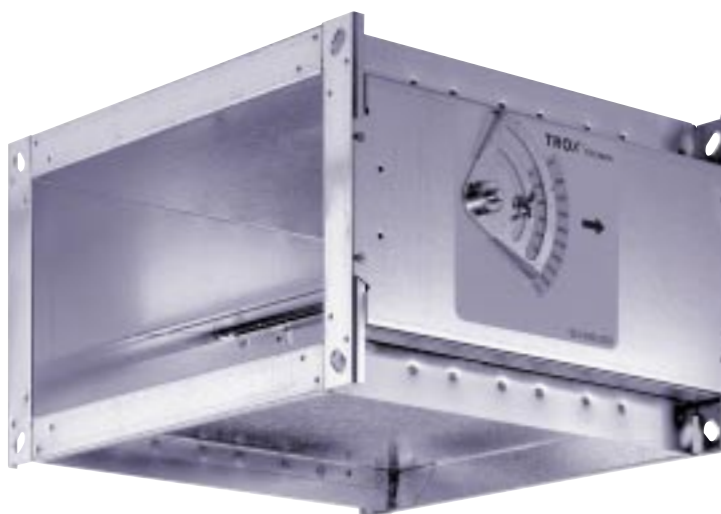


Volume Flow Rate Controller

for constant volume systems

Type E



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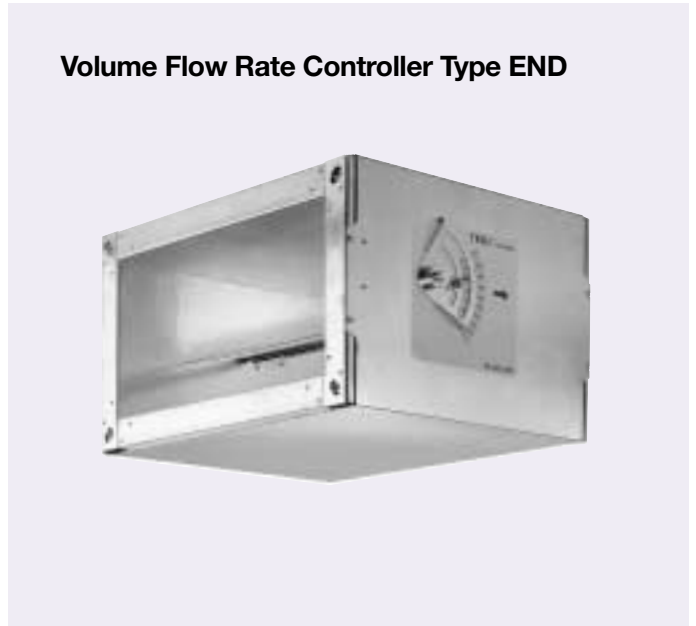
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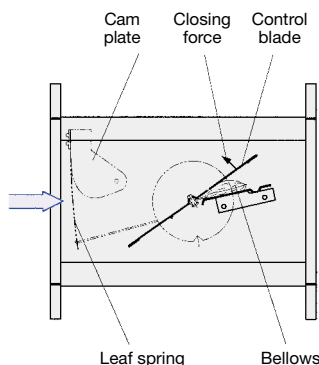
Volume Flow Rate Controller Type EN



Volume Flow Rate Controller Type END



Trox type E volume flow rate controllers are mechanical system powered controllers for constant volume systems. The volume flow rate controller operates without an external power supply. A control blade supported in bearings is positioned by aerodynamic forces such that a pre-set volume flow is maintained constant over the entire differential pressure range.



The aerodynamic closing force on the control blade is amplified by the inflating bellows which also acts as an oscillation damper. A suitably calibrated leaf spring acts against the closing force (see diagram). The leaf spring is adjusted via a cam disc such that as the pressure differential Δp_g changes, the angle of the control blade is adjusted to provide a constant flow rate within a close tolerance.

The volume flow can be accurately set using an external scale with indicator. To simplify on site installation, controllers need only be installed on a size basis and the actual volume flow easily and accurately set up during commissioning.

Economical Commissioning

The required volume flow can be set using the external scale on the type E controller by means of the settings on the arm without site flow measurement. The advantage over conventional dampers is that repeated measurements and adjustments by a qualified commissioning engineer are no longer required.

If the system pressure changes, e.g. due to the opening or closing of duct sections, the volume flows in the entire system change; this is not the case when type E volume flow controllers are used. The controllers respond immediately and adjust the damper positions directly so that the set volume flow is held constant over the entire differential pressure range. The volume flow rate controller type E can be supplied with an electric actuator for changing the set value.

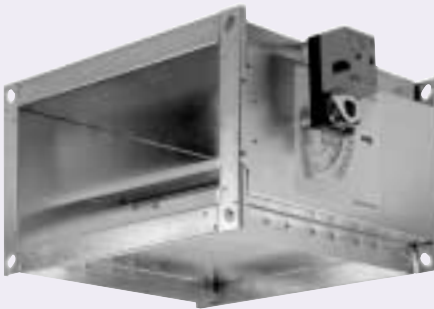
Simplified Installation

The Trox Volume Flow Controller type E has flanges on both ends for airtight connection.

Acoustic Features

If required the attenuator TX can be used to reduce discharge noise levels (installation on site).

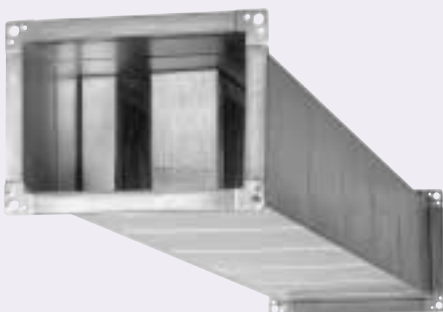
Volume Flow Rate Controller Type EN with Actuator



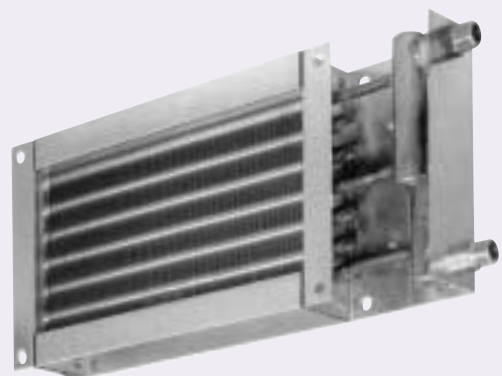
EN, H \geq 400 mm (Double Controller)



Silencer TX



Reheat Coil



Constructions · Dimensions

Design Features

Casing

- Rectangular construction
- Flanged on both ends

Volume Flow Rate Controller

- Mechanical system powered, no external power supply
- For supply air or extract air
- Operating temperature 10 to 50 °C
- Differential pressure range of 50 to 1000 Pa
- Can be installed in any orientation with horizontal blade shaft
- Correct functioning even with unfavourable inlet and outlet flow conditions (required straight inlet length 1.5 B and outlet length 0.5 B)
- Control blade shaft supported in bearings
- Control bellows also acts as an oscillation damper
- Volume flow range 4:1
- Volume flow rate controlled with low tolerance
- Volume flow rate adjustment via external scale, scale accuracy approx. $\pm 4\%$
- The control blade mechanism is maintenance-free

Actuators

- For setpoint changeover via remote signals
- Electrical supply 24 VAC or 230 VAC
- Factory-fitted
- Compact construction takes up little space

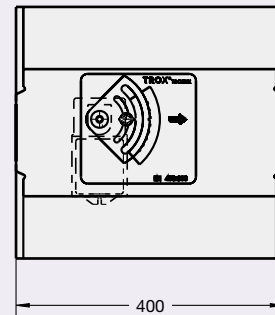
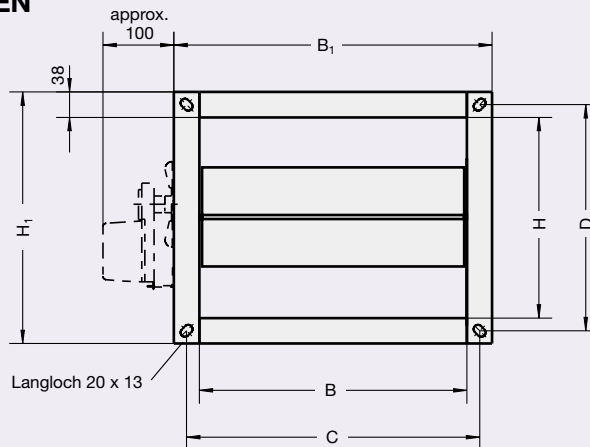
Materials

- Casing and control blade in galvanised sheet steel
- Stainless steel leaf spring
- Polyurethane bellows
- Bearings with PTFE lining

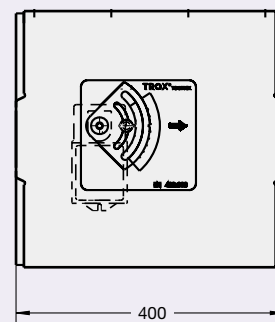
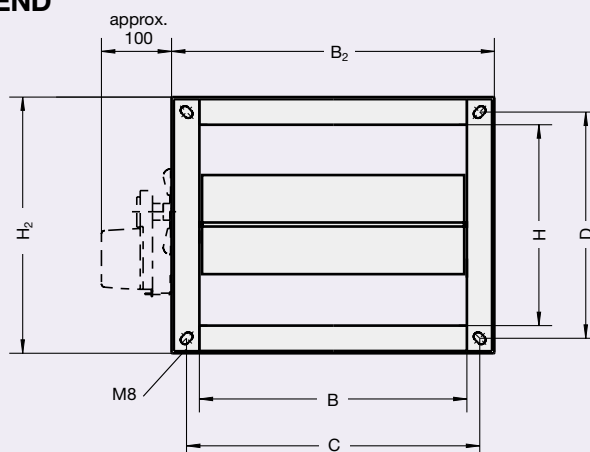
Reheat Coil

- Separately deliverable for reheat of air volume
- Casing made of galvanised sheet steel
- Flanged on both ends
- Copper tubes and aluminium fins
- Generally two rows
- Maximum operating pressure 16 bar
- For warm water up to 100 °C
- Water connections horizontal, air venting by customer

EN



END



Nomenclature · Constructions · Dimensions · Accessories

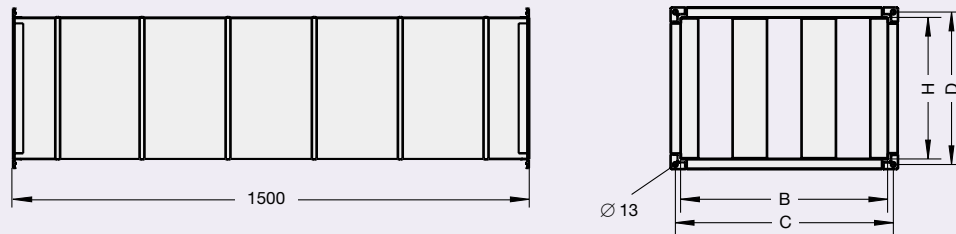
Nomenclature

f_m	in Hz: Octave centre frequency
L_w	in dB: Sound power level (re 1 pW) of air-regenerated noise in connection duct
L_{w1}	in dB: Sound power level (re 1 pW) of radiated noise, according to Fig. 1 ... 3, table 5
L	in dB(A): A-weighted sound power level (re 20 μ Pa) of air-regenerated noise assuming reflection attenuation and room attenuation of 8 dB/Oct.
L_1	in dB(A): A-weighted sound power level (re 20 μ Pa) of case-radiated noise, assuming room attenuation of 8 dB/Oct.
Δp_g	in Pa: Total pressure differential
$\Delta p_{g \min}$	in Pa: Minimum operating pressure differential
\dot{V}	in l/s or m ³ /h: Volume flow
$\Delta \dot{V}$	in \pm %: Volume flow tolerance based on set volume value. Increased tolerance must be taken into account in the case of direct connection behind obstructions/bends in ductwork

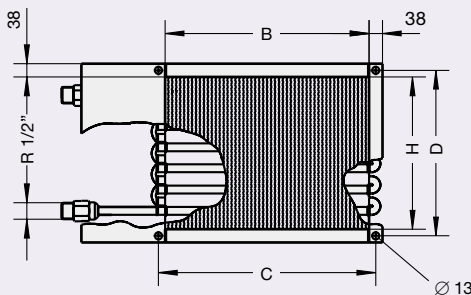
NC	: Noise criteria of sound spectrum, assuming 8 dB/Oct. Room attenuation
$\Delta L_{1 \text{ to } 3}$	in dB: Correction values for radiated noise
$\Delta L_{A1 \text{ to } 3}$	in dB: Correction values for A-weighted radiated noise
\dot{Q}	in kW: Heat output
t_e	in °C: Inlet air temperature
t_a	in °C: Discharge air temperature
PWW	in °C: Hot water
\dot{m}_w	in l/h: Mass flow per circuit
Δp_v	in kPa: Water pressure drop

All noise levels determined in reverberant room. Sound power levels determined and corrected in accordance with ISO 5135, December 1997.

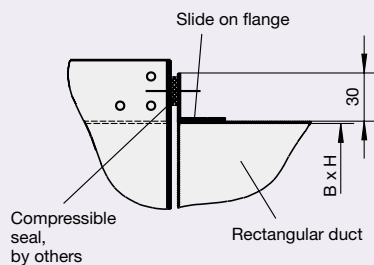
TX¹⁾



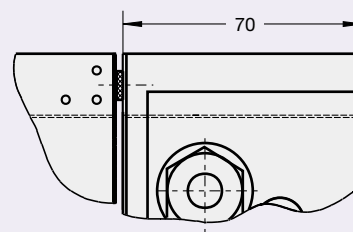
Reheat Coil, two Rows²⁾



Rectangular Duct Connection



Reheat Coil Connection



- 1) Splitters 1000 mm long
- 2) Installed in front of VAV controller in air flow direction

Dimensions · Weights · Technical Data

Table 1:
Dimensions in mm and weight in kg

B x H mm	B1	H1	C	D	B2	H2	Weight			
							EN	END	TX	LE 2RR
200 x 100	276	176	234	134	280	180	5	8	10	1.3
300 x 100	376	176	334	134	380	180	6	10	12	1.7
300 x 150	376	226	334	184	380	230	6.5	11	15	2.0
300 x 200	376	276	334	234	380	280	7	12	20	2.5
400 x 200	476	276	434	234	480	280	9	15	25	3.0
500 x 200	576	276	534	234	580	280	11	17	29	4.0
600 x 200	676	276	634	234	680	280	13	20	34	5.0
400 x 250	476	326	434	284	480	330	10	17	27	3.7
500 x 250	576	326	534	284	580	330	12	18	30	4.9
600 x 250	676	326	634	284	680	330	14	22	36	5.7
400 x 300	476	376	434	334	480	380	12	18	29	4.5
500 x 300	576	376	534	334	580	380	13	19	34	5.8
600 x 300	676	376	634	334	680	380	15	22	40	6.5
400 x 400	476	476	434	434	480	480	18	26	39	7.3
500 x 400	576	476	534	434	580	480	17.5	25.5	42.0	7.7
600 x 400	676	476	634	434	680	480	18	26	45	8.1
500 x 500	576	576	534	534	580	580	18.5	28	45	8.7
600 x 500	676	576	634	534	680	580	19	29	50	9.6
600 x 600	676	676	634	634	680	680	20	30	55	11.1

Table 2:
Technical Data, Performance Data for Reheat Coil

B x H mm	V ¹⁾		ΔV %	Δp _{g min} in Pa			PWW 60/50, t _e = 15 °C ¹⁾				PWW 80/60, t _e = 15 °C ¹⁾			
	l/s	m ³ /h		EN	TX ²⁾	2RR ²⁾	Q̇ in kW t _a in °C	m _w in l/h Δp _v in kPa	Q̇ in kW t _a in °C	m _w in l/h Δp _v in kPa				
200 x 100	40	144	13	50	10	35	1.0	36	72	0.8	1.3	43	36	0.4
	80	288	9	50	30	80	1.5	31	108	1.7	2.0	36	72	0.8
	120	432	6	50	65	170	1.9	28	144	2.16	2.5	32	72	1.1
	160	576	5	50	110	-	-	-	-	-	-	-	-	-
300 x 100	65	234	13	50	10	25	1.7	36	144	2.4	2.3	44	72	1.1
	130	468	9	50	30	95	2.6	31	216	5.1	3.4	36	144	2.3
	195	702	6	50	70	195	3.2	28	252	7.7	4.2	33	180	3.5
	260	936	5	50	120	-	-	-	-	-	-	-	-	-
300 x 150	105	378	13	50	10	30	2.8	37	216	8.9	3.4	42	144	0.9
	210	756	9	50	30	105	4.2	31	324	18.6	5.0	35	216	1.8
	315	1134	6	50	65	225	5.2	29	432	27.9	6.3	31	252	2.7
	420	1512	5	50	110	-	-	-	-	-	-	-	-	-
300 x 200	130	468	13	50	10	25	3.4	36	288	3.9	4.5	44	180	1.8
	260	936	9	50	30	95	5.1	31	432	8.1	6.8	36	288	3.7
	390	1404	6	50	65	195	6.4	28	540	12.2	8.5	33	360	5.5
	520	1872	5	50	110	-	-	-	-	-	-	-	-	-
400 x 200	210	756	13	50	10	40	5.2	35	432	9.3	7.1	43	288	4.4
	420	1512	9	50	30	130	7.8	30	648	19.3	10.5	36	432	8.9
	630	2268	6	50	75	280	9.8	28	828	28.8	13.1	32	540	13.3
	840	3024	5	50	110	-	-	-	-	-	-	-	-	-
500 x 200	230	828	13	50	10	30	6.1	37	504	13.6	8.3	45	324	6.4
	460	1656	9	50	30	105	9.3	32	792	28.5	12.5	37	504	13.3
	690	2484	6	50	65	220	11.6	29	972	42.9	15.7	34	648	20.0
	920	3312	5	50	110	-	-	-	-	-	-	-	-	-
600 x 200	255	918	13	50	10	25	6.7	36	540	2.2	9.0	44	360	1.0
	510	1836	9	50	25	90	10.0	31	864	4.5	13.5	37	576	2.1
	765	2754	6	50	50	190	12.6	29	1080	6.8	16.8	33	720	3.1
	1020	3672	5	50	110	-	-	-	-	-	-	-	-	-
400 x 250	220	792	13	50	5	30	6.0	37	504	13.8	8.1	45	324	6.5
	440	1584	9	50	25	95	9.0	32	756	29.2	12.2	38	504	13.7
	660	2376	6	50	50	200	11.4	29	972	43.9	15.3	34	648	20.5
	880	3168	5	50	110	-	-	-	-	-	-	-	-	-
500 x 250	300	1080	13	50	10	30	7.5	36	648	3.0	10.1	43	432	1.4
	600	2160	9	50	30	110	11.3	30	972	6.1	15.1	36	648	2.8
	900	3240	6	50	65	235	14.1	28	1188	9.2	18.8	32	792	4.2
	1200	4320	5	50	110	-	-	-	-	-	-	-	-	-
600 x 250	320	1152	13	50	5	25	8.6	37	720	4.1	11.6	45	468	1.9
	640	2304	9	50	25	90	13.0	32	1116	8.6	17.4	37	720	4.0
	960	3456	6	50	50	190	16.3	29	1368	13.9	21.8	34	900	5.9
	1280	4608	5	50	110	-	-	-	-	-	-	-	-	-
400 x 300	315	1134	13	50	10	40	7.9	35	648	9.3	10.6	43	432	4.4
	630	2268	9	50	30	130	11.8	30	1008	19.3	15.8	36	648	9.0
	945	3402	6	50	70	280	14.7	28	1260	28.8	19.6	32	828	13.3
	1260	4536	5	50	110	-	-	-	-	-	-	-	-	-
500 x 300	375	1350	13	50	10	35	9.5	36	792	5.2	12.8	43	540	2.4
	750	2700	9	50	30	120	14.2	31	1188	10.7	19.0	36	792	5.0
	1125	4050	6	50	65	255	17.8	28	1412	16.0	23.7	32	1008	7.4
	1500	5400	5	50	110	-	-	-	-	-	-	-	-	-
600 x 300	420	1512	13	50	10	30	11.0	37	936	7.5	15.0	44	612	3.5
	840	3024	9	50	25	105	16.7	31	1404	15.8	22.5	37	936	7.4
	1260	4536	6	50	60	225	20.9	29	1764	23.7	28.1	33	1188	11.0
	1680	6048	5	50	100	-	-	-	-	-	-	-	-	-
400 x 400	420	1512	13	50	10	40	10.5	35	864	7.1	14.1	43	576	3.3
	840	3024	9	50	30	130	15.7	30	1332	14.7	21.0	36	900	6.8
	1260	4536	6	50	70	280	19.6	28	1656	22.0	26.2	32	1116	10.1
	1680	6048	5	50	125	-	-	-	-	-	-	-	-	-
500 x 400	460	1656	13	50	10	30	12.3	37	1044	10.6	16.7	45	684	5.0
	920	3312	9	50	30	105	18.6	32	1584	22.3	25.1	37	1044	10.4
	1380	4968	6	50	65	220	23.3	29	1980	33.5	31.3	34	1332	15.6
	1840	6624	5	50	110	-	-	-	-	-	-	-	-	-
600 x 400	510	1836	13	50	5	25	13.8	37	1152	5.0	18.6	45	792	2.4
	1020	3672	9	50	20	90	20.9	32	1764	10.6	28.0	38	1188	4.9
	1530	5508	6	50	45	190	26.2	29	2232	15.9	35.1	34	1476	7.4
	2040	7344	5	50	110	-	-	-	-	-	-	-	-	-
500 x 500	600	2160	13	50	10	35	15.5	36	1392	6.8	21.0	44	900	3.2
	1200	4320	9	50	30	110	23.4	31	1980	14.2	31.4	36	1332	6.6
	1800	6480	6	50	65	235	29.3	28	2484	21.4	39.2	33	1656	9.9
	2400	8640	5	50	110	-	-	-	-	-	-	-	-	-
600 x 500	640	2304	13	50	5	25	17.6	38	1476	9.4	23.9	46	1008	4.4
	1280	4608	9	50	30	90	26.7	32	2268	19.9	36.0	38	1512	9.3
	1920	6912	6	50	45	190	33.5	29	2880	29.9	45.1	34	1908	14.0
	2560	9216	5	50	80	-	-	-	-	-	-	-	-	-
600 x 600	840	3024	13	50	5	30	22.1	37	1872	8.0	30.0	44	1260	3.8
	1680	6048	9	50	25	105	33.4	31	2844	16.8	45.0	37	1908	7.9
	2520	9072	6	50	55	225	41.8	29	3564	25.3	56.2	33	2412	11.7
	3360	12096	5	50	95	-	-	-	-	-	-	-	-	-

1) Technical data for other conditions or 4RR on inquiry 2) Additional factor to be taken into account – No values, air pressure drop to high

Air-Regenerated Noise with silencer

Table 3: Air-regenerated noise with TX-silencer

B x H mm	V̇ l/s m³/h		Δp _g = 100 Pa														Δp _g = 250 Pa														Δp _g = 500 Pa														Δp _g = 1000 Pa													
			L _w in dB							f _m in Hz							L _w in dB							f _m in Hz							L _w in dB							f _m in Hz							L _w in dB							f _m in Hz						
			63	125	250	500	1000	2000	4000	8000	L in dB(A)	NC	63	125	250	500	1000	2000	4000	8000	L in dB(A)	NC	63	125	250	500	1000	2000	4000	8000	L in dB(A)	NC	63	125	250	500	1000	2000	4000	8000	L in dB(A)	NC	63	125	250	500	1000	2000	4000	8000	L in dB(A)	NC						
			<																																																							
200 x 100	40	144	42	41	26	<	<	<	<	18	<	46	45	32	21	<	18	21	16	24	16	49	49	37	26	17	25	29	25	28	23	52	52	41	31	22	31	36	34	34	31																	
	80	288	51	51	35	24	19	18	18	13	28	23	55	55	41	30	25	26	29	25	33	28	57	58	45	35	29	33	36	34	37	32	60	61	50	40	34	39	44	43	43	38																
	120	432	56	56	41	30	28	25	25	20	34	30	60	61	47	37	34	33	35	32	39	36	63	64	51	42	38	39	42	41	43	40	65	67	56	47	43	46	50	50	49	45																
	160	576	59	60	44	34	33	29	29	27	38	35	63	65	50	40	39	37	39	33	43	41	66	68	55	45	44	43	47	48	48	45	69	71	60	50	48	50	54	57	54	52																
300 x 100	65	234	43	43	29	18	<	<	<	21	<	47	48	36	25	16	21	23	17	26	19	50	51	40	30	20	27	31	26	31	25	53	54	45	35	25	33	38	35	36	33																	
	130	468	52	53	38	28	22	21	20	14	30	26	55	57	44	34	28	29	30	26	35	31	58	60	49	39	33	35	38	35	40	35	61	64	54	44	37	42	46	44	45	40																
	195	702	57	59	44	34	31	27	27	21	36	33	61	63	50	41	37	36	37	33	41	39	63	66	55	46	42	42	44	42	46	43	66	69	60	51	46	48	52	51	51	47																
	260	936	60	63	48	38	36	32	31	29	40	38	64	67	54	44	43	40	41	41	46	44	67	70	58	49	47	46	48	50	48	70	73	63	54	52	52	56	59	56	54																	
300 x 150	105	378	44	45	33	22	13	15	15	<	23	16	48	50	39	29	19	24	25	18	29	21	51	53	44	34	24	30	32	27	33	27	53	56	48	39	28	36	40	36	39	34																
	210	756	53	55	41	32	25	23	22	15	33	28	56	59	48	38	31	32	32	27	38	34	59	63	52	43	36	38	40	36	42	62	66	57	48	40	44	47	45	47	42																	
	315	1134	58	61	47	38	34	30	28	23	39	36	61	65	54	45	40	38	38	35	44	41	64	68	58	50	45	45	46	44	49	67	72	63	55	50	51	54	53	54	50																	
	420	1512	61	65	51	42	40	34	33	30	43	41	65	69	57	48	46	42	43	42	48	47	68	72	62	53	50	49	50	51	53	51	71	76	66	58	55	58	60	58	55																	
300 x 200	130	468	49	37	32	24	18	19	20	15	22	15	55	45	40	31	25	28	31	27	30	25	60	51	46	36	31	35	39	36	37	33	65	57	51	41	36	42	47	45	44	41																
	260	936	58	46	40	32	27	26	25	20	30	25	65	54	47	39	35	35	36	33	38	31	66	60	53	44	40	43	44	42	44	64	59	49	45	40	50	53	51	51	47																	
	390	1404	64	51	45	38	35	32	31	27	36	28	70	59	53	44	42	42	41	39	43	38	75	65	59	49	47	49	50	48	50	45	80	71	64	54	53	56	58	57	57	52																
	520	1872	68	54	48	41	39	36	34	33	39	34	74	62	56	47	46	46	45	45	47	43	79	68	62	52	52	53	53	54	54	50	83	74	67	57	57	60	61	63	60	58																
400 x 200	210	756	48	42	32	24	17	18	20	15	22	15	54	50	39	31	25	27	31	26	31	25	59	56	45	36	30	34	39	35	37	33	64	62	51	41	35	41	47	44	44	41																
	420	1512	57	50	39	32	27	25	25	21	31	22	64	58	47	39	34	34	36	32	39	33	68	64	52	44	39	42	44	41	45	41	73	71	58	49	45	49	53	50	52	49																
	630	2268	63	55	45	37	34	31	30	26	36	29	69	63	52	44	41	41	41	38	44	39	74	70	58	49	47	48	50	47	50	47	79	76	64	54	52	58	56	57	55	55																
	840	3024	67	59	48	40	38	35	34	32	40	33	73	67	55	47	45	45	45	44	48	44	78	73	61	52	51	52	53	53	54	52	82	79	67	57	56	59	61	62	61	60																
500 x 200	230	828	43	42	28	22	15	15	18	<	21	<	49	50	36	28	23	25	29	24	29	23	54	56	41	33	28	32	37	33	36	31	59	62	47	38	33	39	45	42	43	39																
	460	1656	53	51	36	30	25	23	23	18	29	23	59	59	43	36	32	32	34	30	37	33	64	65	49	41	37	39	43	39	44	41	68	71	55	46	43	46	51	48	50	49																
	690	2484	58	56	41	35	32	29	29	24	34	29	65	64	49	41	39	38	40	36	43	40	69	70	55	46	45	48	45	49	48	74	76	60	51	50	53	56	54	56	55																	
	920	3312	62	59	44	38	36	33	32	30	38	34	68	67	52	45	44	42	43	42	46	44	73	73	58	50	49	49	51	51	53	52	78	79	63	55	54	56	59	60	59	60																
600 x 200	255	918	40	43	26	20	<	<	17	<	20	<	46	51	33	27	21	23	27	23	29	23	51	57	39	32	27	30	36	32	35	31	55	63	45	37	32	37	41	41	42	38																
	510	1836	49	51	33	28	23	21	22	19	29	23	55	59	41	35	30	30	33	29	37	34	60	65	47	40	36	37	41	38	43	41	65	71	52	45	41	44	49	47	50	50																
	765	2754	55	56	39	33	31	27	27	22	34	30	61	64	46	40	38	37	38	34	42	40	66	70	52	45	43	44	46	43	48	48	71	76	58	50	49	51	55	52	55	56																
	1020	3672	59	60	42	36	35	31	31	28	38	35	65	68	49	43	42	40	42	40	46	45	70	74	55	48	47	47	50	49	52	53	74	80	61	53	53	58	58	59	61	63																
400 x 250	220	792	47	40	32	26	19	19	20	15	23	15	53	48	40	33	27	29	31	27	31	26	58	54	46	38	32	36	39	36	37	34	62	60	52	43	37	43	47	45	45	42																
	440	1584	56	48	40	34	29	27	26	21	31	20	62	56	48	41	36	36	37	33	39	31	67	62	54	46	41	43	45	42	45	39	72	68	60	51	47	50	53	51	52	47																
	660	2376	62	53	46	39	36	33	31	26	36	27	68	61	54	46	43	42	38	44	36	73	67	59	51	49	49	50	47	51	44	78	73	65	56	54	57	58	56	57	52																	
	880	3168	66	57	49	42	40	37	34	32	40	31	72	65	57	49	48	46	45	44	48	41	77	71	62	54	53	53	53	54	54	81	77	68	59	58	60	62	62	61	57																	
500 x 250	300	1080	45	42	32	26	19	18	20	<	23	15	51	51	39	32	26	27	30	26	31	25	56	57	45	37	31	34	39	35	38	33	61	63	51	42	37	42	47	44	44	41																
	600	2160	55	51	39	33	28	26	25	20	31	23	61	59	47	40	35	35	36	32	39	34	66	65	53	45	40	42	44	41	45	42	70	71	58	50	46	49	53	50	52	50																
	900	3240	60	56	45	39	35	32	30	25	36	30	66	64	52	45	42	41	41	37	44	40	71	70	58	50	48	48	49	46	51	48	76	76	64	55	53	58	58	57	56																	
	1200	4320	64	60	48	42	39	36	34	31	40	34	70	68	55	48	47	45	45	43	48	45	75	74	61	53	52	52	53	52	54	53	80	80	67	58	57	59	61	61	61	61																
600 x 250	320	1152	41	43	29	24	17	16	18	<	21	<	47	51	36	30	24	25	29	24	30	24	52	57	42	35	29	33	37	33	36	32	57	63	48	40	35	40	45	42	43	40																
	640	2304	51	51	36	31	26	24	24	18	30	23	57	59	44	38	33	33	35	30																																						

Air-Regenerated Noise

without silencer

Table 4: Air-regenerated noise

B x H mm	V̇ l/s m³/h		Δp _g = 100 Pa														Δp _g = 250 Pa														Δp _g = 500 Pa														Δp _g = 1000 Pa													
			L _w in dB							f _m in Hz							L in dB(A)	NC	L _w in dB							f _m in Hz							L in dB(A)	NC	L _w in dB							f _m in Hz							L in dB(A)	NC								
			f _m in Hz							L _w in dB									f _m in Hz							L _w in dB																																
			63	125	250	500	1000	2000	4000	8000	63	125	250	500	1000	2000	4000	8000	63	125	250	500	1000	2000	4000	8000	63	125	250	500	1000	2000	4000	8000	63	125	250	500	1000	2000	4000	8000																
200 x 100	40	144	42	41	31	31	34	36	30	22	32	29	46	45	37	37	40	45	41	34	40	37	49	49	42	42	45	51	48	43	47	43	52	52	47	47	49	57	56	52	54	50																
	80	288	51	51	39	38	40	41	37	30	38	33	55	55	45	44	46	49	47	41	46	42	58	58	50	49	51	55	54	50	52	48	61	61	57	54	55	62	62	60	59	56																
	120	432	56	56	44	42	44	44	40	34	42	36	60	61	50	48	50	52	50	46	49	44	63	64	55	53	54	58	58	55	56	52	66	67	60	58	59	64	66	64	63	59																
	160	576	60	60	47	44	46	45	43	37	44	38	64	65	54	51	52	54	53	49	52	47	67	68	58	56	57	60	61	58	58	54	69	71	63	61	62	66	68	67	65	62																
300 x 100	65	234	43	43	34	35	37	39	32	24	35	32	47	48	41	42	43	47	42	36	40	50	51	45	47	48	54	50	45	49	46	53	50	52	53	60	58	54	56	52																		
	130	468	52	53	43	42	44	44	39	31	41	36	56	57	49	48	50	52	49	43	49	44	59	60	54	53	54	58	56	52	55	51	61	64	58	58	59	64	64	61	61	58																
	195	702	57	59	48	46	47	46	42	35	44	39	61	63	54	52	53	54	52	47	52	47	64	66	58	57	58	61	60	56	58	54	67	69	63	62	62	67	67	65	65	61																
	260	936	61	63	51	48	50	48	45	38	47	41	65	67	57	55	56	56	55	50	54	49	68	70	62	60	60	63	62	59	61	56	70	73	66	65	65	69	70	68	67	64																
300 x 150	105	378	44	45	38	39	41	42	34	25	38	34	48	50	44	46	47	50	44	37	46	42	51	53	49	51	51	56	52	46	52	49	53	56	53	56	56	62	59	55	58	55																
	210	756	53	55	46	46	47	46	40	32	44	39	57	59	52	52	53	54	50	44	51	47	59	63	57	57	57	61	58	53	57	53	62	66	62	62	67	67	66	62	64	59																
	315	1134	58	61	51	50	51	49	44	36	47	41	62	65	57	56	57	57	54	48	55	50	65	68	62	61	61	63	62	57	61	56	67	72	66	66	66	70	69	66	67	63																
	420	1512	62	65	54	52	53	51	47	39	50	44	66	69	60	59	59	57	51	57	51	57	68	72	65	64	64	65	64	60	63	58	71	76	70	69	68	71	72	69	70	65																
300 x 200	130	468	49	37	37	41	46	45	39	34	42	37	55	45	45	48	53	54	50	46	51	47	60	51	51	53	58	61	58	55	58	54	65	57	56	58	64	68	67	64	65	61																
	260	936	59	46	44	46	49	49	44	38	46	41	65	54	52	53	56	58	54	50	55	51	70	60	58	58	62	65	63	59	62	58	74	66	64	67	72	71	68	69	65																	
	390	1404	64	51	49	49	51	51	46	40	48	44	71	59	56	56	58	60	57	52	57	53	75	65	62	61	64	68	65	61	64	60	80	71	68	66	69	75	73	70	71	67																
	520	1872	68	54	52	51	52	53	48	42	50	45	75	62	59	58	60	62	59	54	59	54	79	68	65	63	65	69	67	63	66	62	84	74	71	68	70	76	75	72	73	69																
400 x 200	210	756	48	42	37	41	45	44	39	33	41	36	54	50	44	47	52	53	50	45	50	46	59	56	50	52	58	60	58	54	57	53	64	62	56	57	63	67	67	63	64	60																
	420	1512	58	50	44	46	48	48	44	37	45	40	64	58	51	52	55	57	54	49	54	50	69	64	57	57	61	64	63	58	61	57	73	71	63	63	66	71	71	67	68	64																
	630	2268	63	55	48	49	50	50	46	40	48	43	70	63	56	55	57	59	57	52	56	52	74	70	61	60	63	67	65	61	63	59	79	76	67	65	68	74	73	69	71	67																
	840	3024	67	59	51	51	52	52	48	41	49	44	74	67	59	58	59	61	59	53	58	53	78	73	64	63	64	68	67	62	65	61	83	79	70	68	70	75	75	71	72	69																
500 x 200	230	828	43	42	33	38	43	42	37	31	39	34	49	50	41	45	50	51	48	43	48	43	54	56	47	50	56	58	56	52	55	50	59	62	52	55	61	65	65	61	62	58																
	460	1656	53	51	40	44	46	45	42	35	43	38	59	59	48	50	53	55	53	47	52	47	64	65	54	55	59	62	61	56	59	55	69	71	59	60	64	69	69	65	66	63																
	690	2484	59	56	45	47	48	48	44	38	45	40	65	64	52	53	55	57	55	49	54	50	70	70	58	58	61	64	63	58	61	57	74	76	64	63	66	71	72	67	69	65																
	920	3312	63	59	48	49	50	49	46	39	47	42	69	67	55	55	57	59	57	51	56	51	74	73	61	60	62	66	65	60	63	59	78	79	67	65	68	73	69	70	67																	
600 x 200	255	918	40	43	31	37	42	40	36	30	38	32	46	51	38	43	49	49	47	41	46	42	51	57	44	48	54	56	55	50	53	49	55	63	50	53	60	63	63	59	61	57																
	510	1836	49	51	38	42	45	44	40	34	41	36	56	59	45	48	52	53	51	45	50	46	60	65	51	53	57	60	59	54	57	53	65	61	57	58	63	67	68	63	65	61																
	765	2754	55	56	42	45	47	46	43	36	44	38	61	64	50	51	54	55	54	48	53	48	66	70	55	56	59	62	62	57	60	56	71	76	61	65	69	70	66	67	64	60																
	1020	3672	59	60	45	47	48	48	45	38	46	40	65	68	53	54	55	57	56	49	55	50	74	78	59	61	64	64	64	58	62	58	75	80	64	66	71	72	67	69	66																	
400 x 250	220	792	47	40	38	43	47	46	40	34	43	38	53	48	46	50	54	55	50	45	52	47	58	54	51	55	60	62	59	54	58	54	62	60	57	60	65	69	67	63	66	62																
	440	1584	57	48	45	48	50	49	44	38	47	42	63	56	53	55	58	59	55	49	55	51	68	62	58	60	63	66	63	58	62	58	72	68	64	65	68	73	71	67	69	65																
	660	2376	62	53	49	51	52	52	46	40	49	44	68	61	57	58	60	61	57	52	58	53	73	67	63	63	65	68	66	61	65	61	78	73	68	68	70	75	74	70	72	68																
	880	3168	66	57	52	53	54	53	48	42	51	46	73	65	60	60	61	63	59	53	58	55	77	71	66	65	66	70	67	62	66	62	82	77	71	70	72	77	76	71	74	69																
500 x 250	300	1080	45	42	37	42	46	44	39	33	42	37	51	51	44	49	53	54	50	45	51	46	56	57	50	54	59	61	58	53	57	53	61	63	56	59	64	68	66	62	65	60																
	600	2160	55	51	44	47	49	48	43	37	46	41	61	59	52	57	58	54	49	55	50	66	65	57	59	62	65	63	57	61	57	71	71	63	64	67	72	71	66	69	64																	
	900	3240	61	56	48	50	51	51	46	39	48	43	67	64	56	57	59	60	57	51	57	52	72	70	61	62	64	67	65	60	64	59	76	76	67	69	74	73	69	71	67																	
	1200	4320	65	60	51	52	53	52	48	41	50	45	71	68	59	59	62	62	59	52	59	54	76	74	64	64	65	69	67	61	66	61	80	80	70	69	71	76	75	70	73	69																
600 x 250	320	1152	41	43	34	40	45	43	38	31	40	35	47	51	42	47	52	48	43	49	44	52	57	47	52	57	59	57	52	56	51	57	63	53	57	63	66	65	61	63	59																	
	640	2304	51	51	41	45	48	46	42																																																	

Case-Radiated Noise

Example

Given: Size 500 x 200
 $\dot{V} = 690 \text{ l/s or } 2484 \text{ m}^3/\text{h}$
 $\Delta p_g = 250 \text{ Pa}$
 Specified sound pressure level in room 40 dB(A)
 with 4 dB/Oct. room attenuation, 4 dB/Oct.
 ceiling transmission loss.
 Installation see fig. 1.

Required: Case-radiated noise in room

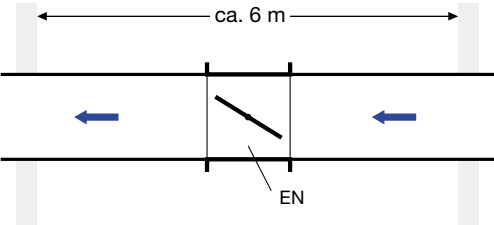
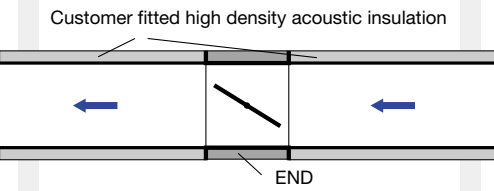
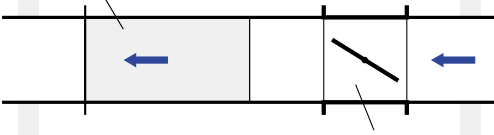
Calculation

f_m	63	125	250	500	1000	2000	4000	8000
$L_w^{(1)}$	65	64	52	53	55	57	55	49
ΔL_1	4	4	2	7	11	16	15	10
Ceiling transmission loss ²⁾	4	4	4	4	4	4	4	4
Room attenuation ²⁾	4	4	4	4	4	4	4	4
	53	52	41	37	35	33	32	31
A-weighting	-26	-16	-9	-3	0	1	1	-1
corrected level	27	36	32	34	35	34	33	30

Result: L_1 ca. 42 dB(A) according to logarithmic addition.
 Specified requirement fulfilled. Additional acoustic cladding on the controller and customer fitted high density acoustic insulation to the outside of the ducting, as in fig. 2, is necessary.
 After repeating the calculation process with $(\Delta L_1 - \Delta L_2)$ the result is:
 $L_1 = 35 \text{ dB(A)}$, the specification requirements are achieved.

1) See page 8 for values
 2) See for example VDI 2081

Table 5: Case-radiated noise

Installation	$\Delta L_{1 \text{ to } 3}$	Height mm	$\Delta L_{W1 \text{ to } 3}$ in dB							$\Delta L_{A1 \text{ to } 3}$ in dB	
			f_m in Hz								
			63	125	250	500	1000	2000	4000		8000
Fig. 1  $L_1 = L - \Delta L_{A1 \dots 3}$ $L_{w1} = L_w - \Delta L_1$	ΔL_1	100	1	1	0	5	9	13	12	7	9
150		3	3	1	6	10	14	14	9	10	
200		4	4	2	7	11	16	15	10	12	
250		5	5	4	9	13	17	16	11	13	
300		5	5	4	9	13	17	17	11	13	
400		6	6	5	10	14	18	17	12	14	
500		7	7	5	10	14	18	18	13	14	
600		7	7	6	11	15	19	19	13	15	
Fig. 2  $L_{w1} = L_w - \Delta L_1 - \Delta L_2$	$\Delta L_2^{(3)}$	All	3	3	6	10	12	13	12	9	7
Fig. 3  $L_{w1} = L_w - \Delta L_3$	ΔL_3	All	10	6	8	12	14	17	17	16	14

3) Additional factor to be taken into account

Order Details

Specification Text

Rectangular volume flow rate controller for constant volume systems, mechanical system powered, external power supply not required. For supply or extract air, differential pressure range 50 to 1000 Pa.

Control blade shaft supported in bearings, control bellows also provides oscillation damper action, volume range 4:1. Volume flow control, with low tolerance, external adjustment scale to set volume flow, maintenance free, independent of gravity (horizontal blade shaft).

Material:

Casing made of galvanised sheet steel, control blade supported in bearings with PTFE lining. Polyurethane bellows.

Also with:

Actuator, 24 VAC or 230 VAC for remote setpoint adjustment.

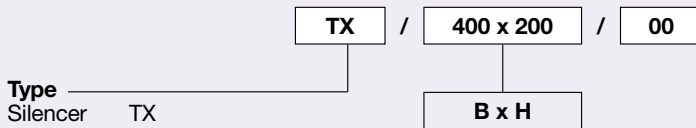
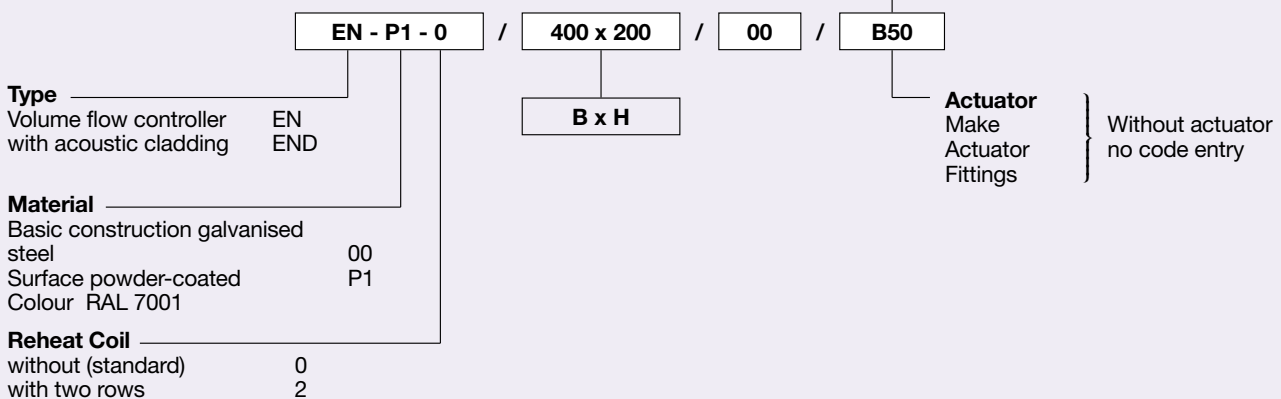
Optional available with:

Acoustic cladding, for reduction of radiated noise, consisting of 40 mm mineral wool and external casing of 1 mm galvanised sheet steel.

Reheat coil, for reheat of air volume. Casing made of galvanised sheet steel, copper tubes and aluminium fins, flanged on both ends.

Silencer TX, for reduction of air-regenerated noise, consisting of mineral wool and 1 mm sheet steel casing, to fit unit, with flnges on both sides.

Order Code



Remarks:

The controller is supplied with a preset reference volume flow. For construction with actuator, the minimum and maximum set volume flow must be adjusted.

Note:

EN-controllers with ≥ 400 mm have two casing (on top of each other).

For each controller must be adjusted 50 % of required volume flow. This units are not available with actuators.

Order Example EN

Make: TROX
Type: EN - P1 - 0 / 400 x 200 / 00 / B50

Order Example TX

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

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