# RP Ex, RQ Ex Fans

## FANS USE

Ex versions of fully controlled, low-pressure RP and RQ radial Fans can be universally used for complex air-conditioning, from simple venting installations to sophisticated air-handling systems..
Due to the special design preventing the formation of mechanical sparks according to EN 80079-36, EN 80079-37 (formerly EN 13463-1, EN 13463-5) and the secured design of the "e" electric motor according to EN 60079-0 ed. 4, the fans are predestined for use in explosion hazardous environments.

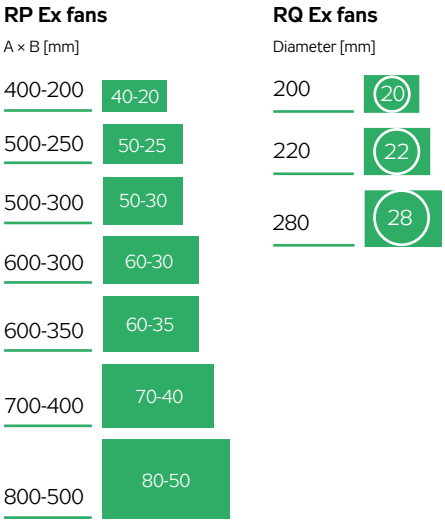
## OPERATING CONDITIONS, POSITION

These fans are designed for indoor and outdoor applications, and to transport air without solid, fibrous, sticky or aggressive impurities. The transported air must be free of corrosive chemicals or chemicals aggressive to zinc, copper and/or aluminium. The allowed temperatures of the transported air ranges from -20 ºC up to +40 ºC.
In terms of the classification of areas with a risk of explosion ČSN EN 60079-10-1, the fans are designed for the environment and for the extraction of air from the environment Zone 1.
Explosion-proof RP and RQ Ex fans, secure version "e", belong according to EN 60079-0 to Group II[1)] and are labelled with the **II 2G Ex e II TX** marks.
The fans themselves are labelled with the **II 2/2G c IIB+H2 TX** marks proving their explosion-proof design (according to ČSN EN 80079-37 it is the design **Ex h IIB+H2 TX Gb**).
The fans can work in any position.
When positioned under the ceiling, it is advisable to situate the RP Ex fan with its cup directed downwards to ease access to the motor terminal box. However, if transported air is oversaturated with moisture or if the risk of intensive steam condensation inside the fan exists, it is advisable to situate the fan's cup upwards. We recommend adding a 1 to 1.5 m long piece of straight duct to the fan's outlet to reduce pressure losses in the assembly.
RQ Ex fans are mostly installed in the horizontal position of the motor shaft rotation (however, this is not a condition of use). The square sidewalls of the fan serve also as legs to fix the fan onto the base using anchor bolts. The fan can be positioned in four positions turned by 90º..

## DIMENSIONAL RANGE

RP Ex fans are manufactured in a range of six sizes according to the A x B dimensions of the connecting flange.
RQ Ex fans are manufactured in a range of three sizes according to the impeller's diameter, see figure # 1.
The standard dimensional and performance range of explosion-proof fans enables the designers to optimize all parameters for air flow up to 5,800 m$^3$ per hour.

FIGURE 1 - DIMENSIONAL RANGE




## MATERIALS

The external casing and connecting flanges of RP Ex and RQ Ex fans are made of galvanized sheet steel (Zn 275 g/m2), respectively stainless steel. Impeller blades are made of galvanized sheet steel, diffusers are made of copper, and the motors' casings are made of aluminium alloys. The internal structure of the motors consists of steel, copper and plastic parts. All materials are carefully verified and checked so they ensure long service life and reliability of the fans.

## IMPELLERS

Impellers of RP Ex and RQ Ex fans are equipped with forward curved blades. After connecting the motor to the wiring, the impeller's direction of rotation must be checked. The fans' impellers must always rotate to the left, i.e. counter clockwise (looking through the inspection opening on the motor cup). The inspection opening on the motor cup is sealed with a rubber plug. Impellers along with the motor are perfectly statically and dynamically balanced.

## MOTORS

Compact three-phase asynchronous motors with an external rotor and a resistance armature of appropriate output and speed, and approved in accordance with the 94/9/ES (ATEX) resp. 2014/34/EU Directive are used as drives, see figure #2. The motors are situated inside the impeller, and during operation are optimally cooled by the flowing air. The motor's high quality enclosed ball bearings with permanent lubricant filling enable the fans to reach a service life of more than 40,000 operating hours without maintenance. The motors are characterized by a relatively low inrush current.

## ELECTRICAL EQUIPMENT

The fan's wiring is terminated in a special explosion-proof terminal box of IP 66 protection degree. For wiring diagrams of motors, refer to the section "Wiring".

[1)] Group II. - Electrical equipment for explosion hazardous areas (except underground mines with presence of methane).

## MOTOR PROTECTION

As standard, permanent monitoring of the internal motor temperature is used in all motors. The temperature inside the motor is read by temperature-sensitive sensors (thermistors) situated in the motor winding (2. The thermistors must be connected to the trip relay which, after reaching a temperature of 130 ºC, disconnects the protective contactor circuit. This system protects the motor against unfavourable operating conditions, e.g. overloading due to phase failure, forced motor braking, current protection circuit breakdown or excessive temperature of the transported air. This thermal protection is comprehensive and reliable providing it is correctly connected. ATEX certified thermistor relay must be of an approved type Ex **II (2) G.** This relay must be located outside an explosive atmosphere.

FIGURE 2

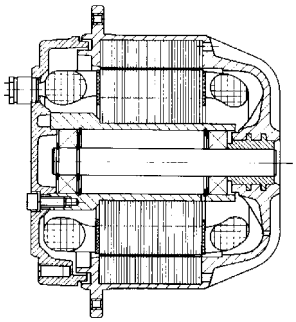


FIGURE 3 – THERMISTOR

RP Ex and RQ Ex fans have been approved by Notified Body ES 1026, Fyzikálně-technický ústav Ostrava-Radvanice, to be operated only in connection with the prescribed thermal protection (refer to the wiring diagrams in the chapter "Wiring").
Therefore, it is forbidden to protect the fan motors by conventional thermal protection ensured by the motor overcurrent protective elements!

## FAN OUTPUT CONTROL

Generally, several types of control can be used with fans; however, voltage control is the most suitable for Vento fans. The fan output can be fully controlled by changing the speed. The fan's speed is changed depending on the voltage at the motor terminals. RP Ex and RQ Ex fans can be steplessly controlled providing the change in voltage is stepless. In practice, stage voltage controllers are usually used.

### Five-stage voltage control (transformer)

The voltage control of Vento fans is the most suitable, technically as well as operationally. There is no interference, humming, squeaking or vibration of the motor; furthermore, voltage controlled motors feature lower warming.
TRN and TRR voltage controllers can control the fan output in five stages in 20 % steps, with which five pressure-airflow relation curves in the working characteristics of each fan comport.
Ex fan motors can be operated within a range from 25% to 100% of the rated voltage. Refer to table # 1 showing the correlation between the input voltage and selected stage of the controller.

TABLE 1 - INPUT VOLTAGE AND CONTROLLER'S STAGE

| MOTOR TYPE | Curve characteristics – controller stage | | | | |
|---|---|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 |
| 3 – phase | 400 V | 280 V | 230 V | 180 V | 140 V |

Ex fans are delivered only with three-phase motors. Three-phase TRN or TRRD controllers are used to control speed, respectively output. Four types of TRN controllers, TRN 2D, TRN 4D, TRN 7D and TRN 9D, are manufactured according to their current ratings. The option of remote control (by manual switch ORe5 or by an OCm controller in the control unit, respectively by automatic switching of the five stages of the OXe controller based on an external control signal of 0 - 10 V) is a significant feature of this product line. TRN controllers are equipped with integrated fan protection, which is activated by connecting to the thermistor relay. Four types of simpler TRRD controllers, TRRD 2, TRRD 4, TRRD 7 and TRRD 9, are also manufactured. These controllers cannot be remotely controlled (therefore, they must be situated within reach of the operator), and they do not contain any fan protection (this must be provided by another device). No other type of regulation is allowed!

## ACCESSORIES

RP Ex and RQ Ex fans are part of the wide range of Vento modular venting and air-handling system components. Any air-handling set-up, from simple venting to sophisticated comfortable air-conditioning, can be created by selecting suitable elements. When designing a particular air-handling device, it is necessary to keep in mind the environment for which the air-handling device is intended.
For thermal protection of fans, an approved type of thermistor relay can be ordered with the fan.

## FAN DESCRIPTION AND DESIGNATION

The type designation of RP Ex and RQ Ex explosion-prove fans in projects and orders is defined by the key shown in figure # 4.
RP 60-30/28-4D Ex specifies the type of fan, impeller and motor.

FIGURE 3 – TYPE DESIGNATION OF RP FANS

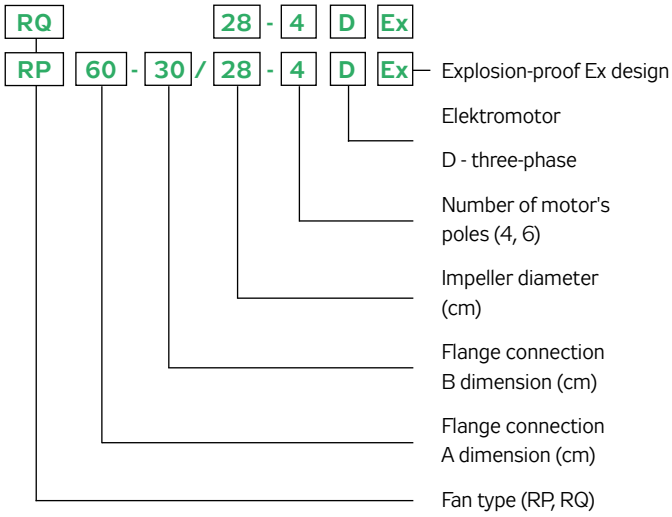


FIGURE 4 – RP EX FAN DIMENSIONAL DIAGRAM

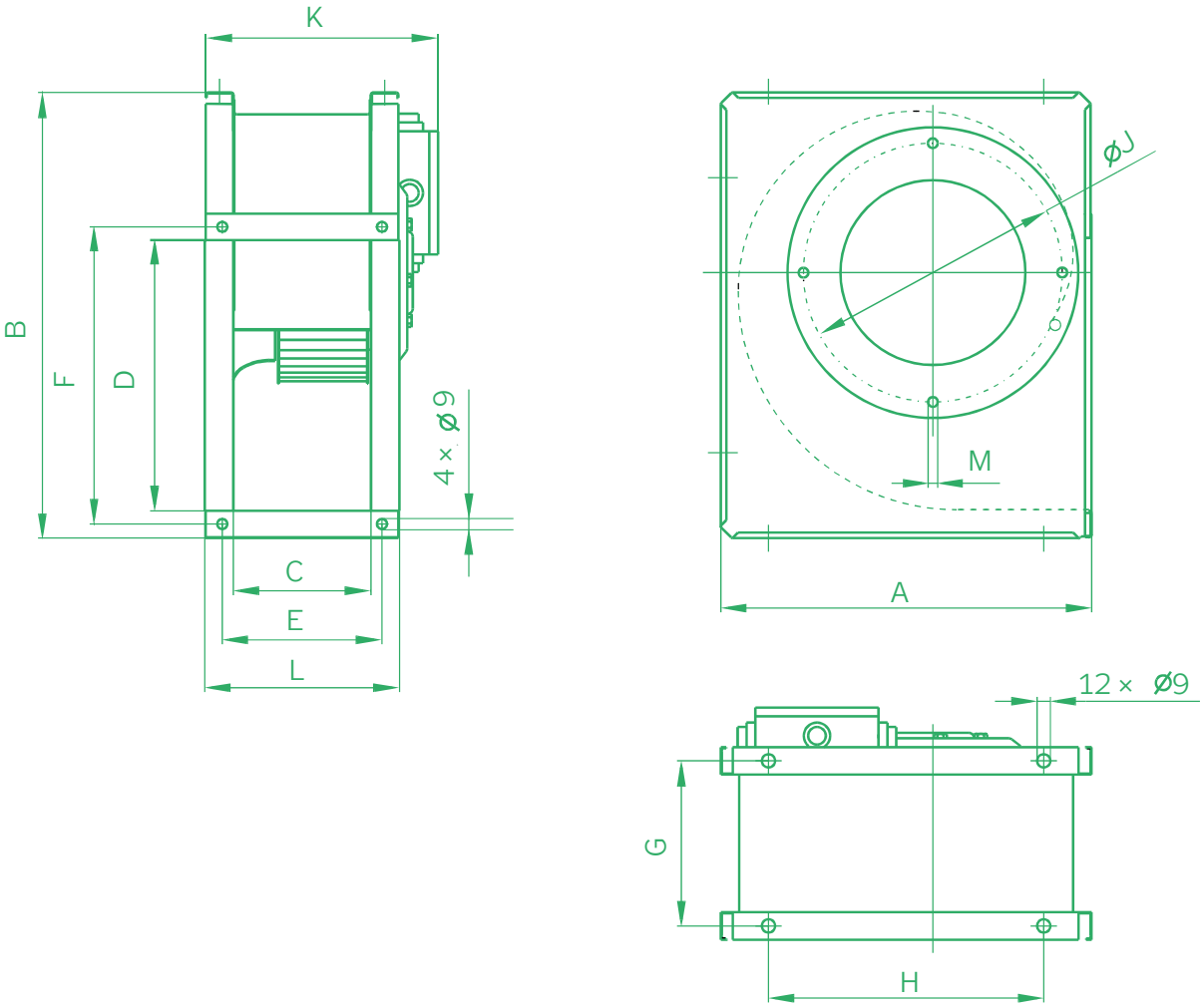
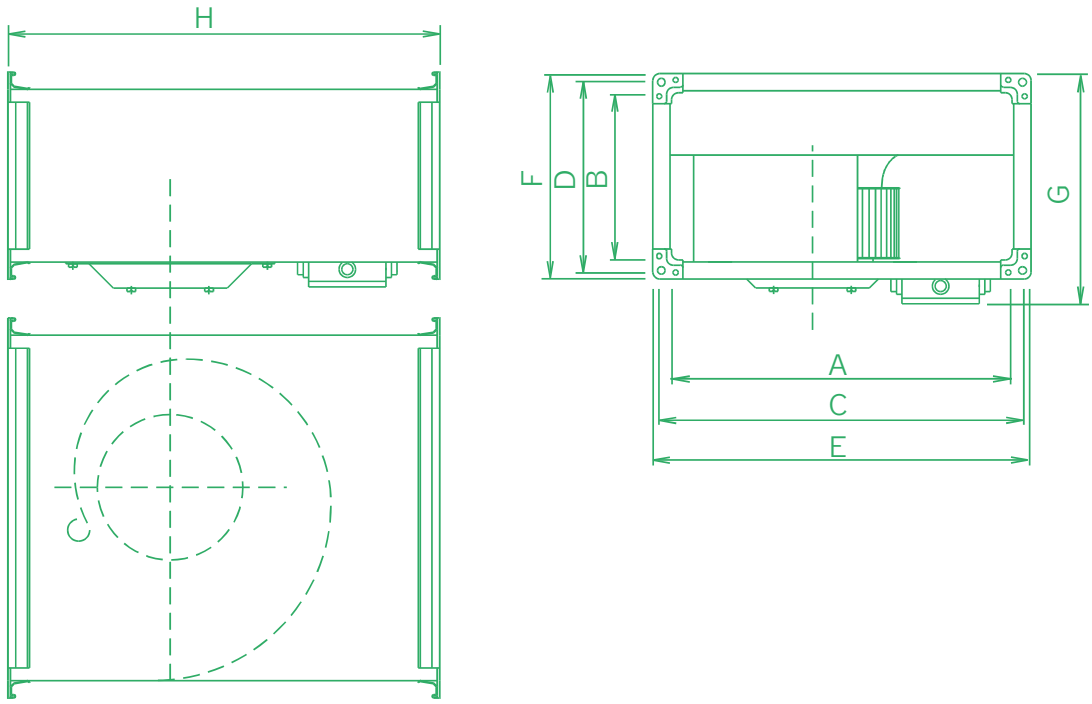


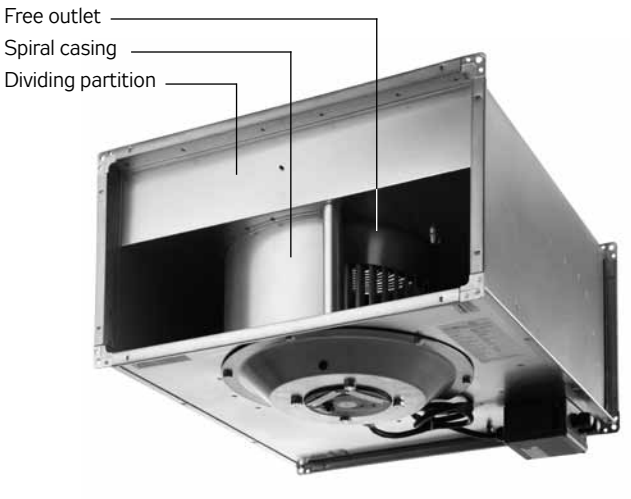

FIGURE 5 – RQ EX FAN DIMENSIONAL DIAGRAM



## DIMENSIONS, WEIGHTS AND PERFORMANCE

Figures 4, 5 and Tables 2, 3 contain data on important dimensions of fans, Table 4 contains basic parameters and nominal values of fans type RP Ex, RQ Ex..

FIGURE 6 – FAN OUTLET ARRANGEMENT




## OPERATING CHARACTERISTICS

Output characteristics of RP Ex and RQ Ex fans are measured in the most modern testing laboratory for aerodynamic and electrical measurements of fans and pressure losses of passive elements within the Czech Republic.
A table showing the most important values is situated next to each fan's characteristic in the "Data Section" of the catalogue (see table # 2). These values are also listed on the fan's rating plate. The meaning of individual lines is as follows:

1 power supply voltage
2 maximum power input of the motor at working point 5c of the fan characteristics
3 maximum current at nominal voltage at working point 5c of the fan characteristics
4 mean speed, rounded to tens, measured at working point 5b of the fan characteristics
6 maximum permissible transported air temperature
7 maximum air flow rate at working point 5c of the fan characteristics
8 maximum total pressure between points 5a - 5c of the fan characteristics
9 minimum permissible static pressure at point 5c of the fan characteristics
10 total weight of the fan
11 recommended fan output controller
12 recommended safety relay during fan operation without controller and without control unit

TABLE 2 - RP EX FAN DIMENSIONS

| Fan type | Dimensions in mm | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H |
| RP 40-20/20-4D Ex | 400 | 200 | 420 | 220 | 440 | 240 | 277 | 500 |
| RP 50-25/22-4D Ex | 500 | 250 | 520 | 270 | 540 | 290 | 349 | 530 |
| RP 60-30/28-4D Ex | 600 | 300 | 620 | 320 | 640 | 340 | 399 | 642 |
| RP 60-35/31-4D Ex | 600 | 350 | 620 | 370 | 640 | 390 | 427 | 720 |
| RP 70-40/35-6D Ex | 700 | 400 | 720 | 420 | 740 | 440 | 477 | 780 |
| RP 80-50/40-6D Ex | 800 | 500 | 820 | 520 | 840 | 540 | 577 | 885 |

TABLE 3 - RQ EX TYPES AND DIMENSIONS

| Fan type | Dimensions in mm | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | J | K | L | M |
| RQ 20-4D Ex | 335 | 405 | 125 | 250 | 145 | 270 | 150 | 250 | 235 | 203 | 173 | 4× M6 |
| RQ 22-4D Ex | 370 | 445 | 140 | 280 | 160 | 300 | 170 | 300 | 260 | 223 | 193 | 4× M6 |
| RQ 28-4D Ex | 460 | 545 | 180 | 355 | 200 | 375 | 210 | 350 | 315 | 260 | 230 | 4× M6 |

## TABLE 4 - RP EX FAN BASIC PARAMETERS AND NOMINAL VALUES

| Typ ventilátoru | $V_{max}$ | $\Delta p_{t\,max}$ | $\Delta p_{s\,min}$ | $n_{nom}$ | $U_{nom}$ | $P_{max}$ | $I_{max}$ | $t_{max}$ | Control. | m |
|---|---|---|---|---|---|---|---|---|---|---|
| | m³/h | Pa | W | min⁻¹ | V | W | A | °C | type | kg |
| RP EX – SINGLE-PHASE MOTORS | | | | | | | | | | |
| **RP 40-20/20-4D Ex** | 1306 | 260 | 0 | 1400 | 400 | 281 | 0,5 | 40 | TRN 2 | 13 |
| **RP 50-25/22-4D Ex** | 1813 | 320 | 60 | 1430 | 400 | 545 | 0,93 | 40 | TRN 2 | 18 |
| **RP 60-30/28-4D Ex** | 3195 | 480 | 0 | 1440 | 400 | 1300 | 2,32 | 40 | TRN 4 | 33 |
| **RP 60-35/31-4D Ex** | 3950 | 603 | 220 | 1440 | 400 | 2044 | 3,9 | 40 | TRN 4 | 47 |
| **RP 70-40/35-6D Ex** | 4108 | 360 | 150 | 900 | 400 | 1100 | 2 | 40 | TRN 2 | 44 |
| **RP 80-50/40-6D Ex** | 5829 | 496 | 238 | 930 | 400 | 1950 | 3,7 | 40 | TRN 4 | 68 |
| RQ EX – THREE-PHASE MOTORS | | | | | | | | | | |
| **RQ 20-4D Ex** | 1273 | 246 | 0 | 1380 | 400 | 278 | 0,48 | 40 | TRN 2 | 9 |
| **RQ 22-4D Ex** | 1836 | 320 | 8 | 1420 | 400 | 524 | 0,93 | 40 | TRN 2 | 11 |
| **RQ 28-4D Ex** | 3202 | 483 | 0 | 1440 | 400 | 1254 | 2,25 | 40 | TRN 4 | 23 |

## SYMBOLS USED IN TABLE 4:

**$V_{max}$** maximum air flow rate

**$\Delta p_{t\,max.}$** the maximum total fan pressure is the maximum of the sum of $\Delta p_s$ and $\Delta p_d$ ($\Delta p_s + \Delta p_d$) max.

**$\Delta p_{s\,min.}$** minimum allowed static pressure (pressure drop of the connected duct) indicates the lowest value to which the fan must be throttled (at the nominal voltage in 5c) to avoid from overloading and activating the protection

**n** fan speed measured at the highest efficiency working point (5b), rounded to tens

**U** nominal power supply voltage of the motor without control (all values in the table are to this voltage)

**$P_{max.}$** electric motor maximal power output

**$I_{max.}$** maximum phase current at voltage **U**

**$t_{max.}$** maximum permissible transported air temperature at air flow **$V_{max}$**

**Control.** voltage regulator type

**m** weight of the fan (±10%)

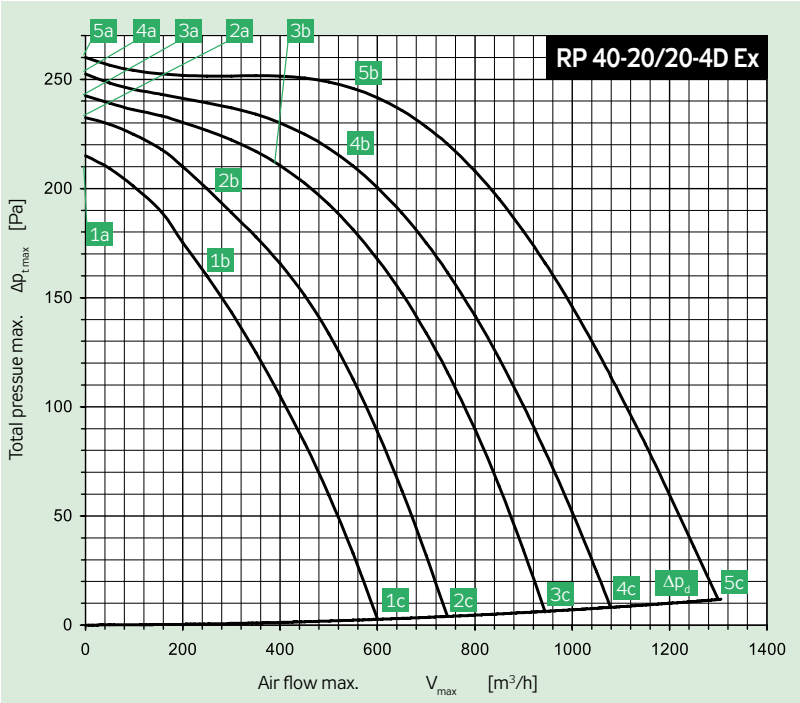
## EXAMPLE AND EXPLANATIONS OF FAN DATA

**RQ 22-4D Ex**

| | | | |
|---|---|---|---|
| Power supply | Y | 3× 400 V | 50 Hz |
| Max. electric input | $P_{max}$ | [W] | 281 |
| Max. current (5c) | $I_{max}$ | [A] | 0.50 |
| Mean speed | n | [min⁻¹] | 1400 |
| Capacitor | C | [ F] | - |
| Max. working temp. | $t_{max}$ | [°C] | 40 |
| Air flow max. | $V_{max}$ | [m³/h] | 1306 |
| Total pressure max. | $\Delta p_{t\,max}$ | [Pa] | 260 |
| Static pressure min. (5c) | $\Delta p_{s\,min}$ | [Pa] | 0 |
| Weight | m | [kg] | 13 |
| Five-stage controller | type | | TRN 2 |
| Protecting relay | type | | therm. relay |

The meaning of individual lines is as follows:

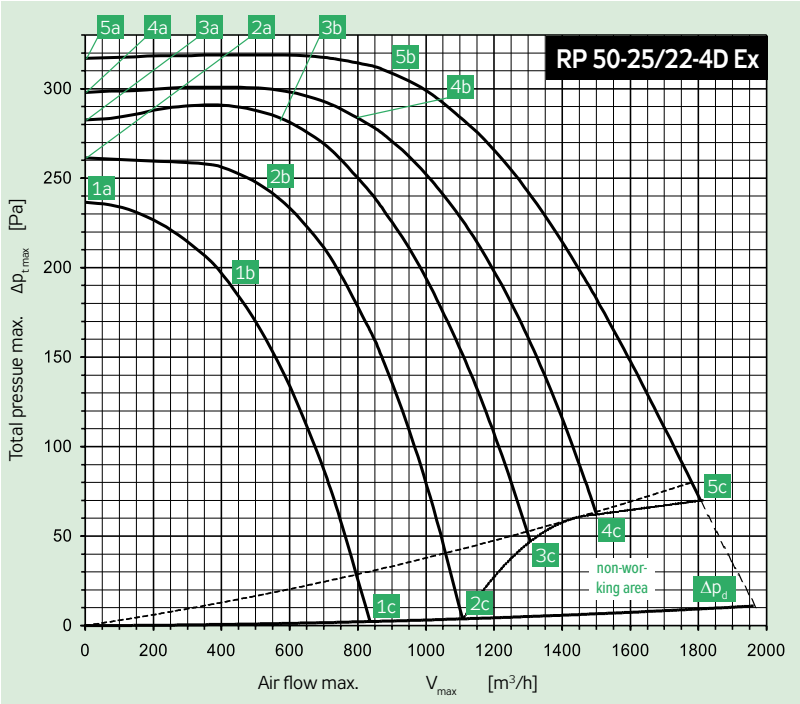
1 Value of nominal power supply voltage
2 Maximum power input of the motor at working point 5c.
3 Maximum current at nominal voltage at working point 5c.
4 Mean speed, rounded to tens, measured at working point 5b.
5 Capacitor capacity with single-phase fans.
6 Maximum permissible transported air temperature.
7 Maximum air flow at working point 5c.
8 Maximum total pressure between points 5a–5c
9 Minimum permissible static pressure at point 5c.
10 Total weight of the fan.
11 Recommended fan output controller.
12 Recommended protecting relay of the fan without controller and control unit.




| | | | |
|---|---|---|---|
| Power supply | Y | 3× 400 V | 50 Hz |
| Max. electric input | $P_{max}$ | [W] | 281 |
| Max. current (5c) | $I_{max}$ | [A] | 0.50 |
| Mean speed | n | [min⁻¹] | 1400 |
| Capacitor | C | [ F] | - |
| Max. working temp. | $t_{max}$ | [°C] | 40 |
| Air flow max. | $V_{max}$ | [m³/h] | 1306 |
| Total pressure max. | $\Delta p_{t\,max}$ | [Pa] | 260 |
| Static pressure min. (5c) | $\Delta p_{c\,min}$ | [Pa] | 0 |
| Weight | m | [kg] | 13 |
| Five-stage controller | type | | TRN 2 |
| Protecting relay | type | | ATEX therm. relay |

| | Inlet | Outlet | Surrounding |
|---|---|---|---|
| Point | 5b | 5b | 5b |
| | Total sound power level LWA [dB(A)] | | |
| $L_{WA}$ | 67 | 73 | 61 |
| | Sound power level LWAokt [dB(A)] | | |
| 125 Hz | 55 | 51 | 48 |
| 250 Hz | 58 | 59 | 52 |
| 500 Hz | 56 | 64 | 54 |
| 1000 Hz | 62 | 69 | 56 |
| 2000 Hz | 61 | 67 | 54 |
| 4000 Hz | 59 | 65 | 49 |
| 8000 Hz | 49 | 56 | 42 |

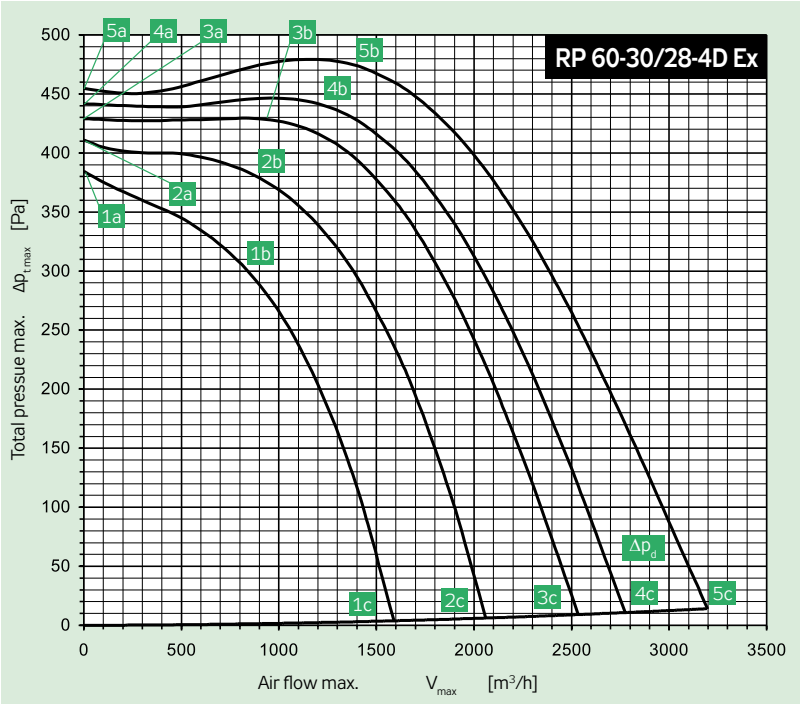
| Parameters in selected working points | 5a | 5b | 5c | 4a | 4b | 4c | 3a | 3b | 3c | 2a | 2b | 2c | 1a | 1b | 1c |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Voltage U [V] | | 400 | | | 280 | | | 230 | | | 180 | | | 140 | |
| Current I [A] | 0.32 | 0.34 | 0.50 | 0.20 | 0.27 | 0.49 | 0.17 | 0.22 | 0.47 | 0.15 | 0.19 | 0.42 | 0.14 | 0.20 | 0.36 |
| Input power P [W] | 64 | 123 | 281 | 43 | 103 | 217 | 36 | 71 | 172 | 35 | 50 | 119 | 29 | 44 | 81 |
| Speed n [min⁻¹] | 1457 | 1397 | 1222 | 1430 | 1308 | 1014 | 1409 | 1303 | 895 | 1346 | 1265 | 712 | 1285 | 1135 | 586 |
| Air flow V [m³/h] | 0 | 563 | 1306 | 0 | 556 | 1078 | 0 | 395 | 945 | 0 | 271 | 744 | 0 | 261 | 600 |
| Static pressure $\Delta p_s$ [Pa] | 260 | 242 | 0 | 252 | 209 | 0 | 242 | 210 | 0 | 232 | 195 | 0 | 215 | 156 | 0 |
| Total pressure $\Delta p_t$ [Pa] | 260 | 244 | 12 | 252 | 211 | 8 | 242 | 211 | 6 | 232 | 196 | 4 | 215 | 157 | 3 |




| | | | |
|---|---|---|---|
| Power supply | Y | 3× 400 V | 50 Hz |
| Max. electric input | $P_{max}$ | [W] | 545 |
| Max. current (5c) | $I_{max}$ | [A] | 0.93 |
| Mean speed | n | [min⁻¹] | 1430 |
| Capacitor | C | [ F] | - |
| Max. working temp. | $t_{max}$ | [°C] | 40 |
| Air flow max. | $V_{max}$ | [m³/h] | 1813 |
| Total pressure max. | $\Delta p_{t\,max}$ | [Pa] | 320 |
| Static pressure min. (5c) | $\Delta p_{c\,min}$ | [Pa] | 60 |
| Weight | m | [kg] | 18 |
| Five-stage controller | type | | TRN 2 |
| Protecting relay | type | | ATEX therm. relay |

| | Inlet | Outlet | Surrounding |
|---|---|---|---|
| Point | 5b | 5b | 5b |
| | Total sound power level LWA [dB(A)] | | |
| $L_{WA}$ | 71 | 76 | 63 |
| | Sound power level LWAokt [dB(A)] | | |
| 125 Hz | 60 | 55 | 51 |
| 250 Hz | 62 | 62 | 54 |
| 500 Hz | 60 | 67 | 56 |
| 1000 Hz | 66 | 72 | 58 |
| 2000 Hz | 65 | 70 | 56 |
| 4000 Hz | 63 | 68 | 51 |
| 8000 Hz | 51 | 57 | 41 |

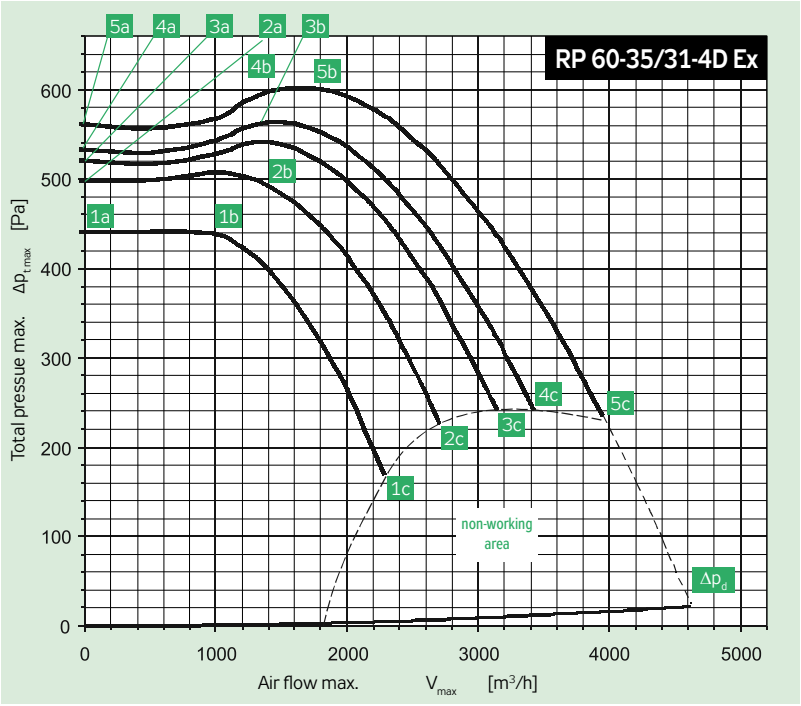
| Parameters in selected working points | 5a | 5b | 5c | 4a | 4b | 4c | 3a | 3b | 3c | 2a | 2b | 2c | 1a | 1b | 1c |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Voltage U [V] | | 400 | | | 280 | | | 230 | | | 180 | | | 140 | |
| Current I [A] | 0.59 | 0.62 | 0.93 | 0.37 | 0.48 | 0.95 | 0.37 | 0.44 | 0.97 | 0.31 | 0.45 | 0.99 | 0.35 | 0.48 | 0.83 |
| Input power P [W] | 164 | 248 | 545 | 105 | 180 | 414 | 113 | 143 | 341 | 76 | 124 | 264 | 75 | 104 | 168 |
| Speed n [min⁻¹] | 1458 | 1425 | 1300 | 1432 | 1371 | 1120 | 1384 | 1348 | 971 | 1374 | 1274 | 733 | 1271 | 1136 | 567 |
| Air flow V [m³/h] | 0 | 882 | 1813 | 0 | 756 | 1497 | 0 | 587 | 1295 | 0 | 508 | 1113 | 0 | 423 | 834 |
| Static pressure $\Delta p_s$ [Pa] | 317 | 307 | 60 | 298 | 288 | 55 | 282 | 275 | 42 | 261 | 245 | 0 | 237 | 189 | 0 |
| Total pressure $\Delta p_t$ [Pa] | 317 | 309 | 70 | 298 | 289 | 62 | 282 | 276 | 47 | 261 | 246 | 4 | 237 | 190 | 2 |




| | | | |
|---|---|---|---|
| Power supply | Y | 3× 400 V | 50 Hz |
| Max. electric input | $P_{max}$ | [W] | 1300 |
| Max. current (5c) | $I_{max}$ | [A] | 2.32 |
| Mean speed | n | [min⁻¹] | 1440 |
| Capacitor | C | [ F] | - |
| Max. working temp. | $t_{max}$ | [°C] | 40 |
| Air flow max. | $V_{max}$ | [m³/h] | 3195 |
| Total pressure max. | $\Delta p_{t\,max}$ | [Pa] | 480 |
| Static pressure min. (5c) | $\Delta p_{c\,min}$ | [Pa] | 0 |
| Weight | m | [kg] | 33 |
| Five-stage controller | type | | TRN 4 |
| Protecting relay | type | | ATEX therm. relay |

| | Inlet | Outlet | Surrounding |
|---|---|---|---|
| Point | 5b | 5b | 5b |
| | Total sound power level LWA [dB(A)] | | |
| $L_{WA}$ | 77 | 83 | 69 |
| | Sound power level LWAokt [dB(A)] | | |
| 125 Hz | 68 | 66 | 61 |
| 250 Hz | 67 | 67 | 59 |
| 500 Hz | 65 | 75 | 63 |
| 1000 Hz | 72 | 79 | 64 |
| 2000 Hz | 71 | 77 | 61 |
| 4000 Hz | 69 | 75 | 56 |
| 8000 Hz | 60 | 66 | 46 |

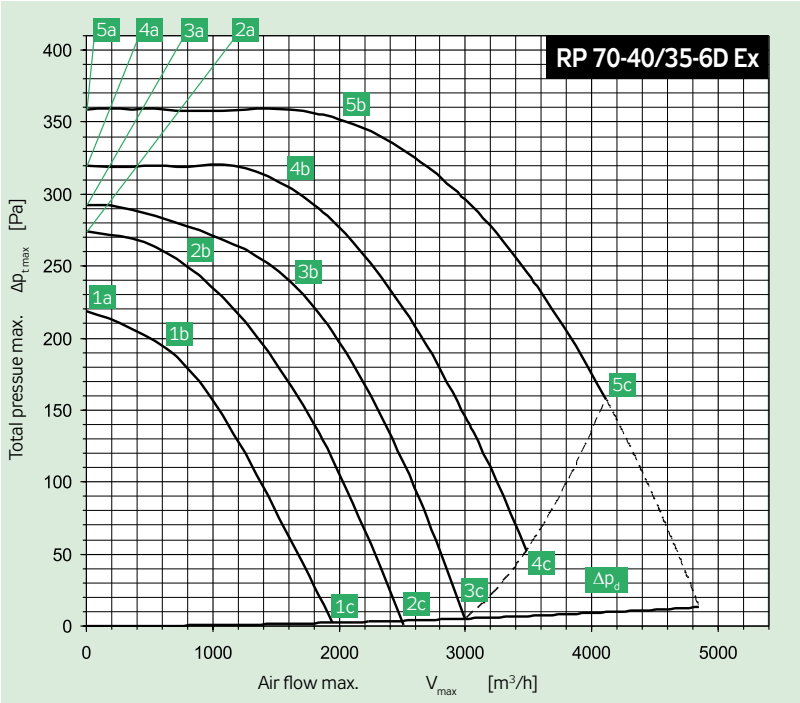
| Parameters in selected working points | 5a | 5b | 5c | 4a | 4b | 4c | 3a | 3b | 3c | 2a | 2b | 2c | 1a | 1b | 1c |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Voltage U [V] | | 400 | | | 280 | | | 230 | | | 180 | | | 140 | |
| Current I [A] | 1.29 | 1.39 | 2.32 | 0.77 | 1.11 | 2.49 | 0.68 | 0.98 | 2.50 | 0.67 | 1.06 | 2.40 | 0.72 | 1.18 | 2.08 |
| Input power P [W] | 248 | 502 | 1300 | 192 | 418 | 1037 | 175 | 323 | 882 | 170 | 293 | 634 | 150 | 252 | 412 |
| Speed n [min⁻¹] | 1476 | 1440 | 1326 | 1453 | 1385 | 1152 | 1437 | 1376 | 1056 | 1395 | 1297 | 854 | 1326 | 1167 | 673 |
| Air flow V [m³/h] | 0 | 1400 | 3195 | 0 | 1233 | 2771 | 0 | 964 | 2528 | 0 | 907 | 2068 | 0 | 816 | 1600 |
| Static pressure $\Delta p_s$ [Pa] | 455 | 474 | 0 | 442 | 441 | 0 | 429 | 425 | 0 | 411 | 374 | 0 | 385 | 304 | 0 |
| Total pressure $\Delta p_t$ [Pa] | 455 | 476 | 14 | 442 | 443 | 11 | 429 | 427 | 9 | 411 | 376 | 6 | 385 | 305 | 4 |




| | | | |
|---|---|---|---|
| Power supply | Y | 3 × 400 V | 50 Hz |
| Max. electric input | $P_{max}$ | [W] | 2044 |
| Max. current (5c) | $I_{max}$ | [A] | 3.90 |
| Mean speed | n | [min⁻¹] | 1440 |
| Capacitor | C | [ F] | - |
| Max. working temp. | $t_{max}$ | [°C] | 40 |
| Air flow max. | $V_{max}$ | [m³/h] | 3950 |
| Total pressure max. | $\Delta p_{t\,max}$ | [Pa] | 603 |
| Static pressure min. (5c) | $\Delta p_{c\,min}$ | [Pa] | 220 |
| Weight | m | [kg] | 47 |
| Five-stage controller | type | | TRN 4 |
| Protecting relay | type | | ATEX therm. relay |

| | Inlet | Outlet | Surrounding |
|---|---|---|---|
| Point | 5b | 5b | 5b |
| | Total sound power level LWA [dB(A)] | | |
| $L_{WA}$ | 80 | 86 | 71 |
| | Sound power level LWAokt [dB(A)] | | |
| 125 Hz | 69 | 67 | 62 |
| 250 Hz | 69 | 71 | 61 |
| 500 Hz | 69 | 78 | 66 |
| 1000 Hz | 75 | 82 | 65 |
| 2000 Hz | 74 | 80 | 63 |
| 4000 Hz | 72 | 78 | 59 |
| 8000 Hz | 67 | 69 | 49 |

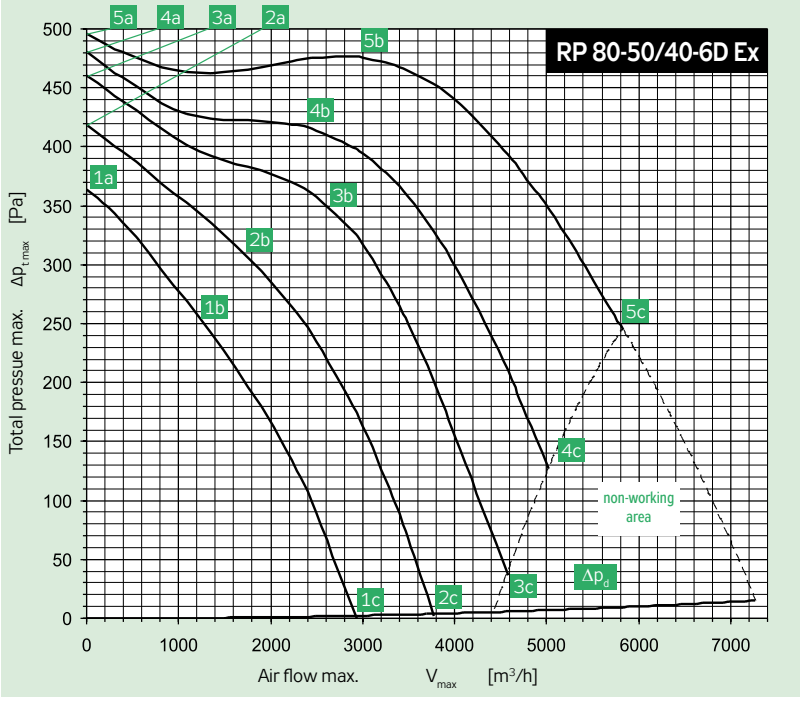
| Parameters in selected working points | 5a | 5b | 5c | 4a | 4b | 4c | 3a | 3b | 3c | 2a | 2b | 2c | 1a | 1b | 1c |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Voltage U [V] | | 400 | | | 280 | | | 230 | | | 180 | | | 140 | |
| Current I [A] | 2.64 | 2.81 | 3.90 | 2.08 | 2.10 | 3.90 | 1.73 | 1.94 | 3.90 | 1.71 | 2.21 | 3.90 | 1.86 | 2.13 | 3.90 |
| Input power P [W] | 376 | 682 | 2044 | 419 | 478 | 1558 | 499 | 601 | 1390 | 444 | 610 | 1089 | 413 | 476 | 858 |
| Speed n [min⁻¹] | 1453 | 1437 | 1375 | 1422 | 1413 | 1271 | 1403 | 1383 | 1207 | 1360 | 1304 | 1096 | 1288 | 1248 | 945 |
| Air flow V [m³/h] | 0 | 1765 | 3950 | 0 | 1281 | 3445 | 0 | 1344 | 3099 | 0 | 1436 | 2707 | 0 | 1069 | 2282 |
| Static pressure $\Delta p_s$ [Pa] | 561 | 603 | 220 | 532 | 544 | 222 | 519 | 534 | 241 | 498 | 486 | 216 | 439 | 433 | 164 |
| Total pressure $\Delta p_t$ [Pa] | 562 | 606 | 236 | 533 | 546 | 234 | 520 | 535 | 251 | 500 | 489 | 223 | 440 | 434 | 169 |




| | | | |
|---|---|---|---|
| Power supply | Y | 3× 400 V | 50 Hz |
| Max. electric input | $P_{max}$ | [W] | 1100 |
| Max. current (5c) | $I_{max}$ | [A] | 2.00 |
| Mean speed | n | [min⁻¹] | 900 |
| Capacitor | C | [ F] | - |
| Max. working temp. | $t_{max}$ | [°C] | 40 |
| Air flow max. | $V_{max}$ | [m³/h] | 4108 |
| Total pressure max. | $\Delta p_{t\,max}$ | [Pa] | 360 |
| Static pressure min. (5c) | $\Delta p_{c\,min}$ | [Pa] | 150 |
| Weight | m | [kg] | 44 |
| Five-stage controller | type | | TRN 2 |
| Protecting relay | type | | ATEX therm. relay |

| | Inlet | Outlet | Surrounding |
|---|---|---|---|
| Point | 5b | 5b | 5b |
| | Total sound power level LWA [dB(A)] | | |
| $L_{WA}$ | 75 | 81 | 66 |
| | Sound power level LWAokt [dB(A)] | | |
| 125 Hz | 65 | 66 | 56 |
| 250 Hz | 63 | 66 | 56 |
| 500 Hz | 66 | 75 | 60 |
| 1000 Hz | 70 | 76 | 62 |
| 2000 Hz | 68 | 75 | 56 |
| 4000 Hz | 67 | 73 | 55 |
| 8000 Hz | 56 | 63 | 40 |

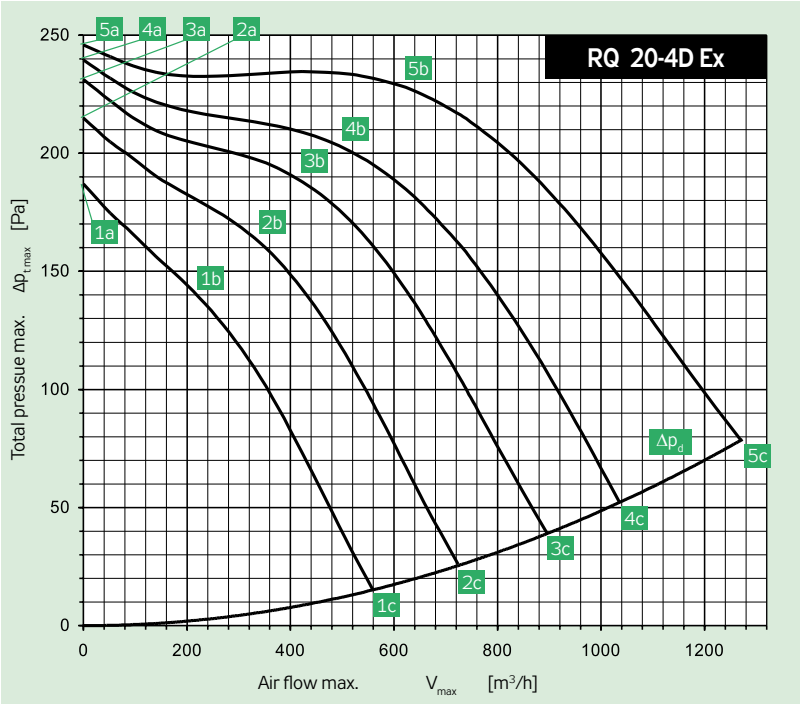
| Parameters in selected working points | 5a | 5b | 5c | 4a | 4b | 4c | 3a | 3b | 3c | 2a | 2b | 2c | 1a | 1b | 1c |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Voltage U [V] | | 400 | | | 280 | | | 230 | | | 180 | | | 140 | |
| Current I [A] | 1.09 | 1.27 | 2.00 | 0.83 | 1.03 | 2.00 | 1.03 | 1.22 | 1.90 | 0.75 | 0.75 | 1.55 | 0.75 | 0.75 | 1.27 |
| Input power P [W] | 316 | 534 | 1100 | 246 | 374 | 819 | 382 | 422 | 644 | 188 | 188 | 393 | 154 | 154 | 246 |
| Speed n [min⁻¹] | 948 | 903 | 763 | 905 | 846 | 563 | 819 | 737 | 436 | 804 | 804 | 359 | 700 | 700 | 278 |
| Air flow V [m³/h] | 0 | 2035 | 4108 | 0 | 1579 | 3484 | 0 | 1677 | 2995 | 0 | 798 | 2510 | 0 | 706 | 1943 |
| Static pressure $\Delta p_s$ [Pa] | 360 | 351 | 150 | 321 | 305 | 43 | 292 | 232 | 0 | 274 | 251 | 0 | 219 | 187 | 0 |
| Total pressure $\Delta p_t$ [Pa] | 360 | 354 | 160 | 321 | 306 | 50 | 293 | 234 | 5 | 274 | 251 | 4 | 219 | 187 | 2 |




| | | | |
|---|---|---|---|
| Power supply | Y | 3× 400 V | 50 Hz |
| Max. electric input | $P_{max}$ | [W] | 1950 |
| Max. current (5c) | $I_{max}$ | [A] | 3.70 |
| Mean speed | n | [min⁻¹] | 930 |
| Capacitor | C | [ F] | - |
| Max. working temp. | $t_{max}$ | [°C] | 40 |
| Air flow max. | $V_{max}$ | [m³/h] | 5829 |
| Total pressure max. | $\Delta p_{t\,max}$ | [Pa] | 496 |
| Static pressure min. (5c) | $\Delta p_{c\,min}$ | [Pa] | 238 |
| Weight | m | [kg] | 68 |
| Five-stage controller | type | | TRN 4 |
| Protecting relay | type | | ATEX therm. relay |

| | Inlet | Outlet | Surrounding |
|---|---|---|---|
| Point | 5b | 5b | 5b |
| | Total sound power level LWA [dB(A)] | | |
| $L_{WA}$ | 75 | 80 | 67 |
| | Sound power level LWAokt [dB(A)] | | |
| 125 Hz | 69 | 65 | 60 |
| 250 Hz | 64 | 70 | 59 |
| 500 Hz | 67 | 74 | 62 |
| 1000 Hz | 68 | 74 | 60 |
| 2000 Hz | 68 | 74 | 57 |
| 4000 Hz | 64 | 71 | 52 |
| 8000 Hz | 54 | 61 | 40 |

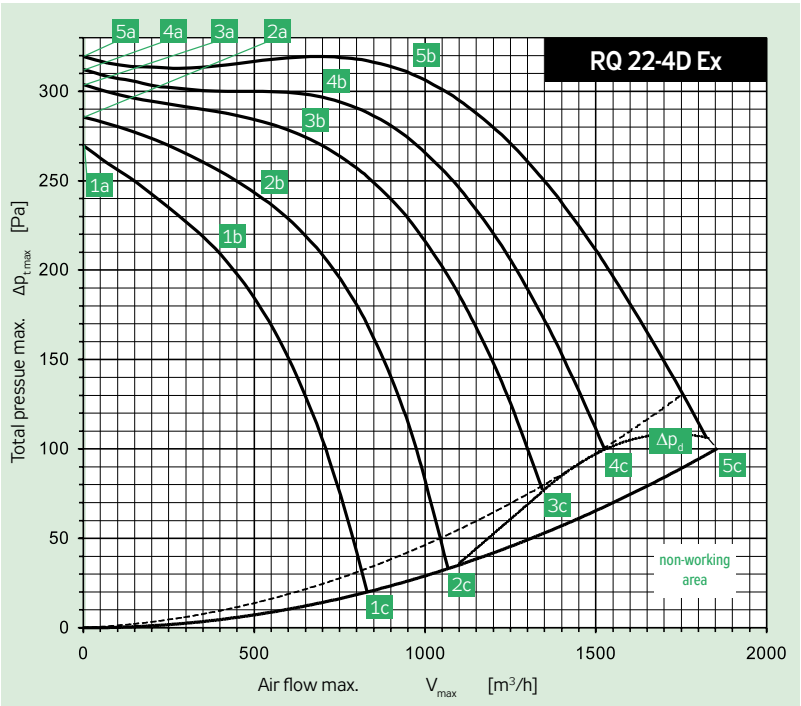
| Parameters in selected working points | 5a | 5b | 5c | 4a | 4b | 4c | 3a | 3b | 3c | 2a | 2b | 2c | 1a | 1b | 1c |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Voltage U [V] | | 400 | | | 280 | | | 230 | | | 180 | | | 140 | |
| Current I [A] | 2.11 | 2.45 | 3.70 | 1.32 | 1.89 | 3.70 | 1.19 | 2.12 | 3.70 | 1.17 | 1.83 | 3.27 | 1.19 | 1.62 | 2.66 |
| Input power P [W] | 419 | 951 | 1950 | 324 | 678 | 1483 | 300 | 692 | 1204 | 279 | 474 | 836 | 239 | 331 | 508 |
| Speed n [min⁻¹] | 980 | 934 | 835 | 951 | 883 | 659 | 930 | 801 | 518 | 888 | 769 | 394 | 821 | 711 | 308 |
| Air flow V [m³/h] | 0 | 3006 | 5829 | 0 | 2403 | 5020 | 0 | 2648 | 4577 | 0 | 1777 | 3775 | 0 | 1249 | 2932 |
| Static pressure $\Delta p_s$ [Pa] | 496 | 475 | 238 | 482 | 416 | 124 | 461 | 350 | 35 | 418 | 304 | 0 | 364 | 250 | 0 |
| Total pressure $\Delta p_t$ [Pa] | 496 | 477 | 248 | 482 | 417 | 131 | 461 | 352 | 41 | 418 | 305 | 4 | 364 | 251 | 2 |




| | | | |
|---|---|---|---|
| Power supply | Y | 3× 400 V | 50 Hz |
| Max. electric input | $P_{max}$ | [W] | 278 |
| Max. current (5c) | $I_{max}$ | [A] | 0.48 |
| Mean speed | n | [min⁻¹] | 1380 |
| Capacitor | C | [ F] | - |
| Max. working temp. | $t_{max}$ | [°C] | 40 |
| Air flow max. | $V_{max}$ | [m³/h] | 1273 |
| Total pressure max. | $\Delta p_{t\,max}$ | [Pa] | 246 |
| Static pressure min. (5c) | $\Delta p_{c\,min}$ | [Pa] | 0 |
| Weight | m | [kg] | 9 |
| Five-stage controller | type | | TRN 2 |
| Protecting relay | type | | ATEX therm. relay |

| | Inlet | Outlet | Surrounding |
|---|---|---|---|
| Point | 5b | 5b | 5b |
| | Total sound power level LWA [dB(A)] | | |
| $L_{WA}$ | 70 | 71 | 61 |
| | Sound power level LWAokt [dB(A)] | | |
| 125 Hz | 58 | 52 | 47 |
| 250 Hz | 62 | 57 | 51 |
| 500 Hz | 57 | 59 | 52 |
| 1000 Hz | 57 | 60 | 51 |
| 2000 Hz | 57 | 59 | 45 |
| 4000 Hz | 54 | 57 | 42 |
| 8000 Hz | 44 | 48 | 41 |

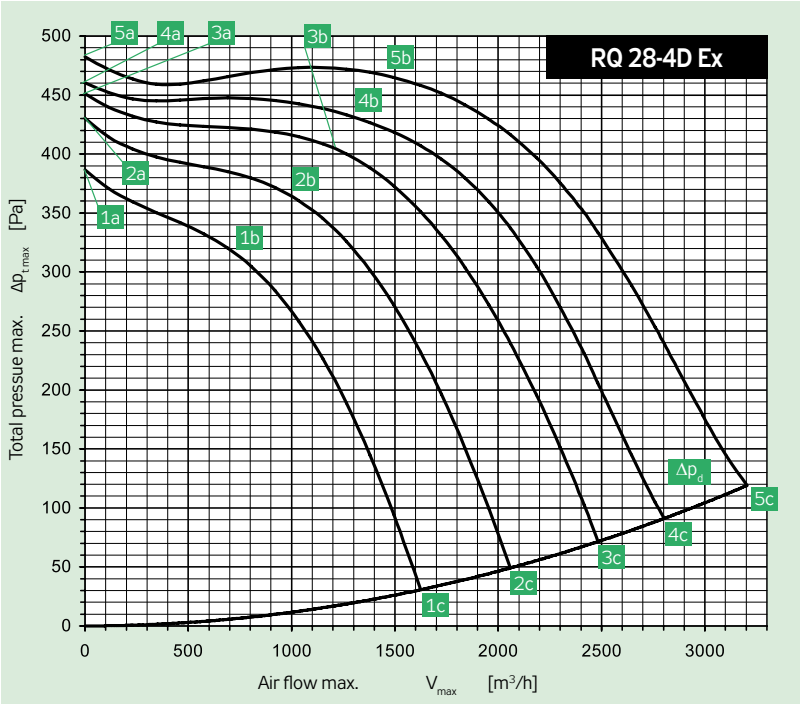
| Parameters in selected working points | 5a | 5b | 5c | 4a | 4b | 4c | 3a | 3b | 3c | 2a | 2b | 2c | 1a | 1b | 1c |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Voltage U [V] | | 400 | | | 280 | | | 230 | | | 180 | | | 140 | |
| Current I [A] | 0.31 | 0.34 | 0.48 | 0.19 | 0.26 | 0.47 | 0.16 | 0.24 | 0.45 | 0.15 | 0.23 | 0.41 | 0.15 | 0.20 | 0.35 |
| Input power P [W] | 68 | 143 | 278 | 46 | 98 | 204 | 40 | 81 | 162 | 35 | 63 | 115 | 30 | 43 | 76 |
| Speed n [min⁻¹] | 1457 | 1384 | 1224 | 1427 | 1313 | 1013 | 1399 | 1261 | 873 | 1346 | 1183 | 721 | 1256 | 1119 | 567 |
| Air flow V [m³/h] | 0 | 627 | 1273 | 0 | 498 | 1039 | 0 | 425 | 895 | 0 | 340 | 726 | 0 | 217 | 561 |
| Static pressure $\Delta p_s$ [Pa] | 246 | 208 | 0 | 240 | 193 | 0 | 231 | 178 | 0 | 215 | 154 | 0 | 187 | 138 | 0 |
| Total pressure $\Delta p_t$ [Pa] | 246 | 227 | 79 | 240 | 205 | 52 | 231 | 187 | 39 | 215 | 159 | 26 | 187 | 140 | 15 |




| | | | |
|---|---|---|---|
| Power supply | Y | 3 × 400 V | 50 Hz |
| Max. electric input | $P_{max}$ | [W] | 524 |
| Max. current (5c) | $I_{max}$ | [A] | 0.93 |
| Mean speed | n | [min⁻¹] | 1420 |
| Capacitor | C | [ F] | - |
| Max. working temp. | $t_{max}$ | [°C] | 40 |
| Air flow max. | $V_{max}$ | [m³/h] | 1836 |
| Total pressure max. | $\Delta p_{t\,max}$ | [Pa] | 320 |
| Static pressure min. (5c) | $\Delta p_{c\,min}$ | [Pa] | 8 |
| Weight | m | [kg] | 14 |
| Five-stage controller | type | | TRN 2 |
| Protecting relay | type | | term. relé ATEX |

| | Inlet | Outlet | Surrounding |
|---|---|---|---|
| Point | 5b | 5b | 5b |
| | Total sound power level LWA [dB(A)] | | |
| $L_{WA}$ | 76 | 77 | 66 |
| | Sound power level LWAokt [dB(A)] | | |
| 125 Hz | 57 | 53 | 48 |
| 250 Hz | 66 | 66 | 59 |
| 500 Hz | 67 | 70 | 60 |
| 1000 Hz | 70 | 72 | 61 |
| 2000 Hz | 71 | 70 | 57 |
| 4000 Hz | 68 | 69 | 54 |
| 8000 Hz | 60 | 61 | 43 |

| Parameters in selected working points | 5a | 5b | 5c | 4a | 4b | 4c | 3a | 3b | 3c | 2a | 2b | 2c | 1a | 1b | 1c |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Voltage U [V] | | 400 | | | 280 | | | 230 | | | 180 | | | 140 | |
| Current I [A] | 0.57 | 0.61 | 0.93 | 0.33 | 0.45 | 0.95 | 0.29 | 0.45 | 0.97 | 0.27 | 0.45 | 0.94 | 0.27 | 0.44 | 0.80 |
| Input power P [W] | 122 | 253 | 524 | 83 | 169 | 407 | 73 | 149 | 341 | 66 | 123 | 249 | 58 | 96 | 161 |
| Speed n [min⁻¹] | 1474 | 1420 | 1308 | 1449 | 1386 | 1145 | 1431 | 1337 | 1014 | 1388 | 1257 | 753 | 1332 | 1178 | 596 |
| Air flow V [m³/h] | 0 | 962 | 1836 | 0 | 708 | 1531 | 0 | 645 | 1337 | 0 | 534 | 1072 | 0 | 406 | 831 |
| Static pressure $\Delta p_s$ [Pa] | 320 | 282 | 8 | 312 | 283 | 32 | 304 | 266 | 23 | 286 | 232 | 0 | 270 | 202 | 0 |
| Total pressure $\Delta p_t$ [Pa] | 320 | 309 | 106 | 312 | 298 | 100 | 304 | 278 | 75 | 286 | 241 | 33 | 270 | 206 | 20 |




| | | | |
|---|---|---|---|
| Power supply | Y | 3× 400 V | 50 Hz |
| Max. electric input | $P_{max}$ | [W] | 1245 |
| Max. current (5c) | $I_{max}$ | [A] | 2.25 |
| Mean speed | n | [min$^{-1}$] | 1440 |
| Capacitor | C | [ F] | - |
| Max. working temp. | $t_{max}$ | [°C] | 40 |
| Air flow max. | $V_{max}$ | [m$^3$/h] | 3202 |
| Total pressure max. | $\Delta p_{t\,max}$ | [Pa] | 483 |
| Static pressure min. (5c) | $\Delta p_{c\,min}$ | [Pa] | 0 |
| Weight | m | [kg] | 23 |
| Five-stage controller | type | | TRN 4 |
| Protecting relay | type | | ATEX therm. relay |

| | Inlet | Outlet | Surrounding |
|---|---|---|---|
| Point | 5b | 5b | 5b |
| Total sound power level LWA [dB(A)] | | | |
| $L_{WA}$ | 80 | 83 | 71 |
| Sound power level LWAokt [dB(A)] | | | |
| 125 Hz | 64 | 58 | 59 |
| 250 Hz | 68 | 70 | 63 |
| 500 Hz | 70 | 75 | 63 |
| 1000 Hz | 75 | 78 | 66 |
| 2000 Hz | 75 | 77 | 64 |
| 4000 Hz | 71 | 75 | 60 |
| 8000 Hz | 62 | 68 | 46 |

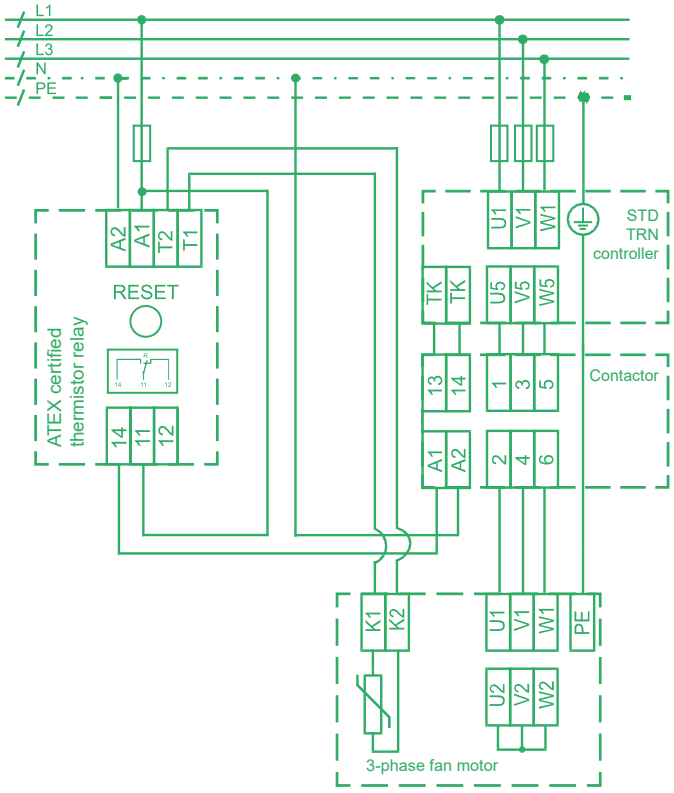
| Parameters in selected working points | 5a | 5b | 5c | 4a | 4b | 4c | 3a | 3b | 3c | 2a | 2b | 2c | 1a | 1b | 1c |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Voltage U [V] | | 400 | | | 280 | | | 230 | | | 180 | | | 140 | |
| Current I [A] | 1.19 | 1.37 | 2.25 | 0.77 | 1.12 | 2.41 | 0.68 | 1.16 | 2.43 | 0.69 | 1.16 | 2.32 | 0.73 | 1.12 | 2.07 |
| Input power P [W] | 235 | 530 | 1245 | 201 | 432 | 1027 | 183 | 394 | 829 | 174 | 322 | 611 | 157 | 245 | 411 |
| Speed n [min$^{-1}$] | 1476 | 1436 | 1328 | 1451 | 1385 | 1167 | 1430 | 1333 | 1033 | 1391 | 1269 | 861 | 1328 | 1189 | 689 |
| Air flow V [m$^3$/h] | 0 | 1485 | 3202 | 0 | 1289 | 2801 | 0 | 1211 | 2494 | 0 | 999 | 2063 | 0 | 742 | 1624 |
| Static pressure $\Delta p_s$ [Pa] | 483 | 440 | 0 | 461 | 415 | 0 | 451 | 384 | 0 | 430 | 340 | 0 | 387 | 305 | 0 |
| Total pressure $\Delta p_t$ [Pa] | 483 | 465 | 119 | 461 | 434 | 91 | 451 | 401 | 72 | 430 | 363 | 49 | 387 | 311 | 31 |

## THERMISTOR PROTECTION OF EX FANS

The temperature inside the motors of all RP Ex and RQ Ex fans is permanently read by temperature sensitive sensors (PTC thermistors) situated in the motor winding. The thermistors must be connected to the ATEX certified thermistor relay, that disconnects the contactor switching circuit.

At a maximum, two fans can be connected to the thermistor relay, and they must be connected in series. It is necessary to be aware of the fact that this type of combined connection will cause both fans to be stopped even if only one of the motors fails.

FIGURE 8 – EXAMPLE OF THE THERMISTOR RELAY'S WIRING

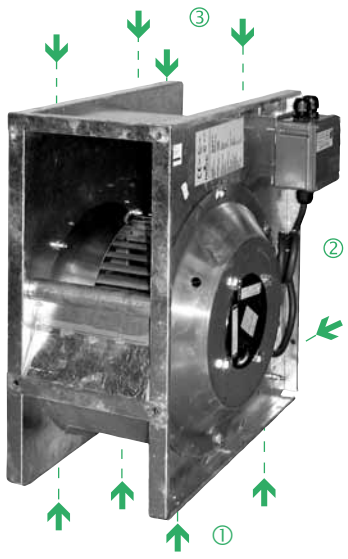



During failure (off) state, terminals 11 and 12 are interconnected.
During failure-free (on) state, terminals 11 and 14 are interconnected.

## INSTALLATION

- RP Ex and RQ Ex fans, including other Vento elements and equipment, are not intended, due to their concept, for direct sale to end customers. Each installation must be performed in accordance with a professional project created by a qualified air-handling designer who is responsible for proper selection of the fan. The installation and commissioning may be performed only by a specialized assembling company licensed in accordance with generally valid regulations.
- The fan must be checked carefully prior its installation. In particular, it is necessary to check the parts and cable insulation for damage, and to see whether the rotating parts can rotate freely.. The minimum clearance between rotating and fixed parts is 1% of the impeller diameter.
- We recommend installing elastic connections in the appropriate design in front of and behind the fan.
- To protect the fan and duct against dirt and dust deposits, it is advisable to install an air filter in front of the fan in the appropriate design Ex.
- If the fan is installed in such a way that a person could come into contact with the impeller or there is a risk of objects entering the impeller space, a cover grille with a min. IP 20 protection.
- The cover grille must be conductively connected to the fan housing.
- On the suction side, the fan is equipped with a cover grille located in front of the suction mouth (diffuser)..
- We recommend adding a 1.5 m long piece of straight duct to the fan's outlet to get optimal pressure conditions. In cramped spaces, it is advisable to consider the necessity to situate directly behind the fan's outlet the duct adapting piece, attenuator, heat exchanger, heater, etc. Figure 11 shows the fan's outlet design and arrangement. From this figure, it is obvious that from the entire cross-section (e.g. 500 x 250), only about 1/4 of the outlet cross-section is free. This means that the airflow velocities close behind the fan can be as much as four times higher than, for example, in the inlet. Therefore, the greater the distance of the attenuators (or other resistant elements) from the outlet, the better.

FIGURE 9 – ANCHOR HOLES FOR RQ EX FANS




On the inlet side, an elastic connection will be sufficient as a distance piece in most cases.

- The fan must always be mounted on separate hinges or foundation so as not to load the elastic connections or the connected piping.
- RQ Ex fans are equipped on three sides with anchor holes, which are fixed to the base in one of three positions ① ② ③ see figure 9.

## WIRING

- he wiring can be performed only by a qualified worker licensed in accordance with national regulations.
- The fans are equipped with a plastic terminal box – Ex II 2G EEx e T6/T5. The terminal box is fixed with screws to the fan casing, and equipped with labelled screw terminals (see figure # 10).
- To connect the fan motor to the supply, use only cables approved for this purpose. .
- The fan must be properly grounded.
- The fan installation must comply with the ČSN EN 60079-14 Standard for Electrical Appliances Intended for Explosive Gaseous Atmosphere, Art. 14 Electrical Installations in Dangerous Areas. When designing the installation, take into account the requirements arising from the Fire Safety Solution report and the protocol for determining external influences.
- See Fig. 11 for wiring diagram.

FIGURE 10 – ALL-PLASTIC TERMINAL BOX ON THE CASING

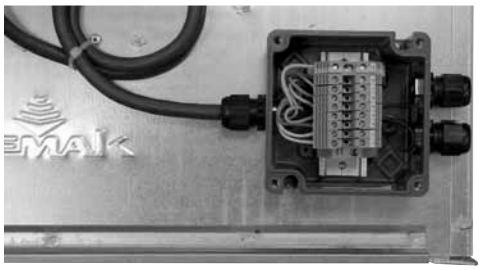
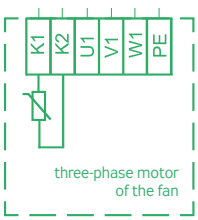


FIGURE 11 – WIRING DIAGRAM




**K1, K2**
– motor thermistor terminals
**U1, V1, W1**
– three-phase motor power supply terminals - 3x 400V/50Hz
**PE**
– protective conductor terminal

**Attention!**
**Electric motors must not be connected in a delta.**
**They are always connected only to the star.**

The wiring diagrams with front-end elements (protective relays, controllers, control units) are included in the installation manual, respectively in the AeroCAD project.
On the following pages you will find some basic examples of the fan connection to output controllers and control units. AeroCAD software is available for precise design of the wiring.

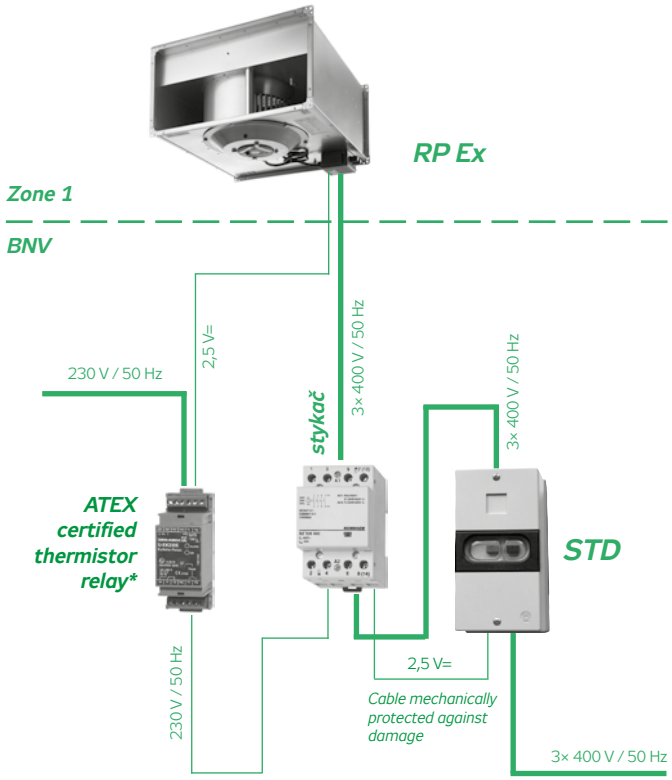
## EXAMPLE A
### FAN EQUIPPED WITH THERMAL PROTECTION, WITHOUT OUTPUT CONTROL

An RP (RQ) Ex fan connection in a simple venting system without output control is shown in figures # 12.
This type of connection ensures full thermal protection of the fan using thermistors, ATEX certified thermistor relay and protecting relay STD. The connection shown in the figures enables manual turning of the fan on/off using the buttons on the protecting relay.

After pressing the button marked "I" on the STD protecting relay, the fan starts and the button will stay in the depressed position, signalling the fan's operation. The fan can be stopped by pressing the button marked "0".
If the motor is overheated above 130ºC due to overloading, the impedance of the K1 and K2 thermistors in the motor winding will be increased several times.
The ATEX certified thermistor relay will detect the increased impedance and open contacts 11 and 14. Upon opening contacts 11 and 14, the STD protecting relay circuit TK, TK will be disconnected. As a reaction to this state, the STD relay will disconnect the power supply to the overheated motor. After cooling down, the motor is not automatically started. The failure must be confirmed (unblocked) by the operator by pressing the red "I" button.

** ATEX certified thermistor relay, eg type U-EK230E manufactured by Ziehl-Abegg. The suitability of using another type must be consulted with the manufacturer.*

FIGURE 12 – FAN CONNECTION

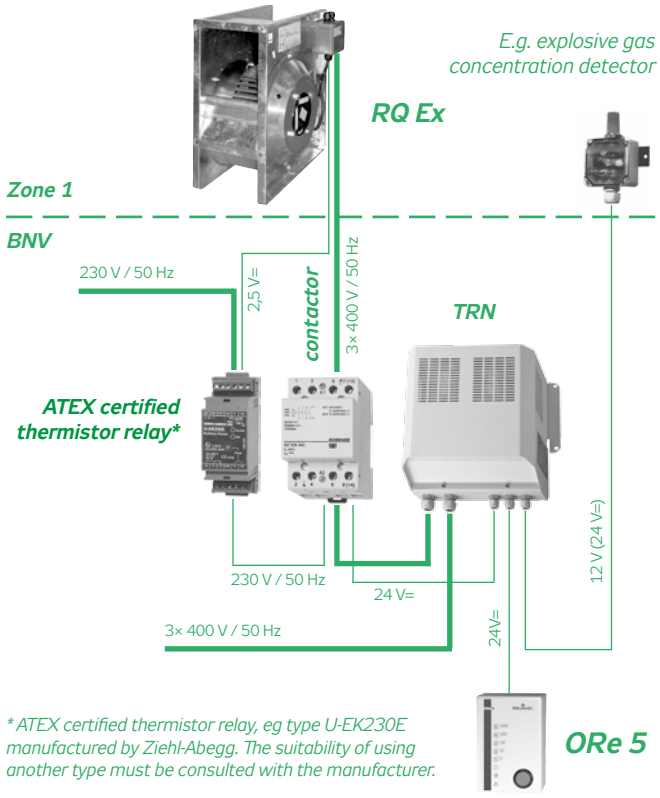



## EXAMPLE B
### FAN WITH OUTPUT CONTROL AND PROTECTION CONTROLLER

An RP (RQ) Ex fan connection in a venting system with output control using the TRN controller equipped with an ORe5 control unit is shown in figures # 13.
In addition to the selection of the fan output within the stage range "0" - "5", this type of connection also ensures its protection via thermistors, ATEX certified thermistor relay and the protection integrated into the TRN controller.
The connection shown in the pictures also enables the fan to be switched on/off manually, by the ORe5 remote controller or any other switch (like room thermostat, gas detector, pressostat, hygrostat, etc.) on the PT1 and PT2 terminals.

After turning the selector to position "1" to "5", the fan will start at the corresponding output (1 to 5), and an indicator signalling the fan's operation will light up. The closed switch connected to PT1, PT2 terminals and closed terminals 11 and 14 of the ATEX certified thermistor relay connected to TK, TK terminals of the controller are essential for fan operation. The switch connected to PT1, PT2 terminals is used to stop and start the fan without other relations so that the fan after being started runs at the output preset on ORe5. If this possibility is not used, it will be necessary to interconnect terminals PT1 and PT2. If the fan is overloaded, contacts 11 and 14 of the tripping device will open due to overheating of the motor. As a reaction to this state, the controller will disconnect the power supply to the motor, and turn off the fan operation signalling indicator. After cooling down, the motor is not automatically started. First, it is necessary to confirm (unblock) the failure removal by turning the selector to position "0". After turning the selector to position "1" to "5", the fan will start at the corresponding output. In this arrangement, position "0" on the ORe5 control unit must not be blocked.

FIGURE 13 – FAN CONNECTION




** ATEX certified thermistor relay, eg type U-EK230E manufactured by Ziehl-Abegg. The suitability of using another type must be consulted with the manufacturer.*

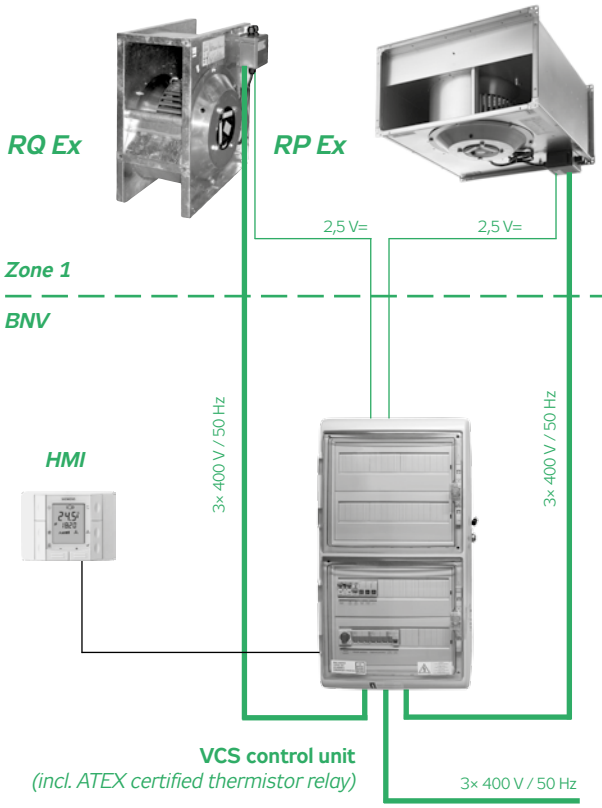
**EXAMPLE C**

FANS WITH CONTROL UNIT WITHOUT OUTPUT CONTROL

An RP (RQ) Ex fan without output control connection in a more sophisticated venting system equipped with a VCS control unit (e.g. with air heating) is shown in figure # 14.
This type of connection ensures full thermal protection of the fan using thermistors and a VCS control unit which already contains an ATEX certified thermistor relay installed in the factory. Fan switching on/off is ensured by the control unit. The motor protection must always be ensured by the control unit by connecting the K1, K2 thermistor terminals to the 5a, 5a, 5b and 5b terminals in the control unit.

The air-handling system is started by the control unit. All protection and safety functions of the fan as well as the entire system are ensured by the VCS control unit.

FIGURE 14 – FAN CONNECTION




**EXAMPLE D**

FAN WITH CONTROL UNIT AND OUTPUT CONTROL

An RP (RQ) Ex fan equipped with an output controller in a more sophisticated venting system with a VCS control unit (e.g. with air heating) is shown in figure # 15.
This type of connection ensures full thermal protection of the fan using thermistors and a VCS control unit which already contains an ATEX certified thermistor relay installed in the factory. Fan switching on/off is ensured by the control unit. The motor protection must always be ensured by the control unit by connecting the K1, K2 thermistor terminals to the 5a, 5a, 5b and 5b terminals in the control unit. The internal fan output controller is installed in the control unit during production. This connection of the speed controller enables the option of fan output in the range from stage "1" to stage "5".
In the D connection example, all additional functions of the controller must always be blocked by interconnecting the PT2 and E48 terminals in the controller.

The air-handling system is started by the control unit. An internal controller is integrated into the control unit, which enables remote control of the controller. All protection and safety functions of the fan as well as the entire system are ensured by the WebCLima control unit.

FIGURE 15 – FAN CONNECTION