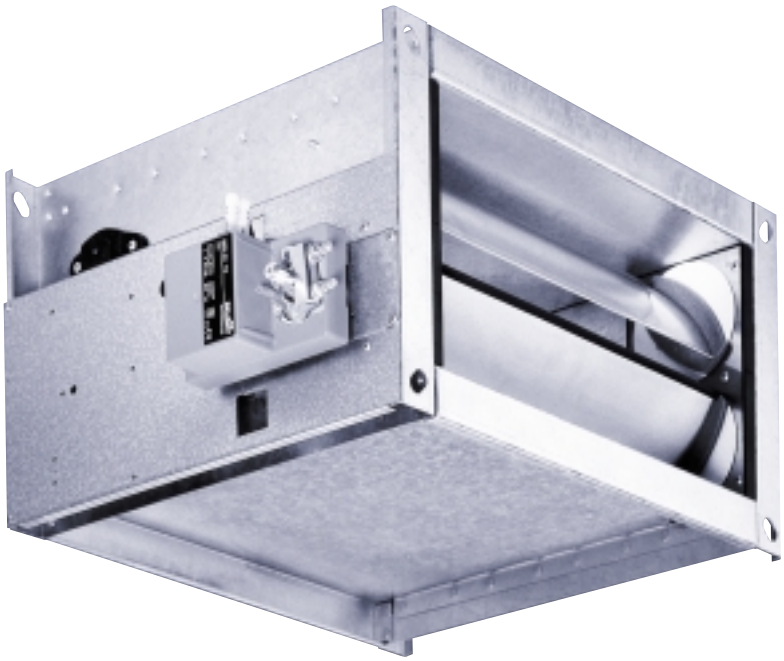
VARYCONTROL
VAV Control Units

for variable volume systems

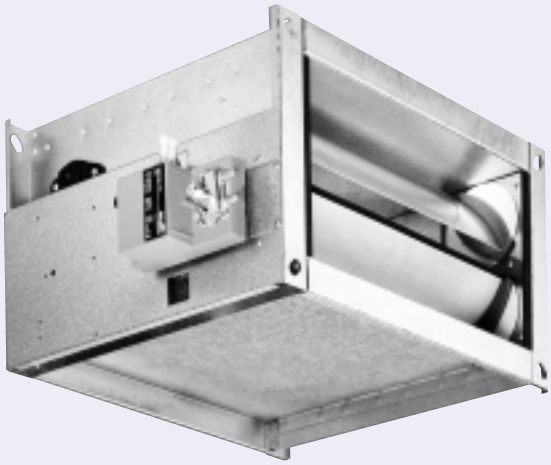
Type TVJ · TVT



TROX® TECHNIK

Contents · Description

TVT



TVTD

Trox VARYCONTROL VAV controllers, type TVJ/TVT, are rectangular volume flow control units for variable volume systems, for supply or extract application. They can be used as volume flow controllers or room or duct pressure controllers. The TVJ/TVT controllers consist of a case, a damper and an averaging differential pressure sensor.

On type TVT, the dampers are air-tight in closed position, in accordance with DIN 1946, Part 4.

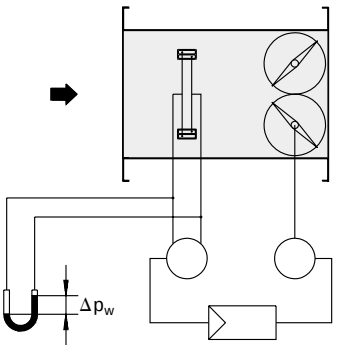
The units are also available with acoustic cladding, to reduce case-radiated noise.

When lower discharge noise requirements apply, the TX attenuator can be used. On request, VAV controllers TVJ/TVT can be provided with two- or four-row reheat coils.

The units also incorporate control components (velocity controller, transducer, actuator), which are factory-fitted compete with tubing and wiring. Trox VAV controllers can be supplied with most makes of control components, which are specified.

Each unit is factory-set to the desired volume flow rates using a calibrated airflow rig.

Further information on planning, applications, the available control components and arrangement of the units (TVJ/TVT, TX, empty casing provided on site, etc.) is contained in the product information leaflet "VARYCONTROL VAV Units".



Δp_W in Pa = effective pressure at differential pressure sensor

Construction · Dimensions

Design Features

Casing

- Stable shape, multi-profile frame
- Suitable for attachment of system 30 slide-on flanges
- Opposed blade action (hollow blades), blades connected by internal gear wheels at both ends
- Bearing sealed with ”O“ rings

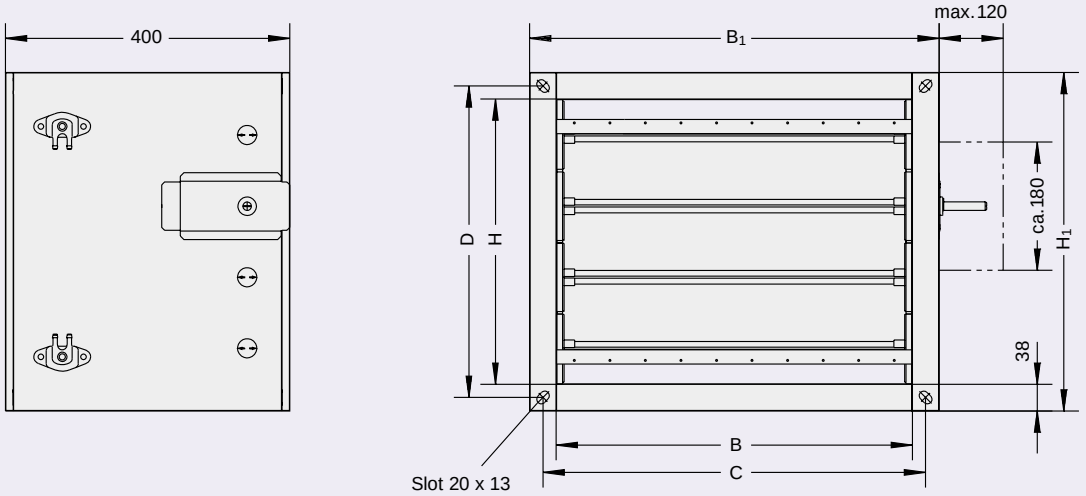
TVT Damper

- Air-tight in accordance with DIN 1946, Part 4 at and above an upstream duct cross-section of 0.04 m^2 (leakage rate < 10 $m^3/h \cdot m^2$ damper cross-section at a pressure differential of 100 Pa)
- Replaceable sealing elements
- Enclosed internal gear wheels

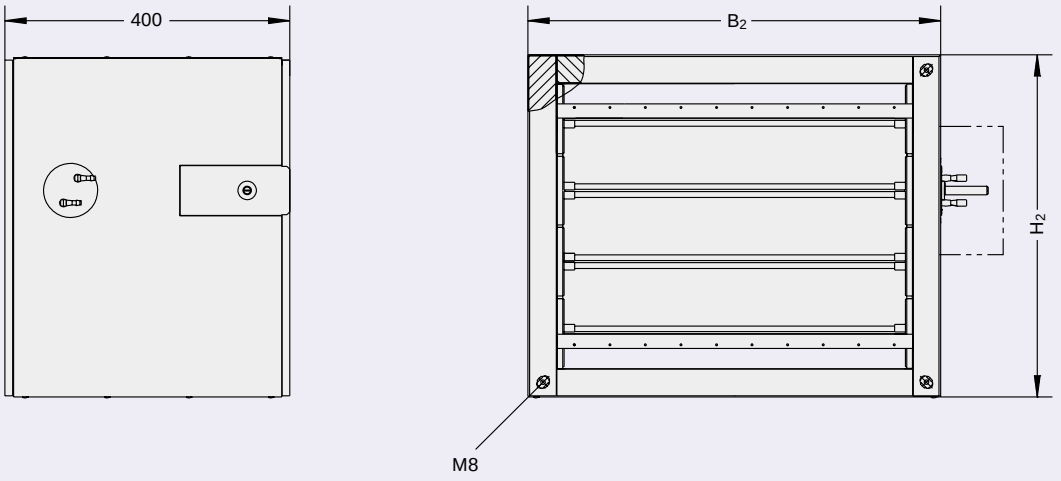
Volume Flow Controller

- Either pneumatic or electronic
- Suitable for supply or extract air
- Volume flow range approximately 5 : 1
- High accuracy of set volumes even under unfavourable inlet conditions, due to use of pressure differential sensor
- Differential pressure range 20 to 1000 Pa
- Complete shut-off possible using the damper (control switch to be provided by customer)
- Can be mounted in any orientation (install in position shown on label when using membrane pressure sensors)
- Volume flow preset at factory and each VAV controller undergoes air-flow testing
- On-site measurement and adjustment of volume flow possible, but additional ancillary equipment may be required
- The control damper mechanism of the VAV controllers is maintenance-free
- Operating temperature range 10 to 50 °C

TVJ/TVT



TVJD/TVTD



Construction · Dimensions

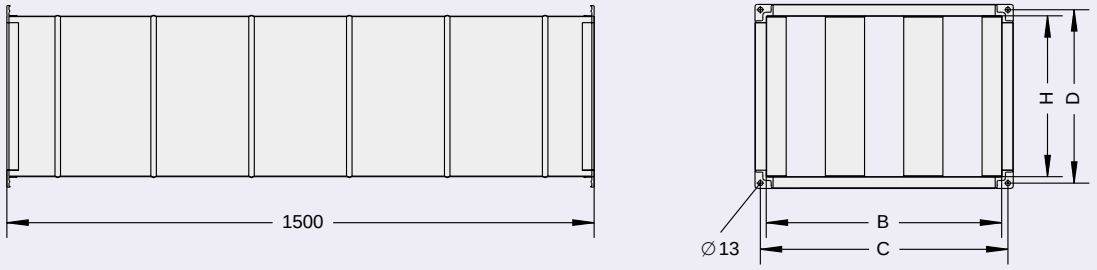
Pressure Control
- Duct or room pressure control
- Positive/negative pressures
- Nominal pressure difference factory-set, subsequent on-site adjustment possible
- Adjustment range dependent on controller type

Acoustic Cladding
- To reduce case-radiated noise
- External covering in galvanised sheet steel
- Acoustic lining

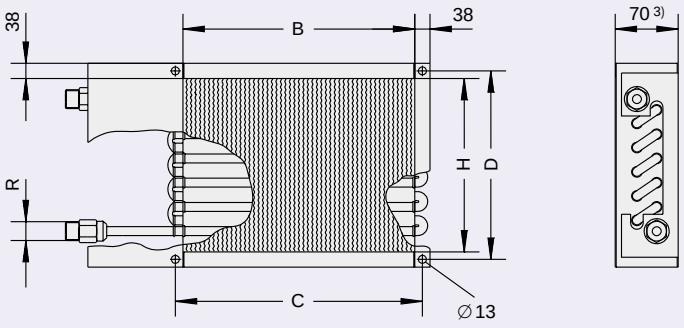
Attenuator TX
- To reduce air-regenerated noise
- Casing in galvanised sheet steel
- Mineral-wool filled splitters
- With slide-on flanges

Materials
- Casing, shafts and rods in galvanised steel
- Blades and differential pressure sensor consist of extruded aluminium sections
- Gear wheels antistatic plastic (ABS), heat-resistant up to 50°C

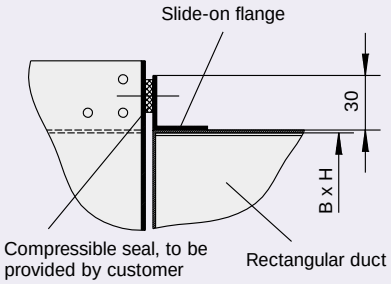
TX [1)]



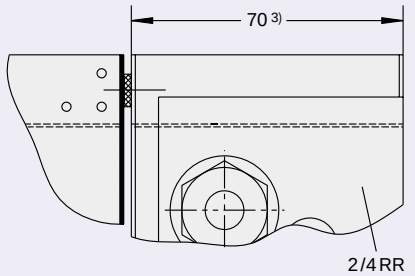
Reheat coil [2)]



Rectangular duct connection



Connection reheat coil



1) Allow 500 mm space between attenuator and VAV controller
2) Installed in front of VAV controller in air flow direction
3) 110 for 4RR

Dimensions · Weights

Table 1: Dimensions in mm, weights in kg

B x H	Dimensions										Weights				
	C	D	B_1	B_2	H_1	H_2	R		n [1]	n_1 [2]	TVJ/ TVT	TVJD/ TVDT	TX	Reheat coil	
							2RR	4RR						2RR	4RR
200 x 100	234	134	276	280	176	180	1/2 "	1/2 "	1	1	6	9	10	1.3	2.2
300 x 100	334	134	376	380	176	180	1/2 "	1/2 "			7	11	12	1.7	2.9
400 x 100	434	134	476	480	176	180	1/2 "	1/2 "			8	12	15	2.1	3.6
500 x 100	534	134	576	580	176	180	1/2 "	1/2 "			9	14	17	2.6	4.3
600 x 100	634	134	676	680	176	180	1/2 "	1/2 "			10	15	20	3.0	5.1
200 x 200	234	234	276	280	276	280	1/2 "	1/2 "	2	2	9	14	16	1.9	3.2
300 x 200	334	234	376	380	276	280	1/2 "	1/2 "			10	15	20	2.5	4.2
400 x 200	434	234	476	480	276	280	1/2 "	1/2 "			11	17	25	3.0	5.1
500 x 200	534	234	576	580	276	280	1/2 "	1/2 "			12	18	29	4.0	6.8
600 x 200	634	234	676	680	276	280	1/2 "	1/2 "			13	20	34	5.0	8.5
700 x 200	734	234	776	780	276	280	1/2 "	1/2 "			14	21	39	5.5	9.4
800 x 200	834	234	876	880	276	280	1/2 "	1/2 "			15	23	44	6.0	10.2
300 x 300	334	334	376	380	376	380	1/2 "	1/2 "	3	2	10	15	24	3.2	5.4
400 x 300	434	334	476	480	376	380	1/2 "	1/2 "			11	17	29	4.5	7.7
500 x 300	534	334	576	580	376	380	1/2 "	1/2 "			12	18	34	5.8	9.9
600 x 300	634	334	676	680	376	380	1/2 "	1/2 "			13	20	40	6.5	11.1
700 x 300	734	334	776	780	376	380	1/2 "	1/2 "			15	22	45	7.2	12.2
800 x 300	834	334	876	880	376	380	1/2 "	1/2 "			16	24	50	7.9	13.3
900 x 300	934	334	976	980	376	380	1/2 "	1/2 "			18	26	55	8.5	14.5
1000 x 300	1034	334	1076	1080	376	380	1/2 "	1 "			19	29	60	9.2	15.6
400 x 400	434	434	476	480	476	480	1/2 "	1/2 "	4	2	14	21	34	6.5	11.1
500 x 400	534	434	576	580	476	480	1/2 "	1/2 "			15	23	39	7.3	12.4
600 x 400	634	434	676	680	476	480	1/2 "	1/2 "			16	24	45	8.1	13.8
700 x 400	734	434	776	780	476	480	1/2 "	1 "			17	26	50	8.9	15.1
800 x 400	834	434	876	880	476	480	1/2 "	1 "			18	27	56	9.7	16.5
900 x 400	934	434	976	980	476	480	1/2 "	1 "			20	29	61	10.5	17.8
1000 x 400	1034	434	1076	1080	476	480	1/2 "	1 1/4 "			21	32	67	11.2	19.0
500 x 500	534	534	576	580	576	580	1/2 "	1 "	5	4	19	28	45	8.7	14.8
600 x 500	634	534	676	680	576	580	1/2 "	1 "			20	30	50	9.6	16.3
700 x 500	734	534	776	780	576	580	1/2 "	1 "			22	32	56	10.5	17.9
800 x 500	834	534	876	880	576	580	1/2 "	1 "			23	35	62	11.4	19.4
900 x 500	934	534	976	980	576	580	1/2 "	1 1/4 "			25	37	68	12.3	20.9
1000 x 500	1034	534	1076	1080	576	580	1 "	1 1/4 "			26	39	73	13.2	22.4
600 x 600	634	634	676	680	676	680	1/2 "	1 "	6	4	19	29	55	11.1	18.9
700 x 600	734	634	776	780	676	680	1/2 "	1 1/4 "			21	32	61	12.5	21.3
800 x 600	834	634	876	880	676	680	1/2 "	1 1/4 "			23	35	67	13.9	23.6
900 x 600	934	634	976	980	676	680	1 "	1 1/4 "			25	38	73	14.9	25.3
1000 x 600	1034	634	1076	1080	676	680	1 "	1 1/4 "			27	41	80	15.9	27.0
700 x 700	734	734	776	780	776	780	1/2 "	1 1/4 "	7	4	23	35	68	14.6	24.8
800 x 700	834	734	876	880	776	780	1 "	1 1/4 "			25	38	73	15.8	26.8
900 x 700	934	734	976	980	776	780	1 "	1 1/4 "			27	41	80	16.9	28.7
1000 x 700	1034	734	1076	1080	776	780	1 "	1 1/4 "			29	44	87	18.1	30.8
800 x 800	834	834	876	880	876	880	1 "	1 1/4 "	8	4	28	42	79	17.7	30.1
900 x 800	934	834	976	980	876	880	1 1/4 "	1 1/4 "			30	45	86	19.0	32.2
1000 x 800	1034	834	1076	1080	876	880	1 1/4 "	1 1/2 "			32	48	93	20.2	34.3
900 x 900	934	934	976	980	976	980	1 1/4 "	1 1/2 "	9	4	33	50	95	21.0	35.7
1000 x 900	1034	934	1076	1080	976	980	1 1/4 "	1 1/2 "			35	53	100	22.4	38.1
1000 x 1000	1034	1034	1076	1080	1076	1080	1 1/4 "	1 1/2 "	10	4	38	57	107	27.9	47.4

1) n = number of dampers

2) n_1 = number of differential pressure sensors

Volume Flow Control

Depending on the application, there are three types of control: volume flow control, duct pressure control and room pressure control.

Volume Flow Control

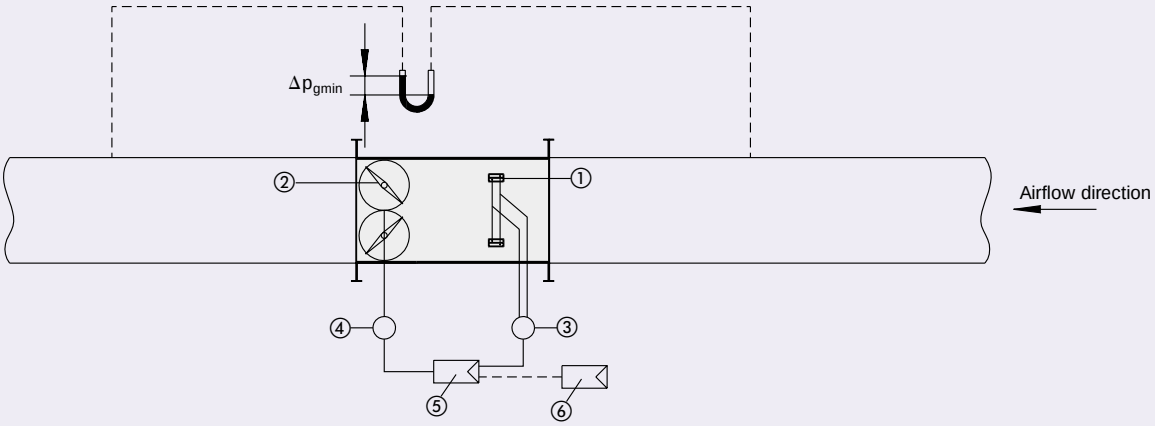
The pressure differential, Δp_w, measured at the differential pressure sensor is sent via a transmitter to the electronic or pneumatic controller as a reference signal. The controller compares the actual value with the set value. If there is discrepancy, the actuator adjusts the control damper accordingly, thus keeping the volume flow constant within close tolerances over the entire pressure differential range.

Pressure Control

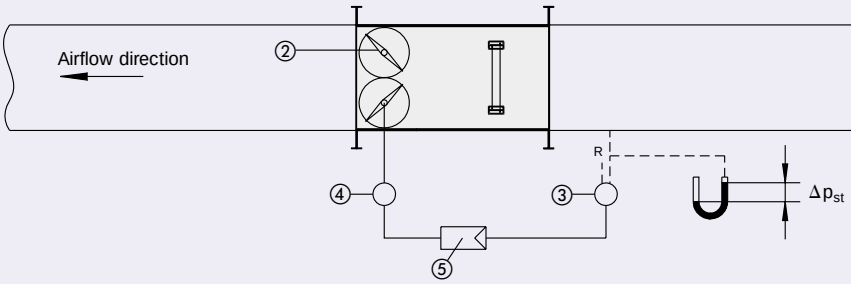
TVJ/TVT controllers are also suitable for use as duct or room pressure controllers. In this case, the differential pressure between the duct and the surrounding area or between two rooms is measured and transmitted to the controller as a reference signal.

① Differential pressure sensor
② Control damper
③ Transmitter
④ Actuator
⑤ Volume flow, room pressure or duct pressure controller
⑥ Room temperature controller (to be supplied by others)
--- piping to be provided by others

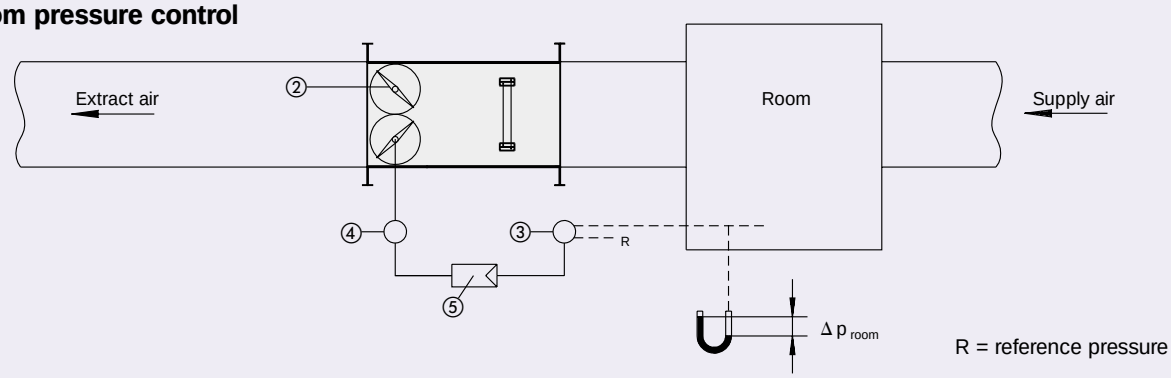
Volume flow control



Duct pressure control



Room pressure control



R = reference pressure

Nomenclature · Modes of Installation

Nomenclature

f_m in Hz: Octave band centre frequency

L_W in dB: Sound power level of air-regenerated noise in duct

L_{W1} in dB: Sound power level of case-radiated noise with 3 m connection duct on inlet and discharge side of controller. (All levels measured in reverberation chamber. Sound power data calculated and corrected in accordance with ISO 5135, December 1997).

L_{WKA} in dB(A): Sound power level of air-regenerated noise in duct, A-weighted, control damper in closed position (on TVJ only)

L in dB(A): A-weighted sound pressure level (re 20 µPa) of air-regenerated noise, including 8 dB/oct. room attenuation

L_1 in dB(A): A-weighted sound pressure level (re 20 µPa) of case-radiated noise, including 8 dB/oct., room attenuation

NC : Noise criteria of sound pressure spectrum, including 8 dB/oct. room attenuation

‡ in l/s or m³/h: Volume flow rate

$‡_L$ in l/s or m³/h: Leakage flow rate, control damper TVJ in closed position

v_A in m/s: Air velocity in inlet duct, B x H

v_H in m/s: Air velocity in main duct

Δp_g in Pa: Total pressure differential

$\Delta p_{g\,min}$ in Pa: Minimum total pressure differential

$\Delta \dot{V}$ in ± %: Deviation of volume flow from set value

B in mm: Width

H in mm: Height

L_A in mm: Upstream duct length

LB : Perforated sheet, 50% free area

K_1 in dB or NC: Correction value for air-regenerated noise

K_2 in dB or NC: Correction value for case-radiated noise (room width approx. 6 m)

Possible modes of installation and additional tolerances [1)]

Fig. 1

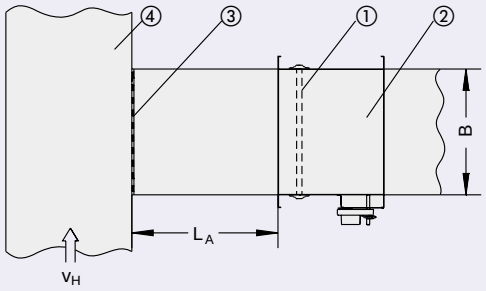


Fig. 3

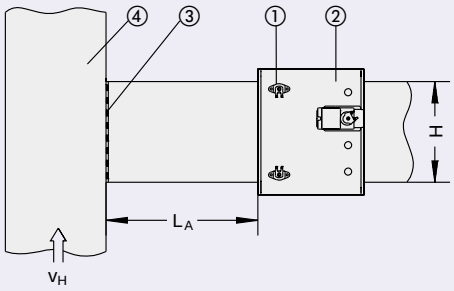


Fig. 2

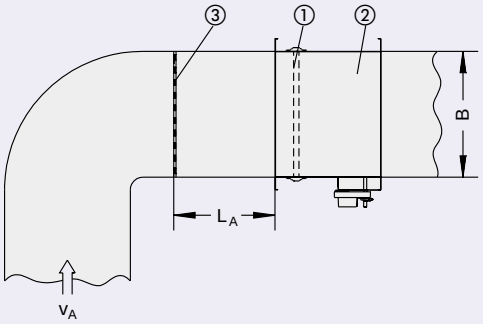
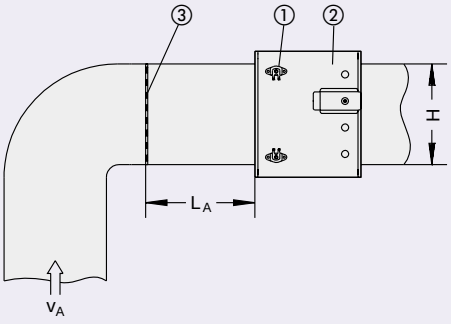


Fig. 4



① Differential pressure sensor
② VAV controller
③ Perforated sheet, 50% free area (not recommended for extract air)
④ Main duct

Table 2

Upstream duct length L	Perforated sheet	Deviation of actual $‡_{actual}$ to $‡_{set}$ in %		
		Figure 1		Figure 2
		v_H = 2.5 m/s	v_H = 8 m/s	v_A = 8 m/s
0	with	*	*	– 8
B	without	– 4	– 8	– 20
B	with	– 2	– 6	– 3
2B	without	– 2	– 4	– 8
2B	with	– 1	– 3	–
4B	without	–	–	– 3

* This mode of installation is not recommended
– Deviation negligible

Table 3

Upstream duct length L	Perforated sheet	Deviation of actual $‡_{actual}$ to $‡_{set}$ in %		
		Figure 3		Figure 4
		v_H = 2.5 m/s	v_H = 8 m/s	v_A = 2-10 m/s
0	without	*	*	– 10
0	with	*	*	– 6
0.5H	with	*	*	– 2
1.5H	without	*	*	– 2
3H	without	– 3	– 5	–
3H	with	– 3	– 3	–

1) If the mode of installation is stated when ordering, on request the tolerances can be taken into account when calibrating the units.

Aerodynamic Data

H = 100 to 400

Table 4: Minimum pressure differentials, volume flow ranges and volume flow accuracy

B x H	Δ $p_{g\ min}$ in Pa		Δ ‡ [2]	‡ [2]		v_A
mm	TVJ/TVT	TX [1]	±%	l/s	m³/h	m/s
200 x 100	20	10	14	45	162	2
	20	30	8	85	306	4
	30	85	5	150	540	7
	40	185	5	215	774	10
300 x 100	20	10	14	65	234	2
	20	30	8	120	432	4
	30	85	5	210	756	7
	40	185	5	320	1152	10
400 x 100	20	10	14	85	306	2
	20	30	8	170	612	4
	30	85	5	300	1080	7
	40	185	5	425	1530	10
500 x 100	20	10	14	105	378	2
	20	30	8	200	720	4
	30	85	5	350	1260	7
	40	185	5	535	1926	10
600 x 100	20	10	14	130	468	2
	20	30	8	260	936	4
	30	85	5	450	1620	7
	40	185	5	650	2340	19
200 x 200	20	10	14	85	306	2
	20	30	8	160	576	4
	30	85	5	280	1008	7
	40	185	5	415	1494	10
300 x 200	20	10	14	125	450	2
	20	30	8	240	864	4
	30	85	5	420	1512	7
	40	185	5	620	2232	10
400 x 200	20	10	14	165	594	2
	20	30	8	330	1188	4
	30	85	5	580	2088	7
	40	185	5	825	2970	10
500 x 200	20	10	14	205	738	2
	20	30	8	400	1440	4
	30	85	5	700	2520	7
	40	185	5	1035	3726	10
600 x 200	20	10	14	250	900	2
	20	30	8	500	1800	4
	30	85	5	870	3132	7
	40	185	5	1250	4500	10
700 x 200	20	10	14	290	1044	2
	20	30	8	560	2016	4
	30	85	5	980	3528	7
	40	185	5	1450	5220	10
800 x 200	20	10	14	330	1188	2
	20	30	8	660	2376	4
	30	85	5	1160	4176	7
	40	185	5	1650	5940	10

B x H	Δ $p_{g\ min}$ in Pa		Δ ‡ [2]	‡ [2]		v_A
mm	TVJ/TVT	TX [1]	±%	l/s	m³/h	m/s
300 x 300	20	10	14	185	666	2
	20	30	8	360	1296	4
	25	85	5	630	2268	7
	35	185	5	920	3312	10
400 x 300	20	10	14	245	882	2
	20	30	8	480	1728	4
	25	85	5	840	3024	7
	35	185	5	1230	4428	10
500 x 300	20	10	14	305	1098	2
	20	30	8	600	2160	4
	25	85	5	1050	3780	7
	35	185	5	1535	5526	10
600 x 300	20	10	14	370	1332	2
	20	30	8	740	2664	4
	25	85	5	1290	4644	7
	35	185	5	1850	6660	10
700 x 300	20	10	14	430	1548	2
	20	30	8	840	3024	4
	25	85	5	1470	5292	7
	35	185	5	2150	7740	10
800 x 300	20	10	14	490	1764	2
	20	30	8	980	2528	4
	25	85	5	1720	6192	7
	35	185	5	2450	8820	10
900 x 300	20	10	14	555	1998	2
	20	30	8	1080	3888	4
	25	85	5	1890	6804	7
	35	185	5	2770	9972	10
1000 x 300	20	10	14	620	2234	2
	20	30	8	1240	4464	4
	25	85	5	2150	7740	7
	35	185	5	3100	11160	10
400 x 400	20	10	14	325	1170	2
	20	30	8	640	2304	4
	25	85	5	1120	4032	7
	35	185	5	1630	5868	10
500 x 400	20	10	14	410	1476	2
	20	30	8	800	2880	4
	25	85	5	1400	5040	7
	35	185	5	2040	7344	10
600 x 400	20	10	14	490	1764	2
	20	30	8	980	2528	4
	25	85	5	1720	6192	7
	35	185	5	2450	8820	10
700 x 400	20	10	14	570	2052	2
	20	30	8	1120	4032	4
	25	85	5	1960	7056	7
	35	185	5	2850	10260	10
800 x 400	20	10	14	650	2340	2
	20	30	8	1300	4680	4
	25	85	5	2280	8208	7
	35	185	5	3250	11700	10
900 x 400	20	10	14	735	2646	2
	20	30	8	1440	5184	4
	25	85	5	2520	9072	7
	35	185	5	3670	13212	10
1000 x 400	20	10	14	820	2952	2
	20	30	8	1640	5904	4
	25	85	5	2850	10260	7
	35	185	5	4100	14760	10

1) Additional factor to be taken into account
2) Typical values

Table 5: Minimum pressure differentials, volume flow ranges and volume flow accuracy

B x H	Δ $p_{g\ min}$ in Pa		Δ ‡ [2]	‡ [2]		v_A
mm	TVJ/TVT	TX [1]	±%	l/s	m³/h	m/s
500 x 500	20	10	14	510	1836	2
	20	30	8	1000	3600	4
	30	85	5	1750	6300	7
	40	185	5	2540	9144	10
600 x 500	20	10	14	610	2196	2
	20	30	8	1200	4320	4
	30	85	5	2100	7560	7
	40	185	5	3050	10980	10
700 x 500	20	10	14	710	2556	2
	20	30	8	1400	5040	
	30	85	5	2450	8820	7
	40	185	5	3550	12780	10
800 x 500	20	10	14	810	2916	2
	20	30	8	1600	5760	4
	30	85	5	2800	10080	
	40	185	5	4050	14580	10
900 x 500	20	10	14	915	3294	2
	20	30	8	1800	6480	4
	30	85	5	3150	11340	7
	40	185	5	4570	16452	10
1000 x 500	20	10	14	1020	3672	2
	20	30	8	2000	7200	4
	30	85	5	3500	12600	7
	40	185	5	5100	18360	10
600 x 600	20	10	14	730	2628	2
	20	30	8	1440	5184	4
	30	85	5	2520	9072	7
	40	185	5	3650	13140	1
700 x 600	20	10	14	850	3060	2
	20	30	8	1680	6048	4
	30	85	5	2940	10584	7
	40	185	5	4250	15300	10
800 x 600	20	10	14	970	3492	2
	20	30	8	1920	6912	4
	30	85	5	3360	12096	7
	40	185	5	4850	17460	10
900 x 600	20	10	14	1100	3960	2
	20	30	8	2160	7776	4
	30	85	5	3780	13608	7
	40	185	5	5500	19800	10
1000 x 600	20	10	14	1220	4392	2
	20	30	8	2400	8640	4
	30	85	5	4200	15120	7
	40	185	5	6100	21960	10

B x H	Δ $p_{g\ min}$ in Pa		Δ ‡ [2]	‡ [2]		v_A
mm	TVJ/TVT	TX [1]	±%	l/s	m³/h	m/s
700 x 700	20	10	14	990	3564	2
	20	30	8	1960	7056	4
	30	85	5	3430	12348	7
	40	185	5	4950	17820	10
800 x 700	20	10	14	1140	4104	2
	20	30	8	2240	8064	4
	30	85	5	3920	14112	7
	40	185	5	5700	20520	10
900 x 700	20	10	14	1280	4608	2
	20	30	8	2520	9072	4
	30	85	5	4410	15876	7
	40	185	5	6400	23040	10
1000 x 700	20	10	14	1420	5112	2
	20	30	8	2520	9072	4
	30	85	5	4410	15876	7
	40	185	5	7100	25560	10
800 x 800	20	10	14	1300	4680	2
	20	30	8	2560	9216	4
	30	85	5	4480	16128	7
	40	185	5	6500	23400	10
900 x 800	20	10	14	1460	5256	2
	20	30	8	2880	10368	4
	30	85	5	5040	18144	7
	40	185	5	7300	26280	10
1000 x 800	20	10	14	1620	5832	2
	20	30	8	3200	11520	4
	30	85	5	5600	20160	7
	40	185	5	8100	29160	10
900 x 900	20	10	14	1640	5904	2
	20	30	8	3240	11664	4
	30	85	5	5670	20412	7
	40	185	5	8200	29520	10
1000 x 900	20	10	14	1820	6552	2
	20	30	8	3600	12960	4
	30	85	5	6300	22680	7
	40	185	5	9100	32760	10
1000 x 1000	20	10	14	2020	7272	2
	20	30	8	4000	14400	4
	30	85	5	7000	25200	7
	40	185	5	10100	36360	10

1) Additional factor to be taken into account
2) Typical values

Air-Regenerated Noise

Correction Values for Air-Regenerated Noise

Width B in mm	200	300	400	500	600	700	800	900	1000
K_1 in dB or NC (reference width 600)	– 3	– 2	– 1	– 1	0	0	1	1	2
K_1 in dB or NC (reference width 1000)	–	–	–	–	–	– 1	– 1	0	0

Table 6: Air-regenerated noise

B	H	v_A	TVJ												TVT											
			Supply						Extract						Supply						Extract					
			Δp_g in Pa																							
			200		500		1000		200		500		1000		200		500		1000		200		500		1000	
mm	mm	m/s	L in dB(A)	NC	L in dB(A)	NC	L in dB(A)	NC	L in dB(A)	NC	L in dB(A)	NC	L in dB(A)	NC	L in dB(A)	NC	L in dB(A)	NC	L in dB(A)	NC	L in dB(A)	NC	L in dB(A)	NC	L in dB(A)	NC
600	100	2	50	48	60	56	67	62	50	47	58	55	65	61	45	39	54	49	61	57	48	41	59	51	67	59
		4	53	50	62	58	69	64	53	49	61	57	68	64	49	43	59	54	66	61	53	45	64	56	72	64
		7	55	51	64	59	71	>65	55	51	64	59	70	>65	53	47	62	57	69	65	57	49	68	60	76	>65
		10	56	52	65	60	73	>65	56	52	65	60	72	>65	56	49	65	59	72	>65	59	51	70	62	78	>65
600	200	2	53	50	62	58	69	64	52	49	61	57	67	63	47	42	57	52	64	60	48	41	58	52	67	60
		4	55	52	65	60	72	>65	55	51	64	59	70	>65	52	46	61	56	68	64	53	46	63	56	71	64
		7	57	53	66	61	74	>65	57	53	66	61	73	>65	56	50	65	60	72	>65	56	49	67	60	75	>65
		10	58	54	68	62	75	>65	59	54	68	62	74	>65	58	52	68	62	75	>65	59	52	70	62	78	>65
600	300	2	54	52	64	60	71	>65	53	50	62	58	69	65	49	43	58	53	65	61	47	41	58	52	66	60
		4	56	53	66	61	73	>65	56	52	65	61	72	>65	54	48	63	58	70	>65	52	46	63	56	71	64
		7	58	54	68	62	75	>65	59	54	67	62	74	>65	57	51	67	61	74	>65	56	50	67	60	75	>65
		10	60	55	69	63	76	>65	60	55	69	64	75	>65	60	53	69	63	76	>65	59	52	69	63	77	>65
600	400	2	55	52	64	60	72	>65	54	51	63	59	69	>65	50	44	59	54	66	62	47	42	58	52	66	60
		4	57	54	67	62	74	>65	57	53	66	61	72	>65	55	49	64	59	71	>65	52	46	63	57	71	65
		7	59	55	69	63	76	>65	60	55	68	63	75	>65	58	52	68	62	75	>65	56	50	67	60	75	>65
		10	60	56	70	64	77	>65	61	56	70	64	76	>65	61	54	70	64	77	>65	58	52	69	63	77	>65
600	500	2	56	53	65	61	72	>65	55	51	64	60	70	>65	51	45	60	55	67	63	47	42	58	52	66	60
		4	58	55	68	63	75	>65	58	54	67	62	73	>65	55	49	65	60	72	>65	52	46	63	57	71	65
		7	60	56	69	64	77	>65	60	56	69	64	76	>65	59	53	69	63	76	>65	56	50	66	60	74	>65
		10	61	57	71	65	78	>65	62	57	71	>65	77	>65	62	55	71	>65	78	>65	58	52	69	63	77	>65
600	600	2	56	54	66	62	73	>65	56	52	64	60	71	>65	51	46	61	56	68	64	47	42	58	52	66	60
		4	59	55	68	63	75	>65	59	54	67	63	74	>65	56	50	66	60	73	>65	52	46	62	57	70	65
		7	61	56	70	64	77	>65	61	56	70	64	76	>65	60	54	69	64	76	>65	56	50	66	61	74	>65
		10	62	57	71	>65	78	>65	62	57	71	>65	78	>65	62	56	72	>65	79	>65	58	52	69	63	77	>65
1000	700	2	59	54	68	63	75	>65	58	53	67	61	73	>65	54	48	63	58	70	>65	50	44	60	54	69	62
		4	61	56	71	64	78	>65	61	55	70	64	76	>65	59	52	68	63	75	>65	54	48	65	59	73	>65
		7	63	57	73	>65	80	>65	63	57	72	>65	79	>65	62	56	72	>65	79	>65	58	52	69	62	77	>65
		10	64	58	74	>65	81	>65	65	58	74	>65	80	>65	65	58	74	>65	81	>65	61	54	72	65	80	>65
1000	800	2	59	55	69	63	76	>65	58	53	67	62	74	>65	54	49	64	59	71	>65	50	44	60	54	68	62
		4	62	56	71	64	78	>65	61	56	70	64	77	>65	59	53	68	63	76	>65	54	48	65	59	73	>65
		7	64	58	73	>65	80	>65	64	58	72	>65	79	>65	63	56	72	>65	79	>65	58	52	69	62	77	>65
		10	65	58	74	>65	81	>65	65	59	74	>65	81	>65	65	59	75	>65	82	>65	61	54	71	65	80	>65
1000	900	2	60	55	69	63	76	>65	59	54	67	62	74	>65	55	49	64	59	71	>65	50	44	60	54	68	62
		4	62	57	71	65	79	>65	62	56	70	64	77	>65	60	53	69	63	76	>65	54	48	65	59	73	>65
		7	64	58	73	>65	81	>65	64	58	73	>65	79	>65	63	57	73	>65	80	>65	58	52	69	63	77	>65
		10	65	59	75	>65	82	>65	66	59	74	>65	81	>65	66	59	75	>65	82	>65	61	54	71	65	79	>65
1000	1000	2	60	56	69	64	77	>65	59	54	68	63	74	>65	55	49	65	59	72	>65	49	44	60	54	68	62
		4	62	57	72	>65	79	>65	62	56	71	65	77	>65	60	54	69	64	76	>65	54	48	65	59	73	>65
		7	64	58	74	>65	81	>65	64	58	73	>65	80	>65	64	57	73	>65	80	>65	58	52	69	63	77	>65
		10	65	59	75	>65	82	>65	66	59	75	>65	81	>65	66	59	76	>65	83	>65	61	54	71	65	79	>65

Correction Values for Case-Radiated Noise

Width B in mm	200	300	400	500	600	700	800	900	1000
K_2 in dB or NC (reference width 600)	– 2	– 2	– 1	0	0	0	1	1	1
K_2 in dB or NC (reference width 1000)	–	–	–	–	–	– 1	0	0	0

Table 7: Case-radiated noise

B	H	v_A	TVJ						TVT					
			Δp_g in Pa											
			200		500		1000		200		500		1000	
mm	mm	m/s	L_1 in dB(A)	NC	L_1 in dB(A)	NC	L_1 in dB(A)	NC	L_1 in dB(A)	NC	L_1 in dB(A)	NC	L_1 in dB(A)	NC
600	100	2	37	31	45	39	51	45	36	51	44	61	50	> 65
		4	43	38	51	46	56	52	43	62	51	> 65	58	> 65
		7	47	44	55	52	61	58	49	> 65	57	> 65	63	> 65
		10	50	48	58	56	64	62	53	> 65	61	> 65	67	> 65
600	200	2	41	35	49	43	55	49	39	45	47	54	54	61
		4	47	43	54	50	60	56	46	55	55	64	61	> 65
		7	51	49	59	56	65	62	52	63	60	> 65	67	> 65
		10	54	52	62	60	68	> 65	56	> 65	64	> 65	70	> 65
600	300	2	43	38	51	46	57	52	41	41	49	50	55	57
		4	49	45	57	53	62	59	48	51	56	60	63	> 65
		7	53	51	61	59	67	65	54	59	62	> 65	68	> 65
		10	56	55	64	63	70	> 65	58	64	66	> 65	72	> 65
600	400	2	45	40	53	47	59	53	42	38	51	47	57	54
		4	50	47	58	55	64	61	50	48	58	57	64	64
		7	55	53	63	61	69	> 65	55	56	64	> 65	70	> 65
		10	58	57	65	64	71	> 65	59	61	67	> 65	73	> 65
600	500	2	46	41	54	49	60	55	43	36	52	45	58	52
		4	52	48	59	56	65	62	51	46	59	55	65	62
		7	56	54	64	62	70	> 65	56	54	65	63	71	> 65
		10	59	58	67	> 65	73	> 65	60	59	68	> 65	75	> 65
600	600	2	47	42	55	50	61	56	44	34	52	43	59	50
		4	53	49	60	57	66	63	51	44	60	53	66	60
		7	57	55	65	63	71	> 65	57	52	65	61	72	> 65
		10	60	59	68	> 65	74	> 65	61	57	69	> 65	75	> 65
1000	700	2	50	44	58	52	64	58	45	38	53	47	60	54
		4	56	51	63	59	69	> 65	53	49	61	58	67	64
		7	60	57	68	> 65	74	> 65	58	57	66	> 65	73	> 65
		10	63	61	71	> 65	76	> 65	62	62	70	> 65	76	> 65
1000	800	2	51	45	59	53	64	59	46	37	54	46	60	53
		4	56	52	64	60	70	> 65	53	47	61	56	67	63
		7	61	58	68	> 65	74	> 65	59	55	67	64	73	> 65
		10	63	62	71	> 65	77	> 65	63	61	71	> 65	77	> 65
1000	900	2	51	46	59	53	65	59	46	36	55	45	61	52
		4	57	53	65	61	71	> 65	54	46	62	55	68	62
		7	61	59	69	> 65	75	> 65	59	54	68	63	74	> 65
		10	64	63	72	> 65	78	> 65	63	59	71	> 65	78	> 65
1000	1000	2	52	46	60	54	66	60	47	35	55	44	61	51
		4	57	54	65	61	71	> 65	54	45	62	54	68	61
		7	62	60	70	> 65	76	> 65	60	53	68	62	74	> 65
		10	65	63	72	> 65	78	> 65	64	58	72	> 65	78	> 65

Leakage Flow Rate

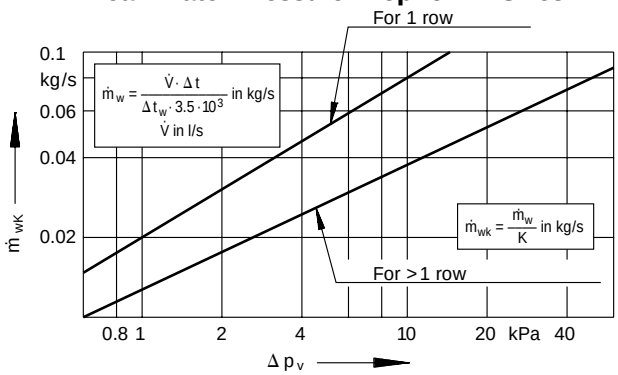
TVJ only

Table 8: Leakage flow rate and sound power level with damper blades in closed position

Dimensions B x H Size	Δ p_g = 200 Pa			Δ p_g = 500 Pa			Δ p_g = 1000 Pa		
	‡ $_L$		L_{WKA}	‡ $_L$		L_{WKA}	‡ $_L$		L_{WKA}
	in l/s	in m³/h	in dB(A)	in l/s	in m³/h	in dB(A)	in l/s	in m³/h	in dB(A)
200 x 100	13	46	47	20	72	57	28	102	65
300 x 100	13	48	49	21	76	59	30	107	67
400 x 100	14	50	50	22	79	60	31	112	68
500 x 100	16	57	51	25	90	61	35	127	69
600 x 100	18	64	52	28	101	62	40	143	70
200 x 200	14	50	50	22	79	60	31	112	68
300 x 200	16	57	52	25	90	62	35	127	70
400 x 200	18	64	53	28	101	63	40	143	71
500 x 200	20	73	53	32	115	63	45	163	71
600 x 200	22	80	54	35	126	64	49	178	72
700 x 200	25	89	55	39	140	65	55	199	73
800 x 200	27	96	56	42	151	66	59	214	74
300 x 300	21	75	53	33	119	63	47	168	71
400 x 300	24	87	54	38	137	64	54	193	72
500 x 300	28	100	55	44	158	65	62	224	73
600 x 300	31	112	56	49	176	66	69	249	74
700 x 300	34	121	57	53	191	67	75	270	75
800 x 300	35	128	58	56	202	68	79	285	76
900 x 300	37	134	57	59	212	67	83	300	75
1000 x 300	39	139	58	61	220	68	86	311	76
400 x 400	32	114	56	50	180	66	71	255	74
500 x 400	35	128	57	56	202	67	79	285	75
600 x 400	39	139	58	61	220	68	86	311	76
700 x 400	43	155	57	68	245	67	96	346	75
800 x 400	47	171	58	75	270	68	106	382	76
900 x 400	50	180	59	79	284	69	112	402	77
1000 x 400	52	189	59	83	299	69	117	423	77
500 x 500	41	148	58	65	234	68	92	331	76
600 x 500	46	164	58	72	259	68	102	367	76
700 x 500	49	178	58	78	281	68	110	397	76
800 x 500	53	191	59	84	302	69	119	428	77
900 x 500	57	205	59	90	324	69	127	458	77
1000 x 500	61	219	60	96	346	70	136	489	78
600 x 600	51	182	59	80	288	69	113	407	77
700 x 600	56	203	59	89	320	69	126	453	77
800 x 600	62	223	60	98	353	70	139	499	78
900 x 600	68	244	60	107	385	70	151	545	78
1000 x 600	73	262	61	115	414	71	163	585	79
700 x 700	63	228	60	100	360	70	141	509	78
800 x 700	71	257	61	113	407	71	160	575	79
900 x 700	79	285	61	125	450	71	177	636	79
1000 x 700	85	307	61	135	486	71	191	687	79
800 x 800	76	273	61	120	432	71	170	611	79
900 x 800	84	303	62	133	479	72	188	677	80
1000 x 800	92	330	62	145	522	72	205	738	80
900 x 900	85	307	62	135	486	72	191	687	80
1000 x 900	95	342	62	150	540	72	212	764	80
1000 x 1000	108	387	63	170	612	73	240	865	81

Reheat Coil Configuration

1 Mean Water Pressure Drop for All Sizes



Number of Circuits K

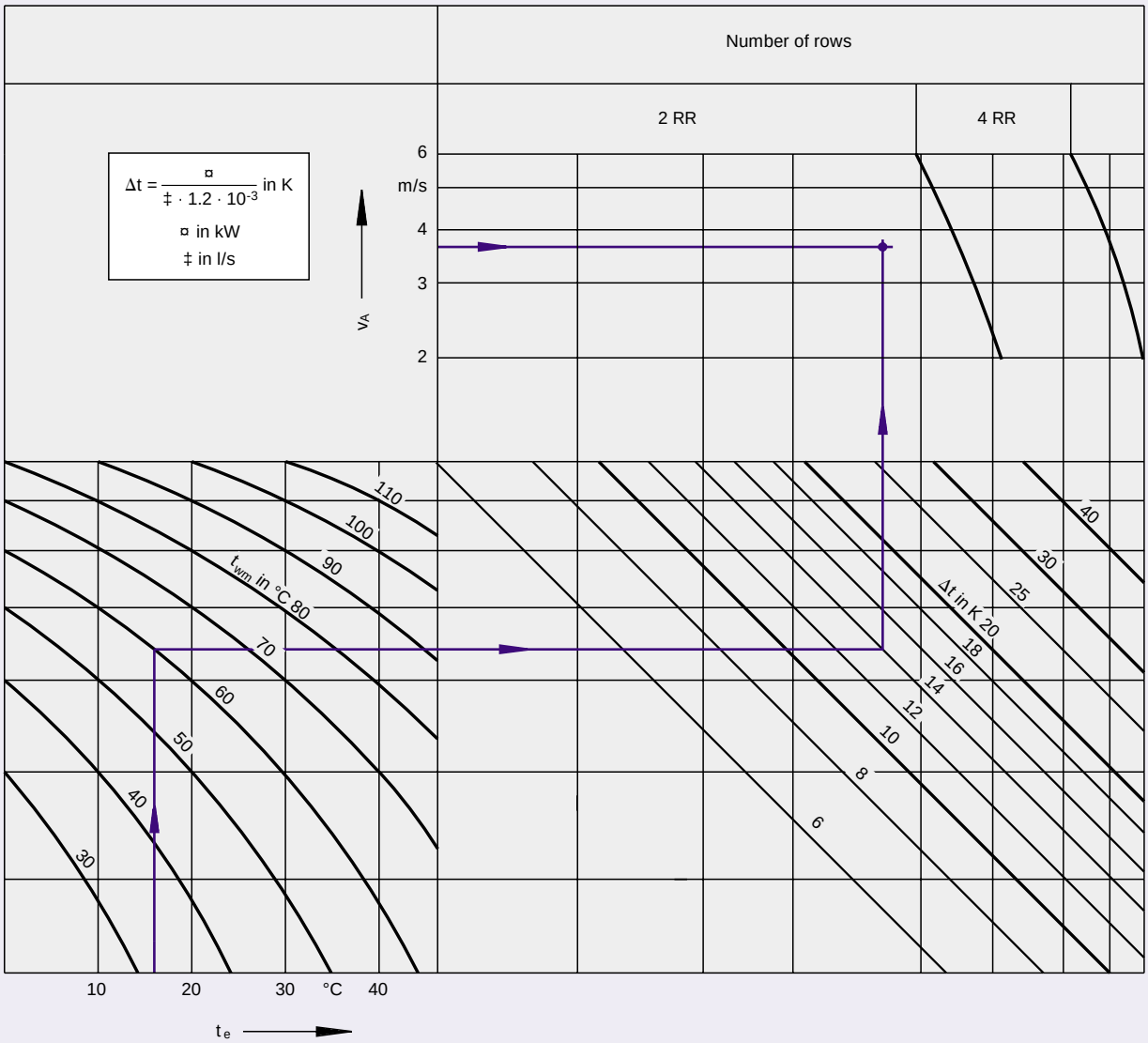
B / H	200		300		400		500		600		700		800		900		1000	
	2RR	4RR	2RR	4RR	2RR	4RR	2RR	4RR	2RR	4RR	2RR	4RR	2RR	4RR	2RR	4RR	2RR	4RR
100	1	1	1	2	1	2	1	2	2	2								
200	1	2	2	3	2	3	2	4	4	4	4	5	4	5				
300			2	4	3	4	4	6	4	6	4	8	6	9	6	9	6	12
400					4	6	4	8	6	8	5	10	6	12	8	12	8	16
500							5	10	6	10	8	12	8	16	8	16	10	16
600									8	12	8	16	9	16	12	20	12	20
700											9	18	11	22	14	22	14	22
800													12	24	16	24	16	32
900															18	28	18	36
1000																	20	40

Nomenclature

RR : Number of rows
K : Number of circuits
¢ w in kPa: Mass flow (water)
¢ wK in kPa: Mass flow per circuit
¤ in kW: Heat output

t_e in °C: Air on coil temperature
t_a in °C: Air off coil temperature
t_{wm} in °C: Mean water temperature
Δp_v in kPa: Water pressure drop
Δt in K: Air temperature differential
Δt_w in K: Water temperature differential

2 Selection Diagram



Order Information

Specification Text

Rectangular VAV controllers for variable volume flow systems, for supply air or extract air, volume flow range from 45 to 10100 l/s or 162 to 36000 m^3/h. Comprising casing with rectangular damper with opposed blade action connected via gears (type TVT air-tight in accordance with DIN 1946, Part 4 at and above upstream duct cross-section of 0.04 m^2), integrated differential pressure sensor and factory-mounted and pre-wired control components.

Control modes:

☐ Variable volume flow control, electronic controller for connection of control signal, actual signal can be read, dynamic/ static differential pressure measurement, supply voltage 24 VAC signal voltage 2…10 DC/0…10 VDC.

☐ Variable volume flow rate, pneumatic controller for connection of control signal, static differential pressure measurement, P/PI control, control signal 0.2…1.0 bar, normally open/ normally closed, direct or indirect acting

☐ Room temperature and variable control, digital controller with integral/separate transducer, communication via databus, Triac switching for 3-point control of actuator, passive/ busable for room control devices, slave operation: override switching; actuator: 24 VAC, 3-point action.

Casing air-flow leakage to Class II, VDI 3803 or DIN 24194, Part 2. Differential pressure range 20 to 1000 Pa, volume flow range 5:1.

Material: Casing dimensionally stable multi-profile frame in galvanised sheet steel, opposed blade action hollow blades and pressure differential sensor in extruded aluminium sections, gear wheels in ABS plastic.

Options:
Acoustic cladding, to reduce case-radiated noise, 40 mm mineral wool and external cover of 1 mm galvanised sheet steel.
Reheat coils, casing in galvanised sheet steel, copper pipes and aluminium fins, with flange at both ends.
For reduction of attenuator type TX, air-regenerated noise, casing of 1 mm galvanised sheet steel, splitters with mineral wool infill, to fit unit, with slide-on flanges at both ends.

Order code TVJ/TVT

see pricelist

TVJ - P1 / **600 x 400** / **00** / **B13** / **E 2** / **490 - 2450 l/s**

Type
VAV controller, not airtight — TVJ
With acoustic cladding — TVJD
VAV controller, airtight (to DIN 1946, Part 4) — TVT 1)
With acoustic cladding — TVTD 1)

Material
Surface powder-coated (colour RAL 7001) — P1
(Standard, galvanised steel; no entry)

Reheat coil
2-row — 2
4-row — 4
(Reheat coil only in galvanised steel; standard configuration, without reheat coils; no entry)

Matching flange
Without (standard) — 00
Slide-on flange at one end — L1
Slide-on flange at both ends — L2

B x H

Volume flow control (V)
State volume flow range and units

Pressure control (D)
State positive or negative pressure and installation details: supply or extract air pressure in Pa

Mode of operation
M. Master
S. Slave
E. Individual
F. Fixed value
U. Switchable fixed value

Control components
Manufacturer
Controller/sensor
Actuator

1) Airtight at and above upstream duct cross-section 0.04 m^2 (to DIN 1946, Part 4)

Order code TX

TX - LB / **600 x 400** / **00**

Type
Attenuator — TX

Lining
With perforated sheet covering — LB
(no entry for standard configuration without perforated sheet)

B x H

Matching flange
Without (standard) — 00
Slide-on flange at one end — L1
Slide-on flange at both ends — L2

Order example TVJ

Make: TROX
Type: TVJ - P1 / 600 x 400 / 00 / B13 / E2 / 490-2450 l/s

Order example TX

Make: TROX
Type: TX - LB / 600 x 400 / 00