MANDÍK

MAN 169/25
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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

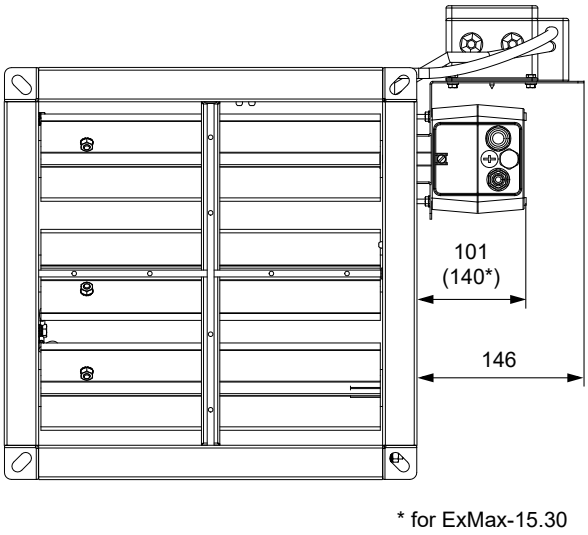
The following design variants intended for use in potentially explosive atmospheres are available

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

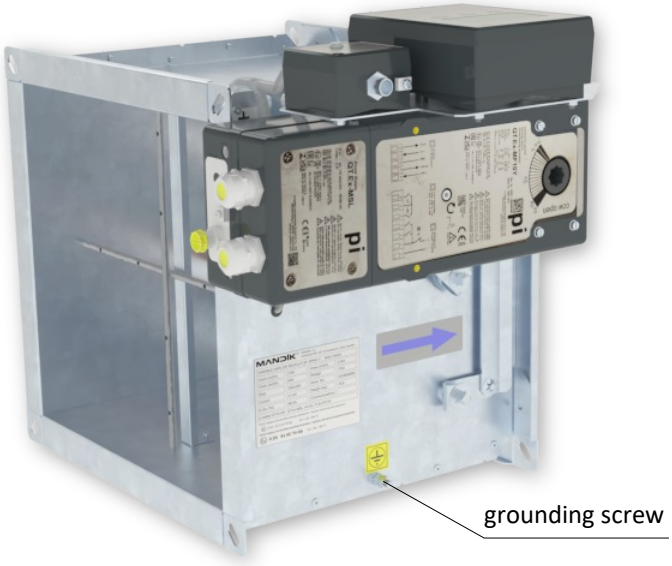
* *as per regulator size*

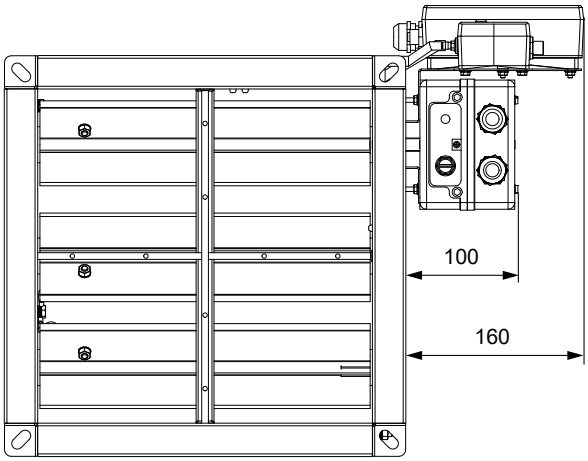
Regulator design





*RPMC-V with **Schischek** electrical equipment*





*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	with 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	(not available)	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	(not available)	QT.Ex-MY-SL	(not available)
600 x 600	ExMax-15.30-CY	(not available)	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 x 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 x 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.

  Al 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, of 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.

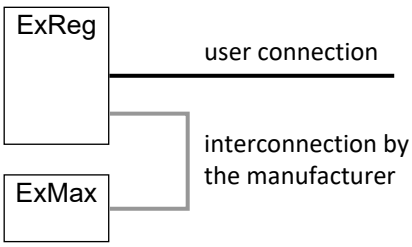
During the serviceability checks, it is necessary to check the mutual conductive connection of all metal parts, including all blades with the body (frame) of the regulator.

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

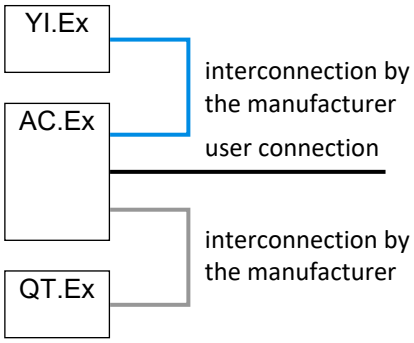
- during commissioning
- as part of each inspection, maintenance, and any possible repair or other intervention on the regulator
- at the latest after 1 year from commissioning
- if no defect in the blades grounding is found after 1 year from commissioning, then periodically at least every 5 years, otherwise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

<u>Do not connect to GND1 or GND2!</u>

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

Schischek actuator	**ExReg-… + ExMax-5.10-CY ExReg-… + ExMax-5.10-CYF ExReg-… + ExMax-15.30-CY ExReg-… + ExMax-15-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
Motor running time	60 s
Spring running time	10 s
Power consumption - the motor is running (running time 60 s)	19 W / 30 VA
Starting current	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.
Dobřišská 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:

Ex II 2G Ex h IIC T6 Gb Ta = -20...+60 °C

Device category and permitted operating temperature - regulator with electrical equipment (assembly):

Ex **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.
Dobřišská 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:

Ex II 2G Ex h IIC T6 Gb Ta = -20...+60 °C

Device category and permitted operating temperature - regulator with electrical equipment (assembly):

Ex **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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