

## Product Data Sheet

**9593505002**  
VBS0040XUGAZ  
RV45-3/14S

**ebm****papst**

The engineer's choice



## RV45-3/14S

## INDEX

|          |                                 |          |
|----------|---------------------------------|----------|
| <b>1</b> | <b>General .....</b>            | <b>3</b> |
| <b>2</b> | <b>Mechanics .....</b>          | <b>3</b> |
| 2.1      | General.....                    | 3        |
| 2.2      | Connections.....                | 3        |
| <b>3</b> | <b>Operating Data .....</b>     | <b>5</b> |
| 3.1      | Electrical Operating Data ..... | 5        |
| 3.2      | Aerodynamics.....               | 6        |
| 3.3      | Sound Data.....                 | 7        |
| <b>4</b> | <b>Environment.....</b>         | <b>7</b> |
| 4.1      | General.....                    | 7        |
| 4.2      | Climatic Requirements .....     | 7        |
| 4.3      | Mechanical Requirements.....    | 7        |
| 4.4      | Bio compatibility .....         | 7        |
| <b>5</b> | <b>Safety.....</b>              | <b>8</b> |
| 5.1      | Electrical Safety .....         | 8        |
| <b>6</b> | <b>Reliability.....</b>         | <b>8</b> |
| 6.1      | General.....                    | 8        |

**1 General**

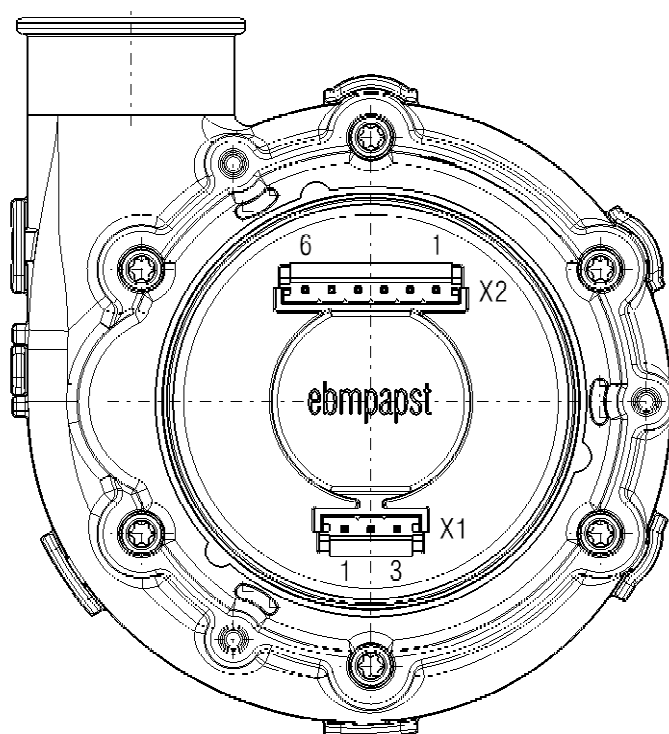
|                                     |                                  |  |
|-------------------------------------|----------------------------------|--|
| Fan type                            | Blower                           |  |
| Rotating direction looking at rotor | Counterclockwise                 |  |
| Airflow direction                   | Air in axially, Air out radially |  |
| Bearing system                      | Ball bearing                     |  |
| Mounting position - shaft           | Any                              |  |
| Balancing grade G (rotor)           | 2,5                              |  |
| Impeller weight                     | 20 g                             |  |

**2 Mechanics****2.1 General**

|                   |         |  |
|-------------------|---------|--|
| Width             | 64,1 mm |  |
| Height            | 69,5 mm |  |
| Depth             | 54,9 mm |  |
| Mass              | 0,13 kg |  |
| Housing material  | Plastic |  |
| Impeller material | Plastic |  |

**2.2 Connections**

|                       |                          |  |
|-----------------------|--------------------------|--|
| Electrical connection | Plug with stranded wires |  |
| Lead wire length      | See drawing              |  |
| Tolerance             |                          |  |
| Tube length           | See drawing              |  |
| Tolerance             |                          |  |
| Plug                  | See drawing              |  |

**Configuration X1:**

| Plug connection | Operation | Color |
|-----------------|-----------|-------|
| X1 Pin 1        | U         | n.a.  |
| X1 Pin 2        | V         | n.a.  |
| X1 Pin 3        | W         | n.a.  |

**Configuration X2:**

| Plug connection | Operation | Color |
|-----------------|-----------|-------|
| X2 Pin 1        | + 5 V     | n.a.  |
| X2 Pin 2        | Hall 1    | n.a.  |
| X2 Pin 3        | Hall 2    | n.a.  |
| X2 Pin 4        | Hall 3    | n.a.  |
| X2 Pin 5        | NTC       | n.a.  |
| X2 Pin 6        | - GND     | n.a.  |

NTC: TSM1C103F3611R

### 3 Operating Data

#### 3.1 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m<sup>3</sup>; Temperature 23°C +/- 3°C; Motor axis horizontal; warm-up time before measuring 5 minutes (unless otherwise specified).  
In the intake and outlet area should not be any solid obstruction within 0,5 m.

$\Delta p = 0$ : corresp. to free air flow (see chapter aerodynamics)  
I: corresp. to arithm. mean current value

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| Features            | Condition      | Symbol         | Values                  |                         |                         |
|---------------------|----------------|----------------|-------------------------|-------------------------|-------------------------|
| Voltage range       |                | U              | 7 V                     |                         | 30 V                    |
| Nominal voltage     |                | U <sub>N</sub> |                         | 24 V                    |                         |
| Power consumption   | $\Delta p = 0$ | P              |                         | 42 W<br>+/- 10 %        | 47 W<br>+/- 10 %        |
| Tolerance           |                |                |                         |                         |                         |
| Current consumption | $\Delta p = 0$ | I              | 600 mA<br>+/- 12,5 %    | 1.750 mA                | 1.550 mA<br>+/- 10 %    |
| Tolerance           |                |                |                         |                         |                         |
| Speed               | $\Delta p = 0$ | n              | 11.000 1/min<br>+/- 5 % | 39.200 1/min<br>+/- 2 % | 40.000 1/min<br>+/- 2 % |
| Tolerance           |                |                |                         |                         |                         |

**Operating requires additional control electronics!**

Values measured with control electronics "Powermodul RV45(9920640004)"

**Attention:**

It is not allowed to exceed the max. speed of 50,000 rpm.

The RMS current shall not be higher than 3 A per connector pin.

If  $U_b > U_n = 24$  V, the input power P shall not exceed 43 W.

**Note:** The performance data refers to the blower with control electronics. The control electronics are sensorless, block commuted and have an efficiency of approx. 95%. The ignition angle of the control electronics influences the efficiency of the blower.

Motor data at  $T_a = 25^\circ\text{C}$ :

Pole pair number  $2p = 1$

Winding connection: Y

Winding resistance  $R_{UV} = 1.7$  Ohm

Max. Motor inductance  $L_{UV\_max} = 460$   $\mu\text{H}$

Min. Motor inductance  $L_{UV\_min} = 335$   $\mu\text{H}$

Voltage constant  $k_e = 1920$   $\text{min}^{-1}/\text{V}$

$k_e = 4.54$  mVs/rad

Total harmonic distortion = 4%

### 3.2 Aerodynamics

Measurement conditions:

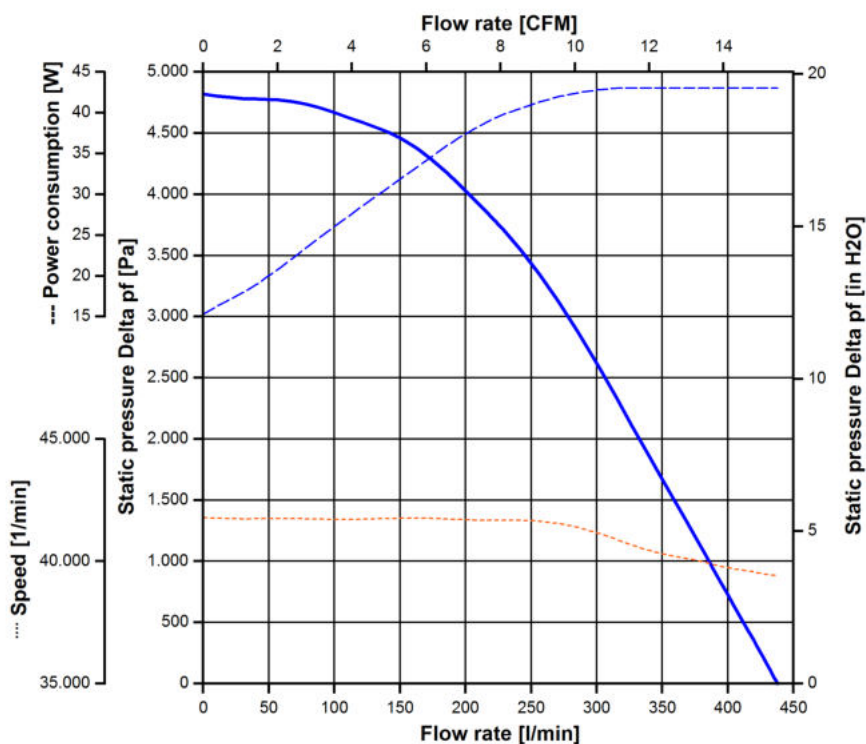
Measured with a double chamber intake rig.  
Normal air density = 1,2 kg/m<sup>3</sup>; Temperature 23°C +/- 3°C;  
In the intake and outlet area should not be any solid obstruction within 0,5 m. Motor shaft horizontal.  
The information is only valid under the specified test conditions and may be changed by the installation conditions. If there are deviations from the standard test conditions, the characteristic values must be checked under the installed conditions.

a) Operation condition:

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Speed: 39.200 1/min at free air flow

|                                                                   |           |  |
|-------------------------------------------------------------------|-----------|--|
| Max. free-air flow ( $\Delta p = 0$ / $\dot{V} = \text{max.}$ )   | 438 l/min |  |
| Max. static pressure ( $\Delta p = \text{max.}$ / $\dot{V} = 0$ ) | 4.820 Pa  |  |



### 3.3 Sound Data

b) Operation condition:

Inlet noise @ 1,000 Pa. The blower lays on a 10 cm thick foam, inlet pointing upwards, outlet connected to a hose with normed 4 mm nozzle (acoustically insulated), microphone located 1.0 m above, room noise level < 26 dB(A)

|                                                       |            |  |
|-------------------------------------------------------|------------|--|
| Sound pressure level measurement $L_{PA}$ Inlet noise | 51,5 dB(A) |  |
|-------------------------------------------------------|------------|--|

## 4 Environment

### 4.1 General

|                                            |        |  |
|--------------------------------------------|--------|--|
| Min. permitted ambient temperature TU min. | -20 °C |  |
| Max. permitted ambient temperature TU max. | 70 °C  |  |
| Min. permitted storage temperature TL min. | -40 °C |  |
| Max. permitted storage temperature TL max. | 85 °C  |  |

### 4.2 Climatic Requirements

|                          |                                                               |  |
|--------------------------|---------------------------------------------------------------|--|
| Humidity requirements    | humid heat, constant; according to DIN EN 60068-2-78, 14 days |  |
| Water exposure           | None                                                          |  |
| Radiation exposure       | None                                                          |  |
| Dust requirements        | None                                                          |  |
| Salt fog requirements    | None                                                          |  |
| Harmful gas requirements | None                                                          |  |
| Oxygen requirements      | Upon request                                                  |  |

Permitted application area:

The product is intended for use in sheltered rooms with controlled temperature and controlled humidity. Directly exposure to water must be avoided.

Pollution degree 1 (according DIN EN 60664-1)

There is either no pollution or it occurs only dry, non-conductive pollution. The pollution has no negative impact.

### 4.3 Mechanical Requirements

Please require severity levels and specification parameters from the responsible development departments.

### 4.4 Bio compatibility

All air-contacting parts are respiratory-physiologically harmless.

## 5 Safety

### 5.1 Electrical Safety

A verification of thermal conditions (normal and abnormal operation) as well as the protection against electric shock, ingress of solid foreign objects and water has to be done in conjunction with the appliance.

## 6 Reliability

### 6.1 General

|                                                    |           |  |
|----------------------------------------------------|-----------|--|
| Life expectancy L10 at TU = 25 °C                  | 22.500 h  |  |
| Life expectancy L10 at TU = 40 °C                  | 17.500 h  |  |
| Life expectancy L10 at TU max.                     | 7.500 h   |  |
| Life expectancy L10 acc. to IPC 9591 at TU = 25 °C | 50.0 00 h |  |
| Life expectancy L10 acc. to IPC 9591 at TU = 40 °C | 27.5 00 h |  |



