

# DC Axial Fans

ebmpapst

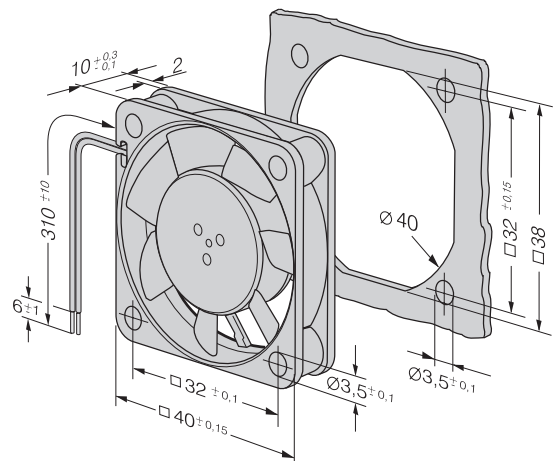
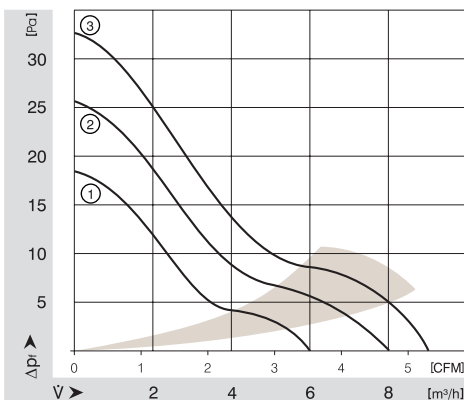
Series 400 F, Type 414 F 40 x 40 x 10 mm



- DC fans with electronically commutated external rotor motor. Fully integrated commutation electronics.
- With electronic protection against reverse polarity. The fan only operates when the polarity is correct. Impedance-protected\* against blocking and overloading.
- Fan of fibreglass reinforced plastic. PBT housing, PA impeller.
- Air exhaust over struts. Rotational direction CCW looking at rotor.
- Electrical connection via 2 leads AWG 28, TR 64. Stripped and tinned ends.
- Mass 17 g.

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| Nominal Data | Air Flow          |     | Nominal Voltage | Voltage Range | Noise | Sinter-Sleeve Bearings<br>Ball Bearings | Power Input | Nominal Speed | Temperature Range | Service Life L <sub>10</sub> |      | Curve |
|--------------|-------------------|-----|-----------------|---------------|-------|-----------------------------------------|-------------|---------------|-------------------|------------------------------|------|-------|
|              | m <sup>3</sup> /h | CFM |                 |               |       |                                         |             |               |                   | V DC                         | V DC |       |
| 405 F        | 8                 | 4.7 | 5               | 4.5...5.5     | 22.1  | 4.4                                     | 0.7         | 5 400         | -20...+70         | 45 000 / 15 000              | 2    |       |
| 405 FH       | 9                 | 5.3 | 5               | 4.5...5.5     | 26.0  | 4.6                                     | 0.9         | 6 000         | -20...+70         | 45 000 / 15 000              | 3    |       |
| 412 FM       | 6                 | 3.5 | 12              | 10...14       | 16.5  | 3.8                                     | 0.6         | 4 300         | -20...+70         | 45 000 / 15 000              | 1    |       |
| 412 F        | 8                 | 4.7 | 12              | 10...14       | 22.1  | 4.4                                     | 0.7         | 5 400         | -20...+70         | 45 000 / 15 000              | 2    |       |
| 412 FH       | 9                 | 5.3 | 12              | 10...14       | 26.0  | 4.6                                     | 0.8         | 6 000         | -20...+70         | 45 000 / 15 000              | 3    |       |
| 414 F        | 8                 | 4.7 | 24              | 20...28       | 22.1  | 4.4                                     | 0.8         | 5 400         | -20...+70         | 45 000 / 15 000              | 2    |       |
| 414 FH       | 9                 | 5.3 | 24              | 21.6...26.4   | 26.0  | 4.4                                     | 0.9         | 6 000         | -20...+70         | 45 000 / 15 000              | 3    |       |

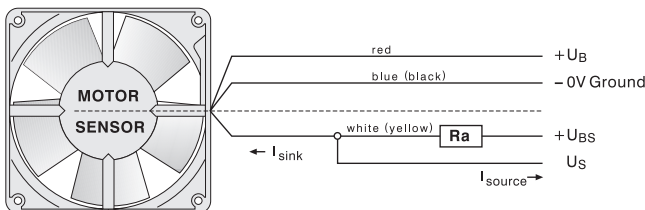




- Speed-proportional rectangular pulse for external speed monitoring of fan motor
- 2 pulses per revolution
- Open-Collector signal output
- Extremely wide operating voltage range (5 ... 60 V)
- Easy adaptation to user interface
- Connection via separate lead
- The sensor signal also serves as a major comparison variable for setting and maintaining the desired speed for interactive or controlled cooling with one or several interconnected fans.

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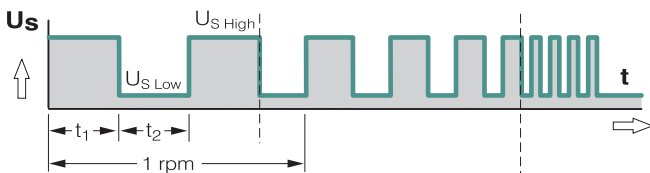
### Electrical connection



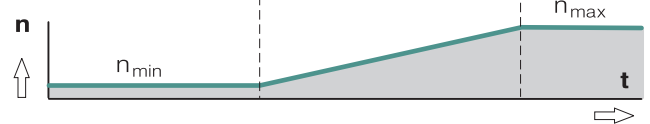
$$R_a = \frac{U_{BS} - U_{SLOW}}{I_{SINK}}$$

All voltages measured to ground.  
External load resistance Ra from US to UBS required.

### Signal output voltage



### Fan speed



Signal symmetry  $[t_1, t_2] = 0.8 \dots 1.2$   
Signal frequency  $[F] = 2 \times n/60$  Hz

### Attention:

With these fan options, deviations in regard to temperature range, voltage range and power consumption are possible compared with standard fan data.

### Signal data

| Type            | Sensor signal<br>US Low<br>V DC | Condition: Isink<br>mA | Sensor signal<br>US High<br>V DC | Condition: Isource<br>mA | Sensor operating<br>voltage UBS<br>V DC | Perm. sink current<br>Isink max.<br>mA |
|-----------------|---------------------------------|------------------------|----------------------------------|--------------------------|-----------------------------------------|----------------------------------------|
| 255 N/2         | ≤ 0.4                           | ≤ 2                    | 30                               | 0                        | ≤ 30                                    | 2                                      |
| 255 H/2         | ≤ 0.4                           | ≤ 2                    | 30                               | 0                        | ≤ 30                                    | 2                                      |
| 252 N/2         | ≤ 0.4                           | ≤ 2                    | 30                               | 0                        | ≤ 30                                    | 2                                      |
| 405 F/2         | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 405 F/2 H       | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 412 F/2 H       | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 414 F/2         | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 405 /2          | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 412 /2          | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 414 /2          | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 414 /2 H        | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 412 J/2 H       | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 4                                    |
| 412 J/2 HH      | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 4                                    |
| 414 J/2 H       | ≤ 0.4                           | 2                      | 30                               | 0                        | ≤ 30                                    | ≤ 4                                    |
| 414 J/2 HH      | ≤ 0.4                           | 2                      | 30                               | 0                        | ≤ 30                                    | ≤ 4                                    |
| 512 F/2         | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 514 F/2         | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 612 F/2         | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 612 F/2 H       | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 614 F/2         | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 612 N/2 H       | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 612 N/2 NHH-120 | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 612 N/2 N       | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 614 N/2 H       | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 614 N/2 HH-121  | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 614 N/2 M       | ≤ 0.4                           | 2                      | 28                               | 0                        | ≤ 30                                    | ≤ 4                                    |
| 712 F/2 L       | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 712 F/2 M       | ≤ 0.4                           | 1                      | 30                               | 0                        | ≤ 30                                    | ≤ 2                                    |
| 8412 N/2 GL     | ≤ 0.4                           | 2                      | 28                               | 0                        | ≤ 28                                    | ≤ 4                                    |
| 8412 N/2 GM     | ≤ 0.4                           | 2                      | 28                               | 0                        | ≤ 28                                    | ≤ 4                                    |
| 8412 N/2 G      | ≤ 0.4                           | 2                      | 28                               | 0                        | ≤ 28                                    | ≤ 4                                    |
| 8414 N/2 GL     | ≤ 0.4                           | 2                      | 28                               | 0                        | ≤ 28                                    | ≤ 4                                    |
| 8414 N/2 GM     | ≤ 0.4                           | 2                      | 28                               | 0                        | ≤ 28                                    | ≤ 4                                    |
| 8414 N/2 G      | ≤ 0.4                           | 2                      | 28                               | 0                        | ≤ 28                                    | ≤ 4                                    |
| 8414 N/2        | ≤ 0.4                           | 2                      | 28                               | 0                        | ≤ 28                                    | ≤ 4                                    |
| 8412 N/2        | ≤ 0.4                           | 2                      | 28                               | 0                        | ≤ 28                                    | ≤ 4                                    |
| 8412 N/2 H      | ≤ 0.4                           | 2                      | 28                               | 0                        | ≤ 28                                    | ≤ 4                                    |
| 8414 N/2 H      | ≤ 0.4                           | 2                      | 28                               | 0                        | ≤ 28                                    | ≤ 4                                    |
| 8312 /2 HL      | ≤ 0.4                           | 2                      | 30                               | 0                        | ≤ 30                                    | ≤ 4                                    |
| 8314 /2         | ≤ 0.4                           | 2                      | 30                               | 0                        | ≤ 30                                    | ≤ 4                                    |
| 8314 /2 H       | ≤ 0.4                           | 2                      | 30                               | 0                        | ≤ 30                                    | ≤ 4                                    |

**Available on request:**

- Galvanically separated sensor signal circuit
- Varying voltage potentials for power and logic circuit.

| Signal data  | Sensor signal<br>U <sub>S, Low</sub> | Condition: I <sub>sink</sub> | Sensor signal<br>U <sub>S, High</sub> | Condition: I <sub>source</sub> | Sensor operating<br>voltage U <sub>BS</sub> | Perm. sink current<br>I <sub>sink max.</sub> |
|--------------|--------------------------------------|------------------------------|---------------------------------------|--------------------------------|---------------------------------------------|----------------------------------------------|
| Type         | V DC                                 | mA                           | V DC                                  | mA                             | V DC                                        | mA                                           |
| 8318 /2      | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 8318 /2 HL   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 8318 /2 H    | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 3412 N/2 GL  | ≤ 0.4                                | 2                            | 28                                    | 0                              | ≤ 28                                        | ≤ 4                                          |
| 3412 N/2 GM  | ≤ 0.4                                | 2                            | 28                                    | 0                              | ≤ 28                                        | ≤ 4                                          |
| 3412 N/2     | ≤ 0.4                                | 2                            | 28                                    | 0                              | ≤ 28                                        | ≤ 4                                          |
| 3412 N/2 G   | ≤ 0.4                                | 2                            | 28                                    | 0                              | ≤ 28                                        | ≤ 4                                          |
| 3412 N/2 HH  | ≤ 0.4                                | 2                            | 28                                    | 0                              | ≤ 28                                        | ≤ 4                                          |
| 3412 N/2 GHH | ≤ 0.4                                | 2                            | 28                                    | 0                              | ≤ 28                                        | ≤ 4                                          |
| 3412 N/2 H   | ≤ 0.4                                | 2                            | 28                                    | 0                              | ≤ 28                                        | ≤ 4                                          |
| 3414 N/2 GH  | ≤ 0.4                                | 2                            | 28                                    | 0                              | ≤ 28                                        | ≤ 4                                          |
| 3414 N/2     | ≤ 0.4                                | 2                            | 28                                    | 0                              | ≤ 28                                        | ≤ 4                                          |
| 3312 /2      | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 3318 /2      | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4412 F/2 GL  | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4412 F/2 GML | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4412 F/2 M   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4412 F/2     | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4414 F/2 L   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4414 F/2 M   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4414 F/2 G   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4414 F/2     | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4418 F/2     | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4312 N/2 H   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4312 N/2 HH  | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4312 /2      | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4314 /2 G    | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4314 /2      | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4318 /2 G    | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4318 /2 M    | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4318 /2      | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4212 N/2 GN  | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4212 N/2 H   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4214 N/2 GN  | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4214 N/2 H   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4218 N/2 GN  | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4218 N/2 H   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4212 /2 M    | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4212 /2      | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4212 /2 H    | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| 4214 /2      | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 4                                          |

| Signal data      | Sensor signal<br>U <sub>S, Low</sub> | Condition: I <sub>sink</sub> | Sensor signal<br>U <sub>S, High</sub> | Condition: I <sub>source</sub> | Sensor operating<br>voltage U <sub>BS</sub> | Perm. sink current<br>I <sub>sink max.</sub> |
|------------------|--------------------------------------|------------------------------|---------------------------------------|--------------------------------|---------------------------------------------|----------------------------------------------|
| Type             | V DC                                 | mA                           | V DC                                  | mA                             | V DC                                        | mA                                           |
| 4214 /2 H        | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 4                                          |
| 4218 /2          | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 4                                          |
| 4218 /2 H        | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 4                                          |
| 4182 N/2 X       | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 4                                          |
| 4184 N/2 GX      | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 4                                          |
| 4184 N/2 X       | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 4                                          |
| 4184 N/2 XH      | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 4                                          |
| 5112 N/2         | ≤ 0.4                                | 2                            | 15                                    | 0                              | ≤ 5                                         | ≤ 20                                         |
| 5114 N/2         | ≤ 0.4                                | 2                            | 60                                    | 0                              | ≤ 60                                        | ≤ 20                                         |
| 5118 N/2         | ≤ 0.4                                | 2                            | 60                                    | 0                              | ≤ 60                                        | ≤ 20                                         |
| 5212 N/2 H       | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 2                                          |
| 5212 N/2 N       | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 2                                          |
| 5214 N/2 N       | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 2                                          |
| 5218 N/2 H       | ≤ 0.4                                | 2                            | 30                                    | 0                              | 4-30                                        | ≤ 2                                          |
| 7112 N/2         | ≤ 0.4                                | 2                            | 60                                    | 0                              | ≤ 60                                        | ≤ 20                                         |
| 7114 N/2         | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 20                                         |
| 7118 N/2         | ≤ 0.4                                | 2                            | 60                                    | 0                              | ≤ 60                                        | ≤ 20                                         |
| 6224 N/2         | ≤ 0.4                                | 8                            | 30                                    | 0                              | ≤ 30                                        | ≤ 20                                         |
| 6248 N/2         | ≤ 0.4                                | 8                            | 60                                    | 0                              | ≤ 30                                        | ≤ 20                                         |
| DV 6224 /2       | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 60                                        | ≤ 20                                         |
| 6424 /2          | ≤ 0.4                                | 2                            | 60                                    | 0                              | ≤ 60                                        | ≤ 20                                         |
| 6448 /2          | ≤ 0.4                                | 2                            | 60                                    | 0                              | ≤ 60                                        | ≤ 20                                         |
| 6448 /2 T        | ≤ 0.4                                | 2                            | 60                                    | 0                              | ≤ 60                                        | ≤ 20                                         |
| RL 48-19/12/2    | ≤ 0.4                                | 2                            | 28                                    | 0                              | 4-30                                        | ≤ 4                                          |
| RL 48-19/14/2    | ≤ 0.4                                | 2                            | 28                                    | 0                              | 4-30                                        | ≤ 4                                          |
| RL 90-18/12N/2   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| RL 90-18/14N/2   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| RG 90-18/12N/2   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| RG 90-18/14N/2   | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| RG 125-19/14N/2  | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| RG 125-19/18N/2  | ≤ 0.4                                | 2                            | 60                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| RER 125-19/14N/2 | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 4                                          |
| RG 160-28/14N/2  | ≤ 0.4                                | 2                            | 30                                    | 0                              | ≤ 30                                        | ≤ 20                                         |

**Attention:**

With these fan options, deviations in regard to temperature range, voltage range and power consumption are possible compared with standard fan data.