



A Global company

ROSENBERG GROUP

ROSENBERG VENTILATOREN-ECOFIT-ETRI

FOUNDED IN 1981 WITH HEADQUARTERS IN KUNZELSAU GERMANY

14 PRODUCTION FACILITIES IN EUROPE, ASIA & NORTHAMERICA

45 SALES OFFICES IN ALL CONTINENTS

1400 EMPLOYEES WORLDWIDE





Integrated manufacturer

Germany - France - Italy - Czeck Republic - Hungary -
Croatia Spain - Turkey - Egypt - China - Singapur -
Canada - Mexico

AC & EC MOTORS (EXTERNAL ROTOR MOTORS)

FAN IMPELLERS

AIR HANDLING & ENERGY RECOVERY UNITS

SHEET METAL PARTS AND ACCESORIES

CAST ALUMINIUM PARTS

<https://www.youtube.com/watch?v=LGYqcm1zMI4>



V020916 dc



Axial

14 to 40" diameter

500 to 19,500 CFM

Available with EC or AC MOTOR

Low Sound Spectrum

Multiple materials and Fin configuration





Plug Fans

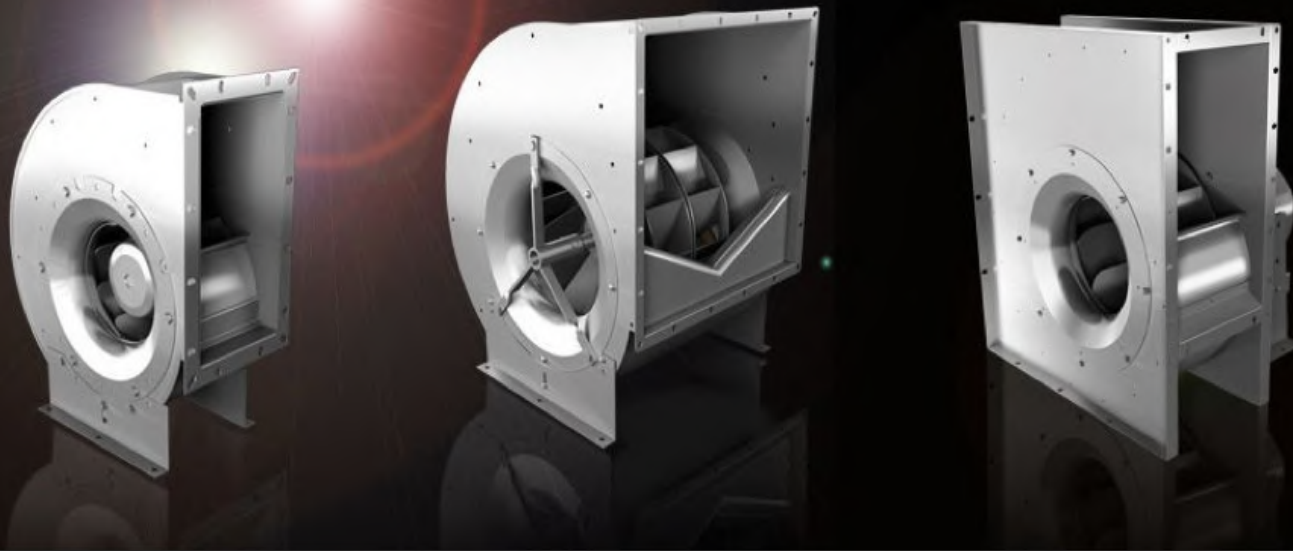
12 to 28" diameter, backward curved inclined
600 to 11,000 CFM

Available with EC or AC motor

Factory balanced

Multiple materials and configurations





Blowers

7 to 22" diameter, forward inclined curve
Up to 7,000 CFM

Available with EC or AC motor

Multiple materials and configurations
available





EC FAN GRID

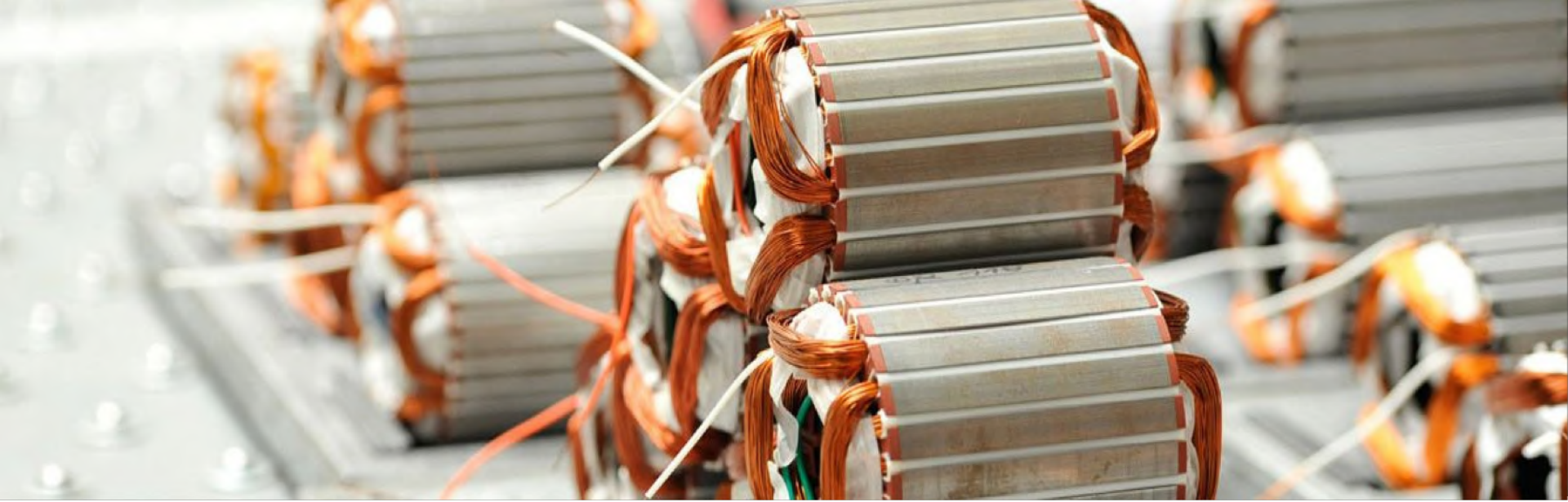
Up to 11,000 CFM per fan
Built in redundancy
Compact and Flexible
Retrofit and new designs



Unobox

COMPACT & MODULAR DESIGN





OUR MOTORS

Our fans are powered by our own external rotor motor.

5 different sizes available.

AC & EC configuration

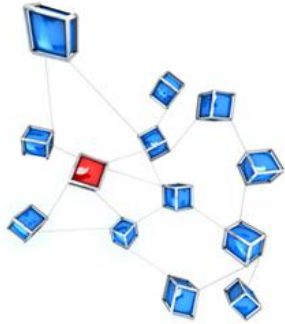




EC TECHNOLOGY

What about it?

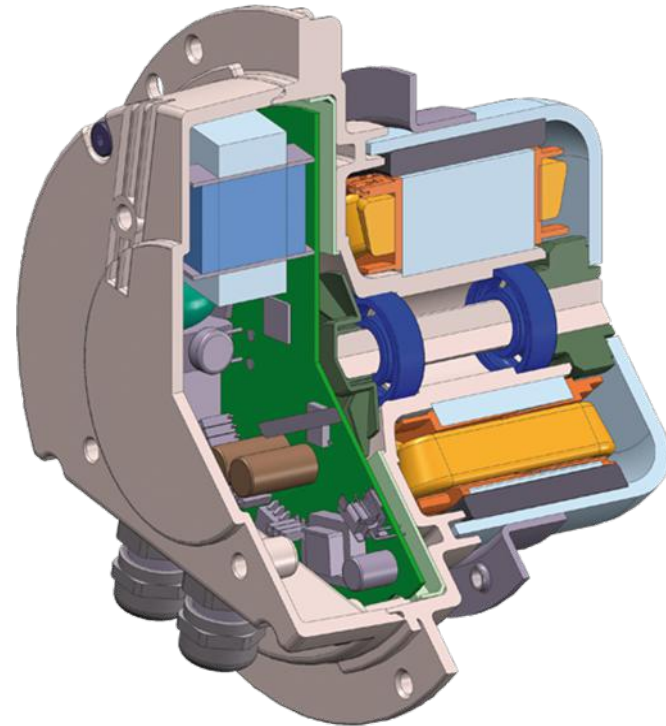




Information



Energy



**Rosenberg
EC-Technology**

COMMITMENT WITH ENERGY WISE SOLUTIONS

Air is our element...
we offer intelligent solutions
to move air **efficiently**
no matter whether it is...

Requirements which must be fulfilled...
by increasing energy **efficiency** to step up
the protection of the environment
and the security of the energy supply*...



* According to: DIRECTIVE 2009/125/EC of the European Parliament and of the Council of 21 October 2009



EC MOTORS

Electronically Commutated Motor

Commutation means the position-dependent switching of the electric current.



Technology

... move air efficiently...



AC

No Commutation



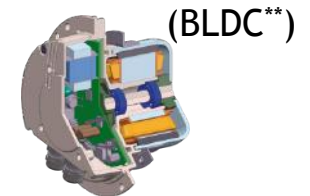
BDC*

Mechanical Commutation



EC

Electrical Commutation



* BDC = Brushed DC Motor, ** BLDC = Brushless DC Motor

Source: DC - Motor Wikimedia.org

Type of Electrical Motors

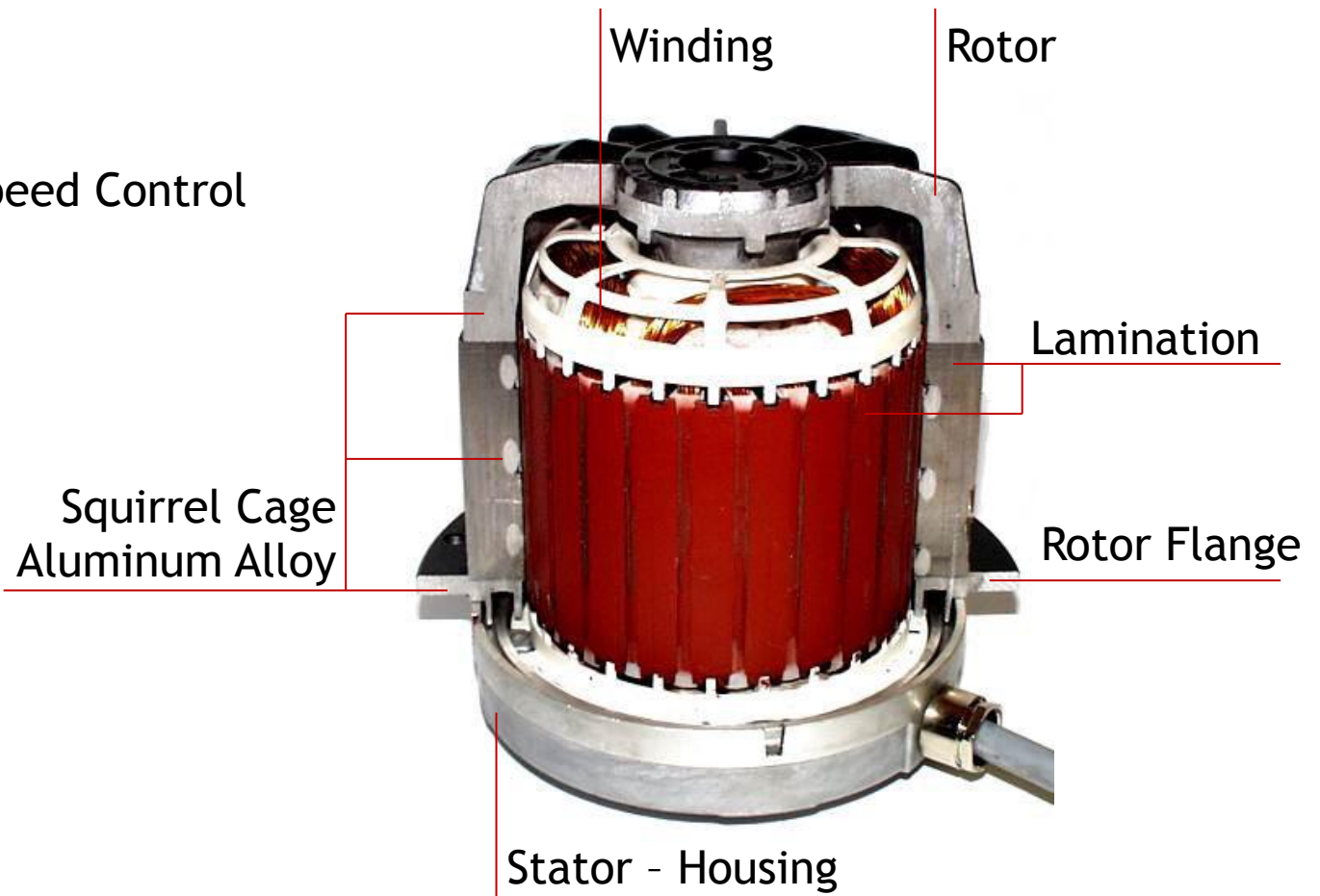
AC Motors



Life Time



Variable Speed Control



Types of electric motors

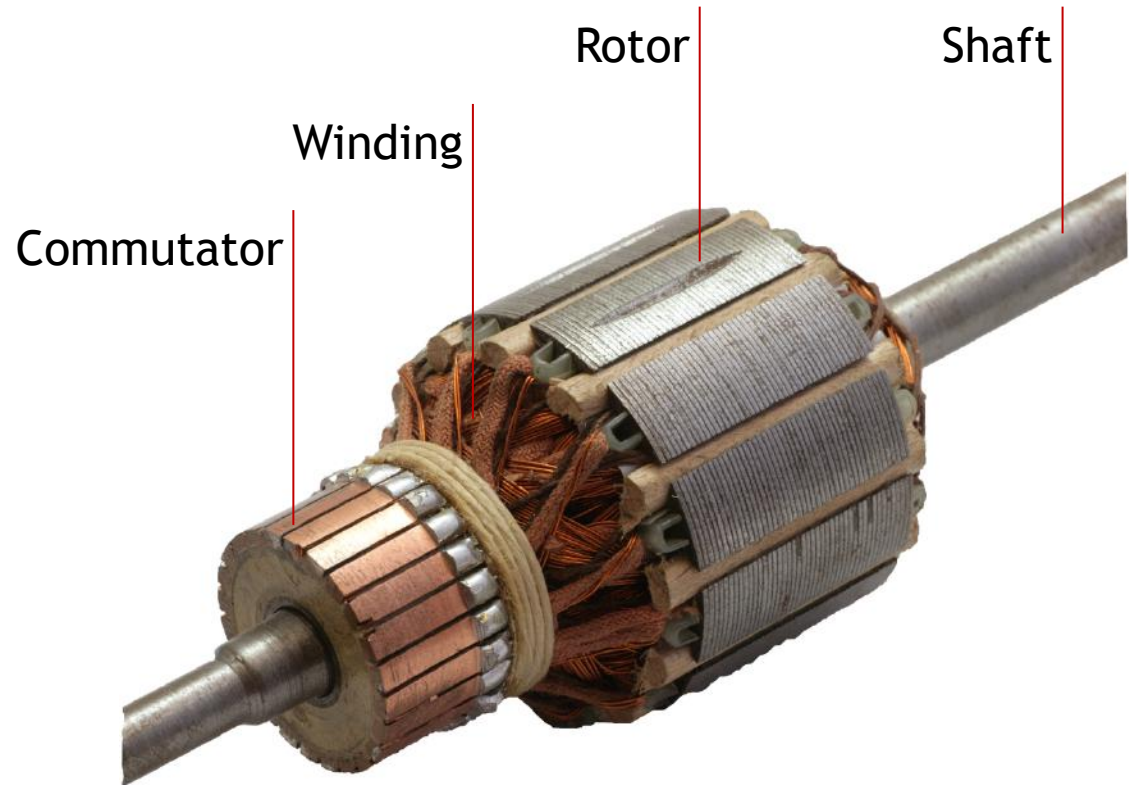
BDC Motors



Variable Speed Control



Life Time



Stator not shown |

* BDC = Brushed DC Motor, no Rosenberg product

Source: DC - Motor Wikimedia.org

Types of electric motors

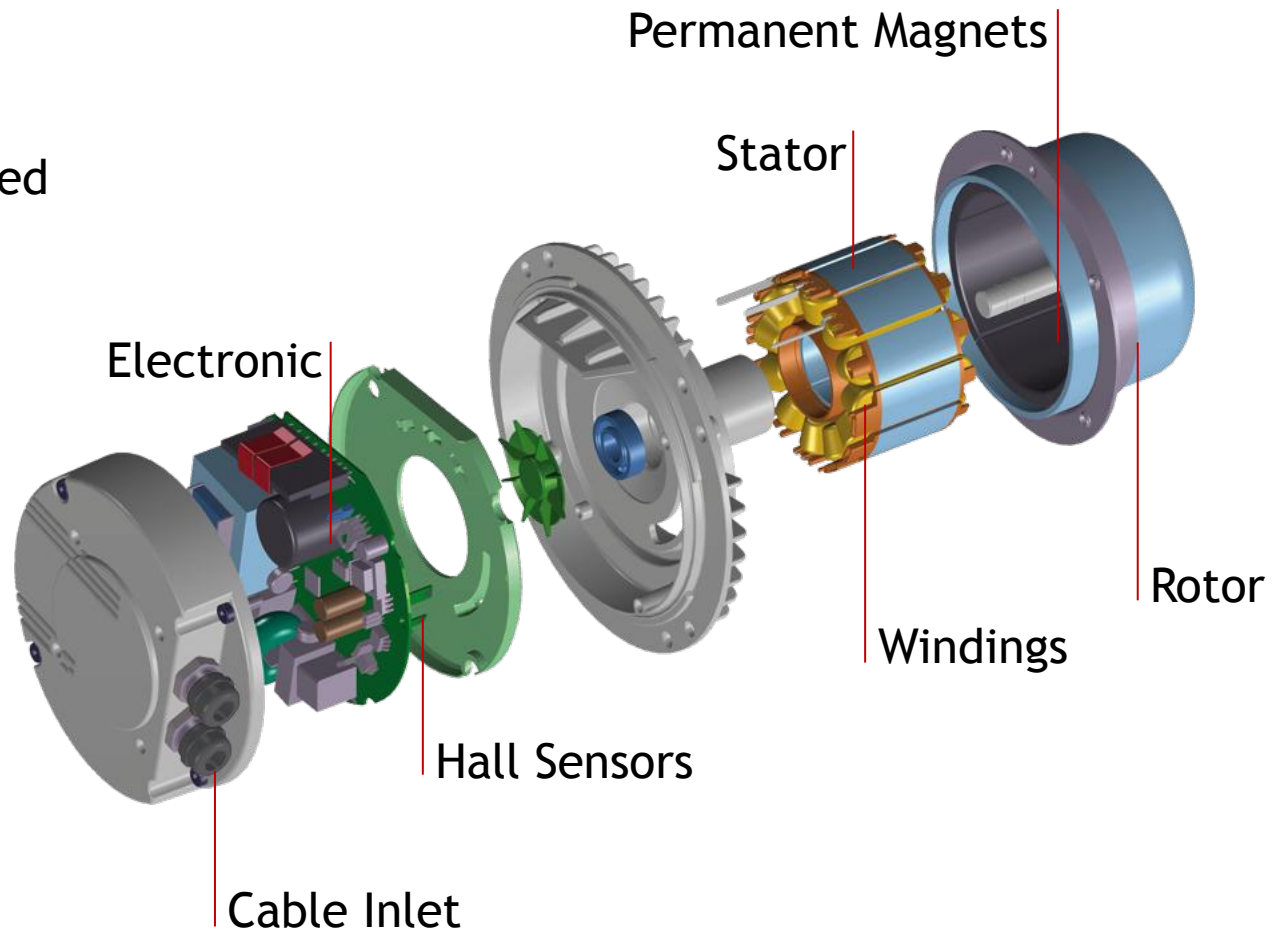
EC Motor



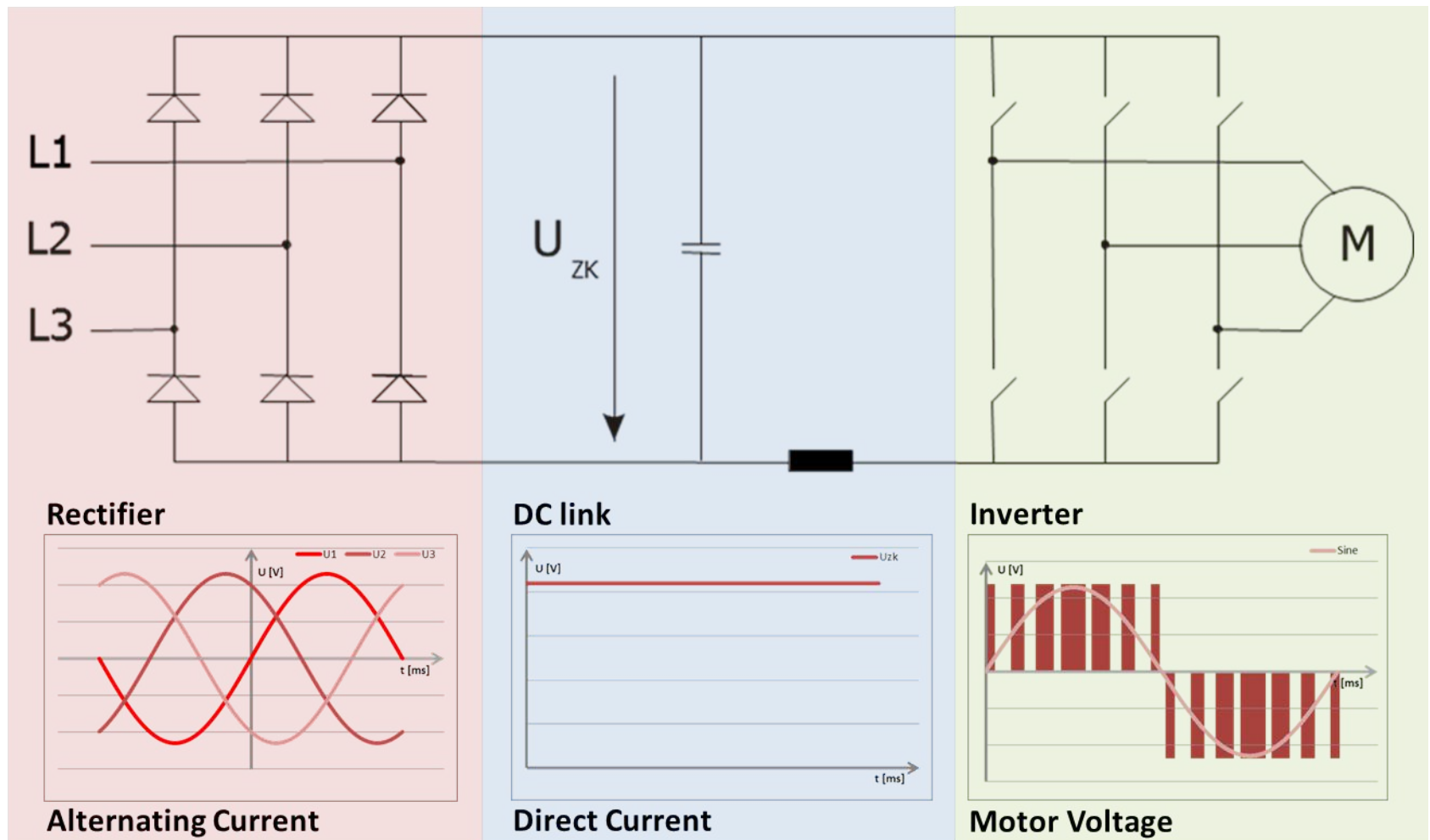
Life Time



Variable Speed Control

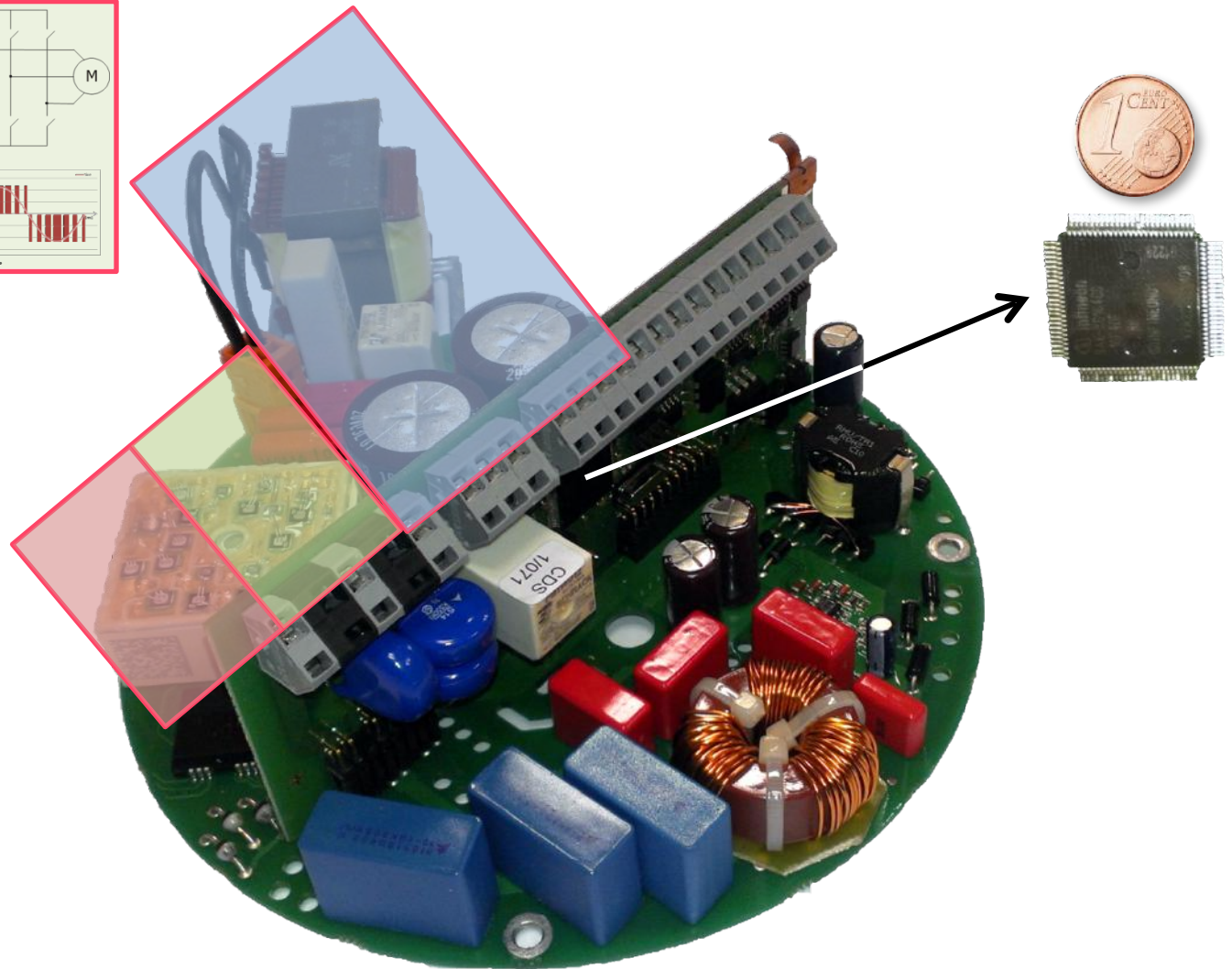
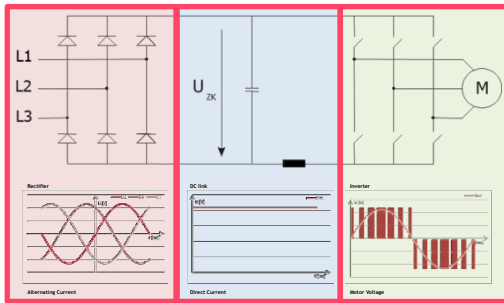


Principles of operation



Technology

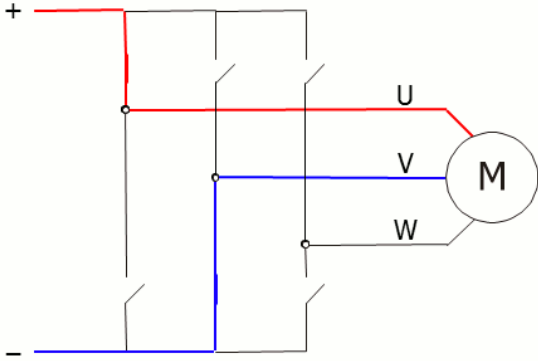
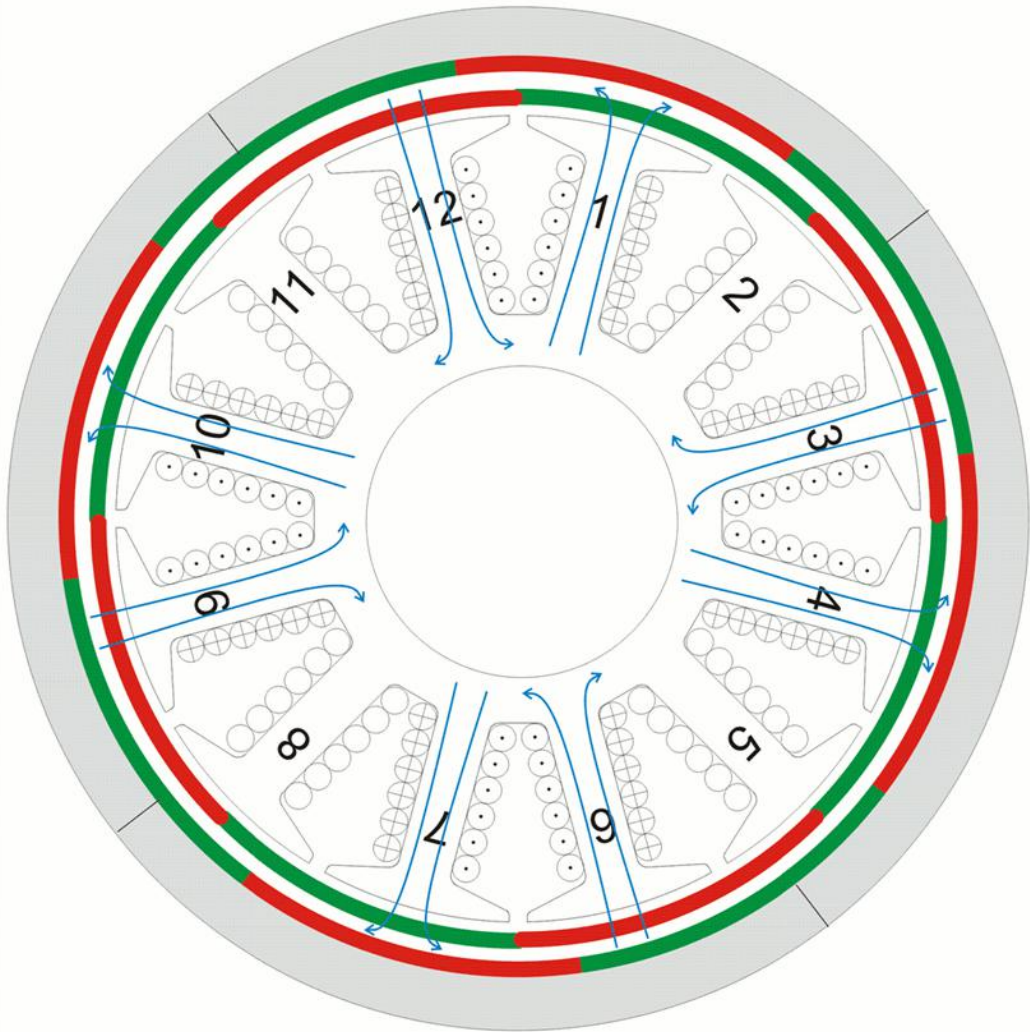
Principles of operation

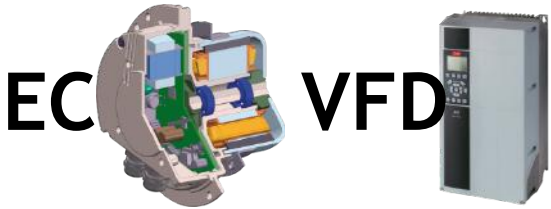
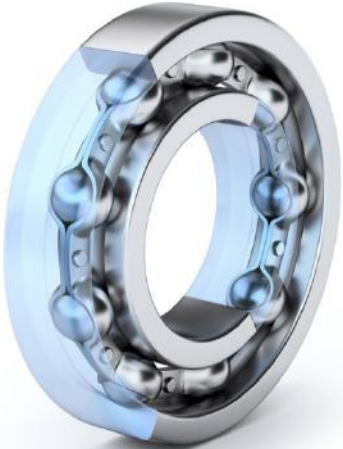
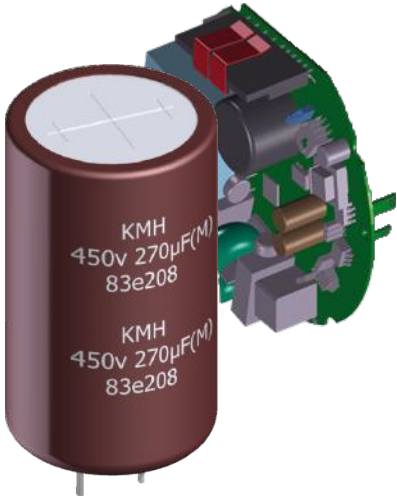


* Power Section device opened

Source: 1-Cent Coin wikipedia.org

Principles of operation

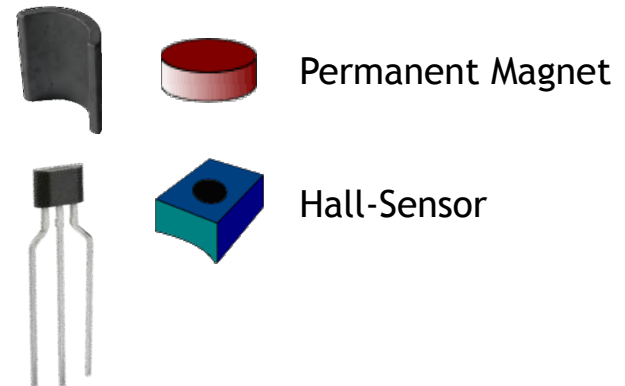
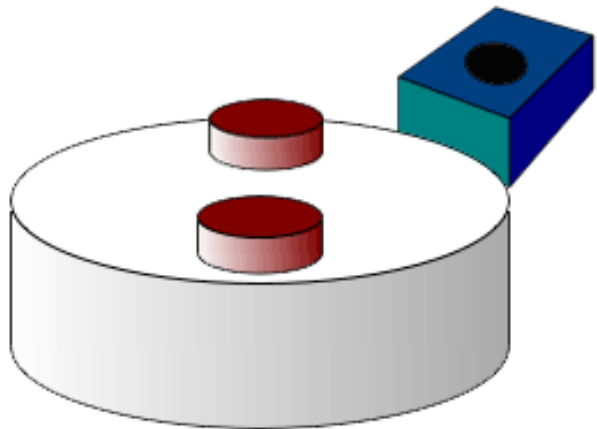




Position detection by Hall Sensors:

a) Commutation

b) Speed Sensing



Ohmic-, Friction, Magnetic
Loses

Ohmic losses, Slippage

Generation of auxiliary
phase

1-phase

50-65 %

3-phase

70-85 %

IE4*

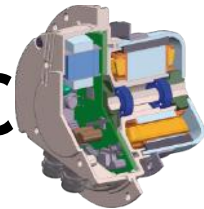


> 90 %

AC



EC



EC-Technology-What is included???

All of this in one package

Motor Protection



Shielding



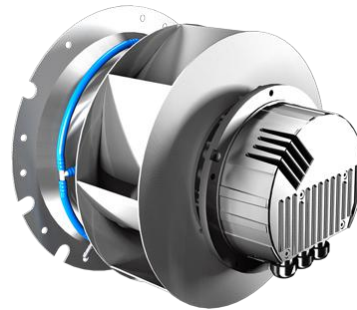
VFD



Integrated Control



AC-Fan



Power supply
for accessories 10 V & 24 V



EMC-Filter



PFC / Power filter



Soft-Start



ROSENBERG'S EC MOTOR FAMILY



GD 72
3"



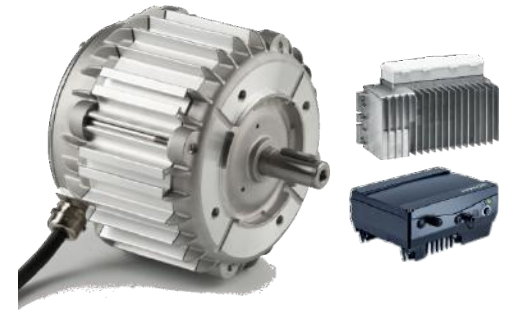
GD 84
4"



GD 112
5"



GD 150
6"



GD 220
8"



Research, Development & Testing

Rosenberg Group

CONTINUOUSLY IMPROVING AND TESTING TO ACHIEVE AND IMPROVE PERFORMANCE ROSENBERG TESTING & RESEARCH LABORATORY IS TUV CERTIFIED (GERMANY & FRANCE)

PERFORMANCE DATA 100% TESTED IN ALL OUR PRODUCTS



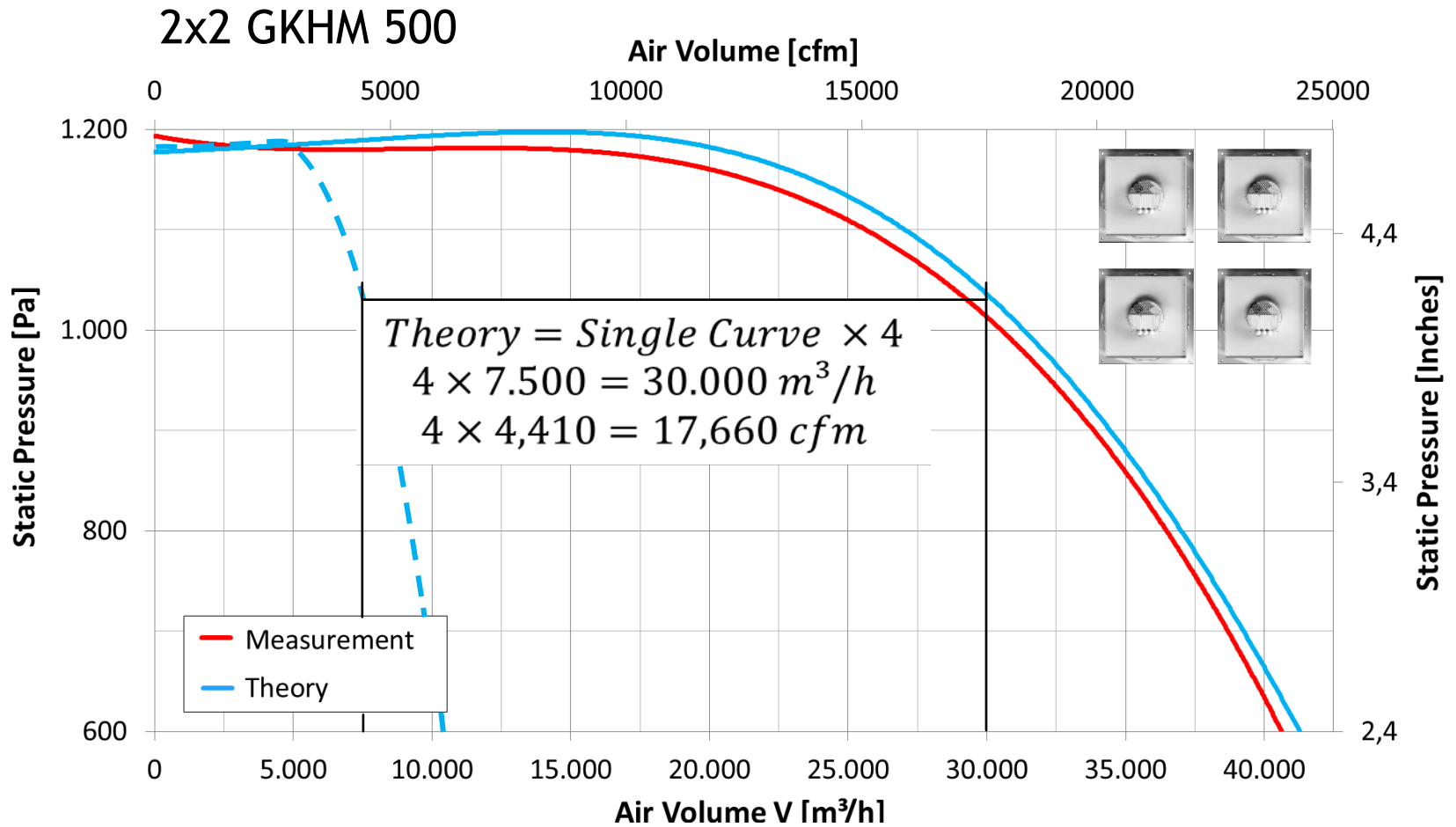
ROSENBERG FANS EC FAN GRID



- EC MOTOR TECHNOLOGY
- ON DEMAND SPEED PREPARED
- EASY CONTROL SET UP
- REDUNDANT
- ENERGY EFFICIENT
- LESS FOOTPRINT
- EASY TO INSTALL AND MAINTAIN

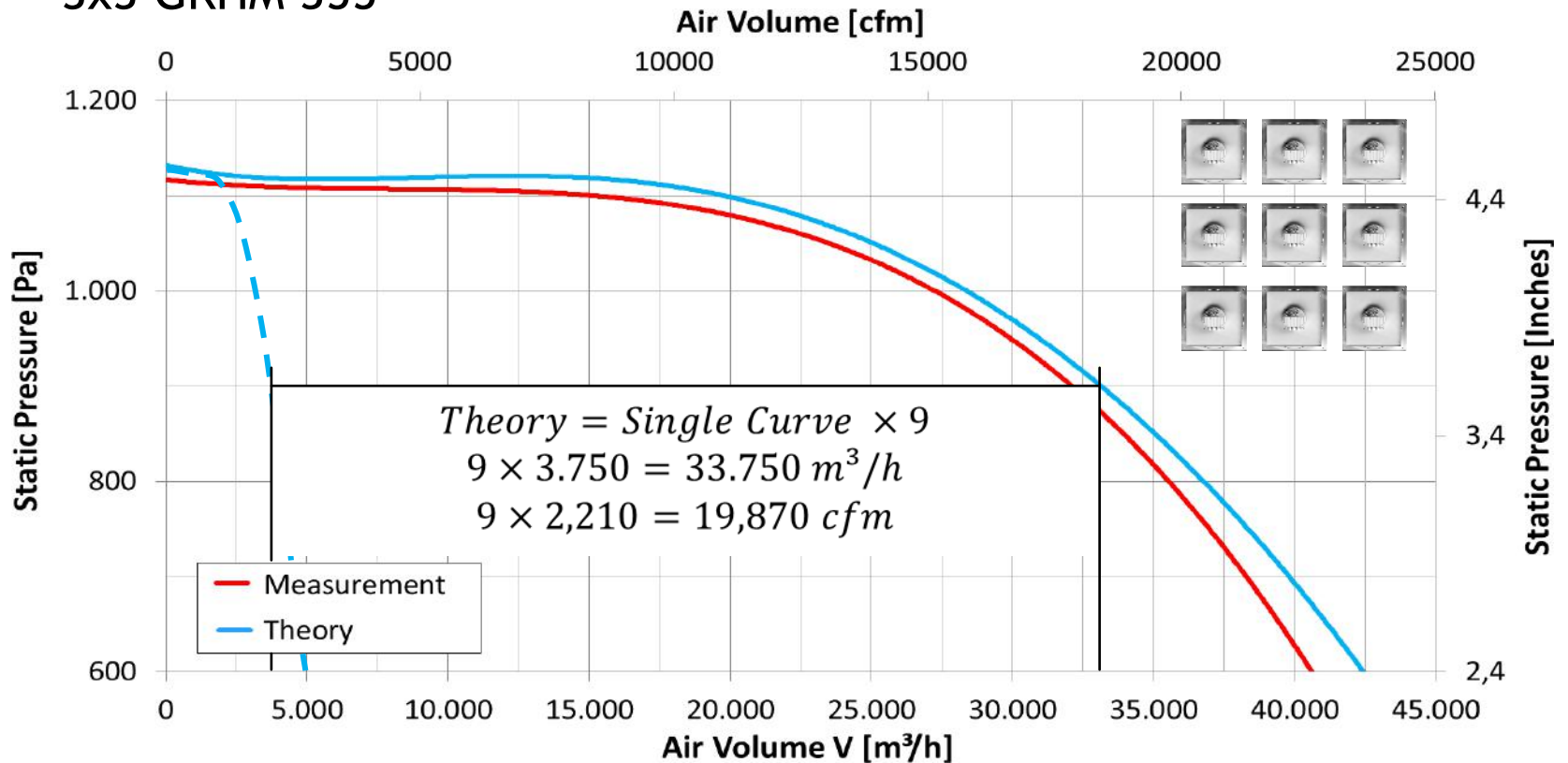
Theory of Using Fans in Parallel

Air Flow is multiplied by maintaining the Pressure



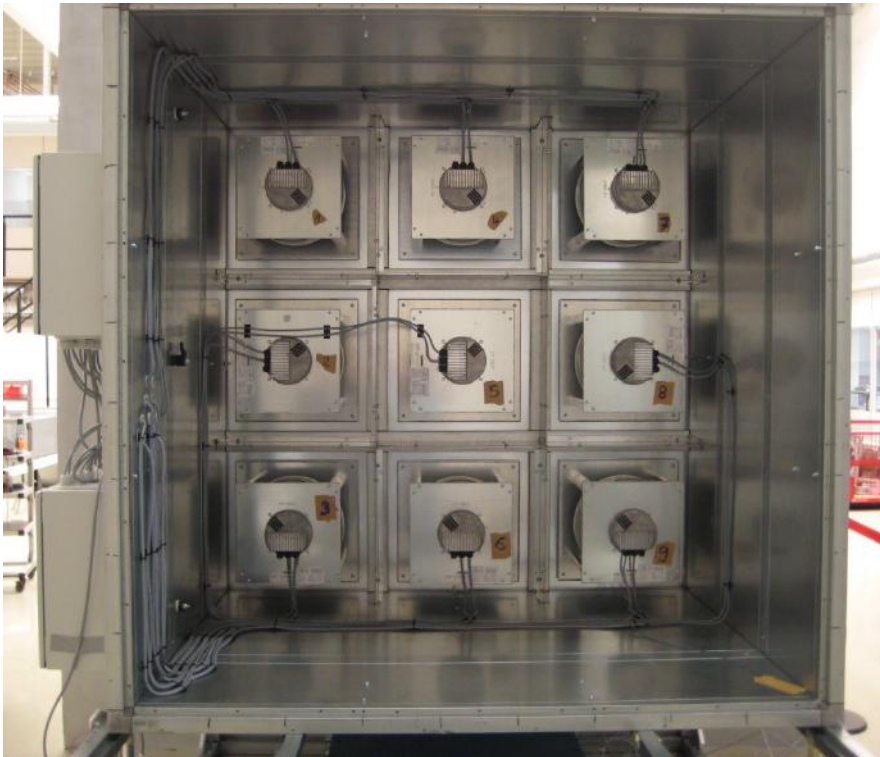
Air Flow is multiplied by maintaining the Pressure

3x3 GKHM 355

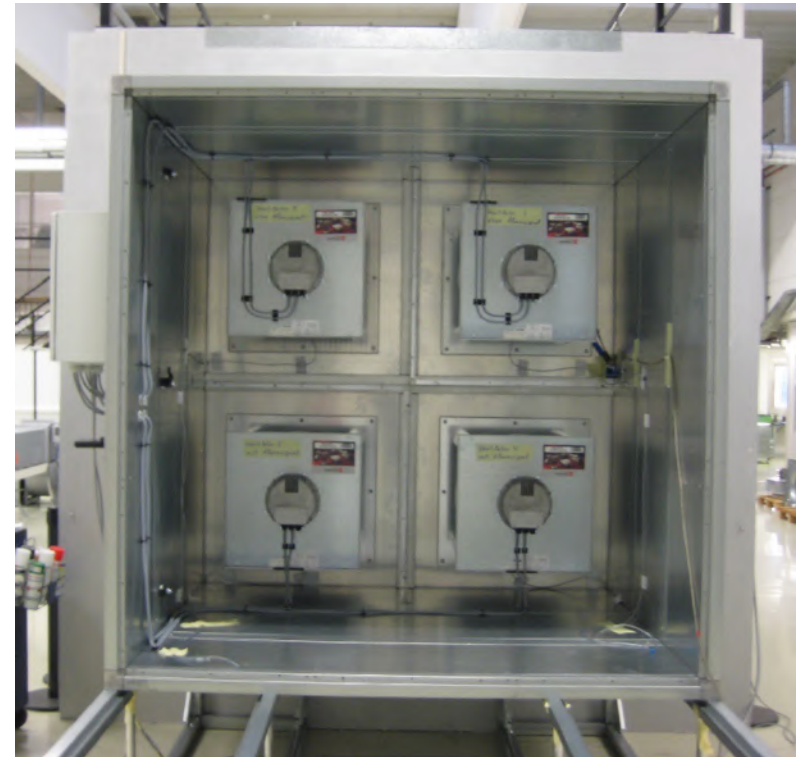


Setting at our Certified Testing Laboratory

3x3 GKHM 355



2x2 GKHM 500



Benefits of an ECFanGrid vs Single Fan AHU

Compact & Flexible

Ease of Replacement & Maintenance

More Uniform Air Distribution

Less Low Frequency Noise

Integrated Speed Control

Easy to Clean

Redundancy / High Availability

Weight Reduction



Efficiency



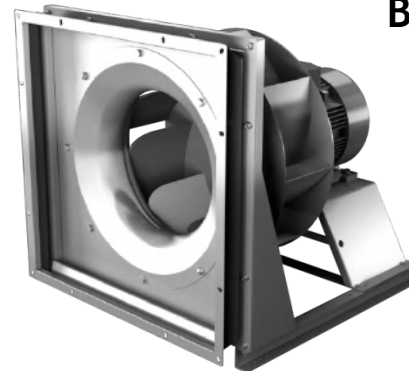
Possible Operating Loss

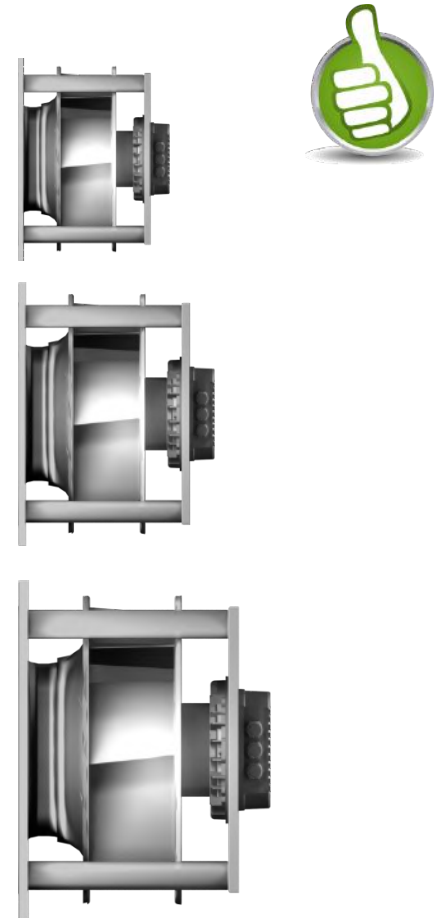
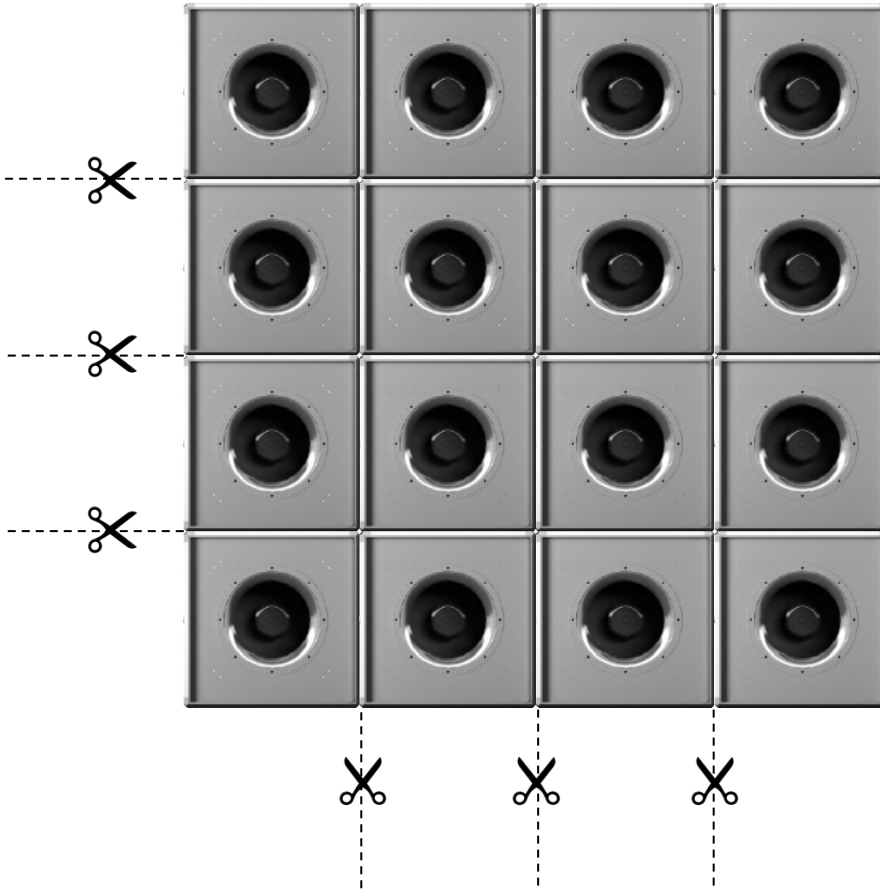
Difficult Replacement

Maintenance of Belts

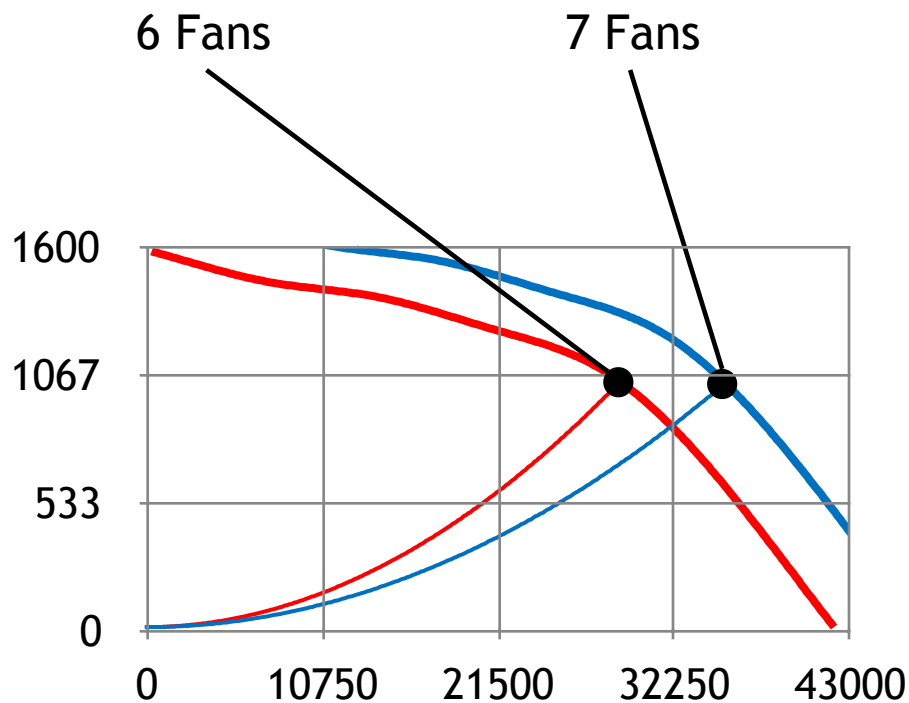
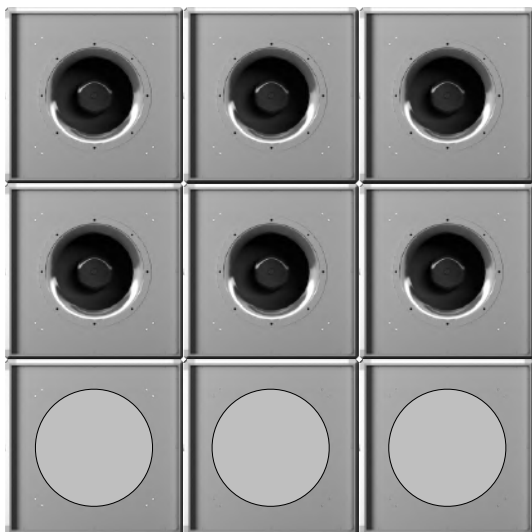
Variable Frequency Drive

Bigger Footprint



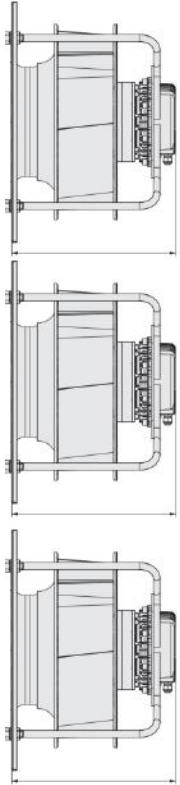


Fits Always

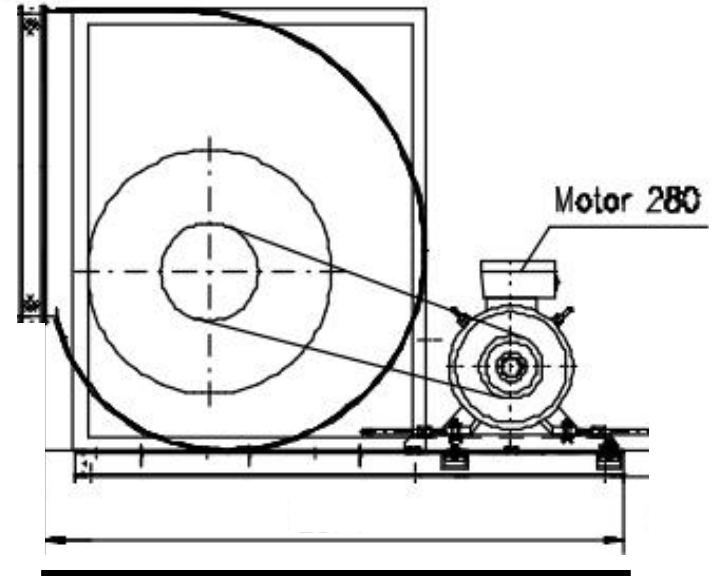
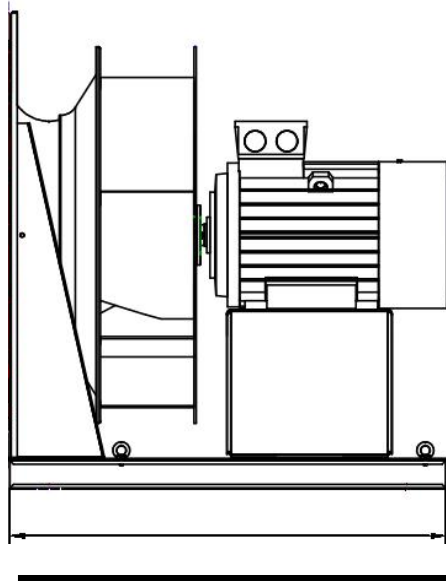


Fits Always

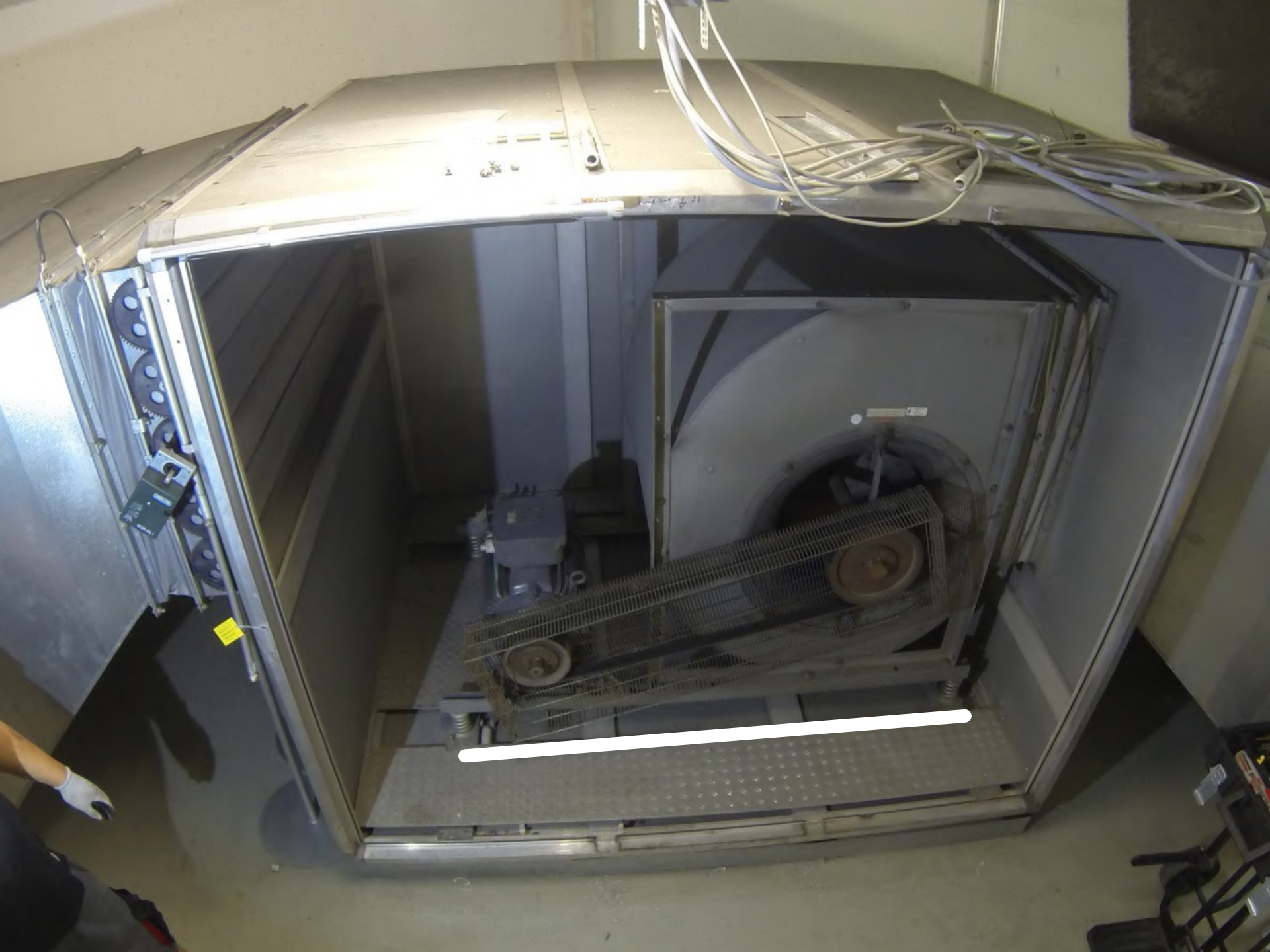
Compactness

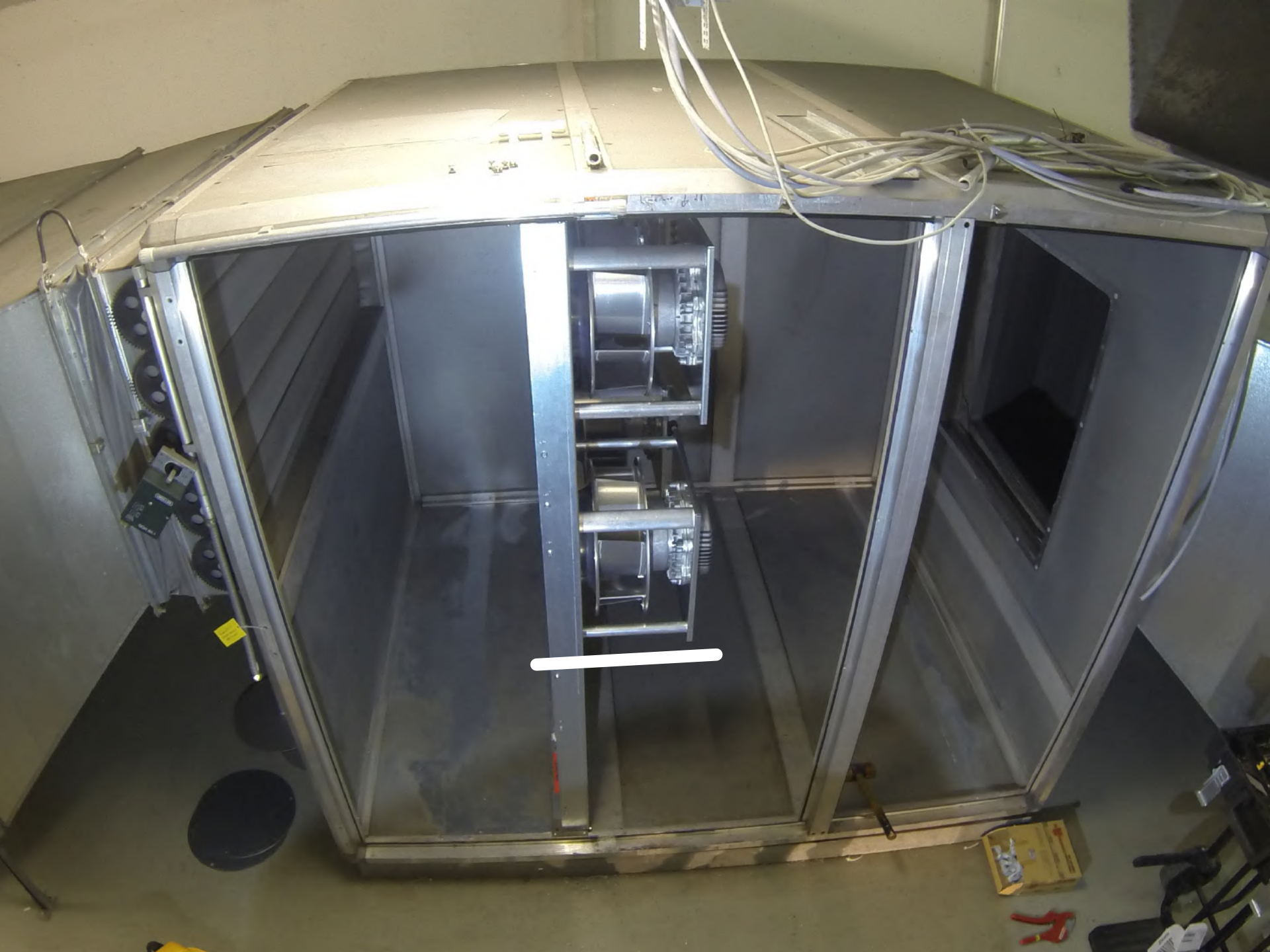


405

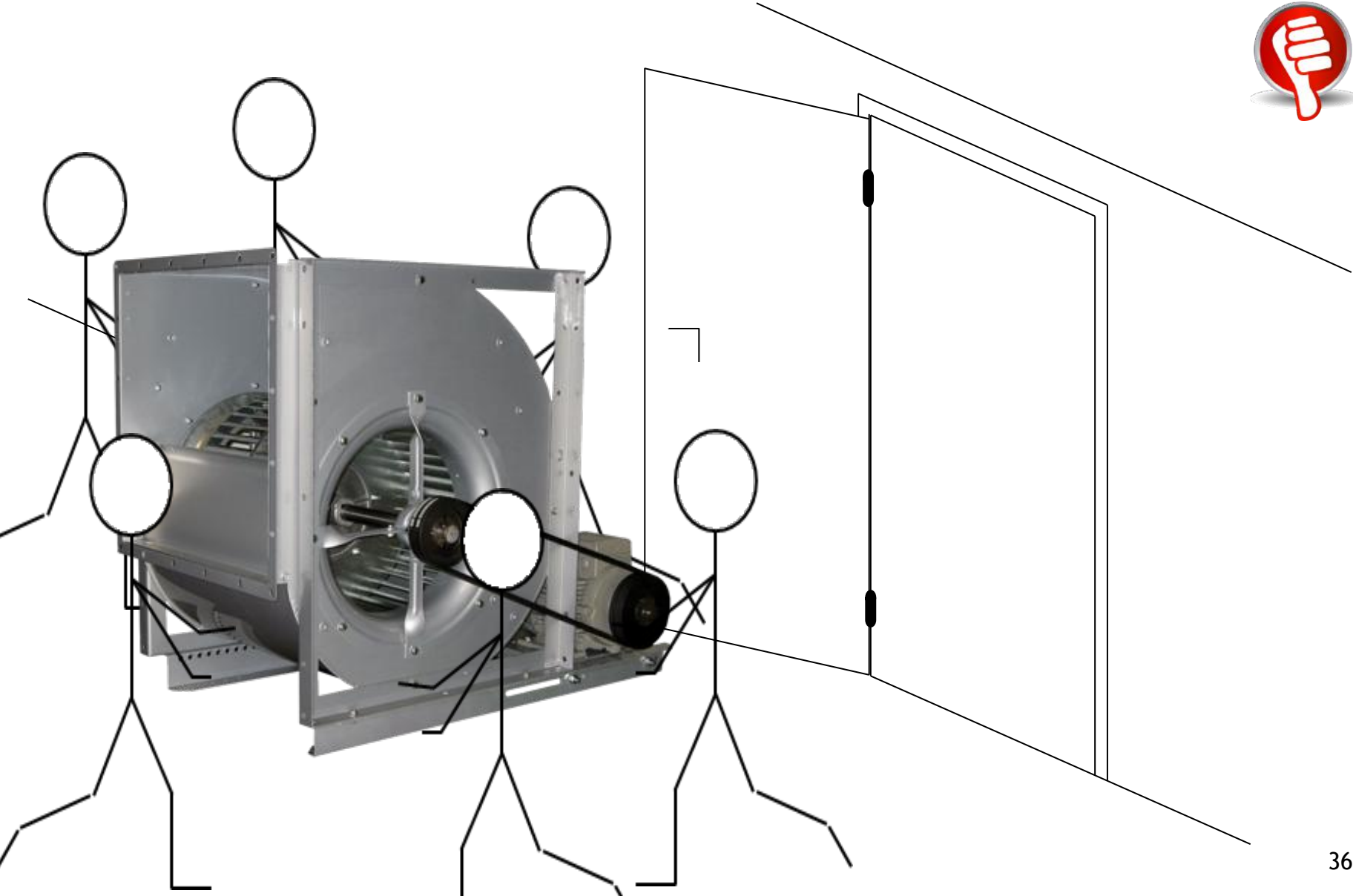


S₀ ^{1.19} up to 50 % Space! ^{2.37}
4

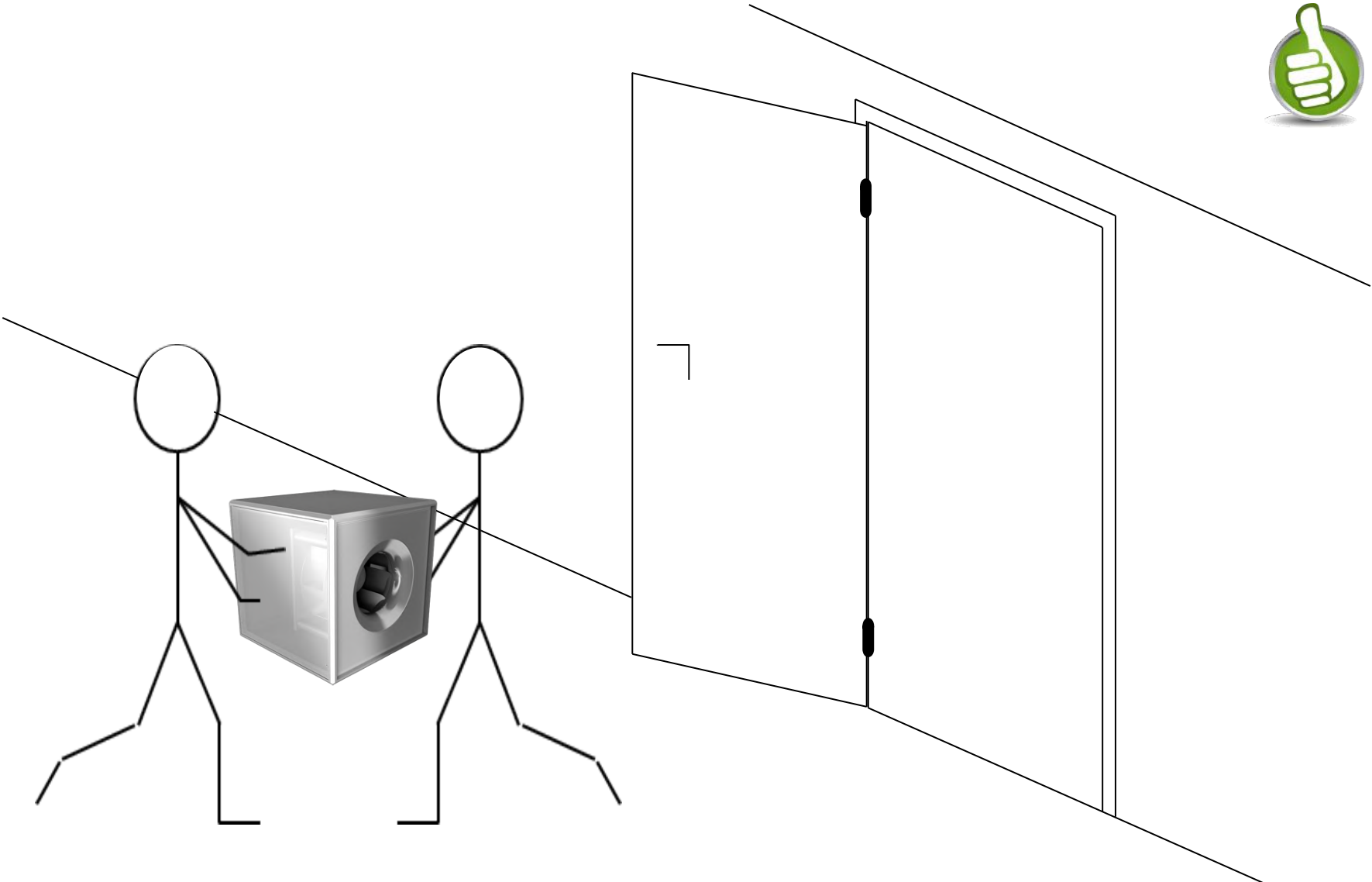




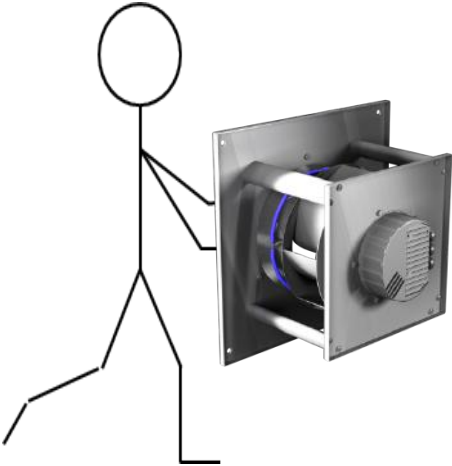
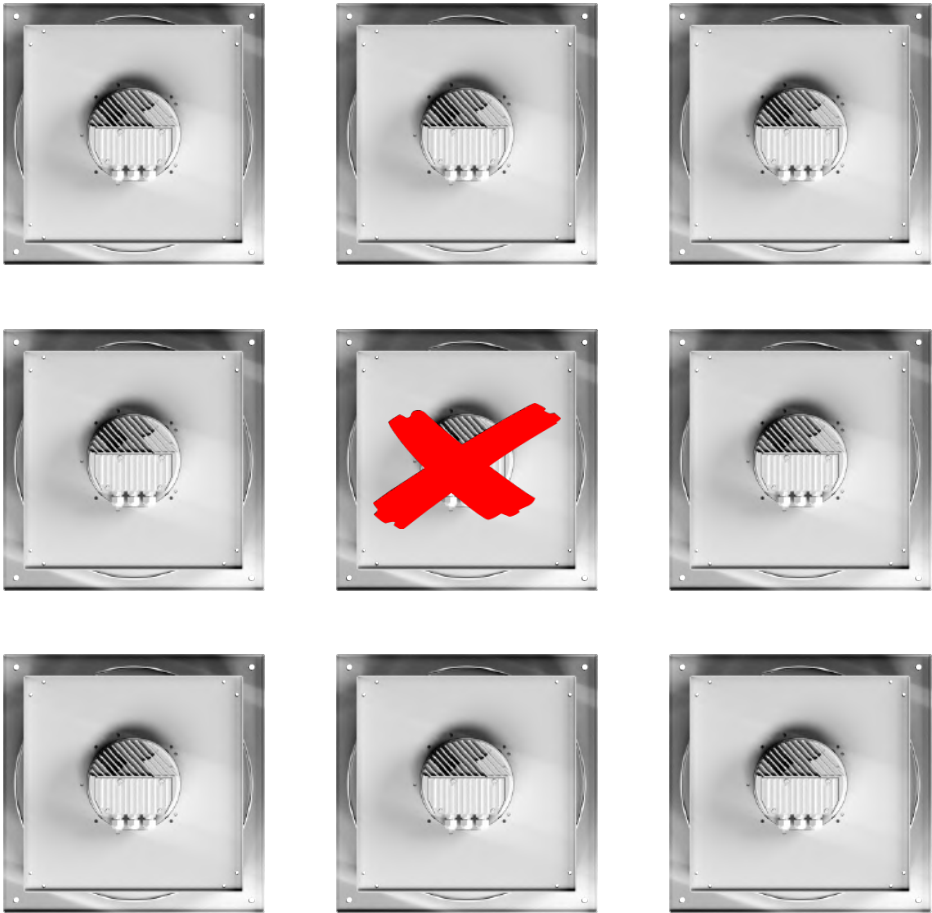
Retrofit Replacement Issues

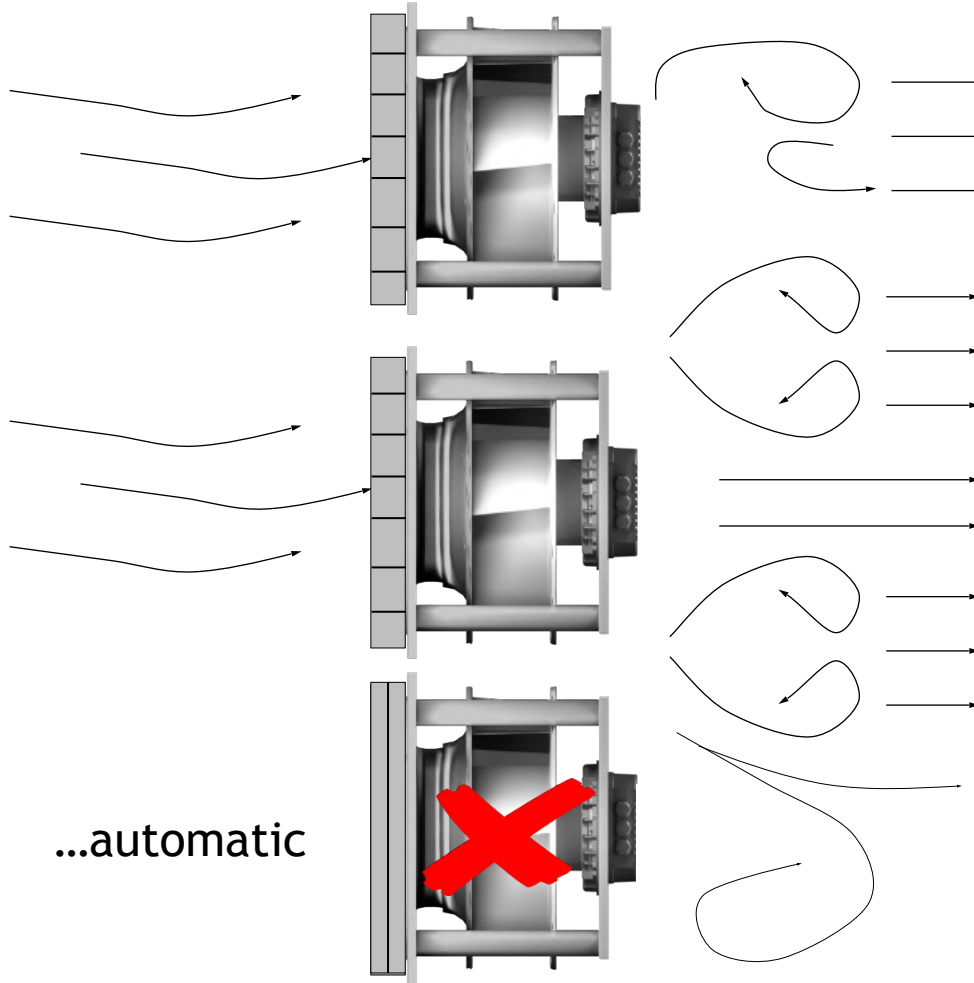


ECFanGrid
Ease of Installation



Ease of Replacement



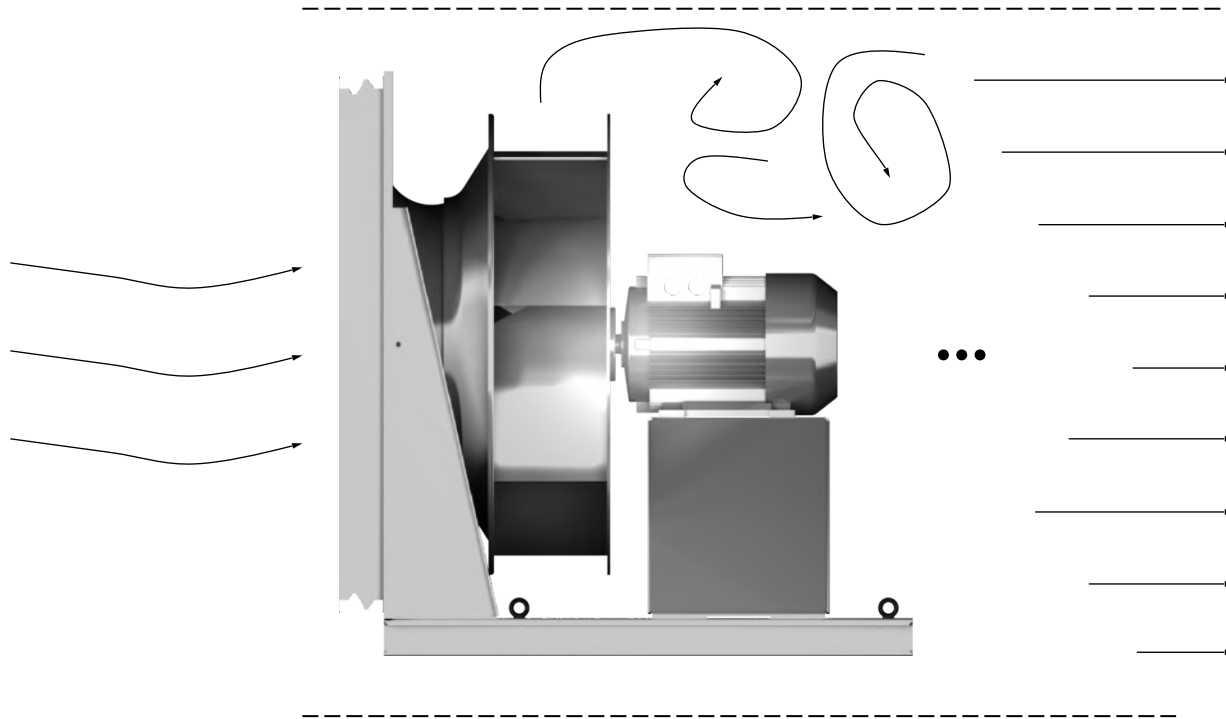


manually...

...automatic

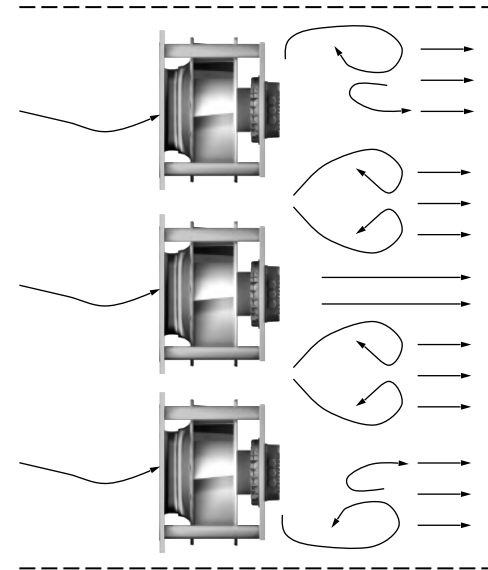
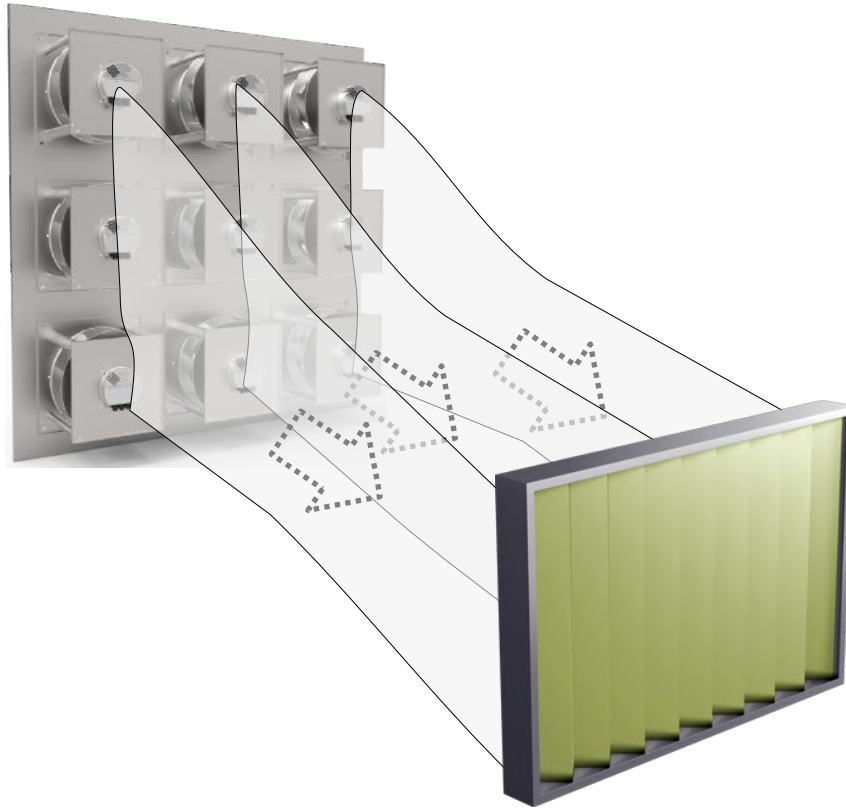
Fail Safe - Emergency Mode Included

Air Distribution



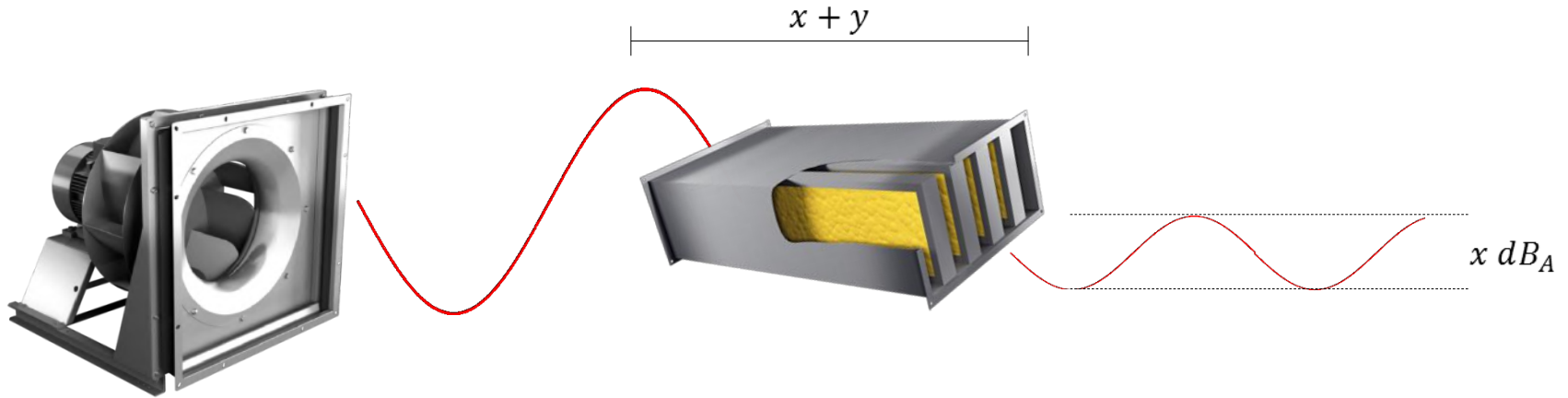
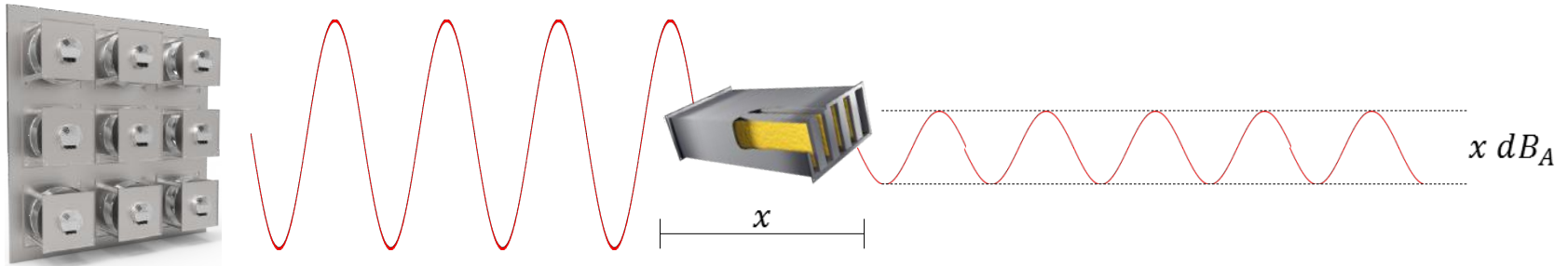
High Spot Air Velocities and an Uneven Air Flow

Air Distribution

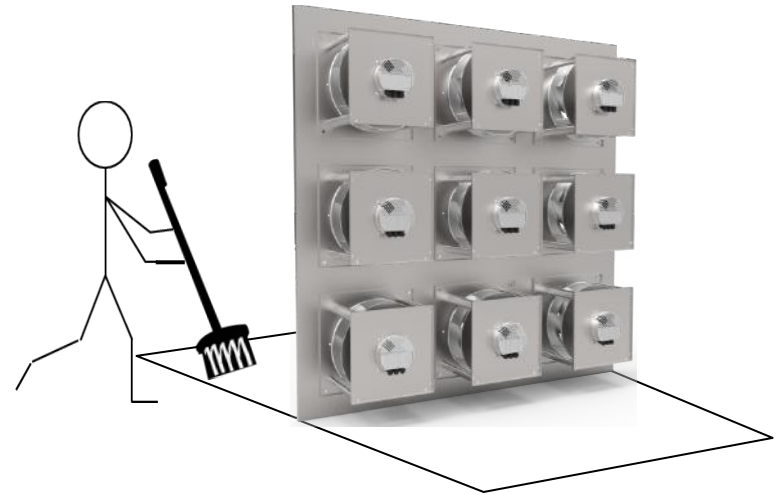
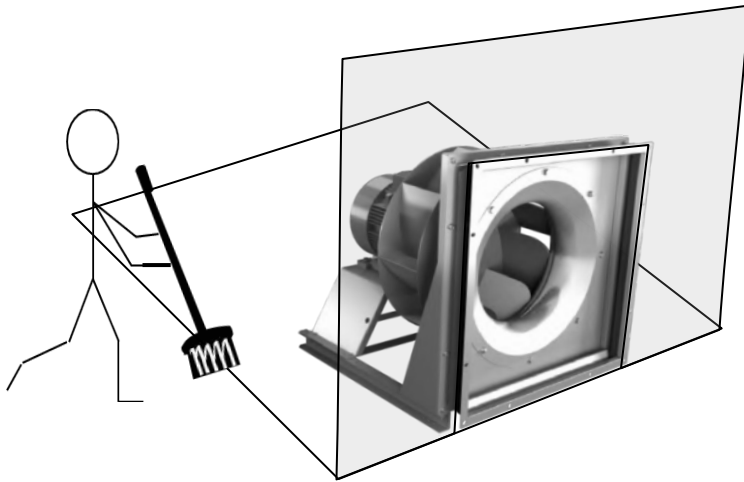


Less Spot Air Velocity and a more Uniform Air Flow

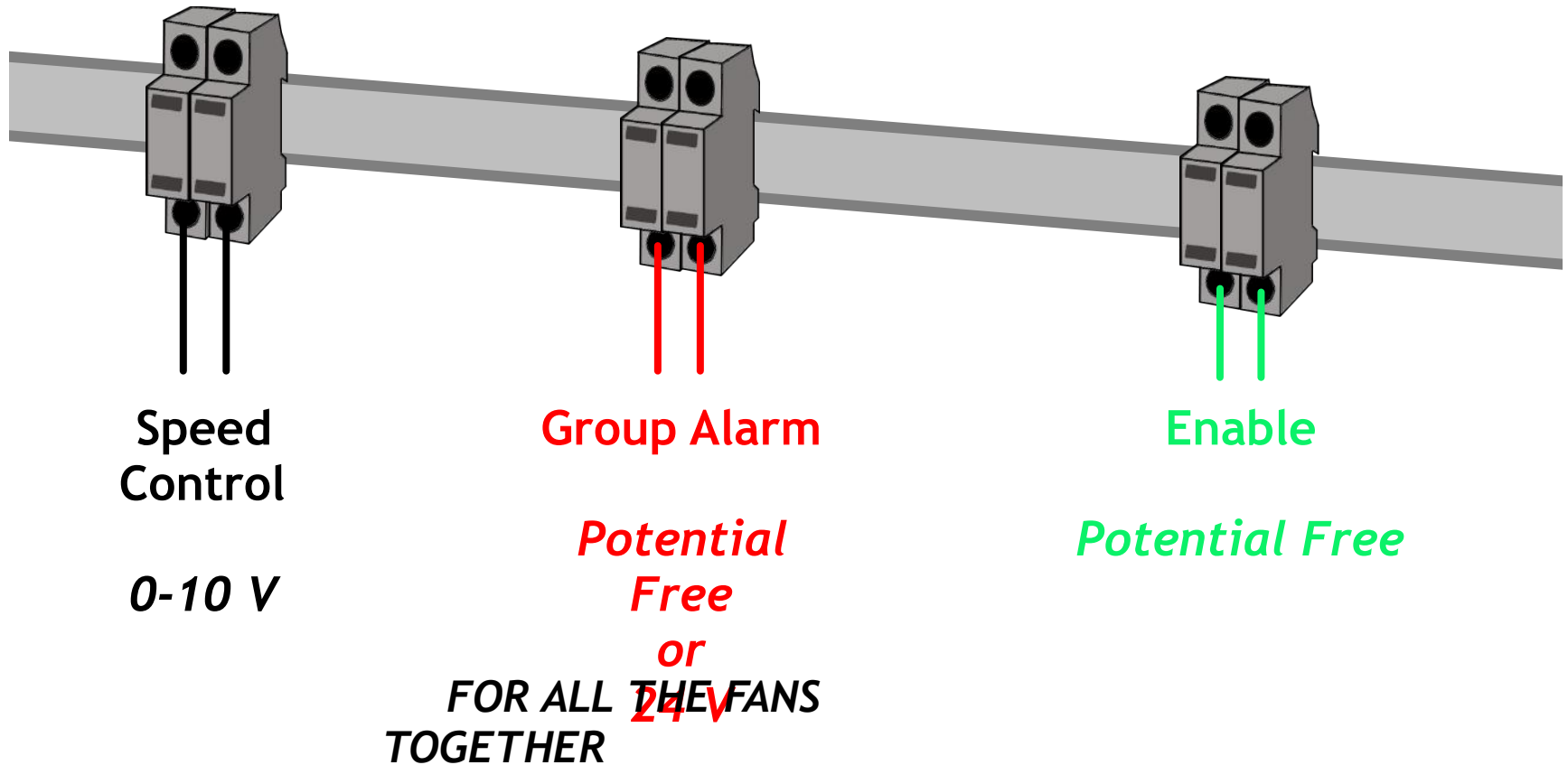
Noise



Less Low Frequency Noises
Moins de bruit de basse fréquence

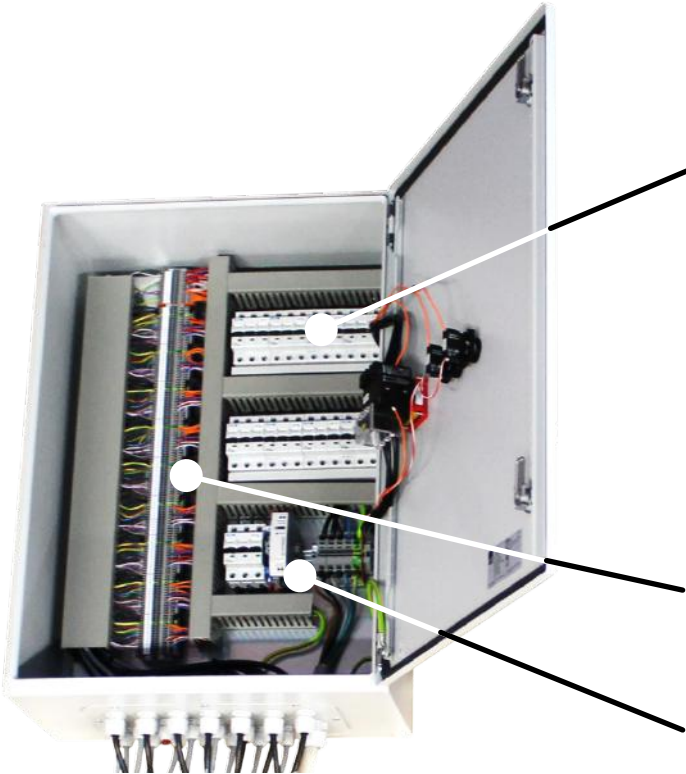


Easy to Clean, because ground is accessible

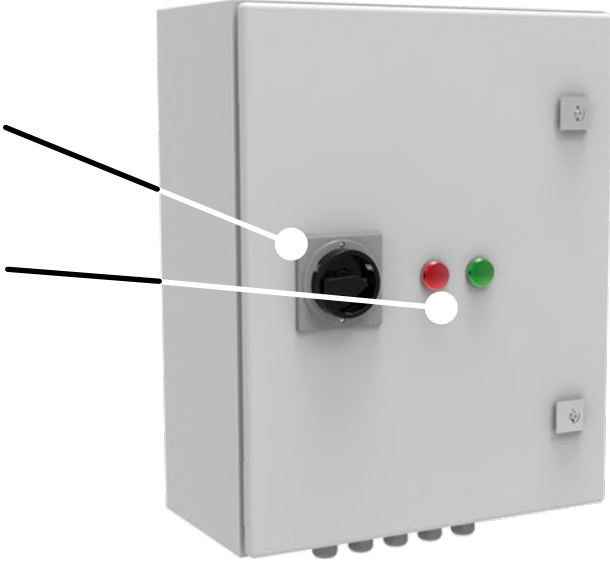


<https://www.youtube.com/watch?v=psv8jkR1G94>

Wiring Cabinet



- n Fuses
- Main Switch
- Signals
- Terminals
- 24 V Supply



Retrofit



New AHU



Retrofit KIT

Adaptive.

Fits in all AHU'S. Manufacturer doesn't matter.

Complete.

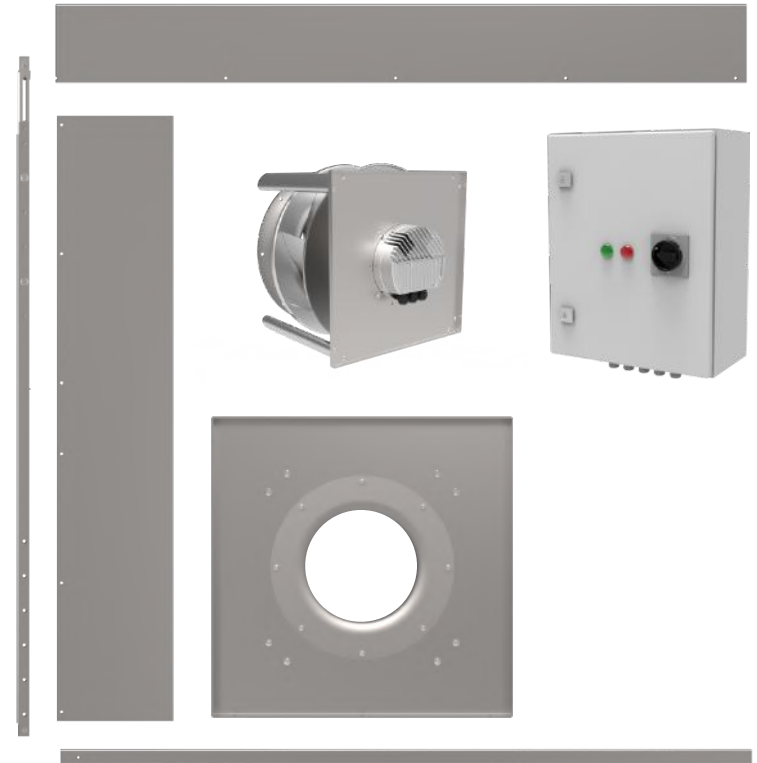
The Kit includes all mechanical parts (Fans, Cabinet, Grid, Screws).

Documented.

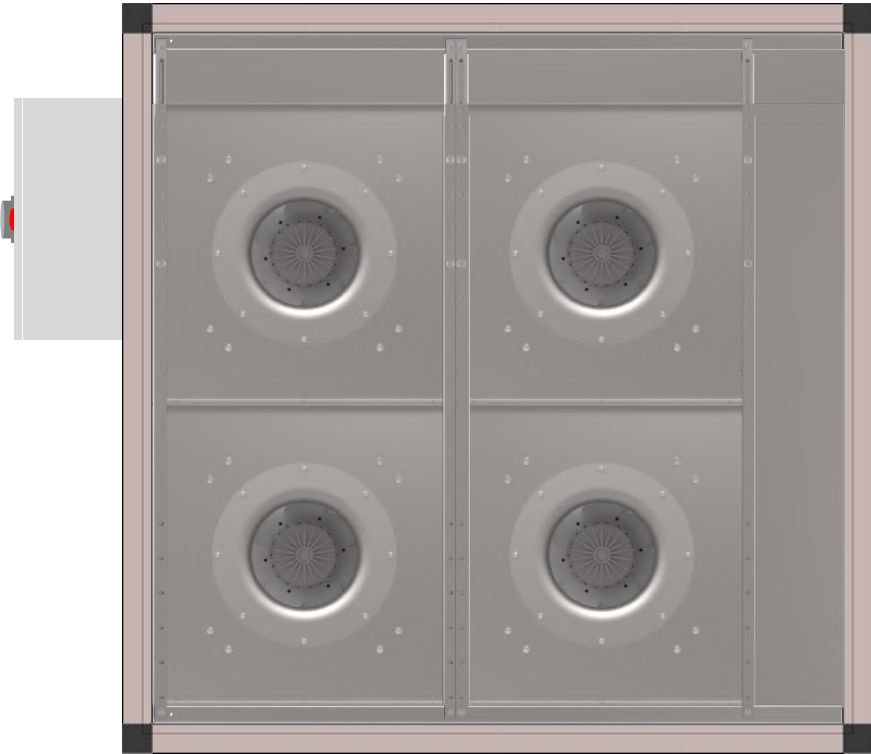
Installation Guide available. Wiring Diagrams available.

Mobile.

Fits through standard doors and stairways.



Retrofit Kit - Installation





https://www.youtube.com/watch?v=l0H_fne4YMw

https://www.youtube.com/watch?v=2u2_evJd5Wg



DATE: AUGUST 2013

SCOPE: SUBSTITUTION OF ONE BELT DRIVEN CENTRIFUGAL FAN INSIDE CUSTOM AHU

AIR VOLUME: 14,000 CFM

SITE OUTLOOK

SPACE RESTRICTIONS



OLD CENTRIFUGAL BELT DRIVEN FAN DISADVANTAGES



- SINGLE MOTOR- NO REDUNDANCY
- BELT DRIVE- EFFICIENCY LOSES & MAINTAINANCE PROBLEMS
- SPACE RESTRAINT
- LONGER NOISE FILTERS
- NEED OF A VFD TO CONTROL SPEED

ROSENBERG EC PLUG FAN

FAN HANDLING AND ACCESSIBILITY



-EASY TO HANDLE INTO THE JOBSITE



NEW EC FAN GRID

RETROFITTING WITH EC FANS

- BUILT IN REDUNDANCY
- EASE OF CONTROL
- EASE OF INSTALLATION
- UNIFORM PROFILE AIR VELOCITIES
- NOISE REDUCTION
- EFFICIENT



AIR HANDLING UNIT RETROFIT WITH EC FAN GRID

ENERGY SAVINGS



Existing
Fan (1)
79.50 A
14, 000 cfm
22.37 kW



Replacement
Fan Array (6 fans)
39.40 A
18, 000 cfm
13.34 kW



40% ENERGY SAVINGS

$(22.37 \text{ kW} - 13.34 \text{ kW}) \times 365 \text{ day/year} \times 24 \text{ h/day} \times 0.10 \text{ \$/kW} = 7,910 \text{ \$/year}$

* **Considering constant speed - Variable speed case savings are significantly**

higher with shorter payback
EC MOTOR = NO VFD

Retrofit with...

ECFanGrid



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www.ECFanGrid.com
ECFanGrid@rosenberg-gmbh.com



Flyer, Contact, References, Installation Videos, 