EC centrifugal fans

Constant air flow

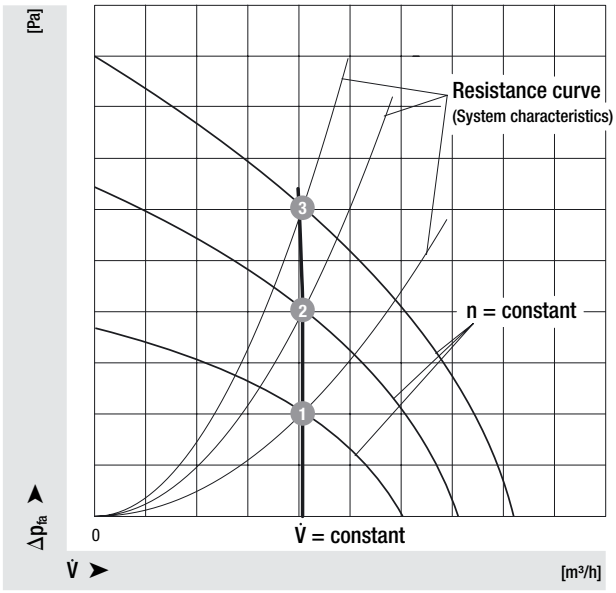
Counterrotating flaps **Pressure sensor**

EC centrifugal fans:
The innovative centrifugal fans with aerodynamically optimised 3D impellers combined with an EC motor bring together a compact design, optimum efficiency and optimum noise levels.

The 3D series ranges from sizes 310 to 630 mm. All these sizes can be easily regulated to either constant pressure or constant air flow.

With the given design, it is possible to control to constant air flow by measuring the pressure differential at the inlet nozzle (see example diagram).
The resistance curve can be changed via the counterrotating flaps. The set values are fixed via LISA or PDA.

Sample diagram:
Constant air flow



Advantages and features of the EC centrifugal fan:
- high efficiency
- low noise
- wide operating range
- compact dimensions
- commutation electronics integrated in the motor
- integrated EMC and mains filter
- integrated PFC (power-factor control)
- integrated motor protection, therefore: less wiring needed
  no other components required
- motor with matching electronics
- no maintenance, high durability
- wide voltage:1~200..277 VAC or 3~380..480 VAC
- 50 Hz or 60 Hz connection
- high reliability due to fewer components
- minimal power loss and minimal heat development
- standard analog and/or digital interfaces for communication with several motors

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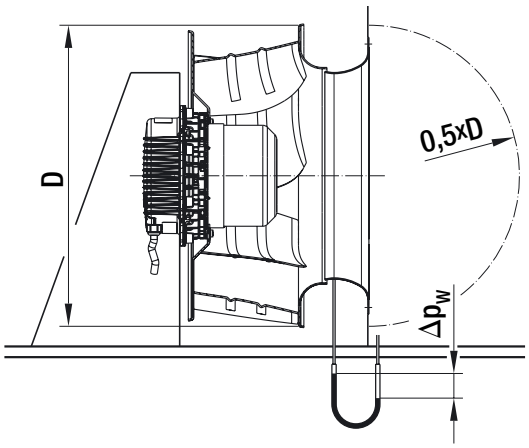
EC technology with pressure control made by ebm-papst:

- precise air flow control
- simple measuring principle
- PID controller and definition of set values via laptop or PDA
- simple programming via laptop or PDA
- PDA is only required for adjustment,
  the system runs automatically controlled

Air flow control via measuring at the inlet nozzle:



The pressure differential method compares the static pressure upstream of the inlet nozzle to the static pressure inside the inlet nozzle.
The air flow can be calculated from the pressure differential (differential pressure of the static pressures) based on the following equation:

$$\dot{V} = k \cdot \sqrt{\Delta p_W} \qquad \dot{V} \text{ in } [m^3/h] \text{ und } \Delta p_W \text{ in [Pa]}$$

For constant air flow control, the nozzle pressure must be kept constant:

$$\Delta p_W = \dot{V}^2 : k^2$$

k takes the specific nozzle characteristics into account.

Pressure is tapped at 4 points along the circumference of the inlet nozzle. Connection to customer terminal point is made via a built-in T-hose connector. This hose connection is suitable for pneumatic hoses with an internal diameter of 4 mm.

Sample calculation:

Air flow definition / adjustment via pressure differential measurement

Air flow $\dot{V} = k \cdot \sqrt{\Delta p_W}$

Pressure $\Delta p_W = \dot{V}^2 : k^2$

Calculation for R3G 450:

Air requirement = 4000 m^3/h

$p = 4000^2 : 217^2$ Pa = 340 Pa

Setting : p = 340 Pa

Fan	k factor
R3G 450	217
R3G 500	283
R3G 560	350
R3G 630	480

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