Fans for range hoods
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<td>EC-Centrifugal fan backward curved Ø 150 (with housing)</td>
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<td></td>
</tr>
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Centrifugal fans from ebm-papst bring a breath of fresh air into the kitchen. High-performance fans provide the necessary airflow, especially where steam and cooking fumes affect indoor air quality. In combination with the filter, the fan is the most important range hood component when it comes to providing an agreeable atmosphere free of disturbing odors, grease and steam.

The perfect interaction between these components ensures high energy efficiency, long service life and smooth operation. Making fans from ebm-papst the ideal choice for use in household appliances; in addition to the safety requirements specified for the fans used in range hoods in the DIN EN 60335-2-31 standard, range hoods are also subject to increasingly strict energy efficiency requirements.

The Ecodesign Directive 2009/125/EC established a framework for the environmentally compatible design of energy-related products. Regulations (EU) No. 65/2014 and 66/2014 on energy labeling and on requirements for the environmentally compatible design of appliances, including range hoods, set out rules for placing labels on hoods with information about characteristics such as their fluid-dynamic efficiency (FDE) and their assignment to energy efficiency classes (energy efficiency index – EEÍ).

This will pose serious challenges for the design of both range hoods and the components used in them. Whether they have a housing or not, whether they use forward- or backward-curved impellers, EC fans from ebm-papst enable top suction power with especially low energy consumption, making them the first choice for hoods in the higher energy efficiency classes.

Speed-controlled fans with EC technology offer further potential for savings in partial-load operation, i.e. when the range hoods are not operating at full capacity. Their optimized impellers also make them especially quiet. In the course of further revisions of the energy label for household appliances, changing requirements can also be expected in the future. With efficient EC technology, you can make your projects future-proof.

**Powerful and efficient**

**Fans for range hoods**

Forward-looking.

In addition to the possibility of varying the speed and direction of rotation, EC technology from ebm-papst offers further uses for the digital communication of tomorrow.

For example:
- Speed analysis
- Integration of communication via bus systems
- Detection of operating status and display on end devices in networked systems
- Implementation of predictive maintenance based on intelligent data utilization

Other convenience functionality is conceivable. Feel free to contact us to discuss a solution for your particular requirements.

### The advantages at a glance:

- Easy installation and start-up
- Available in designs with AC or EC technology
- Perfectly matched components
- High efficiency thanks to improved aerodynamics
- High suction power for fresh air in the kitchen
- Noise reduction thanks to optimized impeller
- Small footprint

### Fluid dynamic efficiency classes for household range hoods

<table>
<thead>
<tr>
<th>Fluid dynamic efficiency classes</th>
<th>Fluid dynamic efficiency (B, hood)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A*</td>
<td>FDE &lt; 28</td>
</tr>
<tr>
<td>B</td>
<td>28 ≤ FDE &lt; 40</td>
</tr>
<tr>
<td>C</td>
<td>40 ≤ FDE &lt; 60</td>
</tr>
<tr>
<td>D</td>
<td>60 ≤ FDE &lt; 80</td>
</tr>
<tr>
<td>E</td>
<td>80 ≤ FDE &lt; 100</td>
</tr>
<tr>
<td>F</td>
<td>FDE ≥ 100</td>
</tr>
</tbody>
</table>

**A**: Highest efficiency

**B**: Lowest efficiency

### Energy efficiency classes for household range hoods

<table>
<thead>
<tr>
<th>Energy efficiency classes</th>
<th>Energy efficiency index (EEÍ) current</th>
<th>Energy efficiency index (EEÍ) from 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+++*</td>
<td>EEÍ ≤ 37</td>
<td>EEÍ ≤ 30</td>
</tr>
<tr>
<td>A++</td>
<td>37 ≤ EEÍ &lt; 40</td>
<td>40 ≤ EEÍ &lt; 45</td>
</tr>
<tr>
<td>A</td>
<td>45 ≤ EEÍ &lt; 55</td>
<td>55 ≤ EEÍ &lt; 60</td>
</tr>
<tr>
<td>B</td>
<td>55 ≤ EEÍ &lt; 70</td>
<td>70 ≤ EEÍ &lt; 80</td>
</tr>
<tr>
<td>C</td>
<td>70 ≤ EEÍ &lt; 85</td>
<td>85 ≤ EEÍ &lt; 100</td>
</tr>
</tbody>
</table>

**A**: Highest efficiency

**B**: Lowest efficiency

For more information, visit [ebm-papst.com](http://ebm-papst.com)
The fans described on the following pages are used in wall-mounted, island and built-in hoods equipped with a fan module. Ebm-papst also supplies a wide range of suitably adapted fans for other designs such as telescopic, integrated and under-cabinet hoods. They are extremely compact, enabling not only smaller appliances but completely new design trends as well.

Thanks to their effective design, ebm-papst fans are very easy to install. They also have perfect noise characteristics even at high air performance levels, which are adjustable. Other important characteristics include tremendous energy efficiency and of course high reliability and long service life. Household appliance manufacturers appreciate not only our technology, but our engineering expertise as well.

As expert engineering partners, we work closely with our customers from the start of a project to help bring innovative and competitive products to market.

Customer-specific solutions
exemplified by BORA.

Since 2007, BORA Lüftungstechnik GmbH, based in the Bavarian town of Raubling, has been developing and selling successful cooktop extractor systems that use patented technology to extract fumes downward. Its innovative BORA Basic, BORA Classic, BORA Professional and BORA Pure product lines are sold in 60 countries worldwide.

Ebm-papst has developed an integrated fan assembly for this innovative type of extraction system. In close cooperation with the customer, all components were perfectly matched in terms of functionality, design and modularity. Sophisticated tool design and a suitable production scheme ensure economical production of the fans.

Ebm-papst product:

BORA cooktop extractors suck away fumes right where they are produced. Fans from ebm-papst are at work in the background, whether under the cooktop or in the base unit. They suck the air downward and convey it outside via a duct or, in the case of an air recirculation system, back into the room after filtering.
Example installations
for all designs

Dual inlet centrifugal fans
One of the main features of this range of fans is the easy of installation. The dual-inlet blower can be installed in an appliance in a few simple steps. Attachment of exhaust ducts and adapters is trouble-free.

For traditional fans with diameters 140mm to 160mm using AC technology, the motor run capacitor is located in the integrated terminal box.

The blower is fully wired for connection to the power grid with a plug. The standard design features four speed levels and covers a wide range of uses.

Modern, innovative EC fans offer smooth speed adjustment and a low noise level. The latest member of this series features integrated contact protection in the housing and bayonet connectors for attaching carbon filters.

Use in worktop hoods
Both forward- and backward-curved fans and also dual-intake fans can be used in this application.

Use in chimneys and inclined hoods or fan modules
Use in worktop hoods

Use in worktop hoods
Both forward- and backward-curved fans and also dual-intake fans can be used in this application.

Use in a cooktop extractor (downdraft)
The special forward-curved impeller design delivers high air performance with pleasantly low noise emissions. A snail-shaped scroll housing is needed in the hood for the forward-curved centrifugal impeller, so the values provided in the catalog were measured using an ebm-papst die-cast scroll housing.

Backward- and forward-curved centrifugal fans
The impeller is pressed directly onto the external rotor motor in centrifugal fans with forward- or backward-curved impellers, enabling a low-profile design. Backward-curved impellers are very efficient, so they are capable of high air flow at high pressures with relatively small motors. Another advantage of this design is that no special scroll housing is needed.

Example of a telescopic design with backward-curved centrifugal fan

Use of a backward-curved blower in ceiling, island, vertical or under-cabinet hoods

Operating modes:
Circulation mode
Extraction mode
Operation with outside wall blower
AC- / EC-Centrifugal fans

forward curved
AC-Centrifugal fan
forward curved, single-intake, ø 140 mm

Measuring requirements
Air performance measured according to S 5801 installation category A with ebm-papst scroll housing without contact protection.

Electrical data
Protection class I (with customer connection of protective earth)
Cable exit: Variable
Speed levels: 4

Standards and approvals
Conformity with standards: EN 60335-1, EN 60335-2-31, CE
Approvals: EAC

Material/surface
- Impeller: Sheet steel galvanized
- Electronics housing: Die-cast aluminium

Mechanical data
- Direction of rotation: R2E140...-04: Clockwise, viewed toward rotor R2E140...-06: Counterclockwise, viewed toward rotor
- Degree of protection: IP44, installation- and position-dependent
- Insulation class: F
- Environmental protection class: H0
- Installation position: Any
- Mode: 51
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

Nominal voltage 230 V AC, 50 Hz

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Air flow</th>
<th>Speed n</th>
<th>Max. input power P</th>
<th>Max. input current I</th>
<th>Sound power level LwA</th>
<th>Capacity (S)</th>
<th>Perm. ambient temp.</th>
<th>Curves drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Step 1</td>
<td>1-230</td>
<td>485</td>
<td>2000</td>
<td>150</td>
<td>0.70</td>
<td>72</td>
<td>5400</td>
<td>-25...+45</td>
<td>A</td>
</tr>
<tr>
<td>B</td>
<td>Step 2</td>
<td>1-230</td>
<td>425</td>
<td>2340</td>
<td>131</td>
<td>0.57</td>
<td>73</td>
<td>5400</td>
<td>-25...+45</td>
<td>B</td>
</tr>
<tr>
<td>C</td>
<td>Step 3</td>
<td>1-230</td>
<td>320</td>
<td>2340</td>
<td>107</td>
<td>0.47</td>
<td>70</td>
<td>5400</td>
<td>-25...+45</td>
<td>C</td>
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</table>

Nominal voltage 230 V AC, 60 Hz on request

<table>
<thead>
<tr>
<th>Curve</th>
<th>Centrifugal fan</th>
<th>Type</th>
<th>Part number/ EFE AG20</th>
<th>Weight kg</th>
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<tbody>
<tr>
<td>A</td>
<td>VFG1402ME2</td>
<td>R2E140AL1464</td>
<td></td>
<td>1.70</td>
</tr>
</tbody>
</table>

Dimensions in mm

- Accessory part: Inlet ring Ø576-3-4013 not included in scope of delivery
- Max. clearance for screw 5 mm
- Cable ETW AWG20; 6 crimped splices

More at www.ebmpapst.com

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Accessories
Page 102
Connection diagrams and technical features

Subject to change

Information
Fans for range hoods

on age ͼͼ͸ on age ͷͶ"
AC-Centrifugal fan  
forward curved, single-intake, Ø 146 mm

Material/surface
- Impeller: PP plastic
- Electronics housing: Die-cast aluminium

Mechanical data
- Direction of rotation: R2E146...25: Clockwise, viewed toward rotor  
  R2E146...26: Counterclockwise, viewed toward rotor  
- Degree of protection: IP44, installation- and position-dependent  
- Insulation class: B  
- Environmental protection class: H0  
- Installation position: Any  
- Mode: 51  
- Mounting: Ball bearing  
- Motor protection: Thermal overload protector internally connected

Electrical data
- Protection class I  
  (with customer connection of protective earth)  
- Cable exit: Variable  
- Speed levels: 4

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE  
- Approvals: EAC

### Nominal voltage 230 V AC, 50 Hz

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Full load</th>
<th>Speed n</th>
<th>Max. input power P</th>
<th>Min. input power P</th>
<th>Sound power level LwA</th>
<th>Capacity (Q)</th>
<th>Min. flow pressure ( P_{\text{min}} )</th>
<th>Max. ambient temp. ( T_{\text{amb}} )</th>
<th>Cond. dim. mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Step 1</td>
<td>1–230</td>
<td>420</td>
<td>1420</td>
<td>107</td>
<td>0.47</td>
<td>55</td>
<td>2450</td>
<td>100</td>
<td>-25...+30</td>
<td>100</td>
</tr>
<tr>
<td>A</td>
<td>Step 2</td>
<td>1–230</td>
<td>355</td>
<td>1760</td>
<td>99</td>
<td>0.43</td>
<td>-</td>
<td>2450</td>
<td>-</td>
<td></td>
<td></td>
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<td>A</td>
<td>Step 3</td>
<td>1–230</td>
<td>270</td>
<td>2110</td>
<td>88</td>
<td>0.39</td>
<td>-</td>
<td>2450</td>
<td>-</td>
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<td>A</td>
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<td>165</td>
<td>1395</td>
<td>77</td>
<td>0.35</td>
<td>-</td>
<td>2450</td>
<td>-</td>
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</tr>
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</table>

Values set in blue are nominal data at operating point with maximum load.

Subject to change

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### Technical drawing

- **Accessory part**: Inlet ring 09576-3-4013 not included in scope of delivery
- **Max. clearance for screws 5 mm**
- **Cable PVC AWG20, Be cramped splices**

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**Diagram:**

- **Step 1**: Accessory part. Inlet ring 09576-3-4013 not included in scope of delivery
- **Step 2**: Max. clearance for screws 5 mm
- **Step 3**: Cable PVC AWG20, Be cramped splices
EC-Centrifugal fan
forward curved, single-intake, Ø 140 mm

Material/surface
- Impeller: PP plastic
- Electronics housing: Die-cast aluminium

Mechanical data
- Direction of rotation: R3G140...-02: Counterclockwise, viewed toward rotor
- Degree of protection: IP54
- Insulation class: B
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Electronic

Electrical data
- Motor: 3-core
- Protection class
  - with customer connection of protective earth
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards:
  - EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

Nominal voltage range: 230 - 240 V AC, 50/60 Hz

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>rpm</th>
<th>W</th>
<th>A</th>
<th>dB (A)</th>
<th>°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1 - 230</td>
<td>475</td>
<td>1800</td>
<td>85</td>
<td>0.73</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>1 - 230</td>
<td>390</td>
<td>2155</td>
<td>85</td>
<td>0.73</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>1 - 230</td>
<td>285</td>
<td>2660</td>
<td>85</td>
<td>0.73</td>
<td>70</td>
<td></td>
</tr>
</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.

Subject to change

Technical drawing
Dimensions in mm

Measurement requirements
- Air performance measured according to EN 5801, installation category A, with peripheral sound housing without contact protection.
- Intake-side sound level according to EN 61000-6-2.
- Measured at 1 m distance from fan axis. The tables given are only applicable to the standard configuration. In the event of deviation from the standard configuration, the parameters must be checked in installed condition.

Accessory part: Inlet ring (DIN 76-3-4033), not included in scope of delivery
Max. clearance for screws 5 mm
Cable PVC AWG20, 3x crimped splices
Cable PVC AWG22, 4x crimped splices

More at www.ebmpapst.com greenthal
EC-Centrifugal fan
forward curved, single-intake, Ø 146 mm

---

**Materials/surface**
- Impeller: Sheet steel galvanized
- Electronics housing: Die-cast aluminium

**Mechanical data**
- Direction of rotation: R3G146...03: Clockwise viewed toward rotor
  R3G146...04: Counterclockwise, viewed toward rotor
- Degree of protection: IP54
- Insulation class: B
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Electronic

**Electrical data**
- Motor: 3-core
- Protection class
  (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

**EMC**
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2/3
- Interference emission: According to EN 61000-6-3

**Standards and approvals**
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

---

**Curves**

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Air flow</th>
<th>Spd in</th>
<th>Max. Input power</th>
<th>Max. Input current</th>
<th>Sound power level</th>
<th>Perme. air temp.</th>
<th>Curve diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V AC</td>
<td>m³/h</td>
<td>mm</td>
<td>W</td>
<td>A</td>
<td>dB (A)</td>
<td>° C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>1–230</td>
<td>505</td>
<td>1830</td>
<td>81</td>
<td>0.70</td>
<td>74</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>B</td>
<td>1–230</td>
<td>420</td>
<td>2090</td>
<td>81</td>
<td>0.70</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>1–230</td>
<td>360</td>
<td>2125</td>
<td>81</td>
<td>0.70</td>
<td>69</td>
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<td>1–230</td>
<td>280</td>
<td>2575</td>
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<td>0.67</td>
<td>70</td>
<td></td>
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</tr>
</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.
Subject to change

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**Technical drawing**

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**Measuring requirements**
Air performance measured according to S 5801, installation category A, with inline scroll housing without contact protection.
Intake-side sound level Lwa according to EN 61000-6-2, measured at 1 m distance from fans.
The values given are only applicable to the standard configuration. In the event of deviation from the standard configuration, the parameters must be limited to installed conditions.
EC-Centrifugal fan
forward curved, single-intake, Ø 160 mm

Materials/surface:
- Impeller: Sheet steel galvanized
- Electronics housing: Die-cast aluminium

Mechanical data:
- Direction of rotation: R3G160...-03: Clockwise viewed toward rotor
  R3G160...-04: Counterclockwise, viewed toward rotor
- Degree of protection: IP54
- Insulation class: B
- Environmental protection class: H1
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Electronic

Electrical data:
- Motor: 3-core
- Protection class I
- (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

EMC:
- Immunity to interference: According to EN 61000-6-2
- Interference emission: According to EN 61000-6-4

Standards and approvals:
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

Measuring requirements:
Air performance measured according to S 5801, installation category A, with vier good sound housing without contact protection. Sound levels are according to EN 13347.

Nominal voltage range: 200 - 240 V AC, 50/60 Hz

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Air flow</th>
<th>Speed n</th>
<th>Min. input</th>
<th>Min. input current</th>
<th>Sound power level</th>
<th>Min. Back pressure</th>
<th>Spec. air</th>
<th>Wash down speed</th>
<th>Min. Temp.</th>
<th>Max. Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1-230</td>
<td>525</td>
<td>2400</td>
<td>170</td>
<td>1.40</td>
<td>75</td>
<td>300</td>
<td>-25...+50</td>
<td>0</td>
<td>75</td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>1-230</td>
<td>470</td>
<td>2600</td>
<td>170</td>
<td>1.40</td>
<td>74</td>
<td>78</td>
<td>-25...+50</td>
<td>0</td>
<td>75</td>
<td>77</td>
<td>-25...+50</td>
</tr>
<tr>
<td>C</td>
<td>1-230</td>
<td>400</td>
<td>2800</td>
<td>170</td>
<td>1.40</td>
<td>76</td>
<td>78</td>
<td>-25...+50</td>
<td>0</td>
<td>75</td>
<td>77</td>
<td>-25...+50</td>
</tr>
</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.

Subject to change.
EC-Centrifugal fan
forward curved, single-intake, Ø 180 mm

Materials/surface
- Impeller: Sheet steel galvanized
- Electronics housing: Die-cast aluminium

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP54
- Insulation class: B
- Environmental protection class: H1
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Elektronik

Electrical data
- Motor: 3-core
- Protection class I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Interference emission: According to EN 61000-6-4

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

Measuring requirements
Air performance measured according to S 5801, installation category A, with 2.5 m proud vent housing without contact protection. Interferenzy levels measured 1 m from fan axe.

Accessories
- Inlet ring: 09597-2-4013 not included in scope of delivery

Values set in blue are nominal data at operating point with maximum load. Subject to change.
EC-Centrifugal fan
forward curved, single-intake, Ø 200 mm

Material/surface
- Impeller: Sheet steel galvanized
- Electronics housing: Die-cast aluminium

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP54
- Insulation class: B
- Environmental protection class: H1
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Elektronic

Electrical data
- Motor: 3-core
- Protection class I
- With customer connection of protective earth
- Cable exit: Variable
- Speed levels: Stepless controllable

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

Measuring requirements
Air performance measured according to S 5801, installation category A, with side use housing without contact protection.

Ranges
- Nominal voltage range: 200 – 240 V AC, 50/60 Hz
  - Curve A: 1–230 m³/h, V = 800 mm, W = 1.30 A, 74 dB (A)
  - Curve B: 1–230 m³/h, V = 985 mm, W = 1.30 A, 72 dB (A)

Values set in blue are nominal data at operating point with maximum load.

Substitute for change

Technical drawing
Dimensions in mm

Accessory part: inlet ring 09605-2-4013 not included in scope of delivery
Max. clearance for screw 10 mm
Max. clearance for screw 5 mm
Cable PVC AWG20, 3x crimped splices
Cable PVC AWG22, 4x crimped splices
AC- / EC-Centrifugal fans
backward curved

<table>
<thead>
<tr>
<th>Fan Model</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC-Centrifugal fan VB50190 / R2E190</td>
<td>28</td>
</tr>
<tr>
<td>AC-Centrifugal fan VB50220 / R2E220</td>
<td>30</td>
</tr>
<tr>
<td>AC-Centrifugal fan VB50250 / R2E250</td>
<td>32</td>
</tr>
<tr>
<td>EC-Centrifugal fan VB50190 / R3G190</td>
<td>34</td>
</tr>
<tr>
<td>EC-Centrifugal fan VB50220 / R3G220</td>
<td>36</td>
</tr>
<tr>
<td>EC-Centrifugal fan VB50250 / R3G250</td>
<td>38</td>
</tr>
<tr>
<td>EC-Centrifugal fan VBH0190 / K3G190</td>
<td>46</td>
</tr>
<tr>
<td>EC-Centrifugal fan VBH0220 / K3G220</td>
<td>48</td>
</tr>
<tr>
<td>EC-Centrifugal fan VBH0250 / K3G250</td>
<td>50</td>
</tr>
</tbody>
</table>
Measuring requirements
Air performance measured according to EN 5801 with ebm-papst inlet ring without contact protection.

Intake-side sound level L_A measured at 1 m distance from fan axis. The values given are only applicable under the specified measuring conditions and may differ depending on the installation conditions. In the event of deviation from the standard configuration, the parameters must be checked in installed condition.

Material/surface
- Impeller: PA plastic
- Electronics housing: Die-cast aluminium

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: Depending IP 44, installation- and position EN 60034-5
- Insulation class: B
- Environmental protection class: HD
- Installation position: Shaft horizontal or rotor bottom; Rotor on top on request
- Condensation drainage holes: On rotor side
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

Electrical data
- Protection class: I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: 4

Standards and approvals
- Conformity with standards: EN 60335-1, EN60335-2-31, CE
- Approvals: EAC

### Curve

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>m^3/h</th>
<th>rpm</th>
<th>W</th>
<th>A</th>
<th>dB(A)</th>
<th>perm. ambient temp. °C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>VAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>230 V AC, 50 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td>1-230</td>
<td>510</td>
<td>3510</td>
<td>52</td>
<td>0.24</td>
<td>59</td>
<td>1.5/400</td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td>1-230</td>
<td>410</td>
<td>3455</td>
<td>54</td>
<td>0.24</td>
<td>57</td>
<td>1.5/400</td>
<td></td>
</tr>
<tr>
<td>Step 6</td>
<td>1-230</td>
<td>285</td>
<td>2460</td>
<td>57</td>
<td>0.23</td>
<td>54</td>
<td>1.5/400</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>160</td>
<td>2475</td>
<td>53</td>
<td>0.24</td>
<td>56</td>
<td>1.5/400</td>
<td></td>
</tr>
</tbody>
</table>

Values in blue are nominal data at operating point with maximum load.

Subject to change

### Accessories

- Inlet ring 09576-2-4013 not included in scope of delivery
- Max. clearance for screw 5 mm
- Cable PVC AWG20, Bx crimped splices

### Technical drawing

Dimensions in mm
AC-Centrifugal fan RadiCal
backward curved, Ø 220 mm

Material/surface
- Impeller: PA plastic
- Electronics housing: Die-cast aluminium

Mechanical data
- Direction of rotation: CW
- Degree of protection: Depending on IP 44, installation and position
- Insulation class: F
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector is internally connected

Electrical data
- Protection class I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: 4

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: EAC

Measuring requirements
An performance tested according to EN 60335-3, installation category B, with inlets without without contact protection in lower row sound level L₁A according to ISO 3744, L₁A measured at 1 m in line with fan face. The column given are not applicable to the standard configuration, the parameters must be checked in installed conditions.

---

**Table:**

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>m³/h</th>
<th>rpm</th>
<th>W</th>
<th>A</th>
<th>dB(A)</th>
<th>pFV (Pa)</th>
<th>°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 6</td>
<td>200</td>
<td>100</td>
<td>515</td>
<td>200</td>
<td>50</td>
<td>0.44</td>
<td>63</td>
<td>2.5</td>
<td>40</td>
</tr>
<tr>
<td>Step 4</td>
<td>200</td>
<td>100</td>
<td>515</td>
<td>200</td>
<td>50</td>
<td>0.44</td>
<td>63</td>
<td>2.5</td>
<td>40</td>
</tr>
<tr>
<td>Step 4</td>
<td>200</td>
<td>100</td>
<td>515</td>
<td>200</td>
<td>50</td>
<td>0.44</td>
<td>63</td>
<td>2.5</td>
<td>40</td>
</tr>
</tbody>
</table>

Values in blue are nominal data at operating point with maximum load.

---

**Diagram:**

- Accessory part: Inlet ring 09609-2-4013 not included in scope of delivery
- Max. clearance for screws 5 mm
- Cable PFA AWG20 (green/yellow AWG28), 5x crimped splices

---

**Accessories:**

- Page 59

---

**Connection diagrams and technical features:**

- Page 102

---

**More at:**

- www.ebmpapst.com

---

**Technical drawing:**

- Dimensions in mm

---

**Range hoods · Edition 2019-10**
**AC-Centrifugal fan RadiCal**

**backward curved, Ø 250 mm**

![AC-Centrifugal fan RadiCal](image)

**Material/surface**
- Impeller: PA plastic
- Electronics housing: Die-cast aluminium

**Mechanical data**
- Direction of rotation: Clockwise, viewed toward rotor
- Degree of protection: Depending on IP 44, installation- and position according to EN60034-5
- Insulation class: F
- Environmental protection class: HD
- Installation position: Shaft horizontal or rotor bottom; Rotor on top on request
- Condensation drainage holes: On rotor side
- Mode: 51
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

**Electrical data**
- Protection class I (with customer connection of protective earthing)
- Cable exit: Variable

**Standards and approvals**
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: EAC

---

**Curve**

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage (V)</th>
<th>Air flow (m³/h)</th>
<th>Speed (rpm)</th>
<th>Max. input current (A)</th>
<th>Max. input current (A)</th>
<th>Sound power level (dB)</th>
<th>Sound power level (dB)</th>
<th>Tolerance</th>
<th>Ambient temp. (°C)</th>
</tr>
</thead>
</table>

**Nominal voltage 230V AC, 50 Hz on request**

Values set in blue are nominal data at operating point with maximum load.

Subject to change

---

**Technical drawing**

Dimensions in mm:

- 118
- 120
- 85
- 95
- 95
- 125
- 70
- 85
- 115
- 105
- 105

---

**Accessories**
- Part 96359-2-4013 not included in scope of delivery

**Electrical data**
- Protection class I
- with customer connection of protective earthing

**Standards and approvals**
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: EAC

---

**Connections and technical features**

More at [www.ebmpapst.com](http://www.ebmpapst.com)
Material/surface
- Impeller: PA plastic
- Electronics housing: Die-cast aluminium

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Insulation class: B
- Environmental protection class: H0
- Installation position: Any
- Mounting: Ball bearing
- Motor protection: Electronic

Electrical data
- Motor: 3-phase
- Protection class I (with customer connection of protective earth)
- Extension: Variable
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2/3
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

Measuring requirements
An performance measured according to ISO 5801, installation category A, with referred speeds may without contact protect four under-norm sound levels L_A, according to ISO 5131, measured at 2 m distance from fan axis. The values given are all applicable under the stated conditions. In the event of deviations from the standard configuration, the parameters must be adapted to installed conditions.
EC-Centrifugal fan RadiCal
backward curved, Ø 220 mm

Material/surface
- Impeller: PA plastic
- Electronics housing: Die-cast aluminium

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Insulation class: B
- Environmental protection class: H0
- Installation position: Any
- Mode: S3
- Mounting: Ball bearing
- Motor protection: Elektronic

Electrical data
- Motor: 3-core
- Protection class I (with customer connection of protective earth)
- Cable entry: Variable
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2/3
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

### Operating point at nominal voltage

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Max. input current</th>
<th>Sound power level</th>
<th>Ambient temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1–230</td>
<td>230 V, 50 Hz</td>
<td>78</td>
<td>0.69</td>
<td>-25…+60</td>
</tr>
<tr>
<td>B</td>
<td>1–230</td>
<td>230 V, 50 Hz</td>
<td>85</td>
<td>0.70</td>
<td>65</td>
</tr>
<tr>
<td>C</td>
<td>1–230</td>
<td>230 V, 50 Hz</td>
<td>85</td>
<td>0.70</td>
<td>65</td>
</tr>
</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.

Subject to change

**Curves**

- Centrifugal fan

**Technical drawing**

Dimensions in mm

- Accessory part: Inlet ring 09609-2-413, not included in scope of delivery
- Max. clearance for screws 5 mm
- Cable PVC AWG20, 3x crimped splices
- Cable PVC AWG22, 4x crimped splices

### Measuring requirements

As performance tested according to ISO 15715, installation category A, with flare quick-act (without contact protective flange)—tested according to ISO 15715, installation category A, with flare quick-act (without contact protective flange). The values given are not applicable to other installation categories. In the event of deviations from the standard configuration, the parameters must be checked in installed condition.

### Accessories

- on Page 56
- on Page 122
- More at www.ebmpapst.com

### Connection diagrams and technical features

More at www.ebmpapst.com
Measuring requirements

A performance measured according to ISO 5801, installation category B, with non-passive inlet (without contact protection)

Mechanical data

- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Insulation class: B
- Environment protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Electronic

Electrical data

- Motor: 3-core
- Protection class I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

EMC

- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2
- Interference emission: According to EN 61000-6-3

Standards and approvals

- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

Material/surface

- Impeller: PA plastic
- Electronics housing: Die-cast aluminium

E LECTRICAL DATA

- Motor: 3-core
- Protection class I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

M ETRICAL DATA

- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Insulation class: B
- Environment protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Electronic

M ECHANICAL DATA

- Impeller: PA plastic
- Electronics housing: Die-cast aluminium
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Insulation class: B
- Environment protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Electronic

A more detailed view of the technical drawing and additional features can be found at [www.ebmpapst.com](http://www.ebmpapst.com).
## EC-Centrifugal fan RadiCal

### backward curved, Ø 225 mm

### Measuring requirements
- Air performance measured according to EN 5801
- Inlet-side sound level \( L_{\text{AN}} \) according to EN 13347
- Measured at 1 m distance from fan axis
- The values given are only applicable under the specified measuring conditions and may differ depending on the installation conditions.
- In the event of deviation from the standard configuration, the parameters must be blocked in installed condition.

### Accessories
- Inlet ring (96358-2-4013) not included in scope of delivery
- Max. clearance for screws 10 mm
- Cable PVC AWG22, 4x crimped splices
- Cable PVC AWG20, 3x crimped splices

### Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Environmental protection class: H1
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Elektronic

### Electrical data
- Motor: 3-core
- Protection class I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

### EMC
- Immunity to interference: According to EN 61000-6-2
- Interference emission: According to EN 61000-6-3

### Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

### Technical drawing

### Dimensions in mm

### Operating point

### Nominal voltage range

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Air flow</th>
<th>Speed in</th>
</tr>
</thead>
<tbody>
<tr>
<td>V-AC</td>
<td>W</td>
<td>A</td>
<td>dB (A)</td>
<td>°C</td>
</tr>
</tbody>
</table>

### Values set in blue are nominal data at operating point with maximum load.

### Subject to change

### More
- On Page 30: Accessories
- On Page 122: Connection diagrams and technical features
- More at: [www.ebmpapst.com](http://www.ebmpapst.com)
EC-Centrifugal fan RadiCal
backward curved, Ø 250 mm

Material/surface
- Impeller: PA plastic
- Electronics housing: Die-cast aluminium

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Insulation class: B
- Environmental protection class: H0
- Installation position: Any
- Mode: S3
- Mounting: Ball bearing
- Motor protection: Electronic

Electrical data
- Motor: 3-core
- Protection class I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

---

**Curves**

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Normal voltage</th>
<th>Air flow</th>
<th>Speed n</th>
<th>Motor input 1</th>
<th>Motor input 2</th>
<th>Sound power level</th>
<th>Power in W</th>
<th>Ambient temp. °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curve</td>
<td>V AC</td>
<td>m³/h</td>
<td>mm</td>
<td>W</td>
<td>A</td>
<td>dB (A)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Curve 1</td>
<td>1–230</td>
<td>1210</td>
<td>2195</td>
<td>80</td>
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<td>71</td>
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<tr>
<td>Curve 2</td>
<td>1–230</td>
<td>985</td>
<td>2070</td>
<td>80</td>
<td>0.70</td>
<td>66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curve 3</td>
<td>1–230</td>
<td>675</td>
<td>1555</td>
<td>80</td>
<td>0.70</td>
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<td></td>
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</tr>
<tr>
<td>Curve 4</td>
<td>1–230</td>
<td>415</td>
<td>2060</td>
<td>80</td>
<td>0.70</td>
<td>68</td>
<td></td>
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</tr>
</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.
Subject to change

---

**Technical drawing**

Dimensions in mm

---

Accessories

Accessories

Connection diagrams and technical features

More at www.ebmpapst.com

---

**Accessories**

Accessory part: Inlet ring 96592-2-4013, not included in scope of delivery

Max. clearance for screw 5 mm

Cable PVC AWG20, 5x crimped splices

Cable PVC AWG22, 4x crimped splices
### Measuring requirements

Air performance measured according to āS 5801 ā installation category ā with ebm-papst inlet ring ā without contact protection.

### Operating point

<table>
<thead>
<tr>
<th>Nominal voltage</th>
<th>Min. rated voltage</th>
<th>Max. rated voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>V AC</td>
<td>230 V</td>
<td>250 V</td>
</tr>
<tr>
<td>m³/h</td>
<td>143</td>
<td>154</td>
</tr>
<tr>
<td>in. wg</td>
<td>1.38</td>
<td>1.50</td>
</tr>
<tr>
<td>Sound power level</td>
<td>A dB (A)</td>
<td>C dB (A)</td>
</tr>
<tr>
<td>1</td>
<td>77</td>
<td>-25...+60</td>
</tr>
<tr>
<td>2</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>72</td>
<td></td>
</tr>
</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.

Subject to change

### Materials/surface

- Impeller: PA plastic
- Electronics housing: Die-cast aluminium

### Mechanical data

- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Insulation class: B
- Environmental protection class: H1
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Elektronik

### Electrical data

- Motor: 3-core
- Protection class I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

### EMC

- Immunity to interference: According to EN 61000-6-2
- Interference emission: According to EN 61000-6-4

### Standards and approvals

- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

### Curves

<table>
<thead>
<tr>
<th>Curve</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Centrifugal fan</td>
</tr>
</tbody>
</table>

### Accessories

- Part number: VBS50SGWLSG5, BSG500RE0704
- Weight: 1.50 kg

### Technical drawing

Dimensions in mm:

- Accessory part: Inlet ring 90019-2-4013, not included in scope of delivery
- Max. clearance for screws 30 mm
- Max. clearance for screws 5 mm
- Cable PVC AWG23, 3x crimped splices
- Cable PVC AWG22, 4x crimped splices
EC-Centrifugal fan RadiCal
backward curved, with housing, Ø 190mm

Material/surface
- Impeller: PA plastic
- Housing: PA plastic

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Insulation class: B
- Environmental protection class: H1
- Installation position: Any
- Mode: S3
- Mounting: Ball bearing
- Motor protection: Elektronic

Electrical data
- Motor: 3-core
- Protection class I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: UL 2004-7 + 60730 CSA C22.2 Nr. 77 + CAN/CSA-E60730-1, EAC

Measurement requirements
An performance measured according to ISO 5801, installation category B, with nine-speed inlet (without contact protection, under normal sound test) I, according to ISO 5801, L, measured at 1 m distance from fan axis. The values given are in applicable to the standard configuration. In the event of deviation from the standard configuration, the parameters must be checked in installed conditions.

Technical drawing

Values set in blue are nominal data at operating point with maximum load.
Subject to change
EC-Centrifugal fan RadiCal
backward curved, with housing, Ø 220mm

Material/surface
- Impeller: PA plastic
- Housing: PA plastic

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Insulation class: B
- Environmental protection class: H1
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Elektronic

Electrical data
- Motor: 3-phase
- Protection class I
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: UL 1004-7+ 60730 CSA C22.2 N77 + CAN/CSA-E60730-1, EAC

Accessories
- on Page 59: Accessories
- on Page 122: Connection diagrams and technical features

More at www.ebmpapst.com

Measurement requirements
An performance measured according to ISO 5801, installation category B, with flexible ducting (without contact protection) and round probe (Ø 75 mm). Values set in blue are nominal data at operating point with maximum load.

Subject to change

Technical drawing
Dimensions in mm

Cable connection:
1. Cable PVC AWG20; 3x crimped splices
2. Cable PVC AWG22; 3x crimped splices
3. Mounting dimensions

Curves
- Operating point
- Nominal voltage
- Speed in
- Motor current I
- Motor input power P
- Sound power level L dB (A)
- Ambient temperature °C

Nominal voltage range: 230 - 240 V AC, 50/60 Hz

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Speed in</th>
<th>Motor current I</th>
<th>Motor input power P</th>
<th>Sound power level L dB (A)</th>
<th>Ambient temperature °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1-230</td>
<td>970</td>
<td>2695</td>
<td>78</td>
<td>0.69</td>
<td>70</td>
<td>-25...+60</td>
</tr>
<tr>
<td>A</td>
<td>1-230</td>
<td>785</td>
<td>2595</td>
<td>85</td>
<td>0.70</td>
<td>67</td>
<td>-25...+60</td>
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<tr>
<td>A</td>
<td>1-230</td>
<td>525</td>
<td>2780</td>
<td>85</td>
<td>0.70</td>
<td>67</td>
<td>-25...+60</td>
</tr>
</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.

Subject to change

Connection diagrams and technical features

More at www.ebmpapst.com

Technical drawing
Dimensions in mm

Cable connection:
1. Cable PVC AWG20; 3x crimped splices
2. Cable PVC AWG22; 3x crimped splices
3. Mounting dimensions
EC-Centrifugal fan RadiCal
backward curved, with housing, Ø 250mm

Material/surface
- Impeller: PA plastic
- Housing: PA plastic

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Insulation class: B
- Environmental protection class: H1
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Elektronik

Electrical data
- Motor: 3-core
- Protection class I (with customer connection of protective earth)
- Cable: Variable
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Interference emission: According to EN 61000-6-4

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC
### AC- / EC-Centrifugal fans

**forward-curved, dual-intake, with housing**

<table>
<thead>
<tr>
<th>Model</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC-Centrifugal fan VHD0140 / DJE140</td>
<td>54</td>
</tr>
<tr>
<td>AC-Centrifugal fan VHD0146 / DJE146</td>
<td>58</td>
</tr>
<tr>
<td>EC-Centrifugal fan VHD0160 / D2G160</td>
<td>62</td>
</tr>
<tr>
<td>EC-Centrifugal fan VHD0160 / D1G146</td>
<td>66</td>
</tr>
<tr>
<td>EC-Centrifugal fan VHD0146 / D3G146</td>
<td>70</td>
</tr>
<tr>
<td>EC-Centrifugal fan VHD0160 / D3G160</td>
<td>74</td>
</tr>
</tbody>
</table>

---

**Image:**

[Image of a centrifugal fan]
AC-Centrifugal fan
forward curved, dual intake, with housing, Ø 140 mm

Material/surface
- Impeller: PP plastic
- Housing: PP plastic

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 44
- Insulation class: F
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

Electrical data
- Protection class: IP 44 with customer connection of protective earth
- Speed levels: 4
- Electrical hookup: Plug, via terminal box, capacitor integrated and connected

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC, CCC

Measurements requirements
Air performance measured according to S 5801, installation category A, with intake-side sound housing without contact protection. Under normal operating conditions (LwA according to S 13347, measured at 1 m distance from fan axis). Values given are only applicable to the standard configuration. In the event of deviation from the standard configuration, the parameters must be checked in installed condition.

Detail X – Coded plug system: 4-pole connector housing TE 237/775-3, 6-pole plug TE 926886-3
- L = Step 1
- N = Step 2
- PE = Step 3
- 4x sheet metal nut for thread EN ISO 2479-ET/8
- M6 screw length 6.0 mm (plus material thickness of attachment)
AC-Centrifugal fan  
forward-curved, dual-intake, with housing, Ø 146 mm

Material/surface
- Impeller: PP plastic
- Housing: PP plastic

Mechanical data
- Direction of rotation: Counter-clockwise, viewed toward rotor
- Degree of protection: IP20
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

Electrical data
- Protection class I
  (with customer connection of protective earth)
- Speed levels: 4
- Electrical hookup: Plug, via terminal box, capacitor integrated and connected

Standards and approvals
- Conformity with standards: EN 60335-1, EN60335-2-31, CE
- Approvals: VDE, EAC, CCC

Technical drawing

Dimensions in mm

Curves

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>qVA</th>
<th>m³/h</th>
<th>Speed n</th>
<th>Max. input power Pmax</th>
<th>Max. input current I</th>
<th>Sound power level LWA</th>
<th>Ambient temp.</th>
<th>Conn. diagram</th>
<th>V  AC m  ℓ</th>
</tr>
</thead>
</table>

Nominal voltage 230 V AC, 50 Hz

- **Step 1**: 1–330 615 1030 140 0.62 60
- **Step 2**: 1–330 535 1455 133 0.58 60
- **Step 3**: 1–330 495 1840 125 0.55 62
- **Step 4**: 1–330 310 2220 112 0.50 67

Values set in blue are nominal data at operating point with maximum load.

Subject to change

Fan data

<table>
<thead>
<tr>
<th>Type</th>
<th>Part number</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>VHD014XY6ME5</td>
<td>2.60</td>
</tr>
</tbody>
</table>

AC-Centrifugal fan Ø 146 mm

Measuring requirements
Air performance measured according to S 5801, installation category A, with the standard scroll housing without contact protection.

The parameters given are applicable under the specified measuring conditions and may differ depending on the installation conditions. In the event of deviation from the standard configuration, the parameters must be checked in installed condition.

Detail X – Coded plug system: 6-pole connector housing TE 327/773-3, 6a plug to TE 326B86-3

4x sheet metal nut for thread EN ISO 2479-17A/B

Dimensions in mm

- Ø 3.3
- 90
- 5.3
- 95
- 60
- 199
- 110
- 173
- 113.6
- 233.2
- 155
- 19

Accessories
Connection diagrams and technical features
More at www.ebmpapst.com
AC-Centrifugal fan
forward-curved, dual-intake, with housing, Ø 146 mm

Material/surface
- Impeller: PP plastic
- Housing: PP plastic

Mechanical data
- Direction of rotation: Counterclockwise, viewed toward rotor
- Degree of protection: IP20
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector

Electrical data
- Protection class I
- (with customer connection of protective earth)
- Speed levels: 4
- Electrical hookup: Plug, via terminal box, capacitor integrated and connected

Standards and approvals
- Conformity with standards: EN 60335-1, EN60335-2-31, CE
- Approvals: VDE, EAC, CCC

Measuring requirements
Air performance measured according to S 5801, installation category A, with free-pass scroll housing without contact protection.

Insertion-side sound level: LwA according to S 13347, measured at 1 m distance from fan.

The values given are only applicable to the standard configuration. In the event of deviation from the standard configuration, these parameters must be checked in the installed condition.

More at www.ebmpapst.com

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Full flow</th>
<th>rpm</th>
<th>pfs Pa</th>
<th>Δp(A)</th>
<th>Sound power level</th>
<th>Current at nominal voltage</th>
<th>Ambient temp.</th>
<th>Conn. diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Y: AC</td>
<td>m³/h</td>
<td>rpm</td>
<td>W</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>1–230</td>
<td>760</td>
<td>1150</td>
<td>135</td>
<td>0.46</td>
<td>65</td>
<td></td>
<td>-25...50 E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>1–230</td>
<td>645</td>
<td>1795</td>
<td>185</td>
<td>0.81</td>
<td>65</td>
<td></td>
<td>-25...50 E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td>1–230</td>
<td>480</td>
<td>1200</td>
<td>189</td>
<td>0.75</td>
<td>67</td>
<td></td>
<td>-25...50 E</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.

Subject to change

AC-Centrifugal fan Ø 146 mm

More at www.ebmpapst.com

<table>
<thead>
<tr>
<th>Curve</th>
<th>Centrifugal fan</th>
<th>Part number</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type</td>
<td>Part number</td>
<td>Weight</td>
</tr>
<tr>
<td>A</td>
<td>VHDG464XMS</td>
<td>D2S264650703</td>
<td>3.00</td>
</tr>
</tbody>
</table>

Detail X – Coded plug system: 6-pole connector housing TE 3278773-3, 6 pin plug TE 326886-1

1. L = Step 1
2. L = Step 2
3. L = Step 3
4. 4x sheet metal nut for thread EN ISO 2479-ETX-8 (min. screw length 1.5 mm
   (plus material thickness of attachment))
AC-Centrifugal fan
forward-curved, dual-intake, with housing, Ø 146 mm

Material/surface
- Impeller: Sheet steel galvanized
- Housing: PP plastic

Mechanical data
- Direction of rotation: Counterclockwise, viewed toward rotor
- Degree of protection: IP20
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector externally connected

Electrical data
- Protection class I (with customer connection of protective earth)
- Speed levels: 4
- Electrical hookup: Plug, via terminal box, capacitor integrated and connected

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

Curves
- Operating point:
  - Nominal voltage: V AC
  - Airflow: m³/h
  - Speed n: rpm
  - Max. input power Pe: W
  - Motor data: A
  - Ambient temp.: °C

Curve
- Centrifugal fan: Type, Part number, Weight kg
- VHD0146X4M, DZE146HT9002, 1.40

Technical drawing

Dimensions in mm

Measuring requirements
Air performance measured according to S 5801, installation category A, with in-line sound housing without contact protection, under-no-load output P , according to S 5801, L measured at 1 m distance from fan. The values given are not applicable in every variant. For other variants, the data must be checked in installed condition. In the event of deviation from the standard configuration, the parameters must be checked in installed condition.

Certification
- Declaration of conformity (all details): 217/673-3, 6a plug-in connection of protective earth.
- Approval: EAC

Details
- H0: 4x sheet metal nut for thread EN ISO 2479-257-B (min. screw length 15.5 mm, plus material thickness of attachment)
**AC-Centrifugal fan**

*forward-curved, dual-intake, with housing, ø 160 mm*

**Material/surface**
- Impeller: Sheet steel galvanized
- Housing: PP plastic

**Mechanical data**
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: Depending IP44; installation and position
- Insulation class: F
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

**Electrical data**
- Protection class I (with customer connection of protective earth)
- Speed levels: 4
- Electrical hookup: Plug, via terminal box, capacitor integrated and connected

**Standards and approvals**
- Conformity with standards: EN 60335-1, EN60335-2-31, CE
- Approvals: EAC

---

** Nominal voltage 230 V AC, 50 Hz**

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Full load</th>
<th>Speed n</th>
<th>Max. Input power Pmax</th>
<th>Max. sound power level LwA</th>
<th>Peak pressure Pperm.</th>
<th>Ambient temp. °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>1–230</td>
<td>400</td>
<td>1170</td>
<td>150</td>
<td>0.48</td>
<td>60</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>1–230</td>
<td>320</td>
<td>1480</td>
<td>105</td>
<td>0.44</td>
<td>62</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>1–230</td>
<td>250</td>
<td>1720</td>
<td>102</td>
<td>0.44</td>
<td>66</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td>1–230</td>
<td>150</td>
<td>1950</td>
<td>99</td>
<td>0.43</td>
<td>70</td>
<td>160</td>
<td></td>
</tr>
</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.

Subject to change

---

**Curve**

**Centrifugal fan**

<table>
<thead>
<tr>
<th>Type</th>
<th>Part number</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>VHD0160X2MC5</td>
<td>2.60</td>
</tr>
</tbody>
</table>

---

**Technical drawing**

**Dimensions in mm**

**Detail X – Coded plug system: 6-pole connector housing TE 237077-3, 6x plug TE 326896-1**

1. L = Step 1
2. L = Step 2
3. L = Step 3
4. L = Step 4
5. N
6. PE
7. 5x sheet metal nut for thread EN ISO 2479-CTA 8 (incl. screw length 14.5 mm, plus material thickness of attachment)
AC-Centrifugal fan

forward curved, dual-intake, with housing, Ø 160 mm

Material/surface
- Impeller: Sheet steel galvanized
- Housing: PP plastic

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: Depending IP44,
- Insulation class: F
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

Electrical data
- Protection class I
- (with customer connection of protective earth)
- Speed levels: 4
- Electrical hookup: Plug via terminal box, capacitor integrated and connected

Standards and approvals
- Conformity with standards: EN 60335-1, EN60335-2-31, CE
- Approvals: EAC

---

**Values set in blue** are nominal data at operating point with maximum load.

Subject to change

---

**Technical drawing**

Dimensions in mm

---

**Measuring requirements**

An air performance measured according (ISO 5801, installation category A, with side plate round housing without contact protection, under-no-load speed L4, according ISO 5801-1, measured at 1 m distance from fan axis. The values given are only applicable for the specified measuring conditions. In the event of deviation from the standard configuration, the parameters must be checked in installed conditions.

---

**Nominal voltage 230 V AC, 50 Hz**

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Airflow</th>
<th>Speed n</th>
<th>Min. input power P1</th>
<th>Max. input power P2</th>
<th>Sound power level LwA</th>
<th>Back pressure Pmb</th>
<th>Perm. ambient temp.</th>
<th>Curves enlarge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>1 – 230</td>
<td>560</td>
<td>1400</td>
<td>180</td>
<td>0.80</td>
<td>0.24</td>
<td>69</td>
<td>150</td>
<td>25...+60</td>
<td>E</td>
</tr>
<tr>
<td>Step 2</td>
<td>1 – 230</td>
<td>470</td>
<td>1780</td>
<td>165</td>
<td>0.72</td>
<td>0.21</td>
<td>71</td>
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<td></td>
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<tr>
<td>Step 3</td>
<td>1 – 230</td>
<td>380</td>
<td>1935</td>
<td>158</td>
<td>0.68</td>
<td>0.19</td>
<td>73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td>1 – 230</td>
<td>260</td>
<td>2260</td>
<td>146</td>
<td>0.63</td>
<td>0.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Connection diagrams and technical features**

More at www.ebmpapst.com

---

**Centrifugal fan**

- Type
- Part number: D2E160F1105
- Weight: 3.10 kg

---

**AC-Centrifugal fan Ø 160 mm**
EC-Centrifugal fan
forward-curved, dual-intake, with housing, Ø 146 mm

Material/surface
- Impeller: PP plastic
- Housing: PP plastic

Mechanical data
- Direction of rotation: Counterclockwise, viewed toward rotor
- Degree of protection: IP 20
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

Electrical data
- Motor: 1-core
- Protection class: Built-in component, protection class results from installation according to intended use
- Speed levels: Stepless controllable
- Electrical hookup: Via permanently mounted connector

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-1
- Interference emission: According to EN 61000-3-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE

On Page 50
Accessories

On Page 122
Connection diagrams and technical features

More at
www.ebmpapst.com
EC-Centrifugal fan
forward-curved, dual-intake with, housing, Ø 146 mm

Material/surface
- Impeller: PP plastic
- Housing: PP plastic

Mechanical data
- Direction of rotation: Counterclockwise, viewed toward rotor
- Degree of protection: IP 20
- Insulation class: B
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

Electrical data
- Motor: 1-core
- Protection class: Built-in component, protection class results from installation according to intended use
- Speed levels: Stepless controllable
- Electrical hookup: Via permanently mounted connector

EMC
- Immunity to interference: According to EN 61000-6-2
- Interference emission: According to EN 61000-6-4

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

Curve
<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Air flow</th>
<th>Speed n</th>
<th>Motor input power</th>
<th>Motor input current</th>
<th>Sound power level</th>
<th>Ambient temp.</th>
<th>Part number</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>1–230</td>
<td>975</td>
<td>1675</td>
<td>170</td>
<td>1.20</td>
<td>73</td>
<td></td>
<td></td>
<td>VHD0144X5G5S</td>
<td>1.90</td>
</tr>
<tr>
<td>B</td>
<td>1–230</td>
<td>835</td>
<td>1970</td>
<td>170</td>
<td>1.20</td>
<td>72</td>
<td></td>
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<td>G3G144X3G54</td>
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</tr>
<tr>
<td>C</td>
<td>1–230</td>
<td>780</td>
<td>2265</td>
<td>170</td>
<td>1.20</td>
<td>72</td>
<td></td>
<td></td>
<td>D3G144X3G54</td>
<td></td>
</tr>
</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.
Subject to change

Technical drawing
Dimensions in mm

Detail X – Coded plug system: 9-pole connector housing TE 927231-7, 5e plug pin TE 926887-1
Matching connector (not in scope of delivery): 9-pole connector housing TE 1-1883003-2, socket TE 926884-1
- J (green)
- K (blue)
- N (yellow)
- GND (blue)
- PE (green/yellow)
- A: Sheet metal nut for thread EN1150 14-78-ST4.8 x 4 terminal box

Measuring requirements
Air performance measured according to S 5801, installation category A, with inlet-side sound housing without contact protection. Under-side sound level L₁A according to S 13347, L₁A measured at 1 m distance from fan. The values given are only applicable for the standard configuration. In the event of deviation from the standard configuration, the parameters must be checked in installed condition.

Accessories
More at www.ebmpapst.com

Connection diagrams and technical features

More at www.ebmpapst.com

Measurement requirements

Measurements according to EN 61000-6-2. Installation category A. For non-standard configurations, parameters must be checked in installed condition.
EC-Centrifugal fan
forward-curved, dual-intake, with housing, Ø 146 mm

Material/surface
- Impeller: PP plastic
- Housing: PP plastic

Mechanical data
- Direction of rotation: Counterclockwise, viewed toward rotor
- Degree of protection: IP 20
- Insulation class: F
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

Electrical data
- Motor: 3-core
- Protection class: I
  (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable
- Electrical hookup: Plug, via terminal box

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2
- Interference emission: According to EN 61000-6-4

Standards and approvals
- Conformity with standards:
  EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE

Connections and technical features
- More at: www.ebmpapst.com

Curves
Operating point
Nominal voltage
Air flow
Spd in m³/h
Max. input power W
Max. input current A
dB(A)
Surface temp. °C
Graphs

<table>
<thead>
<tr>
<th>Curve</th>
<th>Nominal voltage range V-AC, 50 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1–230</td>
</tr>
<tr>
<td>A</td>
<td>1–230</td>
</tr>
<tr>
<td>B</td>
<td>1–230</td>
</tr>
</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.

Subject to change

Technical drawing
Dimensions in mm

Measurements
Air performance measured according to EN 5801, installation category A, with ebm-papst scroll housing without contact protection. Sound levels sound level A, A according to EN 13347, measured at 1 m distance from fan. Hence, given data are applicable only under specified measuring conditions, and may vary depending on the installation conditions. In the event of deviation from the standard configuration, the parameters must be checked in installed condition.

Detail X - Header Stocks MS50 7708-004-003-960 pluggable with Stocks EH 705-004-003-960 + RBB 8230.120 Mm

- 10V
- Tačdo
- 0 – 10V / PWM
- GND
- PE
- 4x sheet metal nut for thread EN ISO 1478 ST4.8

More at www.ebmpapst.com

Accessories
on Page 98
Connection diagrams and technical features
on Page 112
More at www.ebmpapst.com
EC-Centrifugal fan
forward-curved, dual-intake, with housing, Ø 146 mm

Material/surface
- Impeller: PP plastic
- Housing: PP plastic

Mechanical data
- Direction of rotation: Counterclockwise, viewed toward rotor
- Degree of protection: IP 20
- Insulation class: F
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

Electrical data
- Motor: 3-phase
- Protection class: I
  (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable
- Electrical hookup: Plug, via terminal box

EMC
- Immunity to interference: According to EN 61320-6-2
- Interference emission: According to EN 61320-6-4

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-21, CE
- Approvals: VDE, EAC

Measuring requirements
Air performance measured according to EN 5801, installation category A, with in-line sound housing without contact protection. Interake-side sound levels L, A, according to EN 13347, measured at 1 m distance from fan axis. The values given are only applicable for the specified measurement conditions. In the event of deviation from the standard configuration, the parameters must be checked in installed condition.

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Adm. flow</th>
<th>Speed n</th>
<th>Max. input</th>
<th>Motor input</th>
<th>Sound power level</th>
<th>Power consumption</th>
<th>Curves diagram</th>
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<tbody>
<tr>
<td>V-AC</td>
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<td>1080</td>
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<tr>
<td></td>
<td>1’230</td>
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<td>2400</td>
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<td>1’230</td>
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</table>

Values in blue are nominal data at operating point with maximum load.
Subject to change

Technical drawing

Dimensions in mm

Detail X - Header Stocks MSLO 7708-004-005-960 plugable with Stocks EN 705-004-003-560 + RBB 8230.120 Ms
1 10V
2 Tacho
3 0–10V / PWM
4 GND
5 Macromodul connector Stocks MSLO 9494-003-004-960 plugable with Stocks MFMP 975L-003-50A-560
EC-Centrifugal fan
forward-curved, dual-intake, with housing, Ø 160 mm

Material/surface
- Impeller: Sheet steel galvanized
- Housing: PP plastic

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP54
- Insulation class: B
- Environmental protection class: H1
- Installation position: Any
- Make: S1
- Mounting: Ball bearing
- Motor protection: Elektronik

Electrical data
- Motor: 3-core
- Protection class: I
- with customer connection of protective earth
- Cable exit: Variable
- Speed levels: Stepless controllable
- Electrical hookup: Plug, via terminal box

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2/3
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: EAC

Ranges

### Technical drawing

**Dimensions in mm**

- Cable PVC AWG20, 3x crimped splices
- Cable PVC AWG22, 4x crimped splices
- Sheet metal nut for thread ISO 1479-ST4 B (min. screw length 14.5 mm plus material thickness of attachment)
EC-Centrifugal fans
forward-curved, with housing

EC-Centrifugal fan VHD0146 / D1G146

Page

78
EC-Centrifugal fan
forward-curved, dual-intake, with housing, Ø 146 mm

Material/surface
- Impeller: PP plastic
- Housing: PP plastic

Mechanical data
- Direction of rotation: Counterclockwise, viewed toward rotor
- Degree of protection: IP20
- Environmental protection class: H0
- Mounting: Ball bearing
- Motor protection: Thermal overload protector

Electrical data
- Motor: 1-core
- Protection class: II
- Speed levels: Controllable by PWM
- Electrical hookup: Via switch connection

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE, EAC

Curve
- Operating point: 1 - 230
- Rated voltage: 200 - 240 V AC, 50/60 Hz
- Rated current: 0.80 A
- Sound power level: 69 dB (A)

Values set in blue are nominal data at operating point with maximum load.

Subject to change

Technical drawing
Dimensions in mm

- Cable PVC (0.5 mm²), x crimped splices
- Tapping hole prepared for self-tapping screw for fastening plastics (Remform) dia. 5 mm, clearance for screw max. 16 mm.
- Recommended tightening torque 2x 3.7 Nm

A non-return valve (02503-2-04501) can be installed in the outlet.
Attaching activated carbon filters to the intakes. Adaptation tailored to activated carbon filter such as type Q2B6 from Revent Engineering Srl.
EC-Centrifugal fan
forward curved, dual-intake, with housing, Ø 146 mm

Material/surface
- Impeller: PP plastic
- Housing: PP plastic

Mechanical data
- Direction of rotation: Counter-clockwise, viewed toward rotor
- Degree of protection: IP20
- Insulation class: B
- Environmental protection class: H0
- Installation position: Any
- Mode: S3
- Mounting: Ball bearing
- Motor protection: Thermal overload protector externally connected

Electrical data
- Motor: 1-core
- Protection class: II
- Speed levels: Controllable by PWM
- Electrical hookup: Via switch connection

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: VDE

EC-Centrifugal fan Ø 146 mm

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Rated voltage (V)</th>
<th>Air flow (m³/h)</th>
<th>Speed (rpm)</th>
<th>Max. input power (W)</th>
<th>Max. input current (A)</th>
<th>Sound power level (Lwletics)</th>
<th>Ambient temp. °C</th>
<th>Curve diagram</th>
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<tbody>
<tr>
<td>A</td>
<td>1–230</td>
<td>200</td>
<td>800</td>
<td>1500</td>
<td>100</td>
<td>0.80</td>
<td>69</td>
<td>-25...+50</td>
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</tr>
<tr>
<td>B</td>
<td>1–230</td>
<td>300</td>
<td>615</td>
<td>1855</td>
<td>100</td>
<td>0.80</td>
<td>68</td>
<td>-25...+50</td>
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<td>C</td>
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<td>-25...+50</td>
<td></td>
</tr>
</tbody>
</table>

Values in italics are nominal data at operating point with maximum load.

Subject to change

ECMC

Dimensions in mm

Measuring requirements
Air performance measured according to EN 5801, installation category A, with accessories and housing without contact protection.

Sound level measured (Lw) according to EN 1193-2, 1 m distance from fan axis. The values given areapplicable to fans installed in standard configuration. In the event of deviations from the standard configuration, the parameters must be checked in installed conditions.

Detail X – Coded plug system: 6-pole connector housing TE 2378773-1, 4-pole plug TE 926886-1

Mating connector (not included in scope of delivery): 6-pole connector housing TE 1-1264455-5, 4-pole socket TE 926884-1

1. L (black)
2. N (blue)
3. GND (green-grey)
4. Tapping hole prepared for self-tapping screw for fastening plastics (Bormax) dia. 5 mm; clearance for screw max. 18 mm.

Recommended tightening torque 2±0.3 Nm. A non-return valve (10000 – 2, 125 kPa) can be installed in the outlet. Attaching activated carbon filters to the intake. Anbau von Aktivkohlefiltern an den Ansaugöffnungen. Adaptation tailored to activated carbon filter such as type 1286 from Bayer Engineering Srl.
EC-Centrifugal fan RadiCal
backward curved, with housing

Page
EC-Centrifugal fan RadiCal VC50190 / G3G190 84
EC-Centrifugal fan RadiCal
backwards curved, with housing, Ø 190 mm

Material/surface
- Impeller: PA plastic
- Housing: PP plastic

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Environmental protection class: H0
- Installation position: Any
- Mode: S3
- Mounting: Ball bearing
- Motor protection: Elektronic

Electrical data
- Motor: 3-phase
- Protection class I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: EAC

Curves

<table>
<thead>
<tr>
<th>Curve</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>VGS03005LD5</td>
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</tbody>
</table>

Values in blue are nominal data at operating point with maximum load.
Subject to change

Accessories

Technical drawing

Dimensions in mm

Electrical data
- Motor: 3-phase
- Protection class I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: EAC

Technical drawing

Dimensions in mm

Electrical data
- Motor: 3-phase
- Protection class I (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Circuit feedback: According to EN 61000-3-2
- Interference emission: According to EN 61000-6-3

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: EAC

Technical drawing

Dimensions in mm
EC-Centrifugal fan RadiCal
backward curved, with housing, Ø 190 mm

Material/surface
- Impeller: PA plastic
- Housing: PP plastic

Mechanical data
- Direction of rotation: Clockwise viewed toward rotor
- Degree of protection: IP 54
- Insulation class: B
- Environmental protection class: H1
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Elektronic

Electrical data
- Motor: 3-phase
- Protection class I
  (with customer connection of protective earth)
- Cable exit: Variable
- Speed levels: Stepless controllable

EMC
- Immunity to interference: According to EN 61000-6-2
- Interference emission: According to EN 61000-6-4

Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31, CE
- Approvals: EAC

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nom. voltage</th>
<th>Air flow</th>
<th>Spd. in</th>
<th>Min. input</th>
<th>Max. input</th>
<th>Sound power level</th>
<th>Ambient temp.</th>
<th>Coef. diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V AC</td>
<td>m³/h</td>
<td>mm</td>
<td>W</td>
<td>A</td>
<td>dB (A)</td>
<td>°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1–230</td>
<td>855</td>
<td>4135</td>
<td>170</td>
<td>1.35</td>
<td>80</td>
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<td>A</td>
<td>1–230</td>
<td>585</td>
<td>4100</td>
<td>170</td>
<td>1.35</td>
<td>74</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
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<td>430</td>
<td>4365</td>
<td>170</td>
<td>1.35</td>
<td>74</td>
<td>-25...+60</td>
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<td></td>
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</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.

Subject to change.

Curve
Centrifugal fan

- Type
- Part number
- Weight

<table>
<thead>
<tr>
<th>Curve</th>
<th>Centrifugal fan</th>
<th>Type</th>
<th>Part number</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>VC6190RLES</td>
<td>GSG03RHE4504</td>
<td>2.10</td>
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</tr>
</tbody>
</table>

Technical drawing
Dimensions in mm

Curve

- Cable PVC AWG20; 3x crimped splices
- Cable PVC AWG22; 4x crimped splices
- Tapping hole prepared for self-tapping screw for fastening plastics (Remform) dia. 4 mm; clearance for screw max. 15 mm
- 5x sheet metal nut for thread EN ISO 1479-ST 8 (max. screw length 18 mm plus thickness of mounting material)
- Screw-on domes are only permissible for Flowgrid

Measuring requirements
An performance measured according to ISO 5801, installation category 4, with bare gear boxes without contact points, under symmetrical load, 1.4x rated current (U, measured at 1 m distance from fan axis). The values given are only applicable under the specified measuring conditions. In the event of deviation from the standard configuration, the parameters must be checked in installed conditions.

www.ebmpapst.com
AC-Centrifugal fans
forward-curved, dual-intake, with housing
Product for sale in countries/markets outside of EU only
AC-Centrifugal fan
forward curved, dual-intake, with housing, Ø 160 mm

Material/surface
- Impeller: Sheet steel galvanized
- Housing: PP plastic

Mechanical data
- Direction of rotation: Counterclockwise, viewed toward rotor
- Degree of protection: IP20
- Insulation class: F
- Environmental protection class: H0
- Installation position: Any
- Mode: S2
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

Electrical data
- Protection class I
- Speed levels: 4
- Electrical hookup: Plug, via terminal box, capacitor integrated and connected

Standards and approvals
- Conformity with standards: EN 60335-1, EN60335-2-31

Measuring requirements
As performance measured according to ISO 5801, installation category A, with fire proof hood housing without contact protection.

Connection diagrams and technical features
More at www.ebmpapst.com

Curves

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Airflow m³/h</th>
<th>Speed n</th>
<th>Motor input power Pn W</th>
<th>Motor output power Pm W</th>
<th>Sound power level Lw dB (A)</th>
<th>Back pressure Pb Pa</th>
<th>Ambient temp. °C</th>
<th>Curve angle</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Step 1</td>
<td>1–230</td>
<td>1070</td>
<td>1400</td>
<td>340</td>
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<td>67</td>
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<td>-55–+45</td>
<td>E</td>
</tr>
<tr>
<td>A</td>
<td>Step 2</td>
<td>1–230</td>
<td>955</td>
<td>1685</td>
<td>337</td>
<td>1.47</td>
<td>67</td>
<td>67</td>
<td>-55–+45</td>
<td>E</td>
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<tr>
<td>A</td>
<td>Step 3</td>
<td>1–230</td>
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<td>1685</td>
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<td>E</td>
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<tr>
<td>A</td>
<td>Step 4</td>
<td>1–230</td>
<td>400</td>
<td>2280</td>
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<td>1.39</td>
<td>73</td>
<td>73</td>
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<td>E</td>
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</tbody>
</table>

Values set in blue are nominal data at operating point with maximum load.
Subject to change

Technical drawing

Dimensions in mm

Detail X – Coded plug system: 6-pole connector housing TE 237077-3, 6a plug pin TE 326886-1

1. L = Step 1
2. L = Step 2
3. N
4. PE
5. 4x sheet metal nut for thread EN ISO 2479-CT5.6

Product for sale in countries/markets outside of EU only
**AC-Centrifugal fan**

*forward-curved, dual-intake, with housing, Ø 160 mm*

---

### Material/surface
- Impeller: Sheet steel galvanized
- Housing: PP plastic

### Mechanical data
- Direction of rotation: Counterclockwise, viewed toward rotor
- Degree of protection: IP20
- Insulation class: F
- Environmental protection class: H0
- Installation position: Any
- Mode: S1
- Mounting: Ball bearing
- Motor protection: Thermal overload protector internally connected

### Electrical data
- Protection class: In compliance with protective earth
- Speed levels: 4
- Electrical hookup: Plug, via terminal box, capacitor integrated and connected

### Standards and approvals
- Conformity with standards: EN 60335-1, EN 60335-2-31
- Approvals: EAC, CCC

---

**Measuring requirements**

As performance measured according to ISO 5801, installation category A, with inlet soundproof housing without contact protection.

---

**Technical drawing**

---

**Curves**

<table>
<thead>
<tr>
<th>Curve</th>
<th>Operating point</th>
<th>Nominal voltage</th>
<th>Airflow</th>
<th>Speed n</th>
<th>Max. input power Pp</th>
<th>Max. output power Pm</th>
<th>Sound power level LpA</th>
<th>Weight</th>
<th>Perm. ambient temp.</th>
<th>Cond. temp.</th>
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<td>Curve</td>
<td>V AC m³/h</td>
<td>rpm</td>
<td>W</td>
<td>A</td>
<td>dB(A)</td>
<td>Pa</td>
<td>°C</td>
<td>kg</td>
<td>°C</td>
<td>°C</td>
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<td>230-230</td>
<td>1430</td>
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<td>Part number</td>
<td>Weight</td>
<td>kg</td>
<td></td>
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<td>Curve</td>
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</tr>
</tbody>
</table>

1. Product for sale in countries/markets outside of EU only.

---

**Dimensions in mm**

---

**Detail X – Coded plug system:** 6-pole connector housing TE 2378773-3, 6x plug pin TE 326886-1

1. L = Step 1
2. L = Step 2
3. L = Step 3
4. 4x sheet metal nut for thread EN ISO 2479: E7x8.5 mm, screw length 18.5 mm (plus material thickness of attachment)
Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable</td>
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<tr>
<td>Capacitor</td>
<td>97</td>
</tr>
<tr>
<td>Guard grilles</td>
<td>98</td>
</tr>
<tr>
<td>FlowGrid air inlet grill</td>
<td>100</td>
</tr>
<tr>
<td>One-way flap</td>
<td>101</td>
</tr>
<tr>
<td>Inlet rings for centrifugal fans</td>
<td>102</td>
</tr>
</tbody>
</table>
Cable for centrifugal fans

Cable in different lengths.
Strand end with wire end ferrules.

<table>
<thead>
<tr>
<th>Illustration</th>
<th>Part number</th>
<th>Length (L)</th>
<th>suitable for</th>
<th>connection side</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>35786-4-1029</td>
<td>1050</td>
<td>D3G146-HG31-34</td>
<td>D3G146-HG31-37</td>
</tr>
<tr>
<td>B</td>
<td>15572-4-1029</td>
<td>450</td>
<td>D3G146-HG31-34</td>
<td>D3G146-HG31-37</td>
</tr>
<tr>
<td>C</td>
<td>11170-4-1029</td>
<td>450</td>
<td>D1G16-HQ33-04</td>
<td>D1G16-HQ33-04</td>
</tr>
<tr>
<td>D</td>
<td>23158-4-1040</td>
<td>1060</td>
<td>D2S180-HK21-08, D2S180-HK21-09</td>
<td>D2S180-HK21-08, D2S180-HK21-09</td>
</tr>
<tr>
<td></td>
<td>23158-4-1040</td>
<td>455</td>
<td>D2S180-HK21-08, D2S180-HK21-09</td>
<td>D2S180-HK21-08, D2S180-HK21-09</td>
</tr>
<tr>
<td></td>
<td>23158-4-1040</td>
<td>655</td>
<td>D2S180-HK21-08, D2S180-HK21-09</td>
<td>D2S180-HK21-08, D2S180-HK21-09</td>
</tr>
</tbody>
</table>

Subject to alterations

Capacitor for centrifugal fans

Material/surface
- Aluminum can, aluminum cover

Connection lead
- FPU or S2.
- According to DIN EN 60252-1 (flameproof, burst-proof, circuit-breaking)

Life expectancy
- 420 VDB: -25...+85°C, 30,000 Std; class A
- 470 VDB: -25...+85°C, 10,000 Std; class B
- 500 VDB: -25...+85°C, 1,000 Std; class C

Standards and approvals
- Approvals: VDE. According to DIN EN 60252-1 (VDE 0560-B)

Capacitor

<table>
<thead>
<tr>
<th>Part number</th>
<th>Capacity</th>
<th>a</th>
<th>b (max.)</th>
<th>c (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>02115-4-7320</td>
<td>2.5</td>
<td>25</td>
<td>77</td>
<td>80</td>
</tr>
<tr>
<td>02156-4-7320</td>
<td>2.0</td>
<td>25</td>
<td>77</td>
<td>80</td>
</tr>
<tr>
<td>02159-4-7320</td>
<td>2.5</td>
<td>30</td>
<td>77</td>
<td>82</td>
</tr>
<tr>
<td>02160-4-7320</td>
<td>3.0</td>
<td>30</td>
<td>77</td>
<td>82</td>
</tr>
<tr>
<td>02162-4-7320</td>
<td>3.0</td>
<td>25</td>
<td>115</td>
<td>112</td>
</tr>
<tr>
<td>02163-4-7320</td>
<td>3.0</td>
<td>30</td>
<td>107</td>
<td>112</td>
</tr>
</tbody>
</table>

Anti-ripping protection
- The housing length is increased by a maximum of 10 mm. The protection device reacts to an overload by interrupting the internal lead at a predetermined overload level.

Installation
- c is the overall dimension of the capacitor that needs to be taken into account for installation. However, the capacitor design varies from manufacturer to manufacturer. Either 9 mm elongation is added to dimension b, or this elongation is already integrated in the capacitor dimension.

Accessories
Guard grills
for dual-intake centrifugal fans

Guard grills:
According to EN60335-1,
made of plastic, black

Our protective Guard grills are specially designed
for use with ebm-papst fans. Attention was paid
to the highest level of safety with minimal impact
on operating noise. Please note that when using
protective Guard grills from other manufacturers,
compliance with safety-relevant distances is not
always given.

<table>
<thead>
<tr>
<th>Part number *</th>
<th>Mounting side</th>
<th>Suitable for</th>
</tr>
</thead>
<tbody>
<tr>
<td>34751-2-2929</td>
<td>Side of cable exit</td>
<td>B2E 146, D2G146</td>
</tr>
<tr>
<td>38131-2-2929</td>
<td>Opposite of cable exit side</td>
<td></td>
</tr>
</tbody>
</table>

Subject to alteration
* The delivery always includes both part numbers.

Accessories

Guard grills:
According to EN60335-1,
made of plastic, black

Our protective Guard grills are specially designed
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to the highest level of safety with minimal impact
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protective Guard grills from other manufacturers,
compliance with safety-relevant distances is not
always given.

<table>
<thead>
<tr>
<th>Part number *</th>
<th>Mounting side</th>
<th>Suitable for</th>
</tr>
</thead>
<tbody>
<tr>
<td>34751-2-2929</td>
<td>Side of cable exit</td>
<td>D2G146H; D2G146HD</td>
</tr>
<tr>
<td>38131-2-2929</td>
<td>Opposite of cable exit side</td>
<td></td>
</tr>
</tbody>
</table>

Subject to alteration
* The delivery always includes both part numbers.
FlowGrid air inlet grill
efficient noise reduction

The air performance of ebm-papst fans is not the only thing measured in our in-house state-of-the-art test laboratory. The acoustic behavior of the fans is also examined and the measuring results are included in the technical documentation. Please note that the measurements are taken under ideal conditions with undisturbed inflow and outflow. If the fans are later installed in applications where limited space is available, the noise information listed in the documentation will probably not be applicable.

In order to minimize the negative impact of the installation situation, ebm-papst offers the FlowGrid air inlet guard shown here. It is mounted on the fan’s intake side and effectively reduces the noise in the fan’s overall frequency range, especially the disturbing tonal noise in the low frequency range. The result is a far lower sound pressure level and pleasant running noise. Since the level of noise reduction is dependent on the installation circumstances, it is not possible to provide generally applicable information here.

would you like to find out more?

if you need an installation guide or more information about the dimensions, go to:

www.ebmpapst.com/flowgrid-manual

or scan the QR code below.

<table>
<thead>
<tr>
<th>Part number</th>
<th>Ø A (mm)</th>
<th>Ø B (mm)</th>
<th>Ø C (mm)</th>
<th>Ø E (mm)</th>
<th>S (mm)</th>
<th>H (mm)</th>
<th>N (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>003051-2-2057</td>
<td>175</td>
<td>200</td>
<td>155</td>
<td>136</td>
<td>4.5</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>220</td>
<td>220</td>
<td>220</td>
<td>220</td>
<td>220</td>
<td>220</td>
<td>220</td>
<td>220</td>
</tr>
<tr>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>280</td>
<td>280</td>
<td>280</td>
<td>280</td>
<td>280</td>
<td>280</td>
<td>280</td>
<td>280</td>
</tr>
</tbody>
</table>

Accessories

One-way flap
for centrifugal fans

Would you like to find out more?

If you need an installation guide or more information about the dimensions, go to:

www.ebmpapst.com/flowgrid-manual

or scan the QR code below.

<table>
<thead>
<tr>
<th>Part number</th>
<th>Ø A (mm)</th>
<th>Ø B (mm)</th>
<th>Ø C (mm)</th>
<th>Ø E (mm)</th>
<th>S (mm)</th>
<th>H (mm)</th>
<th>N (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00000-2-4054</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
</tbody>
</table>

Accessories
Inlet rings
for centrifugal fans

<table>
<thead>
<tr>
<th>Ø in size</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>140/146/150/150</td>
<td>09576-2-4013</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ø in size</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>09587-2-4013</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ø in size</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>09582-4013</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ø in size</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>0960524013</td>
</tr>
<tr>
<td>Technology</td>
<td>Page</td>
</tr>
<tr>
<td>------------</td>
<td>------</td>
</tr>
<tr>
<td>Connection diagram</td>
<td>108</td>
</tr>
<tr>
<td>Technical parameters &amp; scope</td>
<td>116</td>
</tr>
</tbody>
</table>
Connection diagram: A)

Technical features
- Thermal overload protector internally connected
- The switch must interrupt the circuit when switching

Connection diagram: B)

Technical features
- Control input 0-10 VDC / PWM
- Output 10 VDC, max. 1.1 mA
- Control interface with SELV potential safely disconnected from the mains
- Overvoltage detection
- Over-temperature protected electronics / motor
- Overvoltage detection
- Motor protection electronic

<table>
<thead>
<tr>
<th>Wire</th>
<th>Designation</th>
<th>Colour</th>
<th>Assignment / function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N</td>
<td>blue</td>
<td>Power supply, voltage range see nameplate</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>brown</td>
<td>Neutral conductor</td>
</tr>
<tr>
<td>3</td>
<td>PE</td>
<td>greenyellow</td>
<td>Protective earth</td>
</tr>
<tr>
<td>4</td>
<td>Step I black</td>
<td>white</td>
<td>GND-Connection of Control interface</td>
</tr>
<tr>
<td>5</td>
<td>Step II black</td>
<td>red</td>
<td>Control input 0-10V or PWM, electrically isolated</td>
</tr>
<tr>
<td>6</td>
<td>Step III black</td>
<td>gray</td>
<td>Voltage output 10 VDC 1.1 mA, electrically isolated, short-circuit-proof</td>
</tr>
<tr>
<td>7</td>
<td>Step IV black</td>
<td>black</td>
<td>Tach output: Open collector, 1 impulse per revolution, electrically isolated</td>
</tr>
<tr>
<td>8</td>
<td>L1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>PE</td>
<td>greenyellow</td>
<td></td>
</tr>
</tbody>
</table>
Connection diagram: C)

**Technical features**
- Control input 0-10 VDC / PWM
- Output 10 VDC, max. 10 mA
- Output limit
- Soft start
- Motor current limiter
- Tach output

**Technical features**
- Control interface with SELV potential safely disconnected from the mains
- Overvoltage detection
- Over-temperature protected electronics / motor
- Overvoltage detection
- Motor protection electronic

**Wire Designation Colour**

<table>
<thead>
<tr>
<th>Wire</th>
<th>Designation</th>
<th>Colour</th>
<th>Assignment / function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L</td>
<td>black</td>
<td>Supply connection, power supply, phase, voltage range see name plate</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>blue</td>
<td>Supply connection, power supply, neutral conductor, phase, voltage range see name plate</td>
</tr>
<tr>
<td></td>
<td>PE</td>
<td>green/yellow</td>
<td>Protective earth</td>
</tr>
<tr>
<td>2</td>
<td>0-10V / PWM</td>
<td>yellow</td>
<td>0-10V / PWM Control input, RI 100KΩ, SELV</td>
</tr>
<tr>
<td></td>
<td>Tacho</td>
<td>white</td>
<td>Tacho output, open collector, 1 input per revolution, Isink max = 10mA, SELV</td>
</tr>
<tr>
<td></td>
<td>+10V</td>
<td>red</td>
<td>Fixed voltage output 10 VDC +/-9V, I max 10 mA, short-circuit-proof, power supply for ext. equipment (e.g. pot), SELV</td>
</tr>
<tr>
<td></td>
<td>GND</td>
<td>blue</td>
<td>Reference ground for Control interface, SELV</td>
</tr>
</tbody>
</table>

Connection diagram: D)

**Technical features**
- Thermal overload protector internally connected

**Wire Designation Colour**

<table>
<thead>
<tr>
<th>Wire</th>
<th>Designation</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L</td>
<td>blue</td>
</tr>
<tr>
<td>2</td>
<td>N</td>
<td>black</td>
</tr>
<tr>
<td>3</td>
<td>Capacitor</td>
<td>brown</td>
</tr>
<tr>
<td>4</td>
<td>PE</td>
<td>green/yellow</td>
</tr>
</tbody>
</table>
Connection diagram: E)

**Technical features**
- Motor current limiter
- Soft start
- Control input PWM
- Control interface with SELV potential safely disconnected from the mains
- Thermal overload protection motor
- Thermal overload protector internally connected

**Connection diagram E)**

<table>
<thead>
<tr>
<th>Wire</th>
<th>Designation</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N</td>
<td>blue</td>
</tr>
<tr>
<td>2</td>
<td>Step I black 1</td>
<td>white</td>
</tr>
<tr>
<td>3</td>
<td>Step II black 2</td>
<td>red</td>
</tr>
<tr>
<td>4</td>
<td>Step II black 3</td>
<td>gray</td>
</tr>
<tr>
<td>5</td>
<td>Step II black 4</td>
<td>black</td>
</tr>
<tr>
<td>6</td>
<td>L1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>PE</td>
<td>green/yellow</td>
</tr>
</tbody>
</table>

Connection diagram: G)

**Technical features**
- Thermal overload protector internally connected
- The switch must interrupt the circuit when switching

**Connection diagram G)**

<table>
<thead>
<tr>
<th>Wire</th>
<th>Designation</th>
<th>Colour</th>
<th>Assignment / function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L</td>
<td>brown</td>
<td>Power supply, phase, voltage range see name plate</td>
</tr>
<tr>
<td>2</td>
<td>N</td>
<td>blue</td>
<td>Power supply, neutral conductor, phase, voltage range see name plate</td>
</tr>
<tr>
<td></td>
<td>FE</td>
<td>green/yellow</td>
<td>Functional earth conductor</td>
</tr>
<tr>
<td>2</td>
<td>PWM</td>
<td>yellow</td>
<td>Control input PWM, Impedanz 1kΩ, SELV</td>
</tr>
<tr>
<td></td>
<td>GND</td>
<td>blue</td>
<td>Reference ground for Control interface, SELV</td>
</tr>
</tbody>
</table>

**Connection diagram G)**
Connection diagram: H)

Technical features

- Motor current limiter
- Soft start
- Control input PWM
- Thermal overload protection motor
- Thermal overload protector internally connected

<table>
<thead>
<tr>
<th>Wire</th>
<th>Designation</th>
<th>Colour</th>
<th>Assignment / function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L</td>
<td>black</td>
<td>Power supply, phase, voltage range see name plate</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>blue</td>
<td>Power supply, Neutral conductor, phase, voltage range see name plate</td>
</tr>
<tr>
<td>2</td>
<td>PWM</td>
<td>brown</td>
<td>Control input PWM, not electrically isolated</td>
</tr>
<tr>
<td></td>
<td>GND</td>
<td>grey</td>
<td>Reference ground for Control interface</td>
</tr>
</tbody>
</table>

Connection diagram: I)

Technical features

- Control input 0-10 VDC / PWM
- Output 10 VDC, max. 1.1 mA
- Tach output
- Soft start
- Motor current limiter
- Thermal overload protector internally connected
- Control interface with SELV potential safely disconnected from the mains
- Thermal overload protection motor

<table>
<thead>
<tr>
<th>Wire</th>
<th>Designation</th>
<th>Colour</th>
<th>Assignment / function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L</td>
<td>black</td>
<td>Power supply, voltage range see nameplate</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>blue</td>
<td>Neutral conductor</td>
</tr>
<tr>
<td></td>
<td>PE</td>
<td>green/yellow</td>
<td>Protective earth</td>
</tr>
<tr>
<td>2</td>
<td>10 V max. 1.1mA</td>
<td>red</td>
<td>Voltage output 10 V / 1.1 mA, electrically isolated</td>
</tr>
<tr>
<td></td>
<td>Tacho</td>
<td>white</td>
<td>Tach output: Open collector, 1 inputs per revolution, electrically isolated, Isink max. = 30mA</td>
</tr>
<tr>
<td></td>
<td>0-10 V PWM</td>
<td>yellow</td>
<td>Control input 0-10 V oder PWM, electrically isolated</td>
</tr>
<tr>
<td></td>
<td>GND</td>
<td>blue</td>
<td>GND - Connection of Control interface</td>
</tr>
</tbody>
</table>
High standards for all ebm-papst products

Here at ebm-papst, we constantly strive to further improve our products in order to be able to offer you the best possible solution for your application. Careful monitoring of the market ensures that technical innovations are reflected in the improvements of our products. Based on the technical parameters listed below and the ambience you want our product to operate in, we here at ebm-papst can always work out the best solution for your specific application.

General performance parameters
Any deviations from the technical data and parameters described here are listed on the product-specific data sheet.

Degree of protection
The type of protection is specified in the product-specific data sheets.

Insulation class
The insulation class is specified in the product-specific data sheets.

Installation position
The mounting position is specified in the product-specific data sheets.

Condensate discharge holes
Information on the condensate discharge holes is provided in the product-specific data sheets.

Mode of operation
The mode of operation is specified in the product-specific data sheets.

Protection class
The protection class is specified in the product-specific data sheets.

Service life
The service life of ebm-papst products depends:
– The service life of the bearing system
The service life of the insulation system mainly depends on voltage level, temperature and ambient conditions, such as humidity and condensation.
– The service life of the bearing system depends mainly on the thermal load on the bearing.
The majority of our products use maintenance-free ball bearings for any mounting position possible. The service life \( L_{90} \) of the ball bearings can be taken as approx. 40,000 operating hours at an ambient temperature of 40 °C, yet this estimate can vary according to the actual ambient conditions. We will gladly provide you with a lifetime calculation taking into account your specific operating conditions.

Motor protection / thermal protection
Information on motor protection and thermal protection is provided in the product-specific data sheets. Depending on motor type and field of application, the following protective features are realised:
– Thermal overload protector, connected
– PTC/NTC with electronic evaluation
– Current limiting using electronics

Mechanical strain / performance parameters
All ebm-papst products are subjected to comprehensive tests complying with the normative specifications. In addition to this, the tests also reflect the vast experience and expertise of ebm-papst.

High voltage and insulation testing
If high voltage or insulation testing is carried out in the application, then all connection cables to the fan must be disconnected in advance.

Balancing quality
Testing the balancing quality is carried out in compliance with
– Residual imbalance according to DIN ISO 1940
– Standard balancing quality level G 6.3
Should you require a higher balancing quality level for your specific application, please let us know and specify this when ordering your product.

Chemo-physical strain / performance parameters
Should you have questions about chemo-physical strain, please direct them to your ebm-papst contact.

F ields of application, industries and applications
Our products are used in various industries and applications:
The products in this catalogue have been specifically configured for use in the range hoods.

Legal and normative directives
The products described in this catalogue are designed, developed and produced in keeping with the standards in place for the relevant product and, if known, the conditions governing the relevant fields of application.

Standards
Information on standards is provided in the product-specific data sheets.

EMC
Information on EMC standards is provided in the product-specific data sheets. Complying with the EMC standards has to be established on the final appliance, as different mounting situations can result in changed EMC properties.

Approvals
In case you require a specific approval for your ebm-papst product (UL, ULc, etc.) please let us know.
Most of our products can be supplied with the relevant approval. Information on existing approvals is provided in the product-specific data sheets.

Air performance measurements
All air performance measurements are carried out on suction side and on chamber test beds conforming to the specifications as per ISO 5801 and DIN 24163. The fans under test are installed in the measuring chamber at free air intake and exhaust (installation category A) and are operated at nominal voltage, with AC also at nominal frequency, and without any additional components such as guard grilles.
As required by the standard, the air performance curves correspond to an air density of 1.15 kg/m³.
Measurement conditions for air and noise measurement
ebm-papst products are measured under the following conditions:
- Axial and diagonal fans in direction of rotation “V”
in full nozzle and without guard grill
- Backward curved centrifugal fans, free-running and with inlet nozzle
- Forward curved single and dual inlet centrifugal fans with housing

Noise measurements
All noise measurements are carried out in low-reflective test rooms with reverberant floor. Thus the ebm-papst acoustic test chambers meet the requirements of precision class 1 according to DIN EN ISO 3745. For noise measurement, the fans being tested are placed in a reverberant wall and operated at nominal voltage (for AC, also at nominal frequency) without additional attachments such as the guard grill.

Sound pressure level and sound level
All acoustic values are established according to ISO 13347, DIN 45635 and ISO 3744/3745 to accuracy class 2 and given in A-rated form.
When the sound pressure level (Lp) is measured, the microphone is on the intake side of the fan being tested, usually at a distance of 1 m on the fan axis.
To measure the sound power level (Lw), 10 microphones are distributed over an enveloping surface on the intake side of the fan being tested (see diagram below). The sound power level measured can be roughly calculated from the sound pressure level by adding 7 dB.

Measuring configuration as per ISO 13347-3 and DIN 45635-3B:
- 10 measuring points
- d ≥ D
- h = 1,5d … 4,5d
- Measurement area S = 6d² + 7d (h + 1,5d)

Combined level of multiple same-level sound sources
Adding 2 noise sources with the same level results in a level increase of approx. 3 dB.
The noise characteristics of multiple identical fans can be determined in advance based on the noise values specified in the data sheet. This is shown in the diagram opposite.
Example: 8 A3G800 axial fans are on a condenser. According to the data sheet, the sound pressure level of a fan is approximately 75 dB(A). The level increase measured from the diagram is 9 dB. Thus the overall sound level of the installation can be expected to be 84 dB(A).

Combined level of two different-level sound sources
The acoustic performance of two different fans can be predetermined based on the sound levels given in the data sheet. This is shown in the diagram opposite.
Example: There is an axial fan A3G800 with a sound pressure level of 75 dB(A) at the operating point and an axial fan A3G710 with 73 dB(A) in a ventilation unit. The level difference is 4 dB. The level increase can now be read in the diagram as approx. 1.5 dB. This means that the overall sound level of the unit can be expected to be 76.5 dB(A).

Distance laws
Sound power level is independent of distance to the sound source. In contrast to this, sound pressure level decreases the further away the noise source is. The adjacent diagram shows the decrease in level under far sound field conditions. Far sound field conditions apply whenever the distance between microphone and fan is big when compared to fan diameter and wavelength to be considered.
For more information on far sound field, please consult the relevant literature on this complex topic. Per doubling of distance, the level in the far sound field decreases by 6 dB. In the near field of the fan, other correlations apply and the decrease in levels can be considerably smaller. The following example only applies to far sound field conditions and can vary strongly depending on the installation effects: With an axial fan A3G100, a sound pressure level of 65 dB(A) was measured at a distance of 1 m. According to the distance diagram, at a distance of 20 m we would get a reduction by 26 dB, i.e. a sound pressure level of 39 dB(A).
Aerodynamics fundamentals:

Technical parameters & scope

Further information can be found in our brochure “Technology - Basic principles”

Axial fan operating range:
To the right of the saddle point (right section of the air performance curve):
– Maximum efficiency
– Minimum noise

To the left of the saddle point (left section of the air performance curve):
– Stall
– Impressive efficiency
– Noise suddenly increases

The fan’s optimal range of use is highlighted in green in the adjoining performance curve.

Effects of guard grill:
Installing a guard grill reduces the axial fan’s air performance.

The pressure loss in Pa can be roughly calculated using the following equation:
\[ \Delta p_{\text{gr}} = \epsilon_{\text{gr}} \cdot \beta_{\text{gr}} \cdot \sqrt{V} \]  
\[ V \text{ in [m}^3\text{/h}] \]

For the guard grill that ebm-papst use, the correction factor \( \epsilon_{\text{gr}} \) dependent on impeller diameter \( D \) can be found in the adjoining table.

<table>
<thead>
<tr>
<th>Diameter D</th>
<th>Correction factor ( \epsilon_{\text{gr}} )</th>
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<tr>
<td>400</td>
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<td>450</td>
<td>55</td>
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<td>500</td>
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</table>

Centrifugal fan operating range:
Middle section of the air performance curve:
– Maximum efficiency
– Minimum noise

To the left and right of the middle section of the air performance curve:
– Reduced efficiency
– Increasing noise

The fan’s optimal range of use is highlighted in green in the adjoining performance curve.

Airflow determination for inlet rings with pressure tap:
The differential pressure method compares the static pressure upstream of the inlet ring with the static pressure in the inlet ring. The airflow can be calculated from the differential pressure (between the static pressures) according to the following equation:

\[ q = k \cdot \sqrt{\Delta p} \]

\( q \) in [m³/h] and \( \Delta p \) in [Pa]

If the airflow is to be regulated to remain constant, the inlet pressure must be kept constant:

\[ \Delta p = \frac{q^2}{k^2} \]

\( k \) takes the specific properties of the inlet ring into account.

The pressure is tapped at 1 (¼) point(s) on the circumference of the inlet ring. The customer connection consists of a built-in T-shaped hose fitting. The hose fitting is suitable for pneumatic hoses with an inside diameter of 4 mm.

Influence of speed \( n \) on the sound power level \( L_w \):
The sound power level for changes in speed can be approximately determined based on the adjoining diagram and the following formula:

\[ L_{w}\text{ch} = L_{w}\text{in} - 50 \text{ dB } \cdot \log (n_2 : n_1) \]

\( L_{w}\text{ch} \) = Sound power level after speed change

\( L_{w}\text{in} \) = Sound power level before speed change

\( n_2 \) = Changed speed

\( n_1 \) = Initial speed
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