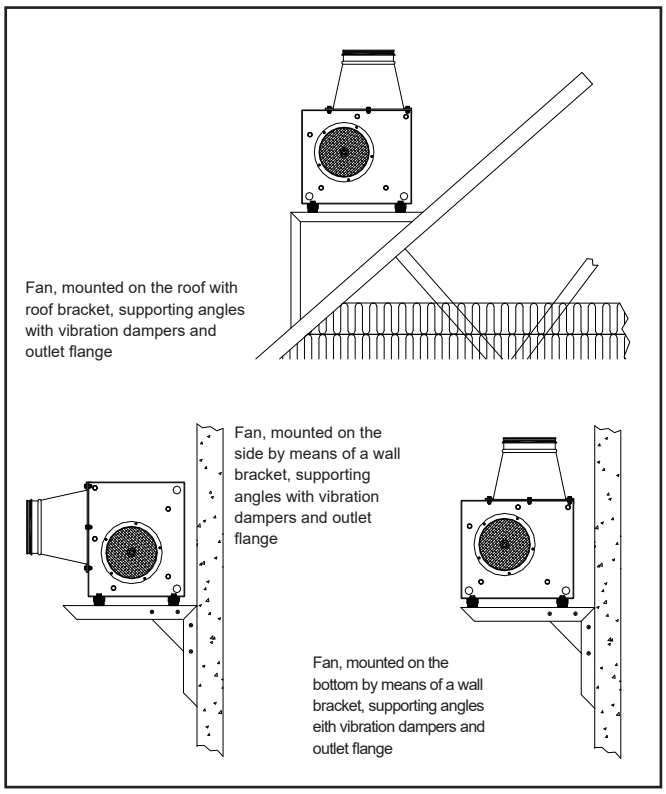



Motors of less than 5,5 Kw do not have a console to support the weight of the motor.

## 2.0 Installation

The Fan is supplied assembled and ready for connection to piping and to the mains.

Before mounting the fan, please make sure that the optimum installation area is selected.
Is there space enough for carrying out satisfactory installation/service of the fan? What about optimum connection possibilities for piping and automatics?
If at all possible, please avoid bends just before the intake and after the outlet, since since this may reduce the effectivity of the fan.
For outdoor mounting, any noise nuisances for neighbours should be taken into account and also ensure that the motor is kept out of heavy showers.
Drill holes in motor housing and remove drain plugs from the motor.




Procedure:

1. The fan is solidly fixed to the roof/floor or to a ceiling bracket or wall bracket (see figure 1). The fan is fixed by attaching the vibration dampers with 4 off M8 bolts. The Fan is to be mounted in one of the shown ways. Do not install the Fan with the intake in vertical direction.

2. The piping is connected to the fan. On the inlet side, the pipe may be fastened by means of self cutting screws. Remember to seal the connection with filler!

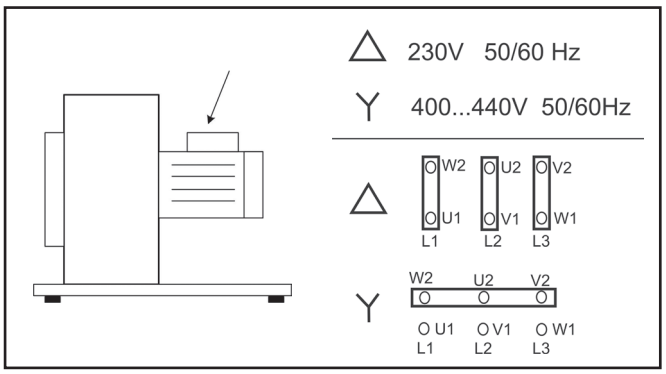
3 On the outlet side, the pressure connecting piece (optional equipment) is attached to the fan by means of the supplied clamps. Remember to seal the connection with filler!

4. The pressure connecting piece is then attached to the piping on the outlet side by means of self-cutting screws. Remember to seal the connection!

## 2.1 Connection of fan to the mains - standard motor

1. The fan should only be connected to the mains by a certified electrician and a motor protection switch should always be used.

2. Our 3-phase motors may be configured to both 3x230V and 3x400V. From the factory, the motor has not been configured and the enclosed metal cover plates are to be mounted in such a way in the terminal box that they fit the voltage.



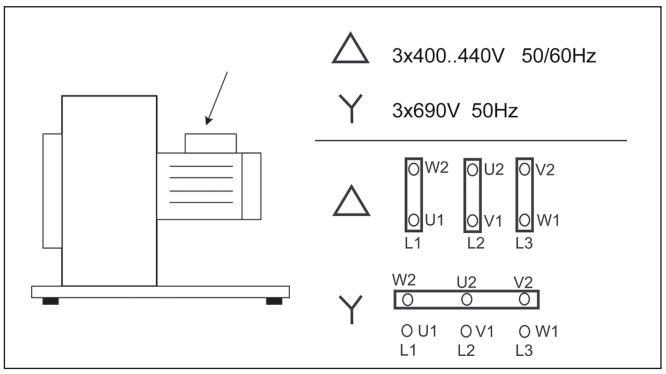

Always double check the metal sign on the motor and on the inner side of the cover for current configurations (diagram).

**From 4,0 kW motors and up:**

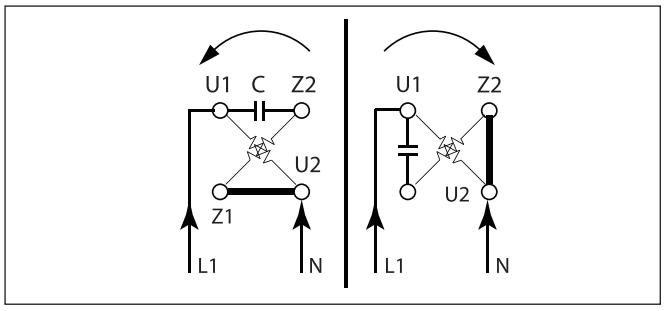
Δ 400… 460V 50/60Hz
Y 690 50Hz

Our 3 phased motors at 4,0 kW and larger are configurable for both 3x400, 440V and 3x690V.
By default the motor is not configured and the jumper bars must be installed in the terminal box according to voltage.
Double check the metal sign on the motor and the inside of the lid for current configuration.

## 2.2 Connection of fan to the mains - Motors with integrated frequency inverter.




3.Connection diagram 1-phase motor
(Not suitable for regulation) up to 2,2 kW




## 2.3 Installation of optional equipment

Mounting of sound box

From the factory, the fan will be installed in the sound box (optional equipment). The box must be mounted on horizontal surfaces and may only be mounted with vertical outlet.

Mounting of frequency converter

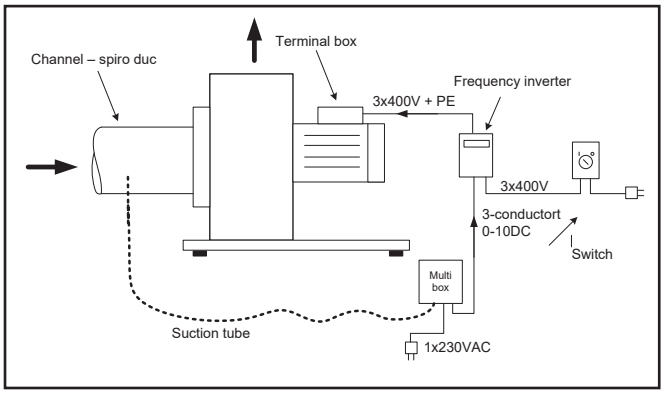
Our standard 3-phase motors are particularly suitable for frequency converter operation.

Suggested application – frequency inverter

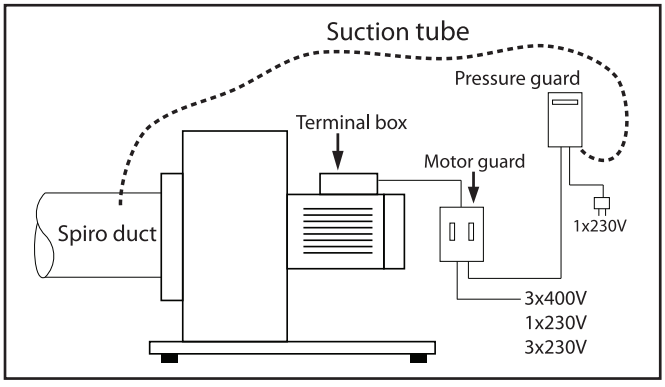
**Installation of frequency inverter**

Our standard 3-phased LEF/MEF fans are highly suitable for operation with frequency inverter allowing for pressure control and speed control.

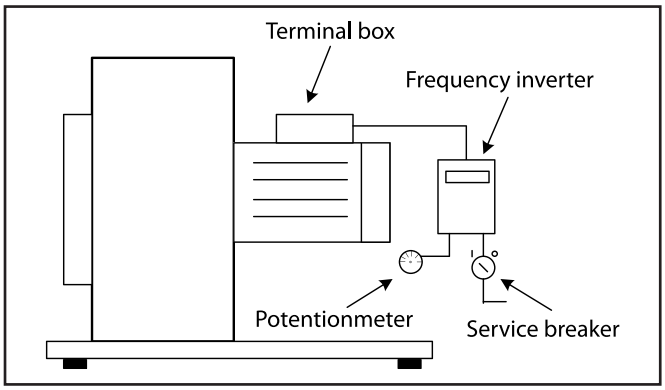
**Draft of installation with frequency inverter:**




**Draft of installation with pressure guard and motor guard:**




**Draft of installation with potentionmeter:**



## 2.4 Trial run – exact adjustment

After the installation has been completed, please check whether there are any vibrations in the fan.

We recommend checking whether the fan supplies the correct volume of air, for which the equipment has been dimensioned. I.e. control the volume of air and make sure that it does not exceed the ampere capacity of the motor.

## 3.0 User instruction – application

When extracting large quantities of air, containing dust, the fan wheel may get out of balance due to dirt on the wheel. In order to avoid this, we recommend using a filter.

In many cases, the fan is started by pushing the green button on the motor protection switch (if automatics are not used).

The fan will not work as intended if:

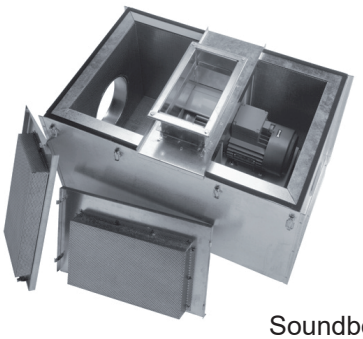
- unauthorised parts have been mounted on the fan (e.g. unauthorised wheel).
- the wheel runs in the wrong direction. It will still work, but the capacity will be reduced to a third of the normal capacity.
- no motor protection switch is used.

## 4.0 Maintenance

**Periodic maintenance**

In principle, the motor is maintenance-free because of the factory-mounted, completely closed special ball bearings, which do not require any maintenance. Replacement of worn bearings should only be handled by an electrician.
The wheel and the fan housing should be cleaned every year or according to requirement. The wheel and the housing may be cleaned by means of a soft brush and detergent. Remember to disconnect the power before the washing and to wipe the parts afterwards with a dry cloth. This operation results in a longer life of the fan.

Access to the inside of the fan housing and the impeller, can be gained by screwing off the umbracko screws on the back of the fan.
**Remember to always cut the power**.



Soundbox - optional

## 4.1 Trouble-shooting

**Remember to always use a motor protection switch!**

**Always use adjustment damper!**

In case of problems with the fan, the following items may be reviewed in order to check whether:

**The volume of air or the pressure is too low:**

- Wrong direction of operation of the wheel.
  May be due to wrong electrical installation.
  Please double-check the direction of rotation.
  Change two phases, if necessary.
- Leaky channel system.
- Poor inlet/outlet possibilities near the Fan may reduce the yield (e.g. 90° bend before the inlet).
- Damaged wheel.
- The rotation speed has been set lower.
- If the temperature deviates substantially from the lab measurements, where the temperature was 20°C with an atmospheric pressure of 101.4 kPa.
- The dampers have not been correctly adjusted.
- The central lid on the sound box is turned the wrong way and thus blocks the air.
- The suction net has been blocked by cotton waste, a cloth or the like.

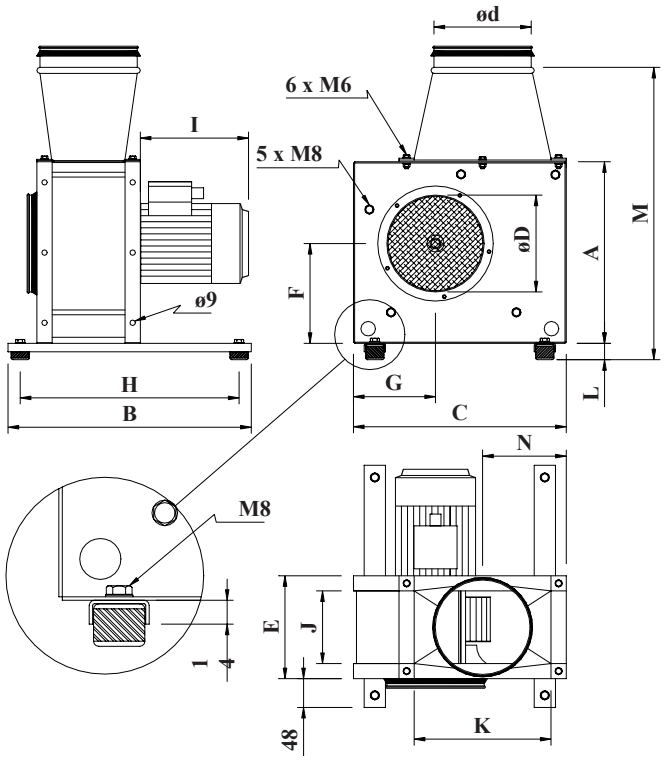
**Vibrations and noise**

- The base is not even/stable.
- Foreign objects are stuck in the fan.
- Damaged wheel or motor.
- The wheel is loose.
- The wheel may have become unstable, for instance as a result of dirt on the impellers.
- The wheel is rotating in the wrong direction.
- The fan supplies more air than for which the equipment has been dimensioned.
  Use adjustment damper.
- Loose bolts or screws.

**The motor is overtaxed**

- The cabling of the motor is not correct.
- The shaft has been bent.
- The fan has over-capacity in relation to the resistance in the system.
  Use adjustment damper.
- The speed of the motor is too high.
- Defective motor – please contact your dealer!

## 4.2 Table of dimensions



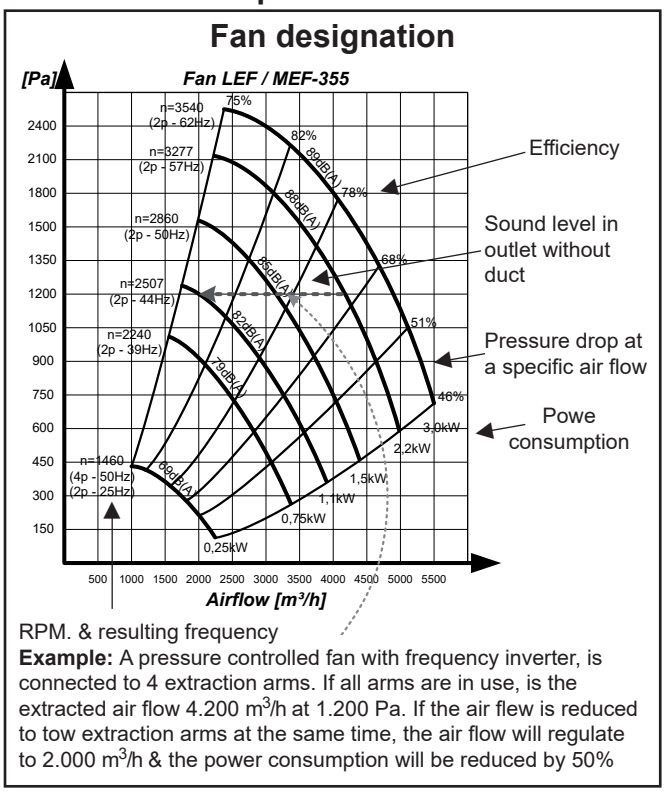

| Table LEF/MEF 250 - 630 (LEX/MEX) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Type** | **250** | **315** | **355** | **400** | **450** | **500** | **560** | **630** |
| A | 410 | 510 | 570 | 648 | 715 | 758 | 907 | 989 |
| B | 500 | 700 | 700 | 800 | 800 | 800 | 800 | 800 |
| C | 500 | 600 | 680 | 756 | 850 | 871 | 1070 | 1175 |
| øD | 250 | 315 | 400 | 400 | 500 | 500 | 630 | 630 |
| ød | *** | *** | *** | *** | *** | *** | *** | *** |
| E | 215 | 260 | 284 | 308 | 340 | 345 | 425 | 446 |
| F | 230 | 290 | 329 | 370 | 408 | 421 | 523 | 563 |
| G | 210 | 240 | 272 | 304 | 340 | 362 | 440 | 467 |
| H | 460 | 660 | 660 | 760 | 760 | 760 | 760 | 760 |
| I | ** | ** | ** | ** | ** | ** | ** | ** |
| J | 170 | 210 | 234 | 260 | 290 | 295 | 375 | 400 |
| K | 320 | 400 | 450 | 500 | 560 | 510 | 709 | 800 |
| M | 637 | 720 | 797 | 965 | 1045 | 1065 | 1340 | 1340 |
| N | 185 | 225 | 250 | 275 | 305 | 263 | 380 | 425 |
| **VÆGT** | 38* | 43* | 48* | 56* | 71* | 81* | 125* | 135* |

* The weight depends on which size motor

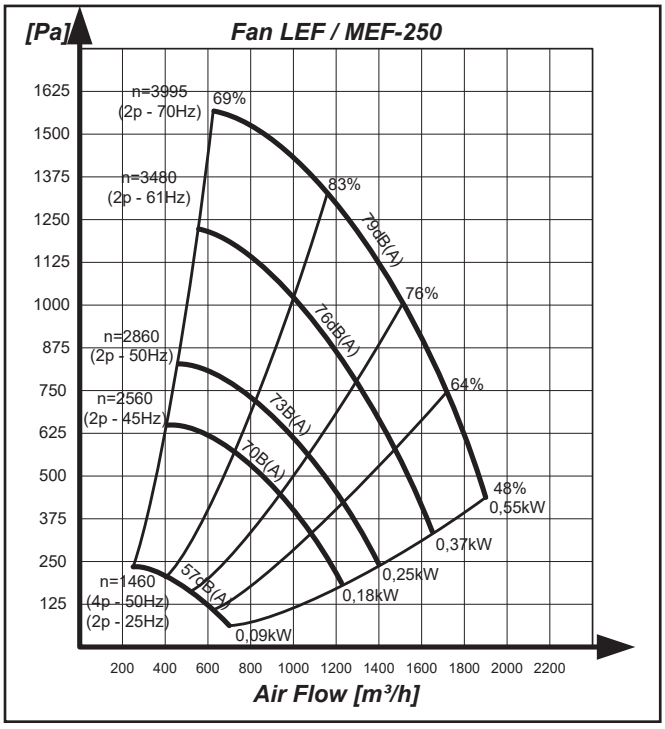
** Depending on the motor size

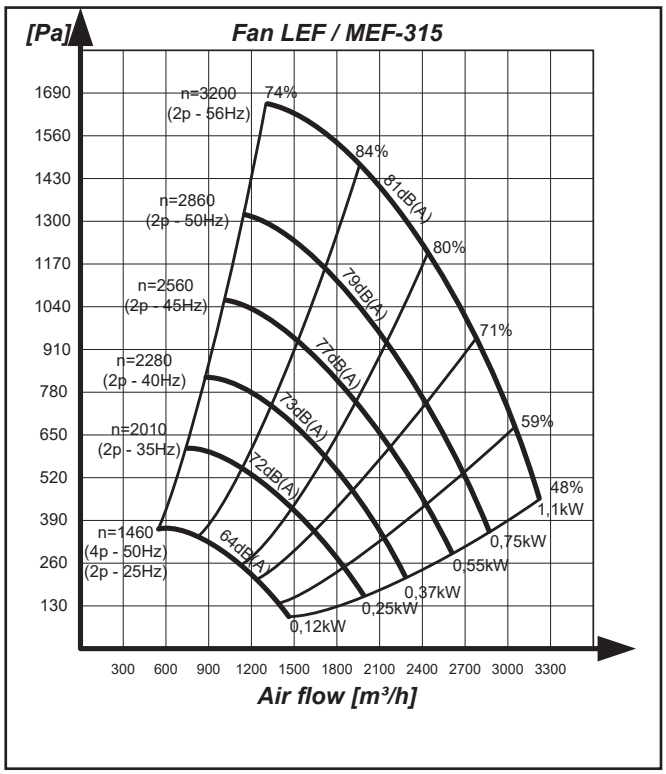
*** Depending on which size pressuretub

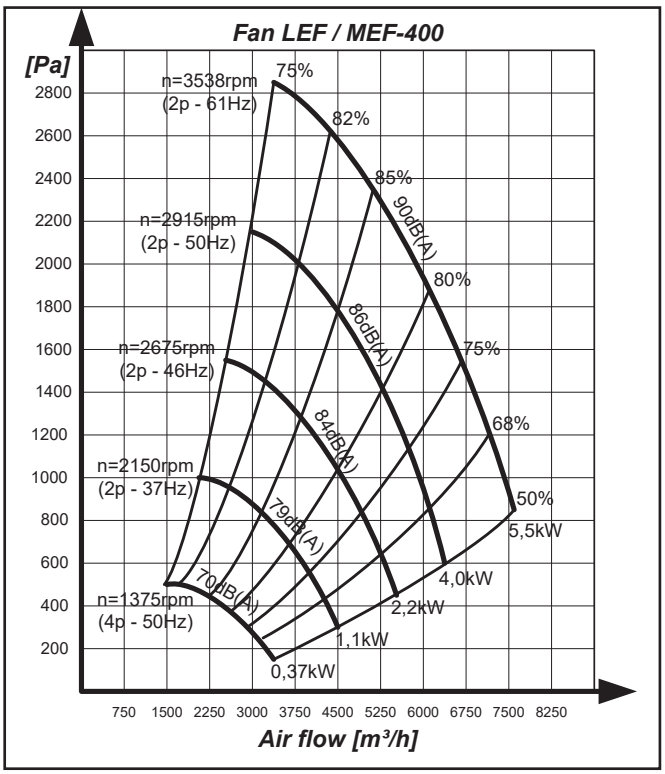
## 4.3 Pressure drop

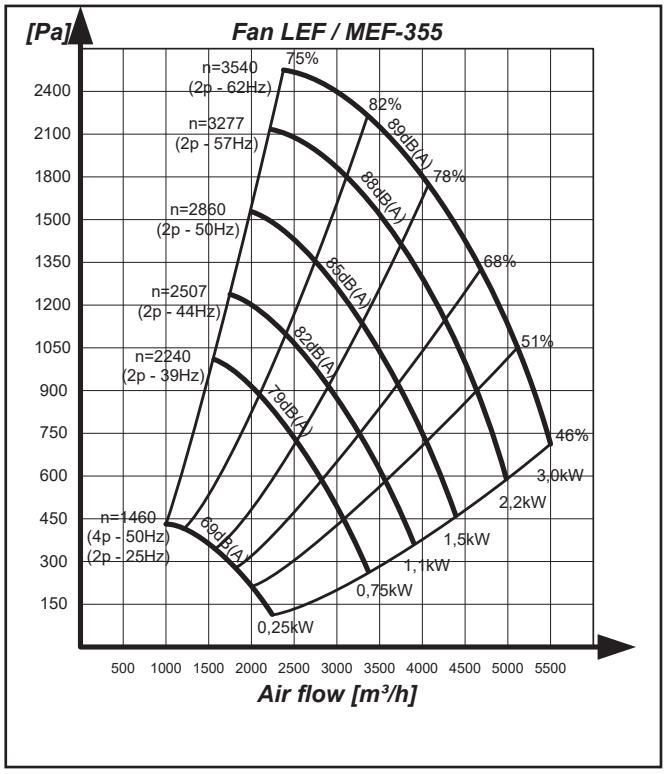


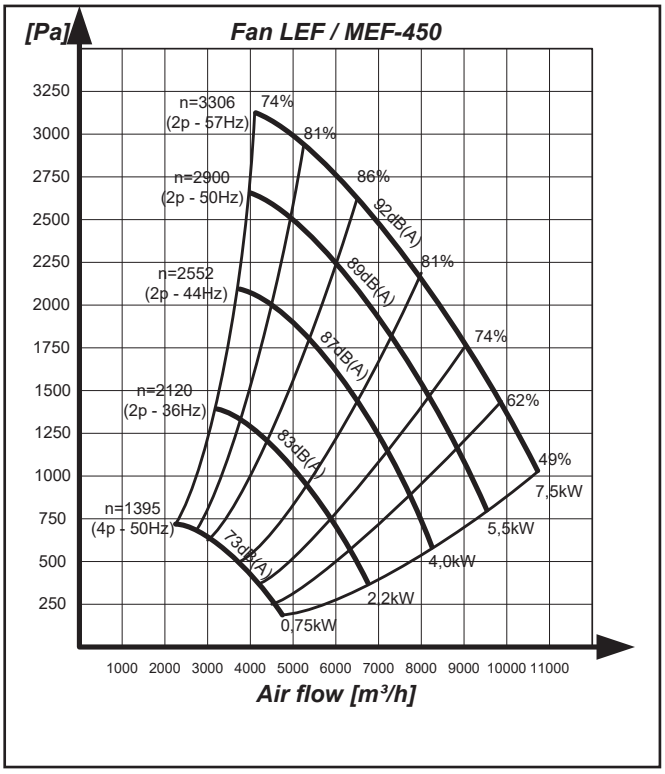

**Example:** A pressure controlled fan with frequency inverter, is connected to 4 extraction arms. If all arms are in use, is the extracted air flow 4.200 $m^3$/h at 1.200 Pa. If the air flew is reduced to tow extraction arms at the same time, the air flow will regulate to 2.000 $m^3$/h & the power consumption will be reduced by 50%

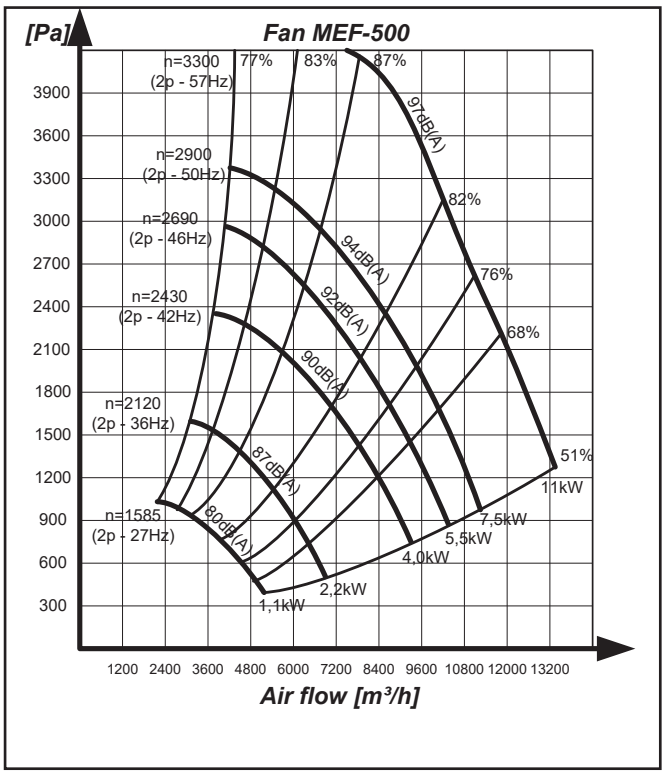


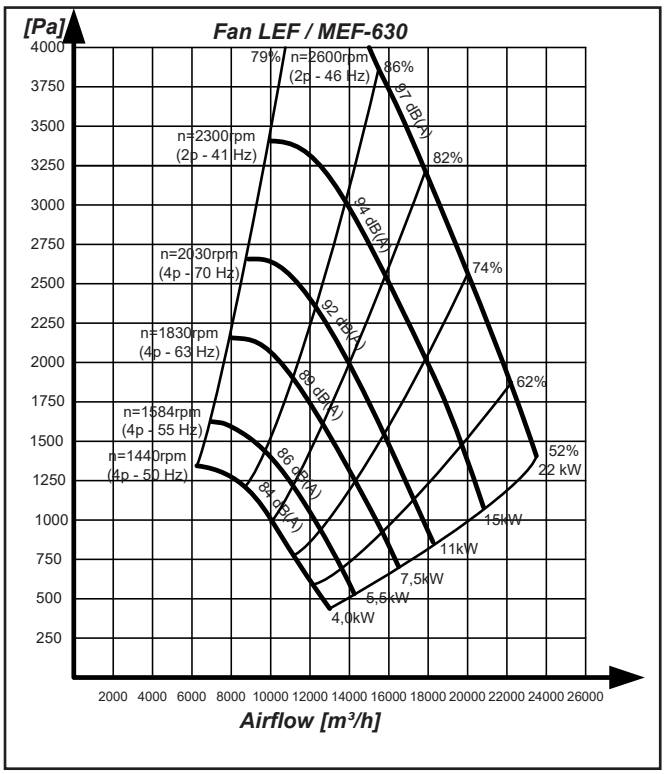

[Pa]
Fan LEF / MEF-315
n=3200 (2p - 56Hz)
n=2860 (2p - 50Hz)
n=2560 (2p - 45Hz)
n=2280 (2p - 40Hz)
n=2010 (2p - 35Hz)
n=1460 (4p - 50Hz) (2p - 25Hz)
74%
84%
80%
71%
59%
48%
81dB(A)
79dB(A)
77dB(A)
73dB(A)
72dB(A)
64dB(A)
1,1kW
0,75kW
0,55kW
0,37kW
0,25kW
0,12kW
1690 1560 1430 1300 1170 1040 910 780 650 520 390 260 130
300 600 900 1200 1500 1800 2100 2400 2700 3000 3300
Air flow [m³/h]

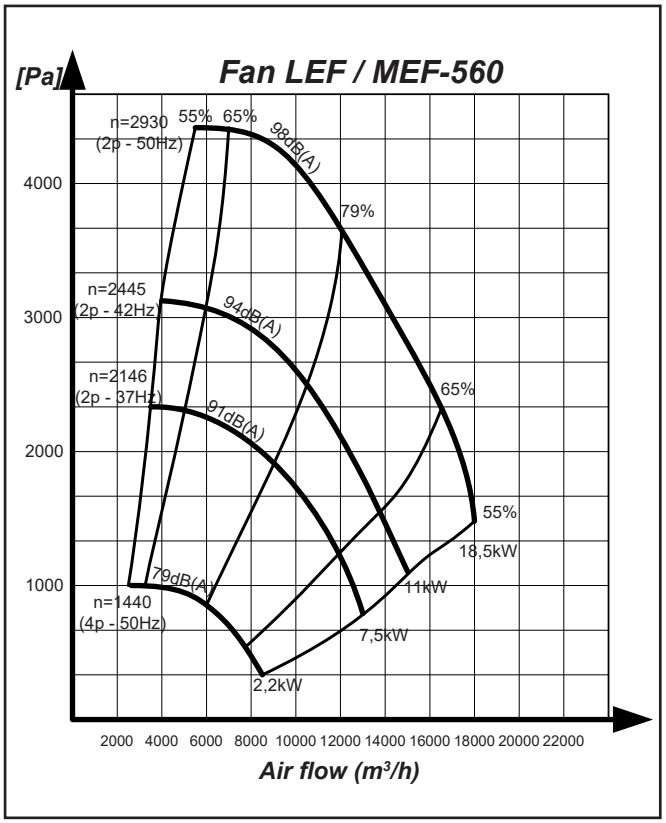

[Pa]
Fan LEF / MEF-400
n=3538rpm (2p - 61Hz)
n=2915rpm (2p - 50Hz)
n=2675rpm (2p - 46Hz)
n=2150rpm (2p - 37Hz)
n=1375rpm (4p - 50Hz)
75%
82%
85%
80%
75%
68%
50%
90dB(A)
86dB(A)
84dB(A)
79dB(A)
70dB(A)
5,5kW
4,0kW
2,2kW
1,1kW
0,37kW
2800 2600 2400 2200 2000 1800 1600 1400 1200 1000 800 600 400 200
750 1500 2250 3000 3750 4500 5250 6000 6750 7500 8250
Air flow [m³/h]


[Pa]
Fan LEF / MEF-355
n=3540 (2p - 62Hz)
n=3277 (2p - 57Hz)
n=2860 (2p - 50Hz)
n=2507 (2p - 44Hz)
n=2240 (2p - 39Hz)
n=1460 (4p - 50Hz) (2p - 25Hz)
75%
82%
78%
68%
51%
46%
89dB(A)
88dB(A)
85dB(A)
82dB(A)
79dB(A)
69dB(A)
3,0kW
2,2kW
1,5kW
1,1kW
0,75kW
0,25kW
2400 2100 1800 1500 1350 1200 1050 900 750 600 450 300 150
500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500
Air flow [m³/h]


[Pa]
Fan LEF / MEF-450
n=3306 (2p - 57Hz)
n=2900 (2p - 50Hz)
n=2552 (2p - 44Hz)
n=2120 (2p - 36Hz)
n=1395 (4p - 50Hz)
74%
81%
86%
81%
74%
62%
49%
92dB(A)
89dB(A)
87dB(A)
83dB(A)
73dB(A)
7,5kW
5,5kW
4,0kW
2,2kW
0,75kW
3250 3000 2750 2500 2250 2000 1750 1500 1250 1000 750 500 250
1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 11000
Air flow [m³/h]


[Pa]
Fan MEF-500
n=3300 (2p - 57Hz)
n=2900 (2p - 50Hz)
n=2690 (2p - 46Hz)
n=2430 (2p - 42Hz)
n=2120 (2p - 36Hz)
n=1585 (2p - 27Hz)
77%
83%
87%
82%
76%
68%
51%
97dB(A)
94dB(A)
92dB(A)
90dB(A)
87dB(A)
80dB(A)
11kW
7,5kW
5,5kW
4,0kW
2,2kW
1,1kW
3900 3600 3300 3000 2700 2400 2100 1800 1500 1200 900 600 300
1200 2400 3600 4800 6000 7200 8400 9600 10800 12000 13200
Air flow [m³/h]


[Pa]
Fan LEF / MEF-630
n=2600rpm (2p - 46 Hz)
n=2300rpm (2p - 41 Hz)
n=2030rpm (4p - 70 Hz)
n=1830rpm (4p - 63 Hz)
n=1584rpm (4p - 55 Hz)
n=1440rpm (4p - 50 Hz)
79%
86%
82%
74%
62%
52%
97 dB(A)
94 dB(A)
92 dB(A)
89 dB(A)
86 dB(A)
84 dB(A)
22 kW
15kW
11kW
7,5kW
5,5kW
4,0kW
4000 3750 3500 3250 3000 2750 2500 2250 2000 1750 1500 1250 1000 750 500 250
2000 4000 6000 8000 10000 12000 14000 16000 18000 20000 22000 24000 26000
Airflow [m³/h]


[Pa]
Fan LEF / MEF-560
n=2930 (2p - 50Hz)
n=2445 (2p - 42Hz)
n=2146 (2p - 37Hz)
n=1440 (4p - 50Hz)
55%
65%
79%
65%
55%
98dB(A)
94dB(A)
91dB(A)
79dB(A)
18,5kW
11kW
7,5kW
2,2kW
4000 3000 2000 1000
2000 4000 6000 8000 10000 12000 14000 16000 18000 20000 22000
Air flow (m³/h)

## 5.0 Liability

**Warranty**
Geovent A/S grants a warranty for products, which are defective, when it can be proved that the defects are due to poor manufacture or materials

on the part of Geovent A/S. The warranty comprises remedial action (reparation or exchange) until one year after date of shipment. No claims can be made against Geovent A/S in relation to loss of earnings or consequential loss as a result of defects on products from Geovent A/S.

Wear parts like fan impellers are not included in the warranty.

**User liability**
In order for Geovent A/S to be capable of granting the declared warranty, the user/fitter must follow this manual in all respects.

Under no circumstances may the products be changed in any way, without prior written agreement with Geovent A/S.

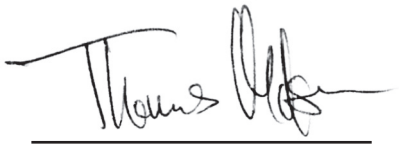
## 6.0 Declaration of conformity

has been manufactured in compliance with the directions of the Directive Council 2006/42/EEC, regarding machine safety, changes of directive 95/16/EEC and following standards:

UNE-EN ISO 12100: 2012

Date: 04/02 - 2016

Position: Managing Director
Name: Thomas Molsen



CE

GEOVENT

HOVEDGADEN 86 • DK-8831 LØGSTRUP
Tlf.: (+45) 8664 2211 • e-mail: salg@geovent.dk