

R3G250-RR09-P1

# EC centrifugal fan - RadiCal

backward-curved, single-intake

for rail applications



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## Nominal data

|       |                |  |
|-------|----------------|--|
| Type  | R3G250-RR09-P1 |  |
| Motor | M3G084-DF      |  |

|                          |                   |           |
|--------------------------|-------------------|-----------|
| Nominal voltage          | VDC               | 110       |
| Nominal voltage range    | VDC               | 77 .. 138 |
| Method of obtaining data |                   | ml        |
| Speed (rpm)              | min <sup>-1</sup> | 3800      |
| Power consumption        | W                 | 540       |
| Current draw             | A                 | 4.9       |
| Min. ambient temperature | °C                | -40       |
| Max. ambient temperature | °C                | 60        |

ml = Max. load · me = Max. efficiency · fa = Free air · cs = Customer specification · ce = Customer equipment  
Subject to change

## Data according to Commission Regulation (EU) 327/2011 (EN 17166)

|                                   |   | Actual | Req. 2015 |                               |                   |      |
|-----------------------------------|---|--------|-----------|-------------------------------|-------------------|------|
| 01 Overall efficiency $\eta_{es}$ | % | 56.8   | 48.6      | 09 Power consumption $P_e$    | kW                | 0.53 |
| 02 Measurement category           |   | A      |           | 09 Air flow $q_v$             | m <sup>3</sup> /h | 1210 |
| 03 Efficiency category            |   | Static |           | 09 Pressure increase $p_{fs}$ | Pa                | 813  |
| 04 Efficiency grade N             |   | 70.2   | 62        | 10 Speed (rpm) n              | min <sup>-1</sup> | 3805 |
| 05 Variable speed drive           |   | Yes    |           | 11 Specific ratio*            |                   | 1.01 |

Data obtained at optimum efficiency level.

\* Specific ratio =  $1 + p_b / 100\,000\text{ Pa}$

LU-172878

The efficiency values displayed for achieving conformity with the Ecodesign Regulation EU 327/2011 has been reached with defined air duct components (e.g. inlet rings).  
The dimensions must be requested from ebm-papst. If other air conduction geometries are used on the installation side, the ebm-papst evaluation loses its validity/the conformity must be confirmed again.  
The product does not fall within the scope of Regulation (EU) 2019/1781 due to the exception specified in Article 2 (2a) (motors completely integrated into a product).



## Technical description

|                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Weight                                                     | 4.1 kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Size                                                       | 250 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Motor size                                                 | 84                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Rotor surface                                              | Painted black                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Electronics housing material                               | Die-cast aluminum                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Impeller material                                          | PA plastic UL94 V0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Number of blades                                           | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Direction of rotation                                      | Clockwise, viewed toward rotor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Degree of protection                                       | IP55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Insulation class                                           | "F"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Moisture (F) / Environmental (H) protection class          | H3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Max. permitted ambient temp. for motor (transport/storage) | +80 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Min. permitted ambient temp. for motor (transport/storage) | -40 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Installation position                                      | Shaft horizontal or rotor on bottom; rotor on top on request                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Condensation drainage holes                                | On rotor side                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Mode                                                       | S1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Motor bearing                                              | Ball bearing; (sealed)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Technical features                                         | <ul style="list-style-type: none"> <li>- Output 10 VDC, max. 10 mA</li> <li>- Operation and alarm display</li> <li>- Alarm relay</li> <li>- Run monitoring</li> <li>- Power limiter</li> <li>- Motor current limitation</li> <li>- RS-485 MODBUS-RTU</li> <li>- Soft start</li> <li>- EEPROM write cycles: 100,000 maximum</li> <li>- Control input 0-10 VDC / PWM</li> <li>- Control interface with SELV potential safely disconnected from the mains</li> <li>- Overvoltage detection</li> <li>- Thermal overload protection for electronics/motor</li> <li>- Line undervoltage detection</li> <li>- Reverse polarity protection</li> </ul> |
| EMC regulations                                            | According to EN 50121-3-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Motor protection                                           | Thermal overload protector (TOP) internally connected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| With cable                                                 | Lateral                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Protection class assignment                                | <p>I; If a protective earth is connected by the customer</p> <p>This component for installation may have several local protection classes. This information relates to this component's basic design.</p> <p>The final protection class is based on the component's intended installation and connection.</p>                                                                                                                                                                                                                                                                                                                                 |
| Conformity with standards                                  | EN 15085-1, CPC3; EN 45545-2, HL3; EN 50155; EN 61373, Cat. 1B; CE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Approval                                                   | EAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



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### Comment

If supply potential (e.g. 230 VAC) is passed through the alarm relay, the SELV signal wires lose their property of reinforced insulation, meaning they then have only basic insulation

The SELV property (reinforced insulation) is not lost when voltages of up to 110 VDC are passed through the alarm relay. EMC regulation: EN 50121-3-2 in preparation; speed limit 4000 rpm

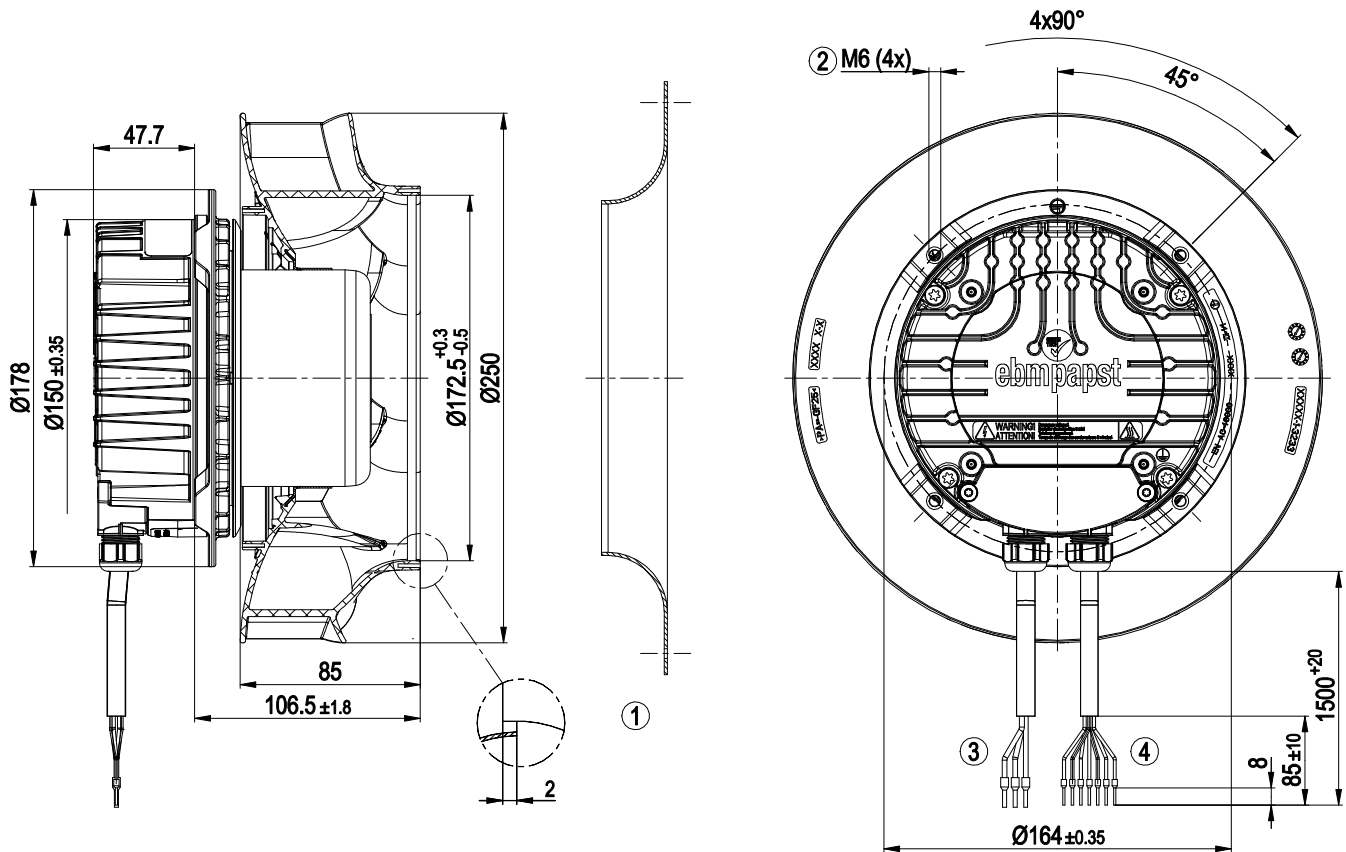


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## Product drawing



- |   |                                                                                                                                 |
|---|---------------------------------------------------------------------------------------------------------------------------------|
| 1 | Accessory part: Inlet ring 96420-2-4013 (not included in scope of delivery)                                                     |
| 2 | Max. clearance for screw 16 mm                                                                                                  |
| 3 | Cable, halogen-free, railway application EN 45545, 4G 1.5 mm <sup>2</sup><br>3x wire-end ferrule, 1x wire not routed externally |
| 4 | Cable, halogen-free, railway application EN 45545, 7x 0.5 mm <sup>2</sup><br>7x wire-end ferrule                                |

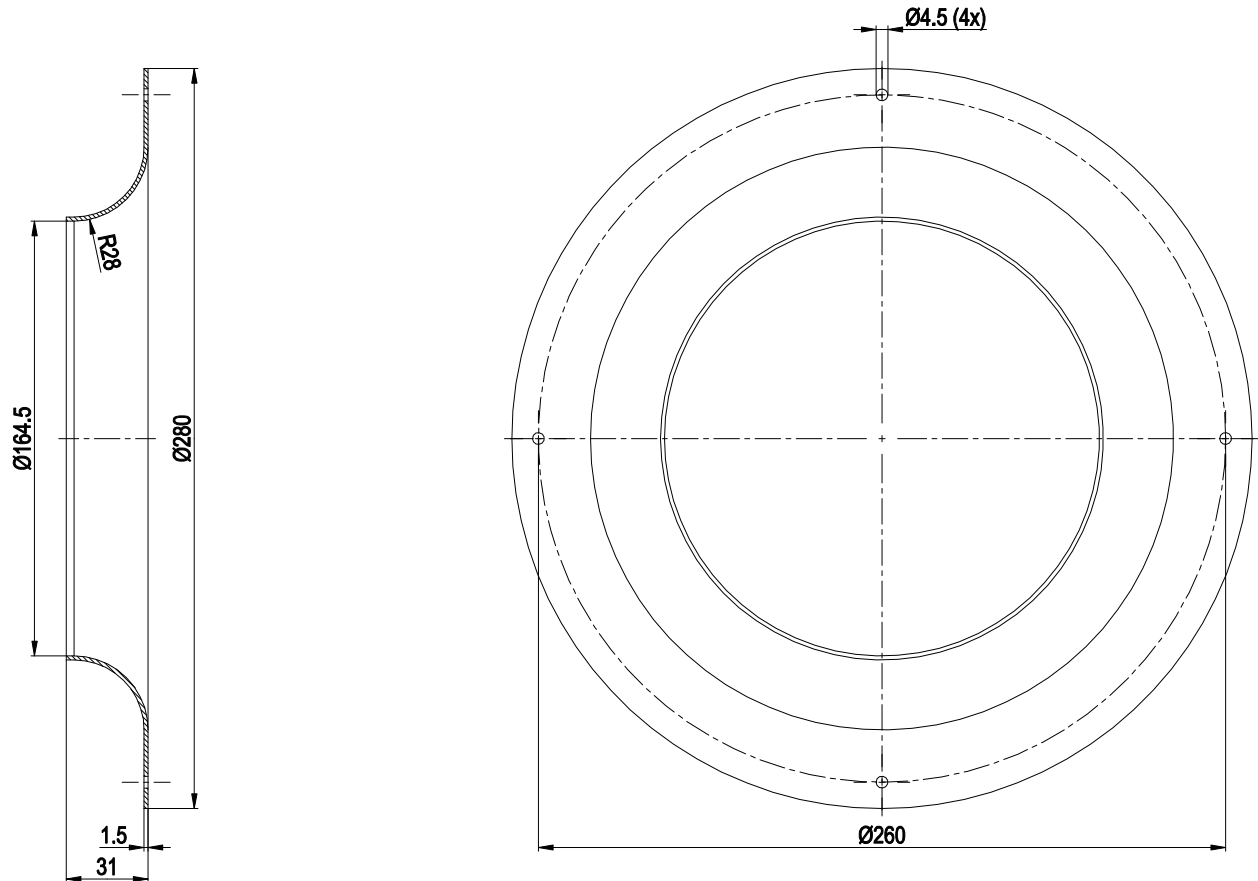


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## Accessory part



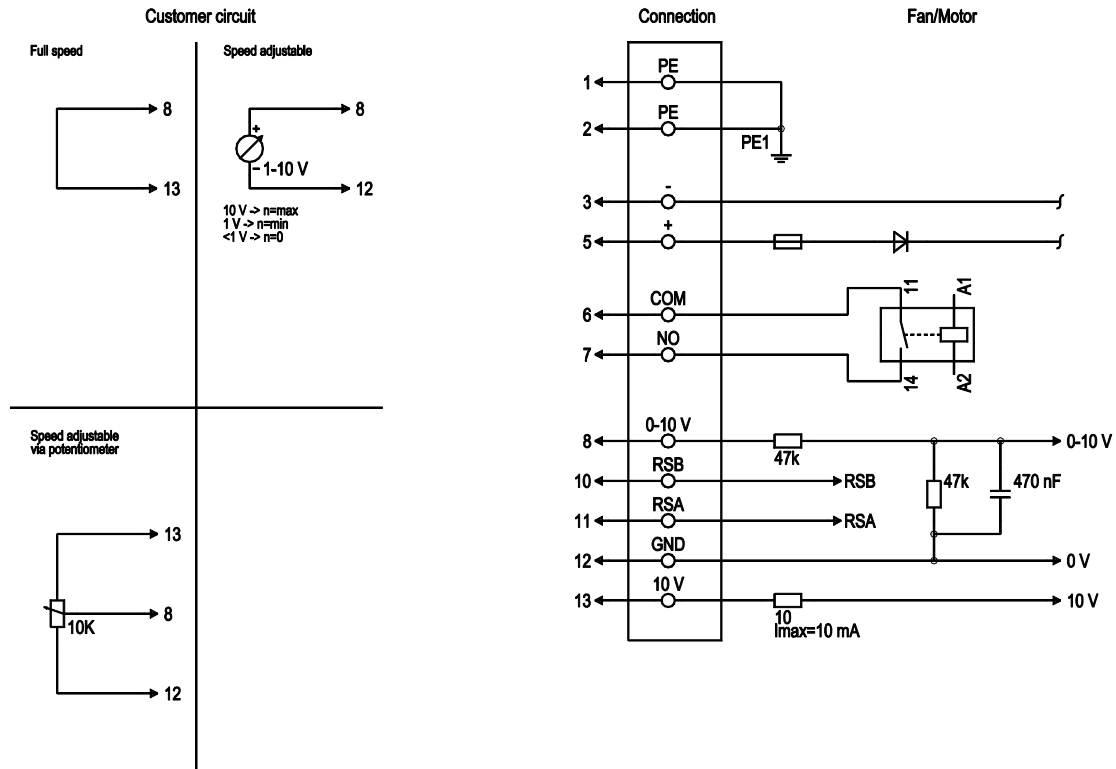
Inlet ring 96420-2-4013

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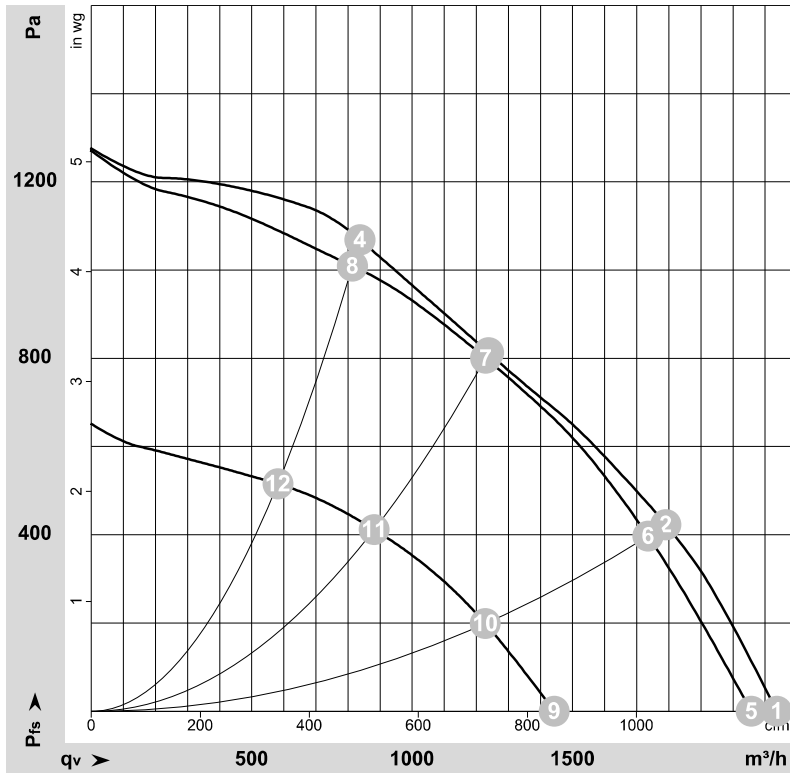
## Connection diagram



| No. | Conn. | Designation | Color        | Function/assignment                                                                                                                                                                                                                         |
|-----|-------|-------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | 1     | PE          | green/yellow | Protective earth                                                                                                                                                                                                                            |
| 1   | 2     | PE          | -            | not brought out via wire                                                                                                                                                                                                                    |
| 1   | 3     | -           | black        | Power supply, GND, voltage range see nameplate                                                                                                                                                                                              |
| 1   | 5     | +           | brown        | Power supply, see nameplate for voltage range                                                                                                                                                                                               |
| 2   | 6     | COM         | gray         | Status relay, floating status contact, common connection, contact rating 250 VAC/30 VDC max. 2 A (AC1), min. 1 mA/5 VDC, reinforced insulation on control interface side, basic insulation on supply side in accordance with EN 50124-1     |
| 2   | 7     | NO          | orange       | Status relay, floating status contact, normally open contact, contact rating 250 VAC/30 VDC max. 2 A (AC1), min. 1 mA/5 VDC, reinforced insulation on control interface side, basic insulation on supply side in accordance with EN 50124-1 |
| 2   | 8     | 0-10 V      | yellow       | Analog input (set value) SELV, 0-10 V, R <sub>i</sub> = 100 kΩ, adjustable curve                                                                                                                                                            |
| 2   | 10    | RSB         | brown        | RS-485 interface for MODBUS, RSB; SELV, bus termination resistor provided by customer                                                                                                                                                       |
| 2   | 11    | RSA         | white        | RS-485 interface for MODBUS, RSA; SELV, bus termination resistor provided by customer                                                                                                                                                       |
| 2   | 12    | GND         | blue         | Reference ground for control interface; SELV                                                                                                                                                                                                |
| 2   | 13    | +10 V       | red          | Fixed voltage output 10 VDC, SELV, +10 V +/-3%, max. 10 mA, short-circuit-proof, power supply for external devices (e.g. potentiometers)                                                                                                    |



## Curves: Air performance



$$\rho = 1.15 \text{ kg/m}^3 \pm 2 \%$$

Measurement: LU-172892-1  
 Measurement: LU-172878-1  
 Measurement: LU-172890-1

Air performance measured according to ISO 5801 installation category A. For detailed information on the measurement setup, contact ebm-papst. Intake sound level: Sound power level according to ISO 13347 / sound pressure level measured at 1 m distance from fan axis. The values given are valid under the specified measuring conditions and may vary due to conditions of installation. For deviations from the standard configuration, the parameters have to be checked on the installed unit.

## Measured values

|    | U   | n                 | P <sub>ed</sub> | I    | LpA <sub>in</sub> | LwA <sub>in</sub> | q <sub>V</sub> | P <sub>fs</sub> | q <sub>V</sub> | P <sub>fs</sub> |
|----|-----|-------------------|-----------------|------|-------------------|-------------------|----------------|-----------------|----------------|-----------------|
|    | V   | min <sup>-1</sup> | W               | A    | dB(A)             | dB(A)             | m³/h           | Pa              | cfm            | in. wg          |
| 1  | 138 | 4000              | 492             | 3.56 |                   |                   | 2135           | 0               | 1255           | 0.00            |
| 2  | 138 | 3945              | 557             | 4.04 |                   |                   | 1790           | 426             | 1055           | 1.71            |
| 3  | 138 | 3835              | 555             | 4.02 |                   |                   | 1240           | 813             | 730            | 3.26            |
| 4  | 138 | 3955              | 553             | 4.00 |                   |                   | 835            | 1069            | 495            | 4.29            |
| 5  | 110 | 3860              | 447             | 4.06 | 78                | 86                | 2055           | 0               | 1210           | 0.00            |
| 6  | 110 | 3815              | 510             | 4.64 | 75                | 83                | 1735           | 400             | 1020           | 1.61            |
| 7  | 110 | 3800              | 540             | 4.90 | 72                | 80                | 1230           | 800             | 725            | 3.21            |
| 8  | 110 | 3840              | 510             | 4.63 | 74                | 82                | 815            | 1000            | 480            | 4.01            |
| 9  | 77  | 2755              | 173             | 2.25 |                   |                   | 1445           | 0               | 850            | 0.00            |
| 10 | 77  | 2735              | 197             | 2.56 |                   |                   | 1230           | 200             | 725            | 0.80            |
| 11 | 77  | 2725              | 211             | 2.73 |                   |                   | 880            | 412             | 520            | 1.65            |
| 12 | 77  | 2735              | 197             | 2.56 |                   |                   | 580            | 516             | 345            | 2.07            |

U = Voltage · n = Speed (rpm) · P<sub>ed</sub> = Power consumption · I = Current draw · LpA<sub>in</sub> = Sound pressure level intake side · LwA<sub>in</sub> = Sound power level intake side · q<sub>V</sub> = Air flow  
 P<sub>fs</sub> = Pressure increase

