

RPMC-V -variable air flow regulator in design variants intended for use in potentially explosive atmospheres

Instructions for use



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I. GENERAL

These Instructions for use apply to air flow regulators in design variants intended for use in potentially explosive atmospheres (hereinafter referred to as „regulators“) in accordance with the ATEX Directive 2014/34/EU, and supplement the Technical specifications TPM 106/14, respectively.

This means that the technical conditions TPM 106/14 are hereby valid for these regulators, with the proviso that in the event of a conflict between TPM 106/14 and this document, this document shall apply.

The mechanical part of the regulators, including the pressure sampling system (measuring profiles, hoses, etc.), is designed and manufactured in accordance with the standards EN IEC 60079-0:2018 and EN ISO 80079-36:2016 by the manufacturer MANDÍK.

The regulator contains an air pressure sensor, an electronic VAV control unit and an actuator manufactured by Schischek (Rotork) or Pi-safety, which are classified, certified, manufactured and marked according to the standards EN IEC 60079-0:2018, EN IEC 60079-1:2014, EN IEC 60079-11:2012, EN IEC 60079-11:2014. Schischek VAV control unit integrates the air pressure sensor, whereas Pi-safety pressure sensor is integrated into a separate enclosure. All electrical components have IP66 protection.

The resulting assembly of the mechanical part, VAV control unit, [pressure sensor] and the actuator is designed, classified in accordance with (EU) Directive 2014/34/EU (ATEX) by the manufacturer MANDÍK.

The assembly and the delivery do not include any separate junction box certified for the given Ex zone, although such junction box may be ordered as an accessory.

Conditions of use

The regulators may be used under the following conditions

- a) the controllers are installed, commissioned, operated and maintained in accordance with these Instructions for use and also in accordance with the operating instructions of the actuator and VAV control unit [and the pressure sensor] manufacturer;
- b) horizontal or vertical orientation of the regulator blades axis; and
- c) average air flow velocity in the duct not exceeding 12 m/s and operating overpressure or underpressure in the duct not exceeding 1,500 Pa; and
- d) pressure loss (e.i. static pressure difference in the duct sections upstream and downstream) of the controller according to TPM 106/14, and
- e) weatherproof environment 3K5 according to EN 60721-3-3 amended. A2, without condensation, frost, ice formation and water from sources other than rain; and
- f) an environment free from abrasive, adhesive, electrically charged, chemically active and radioactive particles or drops, free from chemically active or radioactive gases. In no case may exothermic reactions or precipitation of condensate or the deposition of solid coatings or particles occur during normal operation, and there must be no corrosion, especially of copper and brass components of the regulator. And further
- g) operating temperature according to the given device category, see point i), when
- h) the flange of the air duct to which the regulator flange is mounted must be flat, so as not to guarantee the tightness of the duct and/or reduce the risk of damage to the regulator when closing. The regulator must be attached to the flange on at least one side. This also applies to the actuator adjustment operation. And at the same time
- i) the regulators can be used in the relevant hazardous area under conditions in accordance with the equipment Ex category specified in this point, where the temperature condition Ta applies to both the outside of the regulator and the transported air.

| Manufacturer of VAV control unit and actuator | Regulator's Ex category | Temperature of use | For Ex zones |
|---|-------------------------|-----------------------------|---------------|
| Schischek | II 2G Ex T6...T5 Gb | Ta = -20 °C ... +40 °C (T6) | Zones 1 and 2 |
| | | Ta = -20 °C ... +50 °C (T5) | |
| Pi-Safety | II 2G Ex T4 Gb | Ta = -20 °C ... +58 °C | |

- j) The regulators may only be equipped with actuators and VAV control units specified in this document; while
- k) the assignment of the actuator model/setup to the given regulator size must be respected; and
- l) should the regulator be electrically connected directly in the zone with potentially explosive atmosphere, an Ex-certified junction box intended for the given zone must be used for the connection; and
- m) Air flow regulators shall never be equipped with actuator with nominal opening or closing speed inferior to 3 s, which satisfies the condition of the ATEX certificate of 1 m/s maximum relative velocity of the moving parts surfaces.
- n) The cover of Schischek and Pi-safety electrical devices (i.e. the cover of the connection terminal block) must not be opened when the device is under voltage. It is not permitted to open or even remove covers other than the terminal block cover.
- o) It is not permitted to repair Schischek or Pi-safety devices, except for possible repairs by the manufacturer himself in compliance with the special conditions specified in the device certificate.
- p) The user is obliged to check the tight connection of the hoses leading to the pressure sensor.
- q) The covers of electrical devices must not be exposed to external forces and/or shocks.
- r) ExReg- and AC.Ex devices are not protected against UV radiation; they must therefore not be exposed to direct sunlight or other sources of UV radiation.
- s) Painted electrical devices may be exposed to the risk of static induction of voltage on the paint layer; follow the manufacturer's instructions for use, especially when cleaning them,
- t) connection of intrinsically safe circuits according to EN 60079-25, and
- u) all devices connected to the damper must comply the given Ex category.

II. DESIGN

The following design variants intended for use in potentially explosive atmospheres are available

| Direct control of | Sensor range [Pa] | w_min [m/s] | w_max [m/s] | p_min [Pa] | p_max [Pa] | Return spring | Safety position | Electronic control devices | | | | Design variant |
|-----------------------|-------------------|-------------|--------------|------------|------------|---------------|-----------------|----------------------------|----------------|-------------|---------------|----------------|
| | | | | | | | | Manufact. | VAV unit | Sensor | Actuator | |
| Volume air flow rate | 100 | 2 | 5,7 ... 10 * | - | - | No | - | Schischek | ExReg-V-100-A | - | ExMax-...-CY | .E02 |
| | 100 | 2 | 5,7 ... 10 * | - | - | Yes | Closed | | ExReg-V-100-A | - | ExMax-...-CYF | .E02F |
| | 100 | 2 | 5,7 ... 10 * | - | - | Yes | Open | | ExReg-V-100-A | - | ExMax-...-CYF | .E03F |
| | 300 | 3 | 12 | - | - | No | - | | ExReg-V-300-A | - | ExMax-...-CY | .E04 |
| | 300 | 3 | 12 | - | - | Yes | Closed | | ExReg-V-300-A | - | ExMax-...-CYF | .E04F |
| | 300 | 3 | 12 | - | - | Yes | Open | | ExReg-V-300-A | - | ExMax-...-CYF | .E05F |
| Duct or room pressure | 100 | - | - | 20 | 100 | No | - | Schischek | ExReg-V-100-A | - | ExMax-...-CY | .E52 |
| | 100 | - | - | 20 | 100 | Yes | Closed | | ExReg-V-100-A | - | ExMax-...-CYF | .E52F |
| | 100 | - | - | 20 | 100 | Yes | Open | | ExReg-V-100-A | - | ExMax-...-CYF | .E53F |
| | 300 | - | - | 50 | 300 | No | - | | ExReg-V-300-A | - | ExMax-...-CY | .E54 |
| | 300 | - | - | 50 | 300 | Yes | Closed | | ExReg-V-300-A | - | ExMax-...-CYF | .E54F |
| | 300 | - | - | 50 | 300 | Yes | Open | | ExReg-V-300-A | - | ExMax-...-CYF | .E55F |
| | 1000 | - | - | 150 | 1000 | No | - | | ExReg-V-1000-A | - | ExMax-...-CY | .E56 |
| | 1000 | - | - | 150 | 1000 | Yes | Closed | | ExReg-V-1000-A | - | ExMax-...-CYF | .E56F |
| 1000 | - | - | 150 | 1000 | Yes | Open | ExReg-V-1000-A | - | ExMax-...-CYF | .E57F | | |
| Volume air flow rate | 100 | 2 | 5,7 ... 10 * | - | - | No | - | Pi-Safety | AC.Ex | IY.Ex-P0100 | QT.Ex-MY | .P02 |
| | 100 | 2 | 5,7 ... 10 * | - | - | Yes | Closed | | | IY.Ex-P0100 | QT.Ex-MYF | .P02F |
| | 100 | 2 | 5,7 ... 10 * | - | - | Yes | Open | | | IY.Ex-P0100 | QT.Ex-MYF | .P03F |
| | 250 | 3 | 12 | - | - | No | - | | | IY.Ex-P0250 | QT.Ex-MY | .P04 |
| | 250 | 3 | 12 | - | - | Yes | Closed | | | IY.Ex-P0250 | QT.Ex-MYF | .P04F |
| | 250 | 3 | 12 | - | - | Yes | Open | | | IY.Ex-P0250 | QT.Ex-MYF | .P05F |
| Duct or room pressure | 100 | - | - | 20 | 100 | No | - | Pi-Safety | AC.Ex | IY.Ex-P0100 | QT.Ex-MY | .P52 |
| | 100 | - | - | 20 | 100 | Yes | Closed | | | IY.Ex-P0100 | QT.Ex-MYF | .P52F |
| | 100 | - | - | 20 | 100 | Yes | Open | | | IY.Ex-P0100 | QT.Ex-MYF | .P53F |
| | 250 | - | - | 40 | 250 | No | - | | | IY.Ex-P0250 | QT.Ex-MY | .P54 |
| | 250 | - | - | 40 | 250 | Yes | Closed | | | IY.Ex-P0250 | QT.Ex-MYF | .P54F |
| | 250 | - | - | 40 | 250 | Yes | Open | | | IY.Ex-P0250 | QT.Ex-MYF | .P55F |
| | 600 | - | - | 100 | 600 | No | - | | | IY.Ex-P0600 | QT.Ex-MY | .P56 |
| | 600 | - | - | 100 | 600 | Yes | Closed | | | IY.Ex-P0600 | QT.Ex-MYF | .P56F |
| 600 | - | - | 100 | 600 | Yes | Open | IY.Ex-P0600 | QT.Ex-MYF | .P57F | | | |

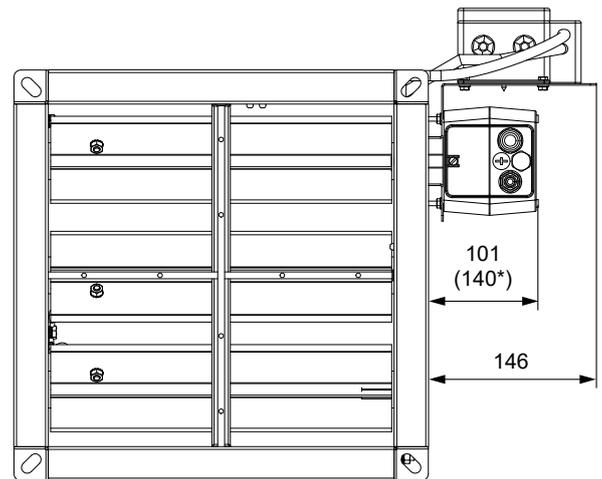
* as per regulator size

Regulator design



grounding screw

RPMC-V with *Schischek* electrical equipment

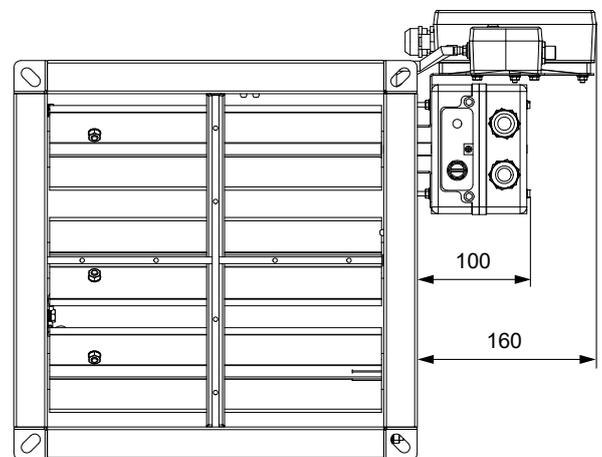


* for ExMax-15.30



grounding screw

RPMC-V with *pi* safety electrical equipment



- The regulator consists of a casing, blades, measuring elements (profiles and tubing system), a VAV control unit, [a sensor] and an actuator.
- Each blade is connected to the casing of the regulator by a copper wire.
- The minimum space for the access to the actuator is 250 mm (in the direction of the blade axis).
- Regulators shall always be without insulation and without paint.

Grounding wire assembly

- The regulator is equipped with one grounding screw M6 x 35 mm on the control side.



III. TECHNICAL DATA

Actuators, control range and accuracy of control

| Size | Actuator Schischek | | Actuator Pi-Safety | |
|-----------|--------------------|----------------|--------------------|-----------------|
| | A x B | w/o spring | with spring | w/o spring |
| 200 x 100 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 200 x 150 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 200 x 200 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 300 x 100 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 300 x 150 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 300 x 200 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 300 x 250 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 300 x 300 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 400 x 200 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 400 x 250 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 400 x 300 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 400 x 400 | ExMax-15.30-CY | ExMax-15-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 500 x 200 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 500 x 250 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 500 x 300 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 500 x 400 | ExMax-15.30-CY | ExMax-15-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 500 x 500 | ExMax-15.30-CY | ExMax-30-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 600 x 200 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 600 x 250 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 600 x 300 | ExMax-5.10-CY | ExMax-5.10-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 600 x 400 | ExMax-15.30-CY | ExMax-15-CYF | QT.Ex-MY-SL | QT.Ex-MF10Y-SL |
| 600 x 500 | ExMax-15.30-CY | ExMax-30-CYF | QT.Ex-MY-SL | (not available) |
| 600 x 600 | ExMax-15.30-CY | ExMax-30-CYF | QT.Ex-MY-SL | (not available) |

| Design variant | Size | | Sensor [Pa] | w_min [m/s] | Vmin | | w_max [m/s] | Vmax | | w_nom [m/s] | Vnom | | Accuracy of control at | | k | |
|----------------|------|-------|-------------|-------------|--------|-------|-------------|--------|-------|-------------|--------|-------|------------------------|-------|------------|-----------|
| | A | x B | | | [m³/h] | [l/s] | | [m³/h] | [l/s] | | [m³/h] | [l/s] | Vmin | Vmax | [m³/h, Pa] | [l/s, Pa] |
| E02/E02F/E03F | 200 | x 100 | 100 | 2 | 144 | 40 | 8,54 | 615 | 171 | 8,54 | 615 | 171 | ± 20 % | ± 9 % | 61,52 | 17,09 |
| E02/E02F/E03F | 200 | x 150 | 100 | 2 | 216 | 60 | 9,10 | 983 | 273 | 9,10 | 983 | 273 | ± 20 % | ± 9 % | 98,27 | 27,30 |
| E02/E02F/E03F | 200 | x 200 | 100 | 2 | 288 | 80 | 9,37 | 1349 | 375 | 9,37 | 1349 | 375 | ± 20 % | ± 9 % | 134,92 | 37,48 |
| E02/E02F/E03F | 300 | x 100 | 100 | 2 | 216 | 60 | 9,10 | 983 | 273 | 9,10 | 983 | 273 | ± 20 % | ± 9 % | 98,27 | 27,30 |
| E02/E02F/E03F | 300 | x 150 | 100 | 2 | 324 | 90 | 9,44 | 1529 | 425 | 9,44 | 1529 | 425 | ± 20 % | ± 9 % | 152,94 | 42,48 |
| E02/E02F/E03F | 300 | x 200 | 100 | 2 | 432 | 120 | 9,64 | 2082 | 578 | 9,64 | 2082 | 578 | ± 20 % | ± 9 % | 208,17 | 57,82 |
| E02/E02F/E03F | 300 | x 250 | 100 | 2 | 540 | 150 | 9,75 | 2634 | 732 | 9,75 | 2634 | 732 | ± 20 % | ± 9 % | 263,37 | 73,16 |
| E02/E02F/E03F | 300 | x 300 | 100 | 2 | 648 | 180 | 9,83 | 3184 | 885 | 9,83 | 3184 | 885 | ± 20 % | ± 9 % | 318,43 | 88,45 |
| E02/E02F/E03F | 400 | x 200 | 100 | 2 | 576 | 160 | 9,76 | 2811 | 781 | 9,76 | 2811 | 781 | ± 20 % | ± 9 % | 281,13 | 78,09 |
| E02/E02F/E03F | 400 | x 250 | 100 | 2 | 720 | 200 | 9,85 | 3546 | 985 | 9,85 | 3546 | 985 | ± 20 % | ± 9 % | 354,56 | 98,49 |
| E02/E02F/E03F | 400 | x 300 | 100 | 2 | 864 | 240 | 9,89 | 4274 | 1187 | 9,89 | 4274 | 1187 | ± 20 % | ± 9 % | 427,44 | 118,73 |
| E02/E02F/E03F | 400 | x 400 | 100 | 2 | 1152 | 320 | 9,99 | 5754 | 1598 | 9,99 | 5754 | 1598 | ± 20 % | ± 9 % | 575,40 | 159,83 |
| E02/E02F/E03F | 500 | x 200 | 100 | 2 | 720 | 200 | 9,85 | 3546 | 985 | 9,85 | 3546 | 985 | ± 20 % | ± 9 % | 354,56 | 98,49 |
| E02/E02F/E03F | 500 | x 250 | 100 | 2 | 900 | 250 | 9,93 | 4469 | 1241 | 9,93 | 4469 | 1241 | ± 20 % | ± 9 % | 446,91 | 124,14 |
| E02/E02F/E03F | 500 | x 300 | 100 | 2 | 1080 | 300 | 9,96 | 5379 | 1494 | 9,96 | 5379 | 1494 | ± 20 % | ± 9 % | 537,94 | 149,43 |
| E02/E02F/E03F | 500 | x 400 | 100 | 2 | 1440 | 400 | 10 | 7200 | 2000 | 10 | 7200 | 2000 | ± 20 % | ± 9 % | 720,02 | 200 |
| E02/E02F/E03F | 500 | x 500 | 100 | 2 | 1800 | 500 | 10,05 | 9042 | 2512 | 10,05 | 9042 | 2512 | ± 20 % | ± 9 % | 904,19 | 251,17 |
| E02/E02F/E03F | 600 | x 200 | 100 | 2 | 864 | 240 | 9,89 | 4274 | 1187 | 9,89 | 4274 | 1187 | ± 20 % | ± 9 % | 427,44 | 118,73 |
| E02/E02F/E03F | 600 | x 250 | 100 | 2 | 1080 | 300 | 9,96 | 5379 | 1494 | 9,96 | 5379 | 1494 | ± 20 % | ± 9 % | 537,94 | 149,43 |
| E02/E02F/E03F | 600 | x 300 | 100 | 2 | 1296 | 360 | 10 | 6478 | 1799 | 10 | 6478 | 1799 | ± 20 % | ± 9 % | 647,75 | 179,93 |
| E02/E02F/E03F | 600 | x 400 | 100 | 2 | 1728 | 480 | 10,06 | 8690 | 2414 | 10,06 | 8690 | 2414 | ± 20 % | ± 9 % | 868,99 | 241,39 |
| E02/E02F/E03F | 600 | x 500 | 100 | 2 | 2160 | 600 | 10,07 | 10871 | 3020 | 10,07 | 10871 | 3020 | ± 20 % | ± 9 % | 1087,11 | 301,98 |
| E02/E02F/E03F | 600 | x 600 | 100 | 2 | 2592 | 720 | 10,08 | 13064 | 3629 | 10,08 | 13064 | 3629 | ± 20 % | ± 9 % | 1306,39 | 362,89 |

| Design variant | Size | | Sensor [Pa] | w_min [m/s] | Vmin | | w_max [m/s] | Vmax | | w_nom [m/s] | Vnom | | Accuracy of control at | | k | |
|----------------|------|-------|-------------|-------------|--------|-------|-------------|--------|-------|-------------|--------|-------|------------------------|-------|------------|-----------|
| | A | x B | | | [m³/h] | [l/s] | | [m³/h] | [l/s] | | [m³/h] | [l/s] | Vmin | Vmax | [m³/h, Pa] | [l/s, Pa] |
| E04/E04F/E05F | 200 | x 100 | 300 | 3 | 216 | 60 | 12 | 864 | 240 | 14,80 | 1066 | 296 | ± 20 % | ± 9 % | 61,52 | 17,09 |
| E04/E04F/E05F | 200 | x 150 | 300 | 3 | 324 | 90 | 12 | 1296 | 360 | 15,76 | 1702 | 473 | ± 20 % | ± 9 % | 98,27 | 27,30 |
| E04/E04F/E05F | 200 | x 200 | 300 | 3 | 432 | 120 | 12 | 1728 | 480 | 16,23 | 2337 | 649 | ± 20 % | ± 9 % | 134,92 | 37,48 |
| E04/E04F/E05F | 300 | x 100 | 300 | 3 | 324 | 90 | 12 | 1296 | 360 | 15,76 | 1702 | 473 | ± 20 % | ± 9 % | 98,27 | 27,30 |
| E04/E04F/E05F | 300 | x 150 | 300 | 3 | 486 | 135 | 12 | 1944 | 540 | 16,35 | 2649 | 736 | ± 20 % | ± 9 % | 152,94 | 42,48 |
| E04/E04F/E05F | 300 | x 200 | 300 | 3 | 648 | 180 | 12 | 2592 | 720 | 16,69 | 3606 | 1002 | ± 20 % | ± 9 % | 208,17 | 57,82 |
| E04/E04F/E05F | 300 | x 250 | 300 | 3 | 810 | 225 | 12 | 3240 | 900 | 16,90 | 4562 | 1267 | ± 20 % | ± 9 % | 263,37 | 73,16 |
| E04/E04F/E05F | 300 | x 300 | 300 | 3 | 972 | 270 | 12 | 3888 | 1080 | 17,02 | 5515 | 1532 | ± 20 % | ± 9 % | 318,43 | 88,45 |
| E04/E04F/E05F | 400 | x 200 | 300 | 3 | 864 | 240 | 12 | 3456 | 960 | 16,91 | 4869 | 1353 | ± 20 % | ± 9 % | 281,13 | 78,09 |
| E04/E04F/E05F | 400 | x 250 | 300 | 3 | 1080 | 300 | 12 | 4320 | 1200 | 17,06 | 6141 | 1706 | ± 20 % | ± 9 % | 354,56 | 98,49 |
| E04/E04F/E05F | 400 | x 300 | 300 | 3 | 1296 | 360 | 12 | 5184 | 1440 | 17,14 | 7403 | 2057 | ± 20 % | ± 9 % | 427,44 | 118,73 |
| E04/E04F/E05F | 400 | x 400 | 300 | 3 | 1728 | 480 | 12 | 6912 | 1920 | 17,30 | 9966 | 2768 | ± 20 % | ± 9 % | 575,40 | 159,83 |
| E04/E04F/E05F | 500 | x 200 | 300 | 3 | 1080 | 300 | 12 | 4320 | 1200 | 17,06 | 6141 | 1706 | ± 20 % | ± 9 % | 354,56 | 98,49 |
| E04/E04F/E05F | 500 | x 250 | 300 | 3 | 1350 | 375 | 12 | 5400 | 1500 | 17,20 | 7741 | 2150 | ± 20 % | ± 9 % | 446,91 | 124,14 |
| E04/E04F/E05F | 500 | x 300 | 300 | 3 | 1620 | 450 | 12 | 6480 | 1800 | 17,25 | 9317 | 2588 | ± 20 % | ± 9 % | 537,94 | 149,43 |
| E04/E04F/E05F | 500 | x 400 | 300 | 3 | 2160 | 600 | 12 | 8640 | 2400 | 17,32 | 12471 | 3464 | ± 20 % | ± 9 % | 720,02 | 200 |
| E04/E04F/E05F | 500 | x 500 | 300 | 3 | 2700 | 750 | 12 | 10800 | 3000 | 17,40 | 15661 | 4350 | ± 20 % | ± 9 % | 904,19 | 251,17 |
| E04/E04F/E05F | 600 | x 200 | 300 | 3 | 1296 | 360 | 12 | 5184 | 1440 | 17,14 | 7403 | 2057 | ± 20 % | ± 9 % | 427,44 | 118,73 |
| E04/E04F/E05F | 600 | x 250 | 300 | 3 | 1620 | 450 | 12 | 6480 | 1800 | 17,25 | 9317 | 2588 | ± 20 % | ± 9 % | 537,94 | 149,43 |
| E04/E04F/E05F | 600 | x 300 | 300 | 3 | 1944 | 540 | 12 | 7776 | 2160 | 17,31 | 11219 | 3117 | ± 20 % | ± 9 % | 647,75 | 179,93 |
| E04/E04F/E05F | 600 | x 400 | 300 | 3 | 2592 | 720 | 12 | 10368 | 2880 | 17,42 | 15051 | 4181 | ± 20 % | ± 9 % | 868,99 | 241,39 |
| E04/E04F/E05F | 600 | x 500 | 300 | 3 | 3240 | 900 | 12 | 12960 | 3600 | 17,43 | 18829 | 5230 | ± 20 % | ± 9 % | 1087,11 | 301,98 |
| E04/E04F/E05F | 600 | x 600 | 300 | 3 | 3888 | 1080 | 12 | 15552 | 4320 | 17,46 | 22627 | 6285 | ± 20 % | ± 9 % | 1306,39 | 362,89 |

- $V = k \times \Delta p^{1/2}$.
- For room or duct pressure control, accuracy of ± 20 % for p_min, and ± 9 % for p_max.
- Mean air velocity shall not exceed 12 m/s in order to guarantee the function and to prevent damage to the regulator or destruction of the regulator.

| Design variant | Size | | Sensor [Pa] | w_min [m/s] | Vmin | | w_max [m/s] | Vmax | | w_nom [m/s] | Vnom | | Accuracy of control at | | k | |
|----------------|------|-------|-------------|-------------|--------|-------|-------------|--------|-------|-------------|--------|-------|------------------------|-------|------------|-----------|
| | A | B | | | [m³/h] | [l/s] | | [m³/h] | [l/s] | | [m³/h] | [l/s] | Vmin | Vmax | [m³/h, Pa] | [l/s, Pa] |
| P02/P02F/P03F | 200 | x 100 | 100 | 2 | 144 | 40 | 8,54 | 615 | 171 | 8,54 | 615 | 171 | ± 15 % | ± 8 % | 61,52 | 17,09 |
| P02/P02F/P03F | 200 | x 150 | 100 | 2 | 216 | 60 | 9,10 | 983 | 273 | 9,10 | 983 | 273 | ± 15 % | ± 8 % | 98,27 | 27,30 |
| P02/P02F/P03F | 200 | x 200 | 100 | 2 | 288 | 80 | 9,37 | 1349 | 375 | 9,37 | 1349 | 375 | ± 15 % | ± 8 % | 134,92 | 37,48 |
| P02/P02F/P03F | 300 | x 100 | 100 | 2 | 216 | 60 | 9,10 | 983 | 273 | 9,10 | 983 | 273 | ± 15 % | ± 8 % | 98,27 | 27,30 |
| P02/P02F/P03F | 300 | x 150 | 100 | 2 | 324 | 90 | 9,44 | 1529 | 425 | 9,44 | 1529 | 425 | ± 15 % | ± 8 % | 152,94 | 42,48 |
| P02/P02F/P03F | 300 | x 200 | 100 | 2 | 432 | 120 | 9,64 | 2082 | 578 | 9,64 | 2082 | 578 | ± 15 % | ± 8 % | 208,17 | 57,82 |
| P02/P02F/P03F | 300 | x 250 | 100 | 2 | 540 | 150 | 9,75 | 2634 | 732 | 9,75 | 2634 | 732 | ± 15 % | ± 8 % | 263,37 | 73,16 |
| P02/P02F/P03F | 300 | x 300 | 100 | 2 | 648 | 180 | 9,83 | 3184 | 885 | 9,83 | 3184 | 885 | ± 15 % | ± 8 % | 318,43 | 88,45 |
| P02/P02F/P03F | 400 | x 200 | 100 | 2 | 576 | 160 | 9,76 | 2811 | 781 | 9,76 | 2811 | 781 | ± 15 % | ± 8 % | 281,13 | 78,09 |
| P02/P02F/P03F | 400 | x 250 | 100 | 2 | 720 | 200 | 9,85 | 3546 | 985 | 9,85 | 3546 | 985 | ± 15 % | ± 8 % | 354,56 | 98,49 |
| P02/P02F/P03F | 400 | x 300 | 100 | 2 | 864 | 240 | 9,89 | 4274 | 1187 | 9,89 | 4274 | 1187 | ± 15 % | ± 8 % | 427,44 | 118,73 |
| P02/P02F/P03F | 400 | x 400 | 100 | 2 | 1152 | 320 | 9,99 | 5754 | 1598 | 9,99 | 5754 | 1598 | ± 15 % | ± 8 % | 575,40 | 159,83 |
| P02/P02F/P03F | 500 | x 200 | 100 | 2 | 720 | 200 | 9,85 | 3546 | 985 | 9,85 | 3546 | 985 | ± 15 % | ± 8 % | 354,56 | 98,49 |
| P02/P02F/P03F | 500 | x 250 | 100 | 2 | 900 | 250 | 9,93 | 4469 | 1241 | 9,93 | 4469 | 1241 | ± 15 % | ± 8 % | 446,91 | 124,14 |
| P02/P02F/P03F | 500 | x 300 | 100 | 2 | 1080 | 300 | 9,96 | 5379 | 1494 | 9,96 | 5379 | 1494 | ± 15 % | ± 8 % | 537,94 | 149,43 |
| P02/P02F/P03F | 500 | x 400 | 100 | 2 | 1440 | 400 | 10 | 7200 | 2000 | 10 | 7200 | 2000 | ± 15 % | ± 8 % | 720,02 | 200 |
| P02/P02F/P03F | 500 | x 500 | 100 | 2 | 1800 | 500 | 10,05 | 9042 | 2512 | 10,05 | 9042 | 2512 | ± 15 % | ± 8 % | 904,19 | 251,17 |
| P02/P02F/P03F | 600 | x 200 | 100 | 2 | 864 | 240 | 9,89 | 4274 | 1187 | 9,89 | 4274 | 1187 | ± 15 % | ± 8 % | 427,44 | 118,73 |
| P02/P02F/P03F | 600 | x 250 | 100 | 2 | 1080 | 300 | 9,96 | 5379 | 1494 | 9,96 | 5379 | 1494 | ± 15 % | ± 8 % | 537,94 | 149,43 |
| P02/P02F/P03F | 600 | x 300 | 100 | 2 | 1296 | 360 | 10 | 6478 | 1799 | 10 | 6478 | 1799 | ± 15 % | ± 8 % | 647,75 | 179,93 |
| P02/P02F/P03F | 600 | x 400 | 100 | 2 | 1728 | 480 | 10,06 | 8690 | 2414 | 10,06 | 8690 | 2414 | ± 15 % | ± 8 % | 868,99 | 241,39 |
| P02/P02F/P03F | 600 | x 500 | 100 | 2 | 2160 | 600 | 10,07 | 10871 | 3020 | 10,07 | 10871 | 3020 | ± 15 % | ± 8 % | 1087,11 | 301,98 |
| P02/P02F/P03F | 600 | x 600 | 100 | 2 | 2592 | 720 | 10,08 | 13064 | 3629 | 10,08 | 13064 | 3629 | ± 15 % | ± 8 % | 1306,39 | 362,89 |

| Design variant | Size | | Sensor [Pa] | w_min [m/s] | Vmin | | w_max [m/s] | Vmax | | w_nom [m/s] | Vnom | | Accuracy of control at | | k | |
|----------------|------|-------|-------------|-------------|--------|-------|-------------|--------|-------|-------------|--------|-------|------------------------|-------|------------|-----------|
| | A | B | | | [m³/h] | [l/s] | | [m³/h] | [l/s] | | [m³/h] | [l/s] | Vmin | Vmax | [m³/h, Pa] | [l/s, Pa] |
| P04/P04F/P05F | 200 | x 100 | 250 | 3 | 216 | 60 | 12 | 864 | 240 | 13,51 | 973 | 270 | ± 15 % | ± 8 % | 61,52 | 17,09 |
| P04/P04F/P05F | 200 | x 150 | 250 | 3 | 324 | 90 | 12 | 1296 | 360 | 14,39 | 1554 | 432 | ± 15 % | ± 8 % | 98,27 | 27,30 |
| P04/P04F/P05F | 200 | x 200 | 250 | 3 | 432 | 120 | 12 | 1728 | 480 | 14,81 | 2133 | 593 | ± 15 % | ± 8 % | 134,92 | 37,48 |
| P04/P04F/P05F | 300 | x 100 | 250 | 3 | 324 | 90 | 12 | 1296 | 360 | 14,39 | 1554 | 432 | ± 15 % | ± 8 % | 98,27 | 27,30 |
| P04/P04F/P05F | 300 | x 150 | 250 | 3 | 486 | 135 | 12 | 1944 | 540 | 14,93 | 2418 | 672 | ± 15 % | ± 8 % | 152,94 | 42,48 |
| P04/P04F/P05F | 300 | x 200 | 250 | 3 | 648 | 180 | 12 | 2592 | 720 | 15,24 | 3291 | 914 | ± 15 % | ± 8 % | 208,17 | 57,82 |
| P04/P04F/P05F | 300 | x 250 | 250 | 3 | 810 | 225 | 12 | 3240 | 900 | 15,42 | 4164 | 1157 | ± 15 % | ± 8 % | 263,37 | 73,16 |
| P04/P04F/P05F | 300 | x 300 | 250 | 3 | 972 | 270 | 12 | 3888 | 1080 | 15,54 | 5035 | 1399 | ± 15 % | ± 8 % | 318,43 | 88,45 |
| P04/P04F/P05F | 400 | x 200 | 250 | 3 | 864 | 240 | 12 | 3456 | 960 | 15,43 | 4445 | 1235 | ± 15 % | ± 8 % | 281,13 | 78,09 |
| P04/P04F/P05F | 400 | x 250 | 250 | 3 | 1080 | 300 | 12 | 4320 | 1200 | 15,57 | 5606 | 1557 | ± 15 % | ± 8 % | 354,56 | 98,49 |
| P04/P04F/P05F | 400 | x 300 | 250 | 3 | 1296 | 360 | 12 | 5184 | 1440 | 15,64 | 6758 | 1877 | ± 15 % | ± 8 % | 427,44 | 118,73 |
| P04/P04F/P05F | 400 | x 400 | 250 | 3 | 1728 | 480 | 12 | 6912 | 1920 | 15,79 | 9098 | 2527 | ± 15 % | ± 8 % | 575,40 | 159,83 |
| P04/P04F/P05F | 500 | x 200 | 250 | 3 | 1080 | 300 | 12 | 4320 | 1200 | 15,57 | 5606 | 1557 | ± 15 % | ± 8 % | 354,56 | 98,49 |
| P04/P04F/P05F | 500 | x 250 | 250 | 3 | 1350 | 375 | 12 | 5400 | 1500 | 15,70 | 7066 | 1963 | ± 15 % | ± 8 % | 446,91 | 124,14 |
| P04/P04F/P05F | 500 | x 300 | 250 | 3 | 1620 | 450 | 12 | 6480 | 1800 | 15,75 | 8506 | 2363 | ± 15 % | ± 8 % | 537,94 | 149,43 |
| P04/P04F/P05F | 500 | x 400 | 250 | 3 | 2160 | 600 | 12 | 8640 | 2400 | 15,81 | 11384 | 3162 | ± 15 % | ± 8 % | 720,02 | 200 |
| P04/P04F/P05F | 500 | x 500 | 250 | 3 | 2700 | 750 | 12 | 10800 | 3000 | 15,89 | 14297 | 3971 | ± 15 % | ± 8 % | 904,19 | 251,17 |
| P04/P04F/P05F | 600 | x 200 | 250 | 3 | 1296 | 360 | 12 | 5184 | 1440 | 15,64 | 6758 | 1877 | ± 15 % | ± 8 % | 427,44 | 118,73 |
| P04/P04F/P05F | 600 | x 250 | 250 | 3 | 1620 | 450 | 12 | 6480 | 1800 | 15,75 | 8506 | 2363 | ± 15 % | ± 8 % | 537,94 | 149,43 |
| P04/P04F/P05F | 600 | x 300 | 250 | 3 | 1944 | 540 | 12 | 7776 | 2160 | 15,81 | 10242 | 2845 | ± 15 % | ± 8 % | 647,75 | 179,93 |
| P04/P04F/P05F | 600 | x 400 | 250 | 3 | 2592 | 720 | 12 | 10368 | 2880 | 15,90 | 13740 | 3817 | ± 15 % | ± 8 % | 868,99 | 241,39 |
| P04/P04F/P05F | 600 | x 500 | 250 | 3 | 3240 | 900 | 12 | 12960 | 3600 | 15,92 | 17189 | 4775 | ± 15 % | ± 8 % | 1087,11 | 301,98 |
| P04/P04F/P05F | 600 | x 600 | 250 | 3 | 3888 | 1080 | 12 | 15552 | 4320 | 15,94 | 20656 | 5738 | ± 15 % | ± 8 % | 1306,39 | 362,89 |

- $V = k \times \Delta p^{1/2}$.
- For room or duct pressure control, accuracy of ± 15 % for p_min, and ± 8 % for p_max.
- Mean air velocity shall not exceed 12 m/s in order to guarantee the function and to prevent damage to the regulator or destruction of the regulator.

IV. MATERIALS, SURFACE TREATMENT

- The materials of the casing, of the blades and of the mechanism used are identical with materials for ordinary design variants.
All three material variants are available:
 - galvanised steel (DX51+Z275)
 - A2 (AISI 304)
 - A4 (AISI 316L)
- Interconnecting wires are made of copper, with connection rings made either from mild steel with zinc coating, or from corresponding stainless steel (A2/A4).
- It is not possible to deliver regulators with insulation or regulators protected by a paint.
- The actuator and the VAV control unit [and the sensor] are inside their envelope as follows:

| Envelope component | Schischek | | | Pi-Safety |
|----------------------|------------------------|--------------------|----------------------------|---------------------------------------|
| | standard | -CT* | -VA** | standard |
| Body material | Al alloy | Al alloy | AISI 316 - stainless steel | Antistatic plastics / stainless steel |
| Body coating | paint | marine grade paint | – | – |
| Cable gland material | UV stabilised plastics | brass | brass | brass |
| Cable gland coating | – | nickel | nickel | nickel |
| Bolts / screws | mild steel zinc coated | stainless steel | stainless steel | stainless steel |

* on special request

** on special request, the actuator only, option not available for the VAV control unit.

Schischek Ex certified components



Pi-safety Ex certified components



V. QUALITY INSPECTION, TESTING BY THE MANUFACTU.

- The dimensions are checked with common measuring devices according to the standard of non-tolerated dimensions used in HVAC.
- Interoperation checks of parts and main dimensions are carried out according to the manufacturing documentation.

The final control includes:

- control of damper (blades) opening and closing, and
- checking the electrical connection of each regulator blades with the regulator body using an electrical detection device.
- Electronic elements and actuators are adjusted and connected to voltage, and the operation of the regulator is tested.

VI. INSTALLATION, COMMISSIONING, OPERATION, MAINTENANCE, OPERATIONAL CHECKS

Installation consists of:

- installation of the regulator into the air duct
 - grounding and conductive connection to the neighbourhood duct sections
 - electrical connection.
-
- The regulators must be installed in compliance with all applicable safety standards and regulations.
 - **The regulators must be grounded with an M6 grounding screw using a nut and a spring washer** (these parts are included in the equipment delivery).
 - According to EN 332000-4-41,-4-47 and -5-54, flange and screw connections must be conductively connected during installation to protect against dangerous contact. For conductive connection, 2 pieces of galvanized spring washers are used, which are placed under the head of one screw and under the screwed nut.
 - Before putting the regulator into operation, it is necessary to visually check the correct installation of the regulator and check the interconnection of all metal parts.

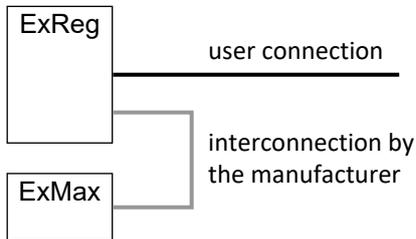
During the serviceability checks, it is necessary to check the mutual conductive connection of all metal parts, including all blades with the body (frame) of the regulator.

The grounding of each individual regulator blades must be checked using an electrical measuring or detection device:

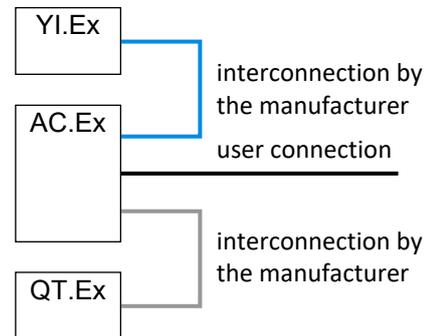
- during commissioning
- as part of each inspection, maintenance, and any possible repair or other intervention on the regulator
- at the latest after 1 year from commissioning
- if no defect in the blades grounding is found after 1 year from commissioning, then periodically at least every 5 years, otherwise annually.

It is necessary to electrically connect the VAV control unit and test the operation of the regulator. **If the electrical connection of the regulator is located within the zone with potentially explosive atmosphere, it is necessary to use an Ex certified terminal block classified for the given zone.**

Electric interconnection and user connection for **Schischek** devices



Electric interconnection and user connection for **pi safety** devices



Electric interconnection and user connection for **Schischek** devices

| ExReg | | |
|-------|----------|---|
| 13 | ← | Input 0...10 / (2...10) V – airflow request, pressure request (not required for CAV mode) |
| 12 | GND1 | Airflow or pressure input / output signal GND |
| 11 | → | Output 0...10 / (2...10) V – measured airflow or pressure (optional) |
| 10 | GND2 | Actuator position output signal GND |
| 9 | → | Actuator position output signal (optional) |
| 8 | occupied | (to the actuator) |
| 7 | occupied | (to the actuator) |
| 6 | occupied | (to the actuator) |
| 5 | occupied | (to the actuator) |
| 4 | occupied | (to the actuator) |
| 3 | → | Alarm output 24 V AC / DC (optional) |
| 2 | L / + | Power input 24 V AC / DC |
| 1 | N / - | |

Do not connect to GND1 or GND2!

It is possible that, depending on the actual conditions in the HVAC system, it will be necessary to fine-tune the parameters of the built-in PID controller.

Electric interconnection and user connection for **pi safety** devices

| AC.Ex | | |
|-------|----------|---|
| 11 | → | Output 0...10 / (2...10) V – measured airflow or pressure (optional) |
| 10 | GND | Input / output signal GND |
| 9 | ← | Input 0...10 / (2...10) V – airflow request or pressure request (not required for CAV mode) |
| 8 | occupied | (to the actuator) |
| 7 | occupied | (to the actuator) |
| 6 | occupied | (to the actuator) |
| 5 | occupied | (to the actuator) |
| 4 | occupied | (to the actuator) |
| 3 | → | Alarm output 24 V AC / DC (optional) |
| 2 | L / + | Power input 24 V AC / DC |
| 1 | N / - | |

A torx TX 10 key is required to open and close the AC.Ex connection box.

A 3 mm wide flat screwdriver is suitable for operating the terminal block.

It is possible that, depending on the actual conditions in the HVAC system, it will be necessary to fine-tune the parameters of the built-in PID controller.

Electrical equipment parameters of regulators manufactured by Schischek
ExReg-... + ExMax-5.10-CY(F), ExReg-... + ExMax-15.30-CY, ExReg-... + ExMax-15-CYF, ExReg-... + ExMax-30-CYF

| Schischek actuator | ExReg-... + ExMax-5.10-CY ExReg-... + ExMax-5.10-CYF ExReg-... + ExMax-15.30-CY ExReg-... + ExMax-15-CYF | ExReg-... + ExMax-30-CYF |
|---|---|--------------------------|
| Power voltage | 24 V AC/DC (20,4 to 27,6 V; 50 to 60 Hz) | |
| Power consumption - motor stopped | 9 W / 12 VA | 9 W / 12 VA |
| Motor running time | 60 s | 60 s |
| Spring running time | 10 s | 20 s |
| Power consumption - the motor is running (running time 60 s) | 19 W / 30 VA | 28 W / 44 VA |
| Starting current | 2,2 A | 2,2 A |
| Voltage input | 0(2) to 10 V, overvoltage up to 30 V | |
| Voltage output | 0(2) to 10 V, load greater than 10 kOhm | |
| Protection class | IP66 | |
| Terminals - conductor dimensions | 0,14 to 2,5 mm ² | |
| Clamps - tightening torque | 0,4 to 0,5 Nm | |
| Storage temperature | -40 °C to +70 °C | |
| Permitted humidity | 0 to 95 % non-condensing | |

Electrical equipment parameters of regulators manufactured by Pi safety A.Ex-... + QT.Ex-MY-SL nebo QT.Ex-MF10Y-SL

| Pi safety actuator | A.Ex-... + QT.Ex-MY-SL nebo QT.Ex-MF10Y-SL |
|--|--|
| Power voltage | 24 V AC/DC (20 to 28,8 V; 50 to 60 Hz) |
| Power consumption - motor stopped | 8 W / 12 VA |
| Motor running time | 15 s |
| Spring running time | 15 s |
| Power consumption - the motor is running | 23 W / 35 VA |
| Starting current | 2,2 A |
| Starting current | 3 Ohm |
| Voltage input | 0(2) to 10 V |
| Current input | 0(4) to 20 mA |
| Protection class | IP66 |
| Terminals - conductor dimensions - without ferrules | 0,08 to 2,5 mm ² |
| Terminals - conductor dimensions - with ferrules | 0,25 to 1,5 mm ² |
| Clamps - tightening torque | N/A (spring-loaded) |
| Storage temperature | -40 °C to +70 °C |
| Permitted humidity | 0 to 90 % non-condensing |

VII. EQUIPMENT IDENTIFICATION

The regulators are equipped with a durable identification label. This label contains the following information:

- manufacturer's logo
- manufacturer's name and registered office
- device type
- design variant number
- size (nominal dimensions)
- weight
- serial number and year of manufacture
- Instructions for use identification
- Ex category and temperature of use of the regulator without equipment
- Ex category and temperature of use of the device (regulator with equipment)
- Ex symbol.

RPMC-V type regulator label with **Schischek** equipment

| | | | |
|--|---------|----------------|------------|
| MANDÍK ® MANDÍK, a.s. Dobříšská 550, 267 24 Hostomice, Czech republic | | | |
| VARIABLE AIRFLOW REGULATOR RPMC-V MAN 169/25 | | | |
| Vnom (m3/h) | 5515 | Vmax (m3/h) | 3888 |
| Vmin (m3/h) | 972 | Design | .E04 |
| Size | 300x300 | Serial. No.: | 25/9999999 |
| Control | 0-10V | Weight (kg): | 18,6 |
| k (m3/h, Pa) | 318,43 | Communications | - |
| SCHISCHEK ExReg-V-300-A, ExMax-5.10-CY | | | |
| Device category and permitted operating temperature - regulator without electrical equipment: | | | |
|  II 2G Ex h IIC T6 Gb Ta = -20...+60 °C | | | |
| Device category and permitted operating temperature - regulator with electrical equipment (assembly): | | | |
|  II 2G Ex IIC T6...T5 Gb Ta = -20...+40 °C (T6) Ta = -20...+50 °C (T5) | | | |

RPMC-V type regulator label with **pi safety** equipment

| | | | |
|--|---------|----------------|------------|
| MANDÍK ® MANDÍK, a.s. Dobříšská 550, 267 24 Hostomice, Czech republic | | | |
| VARIABLE AIRFLOW REGULATOR RPMC-V MAN 169/25 | | | |
| Vnom (m3/h) | 3184 | Vmax (m3/h) | 3184 |
| Vmin (m3/h) | 648 | Design | .P02 |
| Size | 300x300 | Serial. No.: | 25/9999999 |
| Control | 0-10V | Weight (kg): | 18,6 |
| K (l/s, Pa) | 88,45 | Communications | - |
| pi safety QT.Ex-MY, QT.Ex-MSL, AC.Ex, IY.Ex-P0100 | | | |
| Device category and permitted operating temperature - regulator without electrical equipment: | | | |
|  II 2G Ex h IIC T6 Gb Ta = -20...+60 °C | | | |
| Device category and permitted operating temperature - regulator with electrical equipment (assembly): | | | |
|  II 2G Ex IIC T4 Gb Ta = -20...+58 °C | | | |

The producer reserves the right for innovations of the product.
For actual product information see www.mandik.com

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