# Product Data Sheet | 5314/2TDHHP



The engineer's choice

ebmpapst

**5314/2TDHHP**

**INDEX**


**1 General ..... 3**

**2 Mechanics ..... 3**

2.1 General ..... 3
2.2 Connections ..... 3

**3 Operating Data ..... 4**

3.1 Operating Data - Electrical Interface - Input ..... 4
3.2 Electrical Operating Data ..... 5
3.3 Operating Data - Electrical Interface -Output ..... 6
3.4 Electrical Features ..... 6
3.5 Aerodynamic ..... 7
3.6 Sound Data ..... 8

**4 Environment ..... 8**

4.1 General ..... 8
4.2 Climatic requirements*) ..... 9

**5 Safety ..... 9**

5.1 Electrical Safety ..... 9
5.2 Approval Tests ..... 10

**6 Reliability ..... 10**

6.1 General ..... 10

## 1 General

| | | |
|---|---|---|
| Fan type | Fan | |
| Rotational direction looking at rotor | counterclockwise | |
| Airflow direction | Air intake over struts | |
| Bearing system | Ball bearing | |
| Mounting position | any | |

## 2 Mechanics

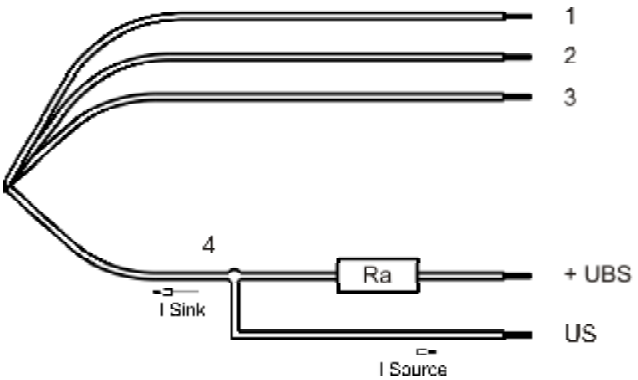
### 2.1 General

| | | |
|---|---|---|
| Width | 140,0 mm | |
| Height | 140,0 mm | |
| Depth | 51,0 mm | |
| Weight | 0,900 kg | |
| Housing material | Metal | |
| Impeller material | Plastic | |
| Max. torque when mounted across both mounting flanges<br>Screw size | wire outlet corner: 440 Ncm<br>remaining corners: 600 Ncm<br>ISO 4762 - M4 degreased, without an additional brace and without washer | |

### 2.2 Connections

| | | |
|---|---|---|
| Electrical connection | Wires | |
| Length of lead wire<br>Tolerance | L = 310 mm<br>+- 10,0 mm | |
| Length of tube<br>Tolerance | S = 50 mm<br>+- 2,0 mm | |
| Wire gauge (AWG) | 20 | |
| Insulation diameter | 2,05 mm | |
| Contact | see drawing | |






| | Colour | Operation |
|---|---|---|
| Wire 1 | red | + UB |
| Wire 2 | blue | - GND |
| Wire 3 | violet | PWM |
| Wire 4 | white | Tacho |

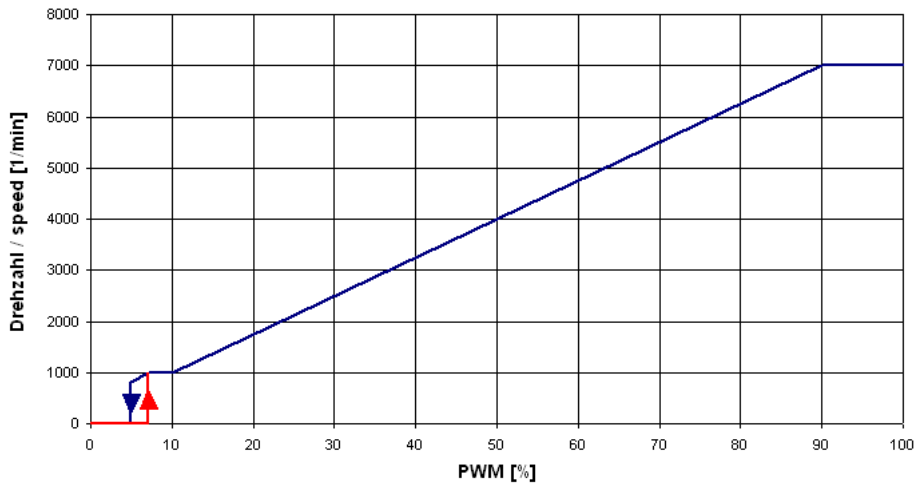
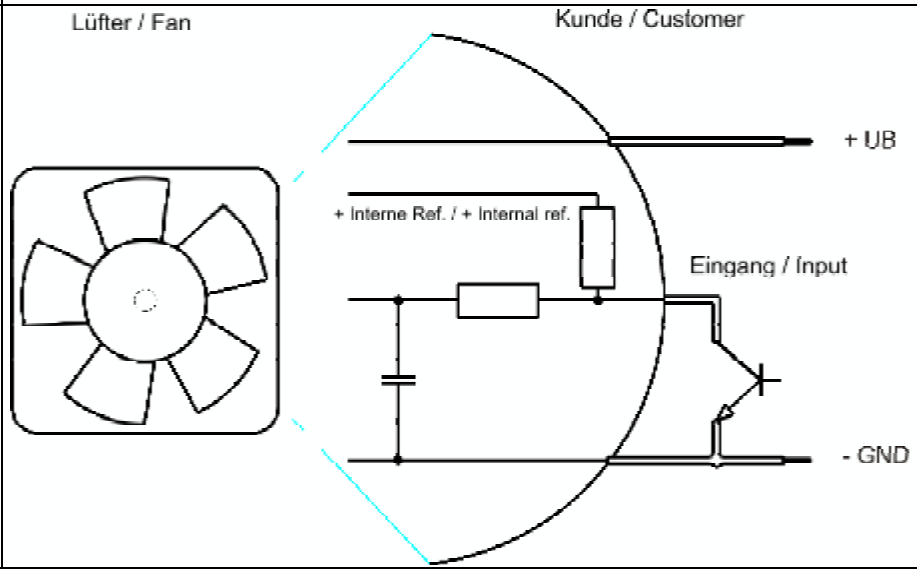
The auxilliaries shown on the schematic diagram (which are required for the intended use) are not part of our delivery.

## 3 Operating Data

### 3.1 Operating Data - Electrical Interface - Input

| | |
|---|---|
| Control input | PWM |

**Features**

| | | |
|---|---|---|
| PWM - Frequency | | 1 kHz - 10 kHz<br>Typical: 2 kHz |
| **Characteristics** |  | |
| **Schematics** |  | |

**Speed control:**
By Puls width modulation (PWM) 0 ... 100%
Open collector in relation to signal-ground.
f: 2 kHz +-20%

**Information to the curve:**

0% - <=7% PWM: 0 1/min (Fan off)
7% PWM: 1.000 1/min (Start-up, comming from 0% PWM)
7% - 10 % PWM: 1.000 1/min (corresponding to min. speed)
10% - 90% PWM: linear increasing curve
90% - 100% PWM: 7.000 1/min (corresp. to max. fan speed)
5% PWM: 800 1/min bzw. 0 1/min (Fan turns off, comming from 100% PWM)

### 3.2 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m3; 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.

Δp = 0: corresp. to free air flow (see section 3.5)
I: corresp. to arithm. mean current value

| Name | Condition | | |
|---|---|---|---|
| PWM 0001 | PWM: 100 %; f: 2 kHz | | |

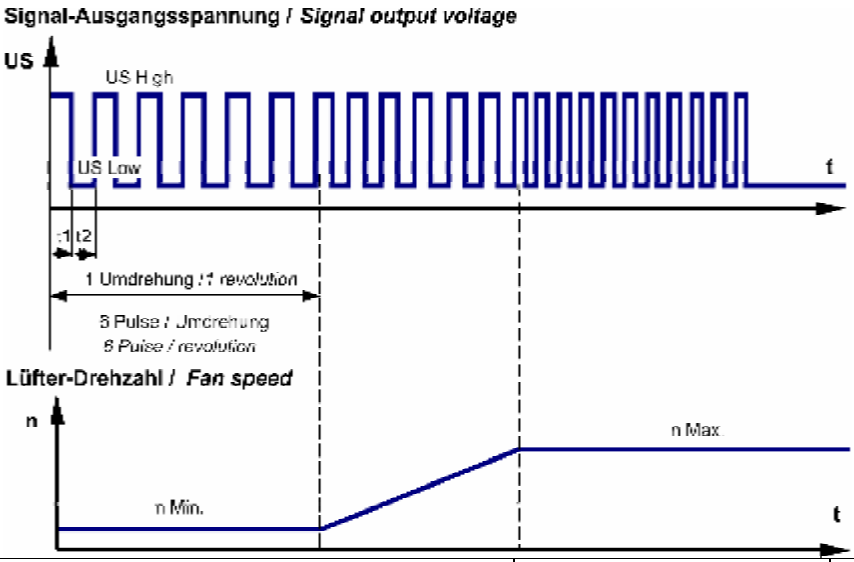
| Features | Condition | Symbol | Values | | |
|---|---|---|---|---|---|
| Voltage range | Δp = 0 | U | 16,0 V | | 36,0 V |
| Nominal voltage | Δp = 0 | $U_N$ | | 24,0 V | |
| Power consumption<br>Tolerance | Δp = 0<br>PWM 0001 | P | 58,0 W<br>+- 10,0 % | 67,0 W<br>+- 10,0 % | 69,0 W<br>+- 10,0 % |
| Current consumption<br>Tolerance | Δp = 0<br>PWM 0001 | I | 3.600 mA<br>+- 10,0 % | 2.750 mA<br>+- 10,0 % | 1.910 mA<br>+- 10,0 % |
| Speed<br>Tolerance | Δp = 0<br>PWM 0001 | n | 6.700 1/min<br>+- 10,0 % | 7.000 1/min<br>+- 10,0 % | 7.000 1/min<br>+- 10,0 % |

| Name | Condition | | |
|---|---|---|---|
| PWM 0002 | PWM: 50 %; f: 2 kHz | | |

| Features | Condition | Symbol | Values | | |
|---|---|---|---|---|---|
| Voltage range | Δp = 0 | U | 16,0 V | | 36,0 V |
| Nominal voltage | Δp = 0 | $U_N$ | | 24,0 V | |
| Power consumption<br>Tolerance | Δp = 0<br>PWM 0002 | P | 13,4 W<br>+- 10,0 % | 14,3 W<br>+- 10,0 % | 15,7 W<br>+- 10,0 % |
| Current consumption<br>Tolerance | Δp = 0<br>PWM 0002 | I | 840 mA<br>+- 10,0 % | 595 mA<br>+- 10,0 % | 440 mA<br>+- 10,0 % |
| Speed<br>Tolerance | Δp = 0<br>PWM 0002 | n | 3.850 1/min<br>+- 10,0 % | 3.850 1/min<br>+- 10,0 % | 3.850 1/min<br>+- 10,0 % |

### 3.3 Operating Data - Electrical Interface -Output

| | |
|---|---|
| Tacho type | /2 (Open collector) |




$$Ra = \frac{UBS - US\ Low}{I\ Sink}$$

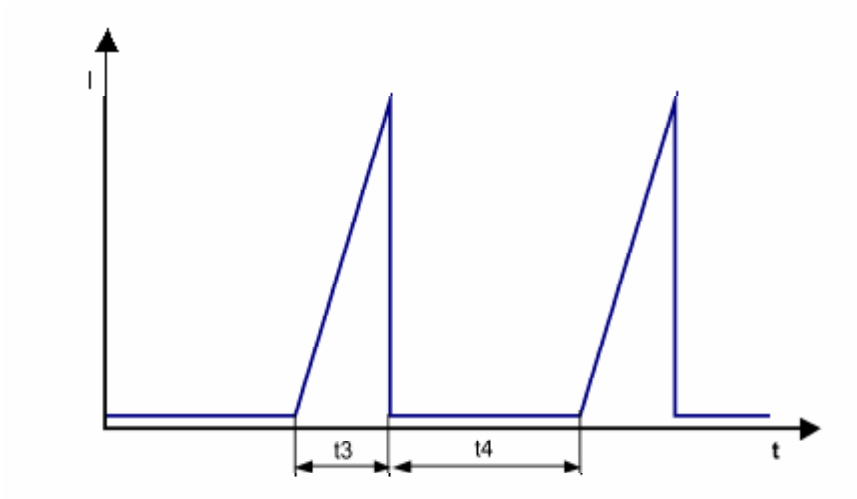
| Features | Note | Values |
|---|---|---|
| Tacho operating voltage (UBS) | | Min.: 4 V Max.: 60 V |
| Tacho signal Low | I sink: 2 mA | <= 0,4 V |
| Tacho signal High | I source: 0 mA | 60,0 V |
| Maximum sink current | | <= 20 mA |
| External resistor | External resistor Ra from UBS to US required. All voltages measured to GND. | |
| Tacho frequency | (6 x n) / 60 | |
| Tacho isolated from motor | No | |
| Slew rate | | => 0,5 V/us |

**Please note:**
At zero speed the tacho signal is at a static HIGH. It will be also HIGH when the fan is still spinning, but the speed control signal is set to zero speed already.
The tacho signal is only activated after the start-up is completed.

| | |
|---|---|
| Alarm type | None |

### 3.4 Electrical Features

| | | |
|---|---|---|
| Electronic function | Speed-Controlled | |
| Reversed polarity protection<br>Max. residual current at Un | P-CH FET<br>IF <= 5 mA | |
| Locked rotor protection | Auto restart | |
| Locked rotor current at Un | | |
| Clock signal t3/t4 at locked rotor | Typical: 1,5 s / 10,0 s | |




Internal Fuse:
Littlefuse NANO2(R) FUSE; Very fast acting 451 Series; 12 A (Art.-Nr.: 451012)

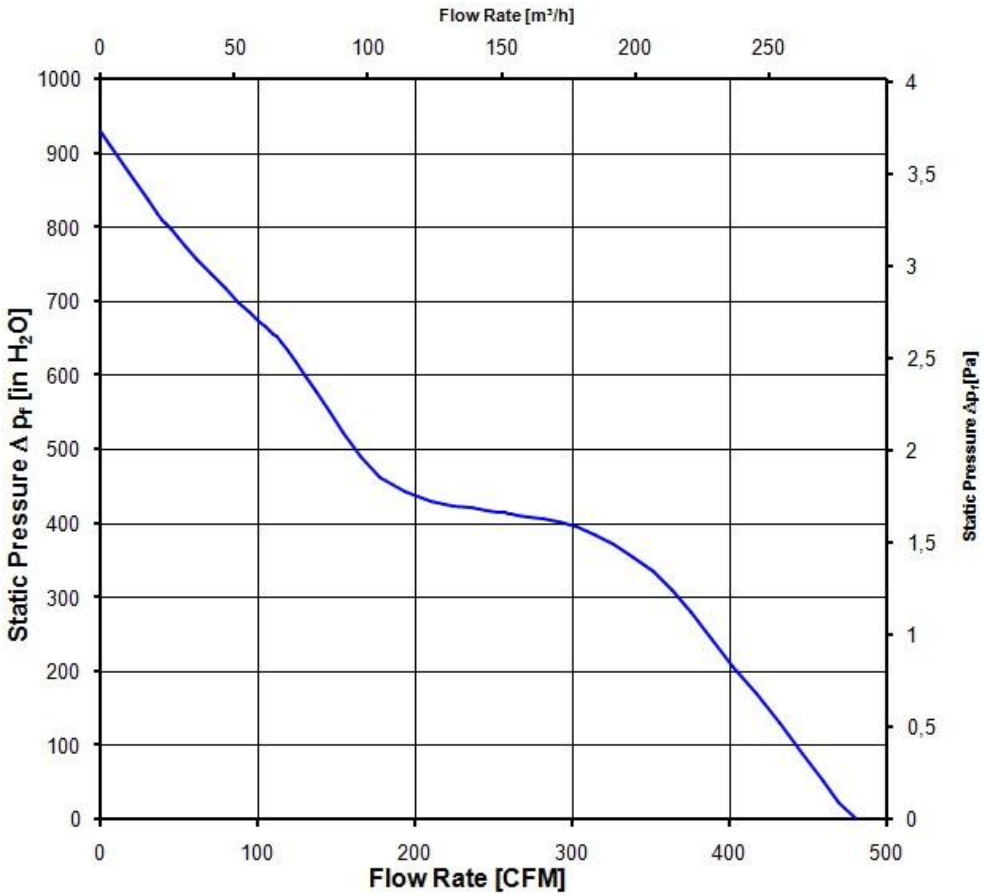
To note inrush current @ U nom:
The internal electrolytic capacitors 2*270uF/50V has inrush current limitation,
the existing peak depends on ceramic capacitors.

### 3.5 Aerodynamic

| | |
|---|---|
| Measurement conditions: | Measured with a double chamber intake rig acc. to DIN EN ISO 5801.<br>Normal air density = 1,2 kg/m3; Temperature 23°C +/- 3°C;<br>In the intake and outlet area should not be any solid obstruction within 0,5 m.<br>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:

| | | | |
|---|---|---|---|
| 7.000 1/min at free air flow | PWM 100 %; f: 2 kHz | | |
| Max. free-air flow (Δp = 0 / $\dot{V}$ = max.) | | 480,0 m3/h | |
| Max. static pressure (Δp = max. / $\dot{V}$ =0) | | 930 Pa | |




### 3.6 Sound Data

| | |
|---|---|
| Measurement conditions: | Sound pressure level: 1 Meter distance between microphone and the air intake.<br>Sound power level: Acc. to DIN 45635 part 38 (ISO 10302)<br>Measured in a semianchoic chamber with a background noise level of Lp(A) < 5 dB(A)<br>For further measurement conditions see section 3.5 |

a.) Operation condition:

| | | | |
|---|---|---|---|
| 7.000 1/min at free air flow | PWM 100 %; f: 2 kHz | PWM min.: | PWM max.: |

| | | |
|---|---|---|
| Optimal operating point | 320,0 m3/h @ 340 Pa | |
| Sound power level at the optimal operating point | 8,2 bel(A) | |
| Sound pressure level at free air flow, measured in rubber bands | 75,0 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. | 80 °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 | |

*) Permittet 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.Please require severity levels and specification parameters from the responsible development departments**Safety**

### 5.1 Electrical Safety

| | | |
|---|---|---|
| Dielectric strength<br>DIN EN 60950 (VDE 0805) and DIN EN 60335 (VDE 0700)<br>A.) Type test<br>Measuring conditions: After 48h of storage at 95% R.H. and 25°C.<br>No arcing or breakdown is allowed!<br>All connections together to ground.<br>B.) Routine test<br>Measuring conditions: At indoor climate.<br>No arcing or breakdown is allowed!<br>All connections together to ground. | <br><br>500 VAC / 1 Min.<br><br><br><br>500 VAC / 1 Sec. | |
| Isolation resistance<br>Measuring conditions: After 48h of storage at 95% R.H. and 25°C measured with U=500 VDC for 1 min. | RI > 10 MOhm | |
| clearance / creepage distance | 1,0 mm / 1,2 mm | |
| Protection class | III | |

### 5.2 Approval Tests

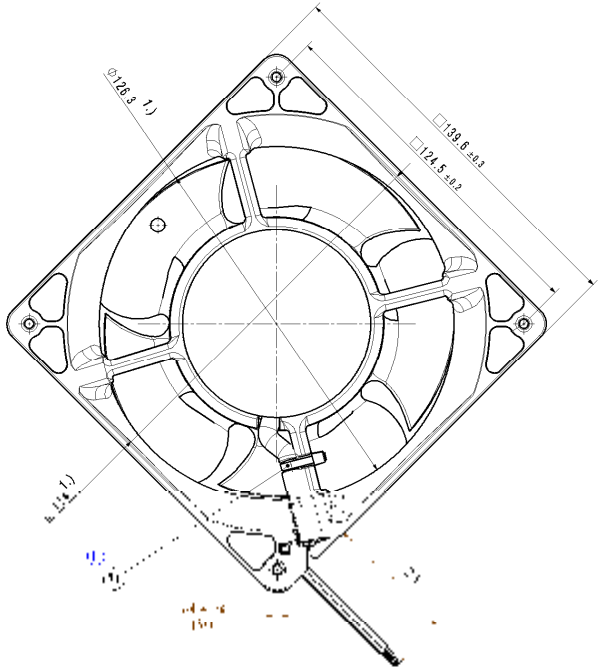
| | |
|---|---|
| CE | No |
| UL | Yes / UL audited by CSA according to UL507, Electric Fans |
| VDE | Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment |
| CSA | Yes / C22.2 No. 113 Fans and Ventilators |
| CCC | No |

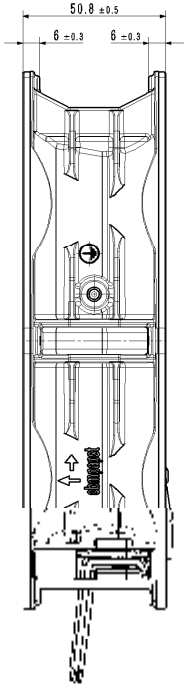
The approval tests are observed to:
U approval max.:36,0 V @ TU approval max.: 70,0 °C

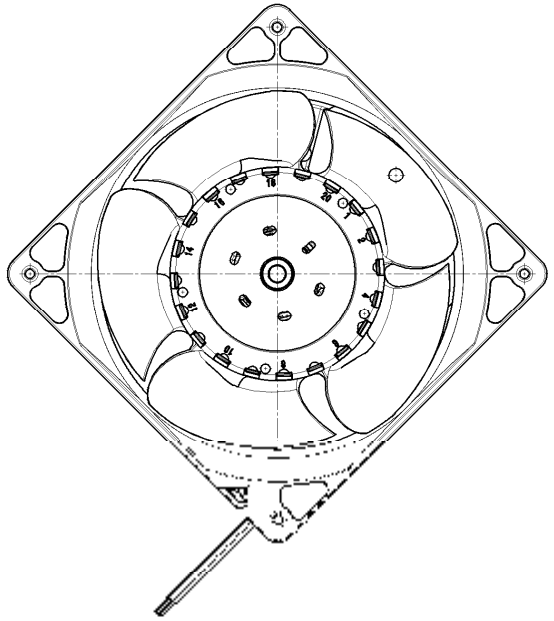
## 6 Reliability

### 6.1 General

| | | |
|---|---|---|
| Life expectancy L10 at TU = 40 °C | 62.500 h | |
| Life expectancy L10 at TU max. | 30.000 h | |
| Life expectancy L10 Delta (40 °C) | 120.000 h | |



1.) Maße aus Montageausschnitt
2.) Anzahl und Länge der Litzen siehe Produktspezifikation

- Axialspiel der Kugellager mit Feder spielfrei gelagert

1.) [illegible]
2.) [illegible]

- [illegible]

This drawing is our property; it shall not be lent out or communicated of its contents thereof, are [illegible] Offenders are liable to the payment of damages. All rights are reserved [illegible]