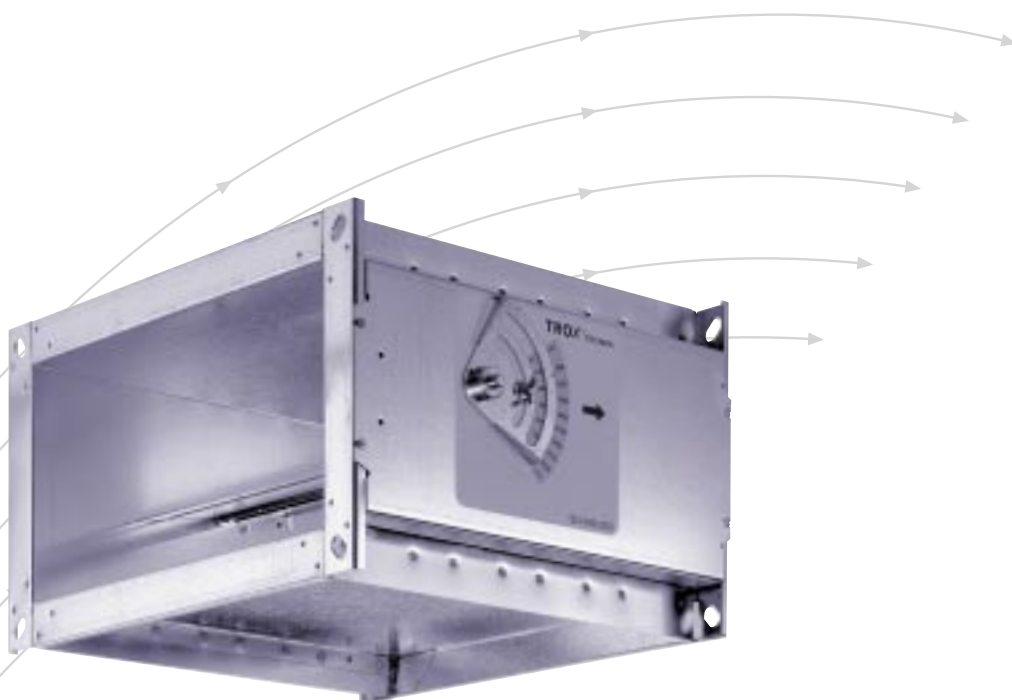


CONSTANTFLOW Volume Flow Controllers

for constant volume systems
Type EN



TROX[®] TECHNIK

TROX GmbH
Heinrich-Trox-Platz
D-47504 Neukirchen-Vluyn

Telephone +49/28 45/2 02-0
Telefax +49/28 45/2 02-2 65
e-mail trox@trox.de
www.troxtechnik.com

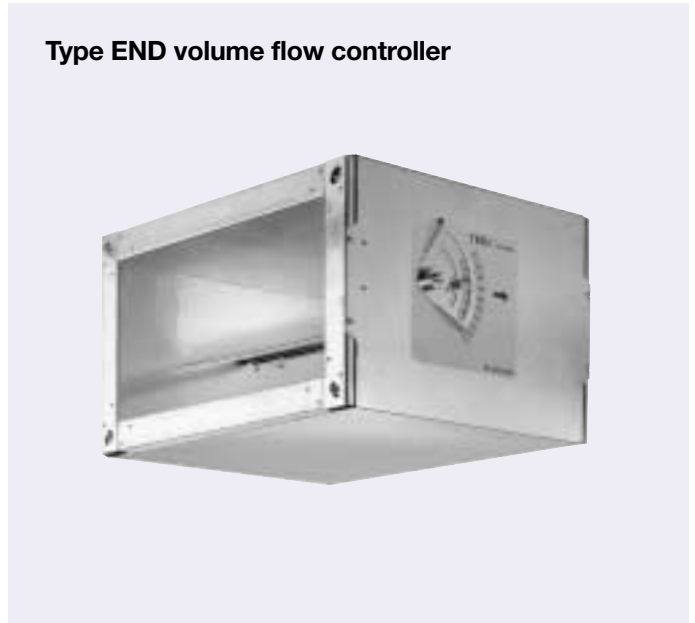
Contents · Description

Description _____	2	Nomenclature · Air-regenerated noise _____	8
Application _____	3	Air-regenerated noise _____	9
Construction · Dimensions · Accessories _____	4	Case-radiated noise _____	10
Dimensions _____	5	Order details _____	11
Aerodynamic and acoustic quick selection _____	6		

Type EN volume flow controller



Type END volume flow controller



TROX Type EN and END volume flow controllers are mechanical system-powered controllers and were developed for the control of flow rates in constant volume systems. The controllers are suited for both supply air and extract air.

- EN: Controller for nominal sizes 200 x 100 to 600 x 600
- END: Controller for nominal sizes 200 x 100 to 600 x 600 with additional acoustic cladding

Each controller is set up to a reference flow rate and has been subjected to an aerodynamic function test.

The required flow rate can be easily set without tools using an external scale. To simplify installation, the controllers can be ordered and fitted by nominal size. The required flow rate can then be easily and accurately set during commissioning.

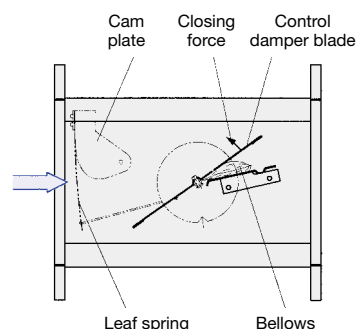
The EN controllers are also available with additional acoustic cladding to reduce case-radiated noise (END). For more stringent noise requirements the TX silencer can be used.

The controller operates without an external power supply. A control damper blade, shaft mounted supported on bearings, is adjusted by the aerodynamic forces such that the preset flow rate is held constant over the entire differential pressure range. Aerodynamic forces from air flow create a closing force on the damper blade. A self inflating bellows amplifies this force, acting

simultaneously as an oscillation damper. This closing force is counteracted by a leaf spring that unrolls over a cam plate. The cam plate is designed such that as the pressure differential changes, the damper blade adjusts to keep a constant flow rate within close tolerances.

Further, current information on application and selection can be found in the "Technical Documentation" download area of our website.

Also available on the Internet is the "Air terminal units" on-line programme for the design and selection of our units.



Inexpensive commissioning

By a simple step and without need for preliminary measurements, the required flow rate value can be set using the pointer against the externally mounted scale of the Type EN or END . The advantage over conventional balancing dampers is that there is no need for repeated measurement and readjustment by a qualified commissioning engineer.

Should the system pressure change, e.g. by opening or closing of duct sections, the flow rates in the entire system will alter if balancing dampers are used; however, this is not the case if the Type EN and ENS volume flow controllers are used.

The controller reacts immediately and adjusts the damper blade position directly, so that the flow rate set is kept constant over the entire differential pressure range.

The Type EN controllers can be fitted with an electric actuator for setpoint value readjustment.

Simplified installation

The Type EN and END volume flow controllers are fitted with flanges on both ends. This ensures very low leakage at the joint.

Acoustic requirements

Depending on requirements, a TX silencer may be supplied to reduce the air-regenerated noise. (installed by others).

Type EN volume flow controller with actuator



**Type EN volume flow controller, $H \geq 400$ mm
(Two controllers used)**



TX silencer



Construction · Dimensions · Accessories

Characteristics

- Mechanical system-powered, without external power supply
- Suitable for supply and extract air
- Correct operation, even under unfavourable upstream and downstream conditions (straight length required upstream 1.5 W, downstream 0.5 W)
- Close tolerances on flow rate
- Flow rate setting using pointer on external scale, scale accuracy approximately $\pm 4\%$
- Flow rate range 4 : 1
- Damper blade shaft supported in bearings
- Bellows also acts as an oscillation damper
- Differential pressure range 50 to 1000 Pa
- Independent of orientation
- Damper blade mechanisms maintenance-free
- Operating temperature range 10 to 50 °C

Constructional features

- Rectangular form, rigid frame
- Flanged at both ends, suitable for fitting System 30 connecting sections

Casing

- Casing and damper blade made of galvanised sheet steel
- Stainless steel leaf spring
- Polyurethane bellows
- Plain bearings with PTFE coating

Additional acoustic cladding

- Outer cover in galvanised sheet steel
- Sound-absorbent lining
- Structure-borne noise isolation
- Cannot be retrofitted

Actuators

- For setpoint readjustment
- 24 VAC or 230 VAC power
- Factory-fitted
- Small footprint thanks to compact construction

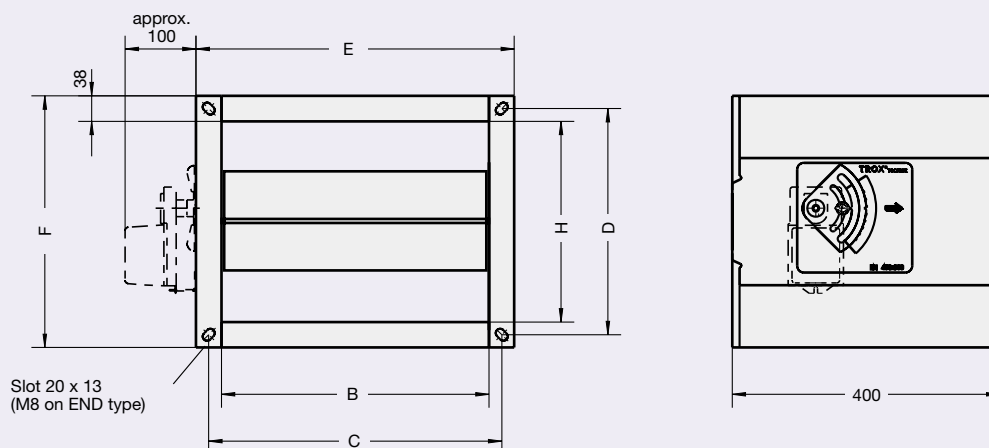
TX silencer

- Suitable for EN/END controllers
- Casing in galvanised sheet steel
- Mineral wool lining conforming to DIN 4102, fire rating class A2, with RAL quality mark RAL-GZ 388, biodegradable as defined by TRGS 905 as well as EU directive 97/69/EC
- Mineral wool faced with glass-fibre fabric providing protection against erosion by air flow up to a maximum air velocity of 20 m/s, inert to fungal and bacterial growth

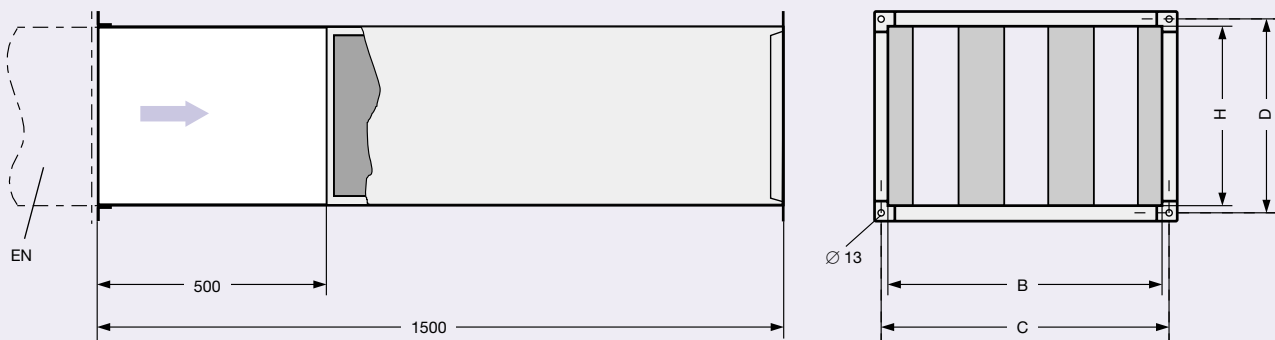
Air heater

- Suitable for EN/END controllers
- See leaflet 5/20/EN/... for dimensions and technical data

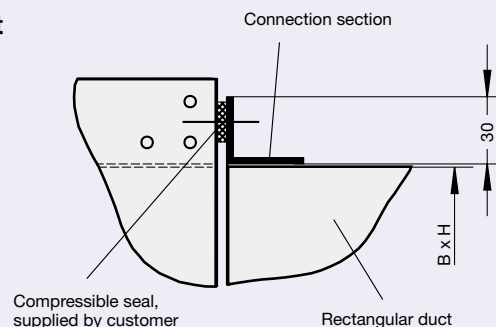
EN · END



TX



Connection of rectangular duct



Dimensions

Dimensions in mm								Weight in kg		
B x H		C	D	EN		END		EN	END	TX
				E	F	E	F			
200	100	234	134	276	176	280	180	5	8	10
300		334	134	376	176	380	180	6	10	12
300	150	334	184	376	226	380	230	6.5	11	15
300	200	334	234	376	276	380	280	7	12	20
400		434	234	476	276	480	280	9	15	25
500		534	234	576	276	580	280	11	17	29
600		634	234	676	276	680	280	13	20	34
400	250	434	284	476	326	480	330	10	17	27
500		534	284	576	326	580	330	12	18	30
600		634	284	676	326	680	330	14	22	36
400	300	434	334	476	376	480	380	12	18	29
500		534	334	576	376	580	380	13	19	34
600		634	334	676	376	680	380	15	22	40
400	400	434	434	476	476	480	480	18	26	39
500		534	434	576	476	580	480	17.5	25.5	42
600		634	434	676	476	680	480	18	26	45
500	500	534	534	576	576	580	580	18.5	28	45
600		634	534	676	576	680	580	19	29	50
600	600	634	634	676	676	680	680	20	30	55

Aerodynamic and Acoustic Quick Selection

System attenuation in dB/Oct. acc. to VDI 2081 (values incorporated into the quick selection table)								
f_m in Hz	63	125	250	500	1000	2000	4000	8000
Duct bend attenuation	0	0	1	2	3	3	3	3
Room attenuation	5	5	5	5	5	5	5	5
End reflection	10	5	2	0	0	0	0	0

Correction for distribution into the duct system (values incorporated into the quick selection table)									
\dot{V}	m ³ /h	500	1000	2000	4000	6000	8000	10000	12000
	l/s	139	278	556	1111	1667	2222	2778	3333
dB per octave		0	3	6	9	11	12	13	14

Quick selection of sound pressure level in dB(A)																		
B x H		\dot{V}		$\Delta \dot{V}$	$\Delta p_{g \text{ min}}$ in Pa		$\Delta p_g = 100 \text{ Pa}$				$\Delta p_g = 200 \text{ Pa}$				$\Delta p_g = 500 \text{ Pa}$			
							Air-regenerated noise		Case-radiated noise ²⁾		Air-regenerated noise		Case-radiated noise ²⁾		Air-regenerated noise		Case-radiated noise ²⁾	
							L_{pA}	L_{pA1}	L_{pA2}	L_{pA3}	L_{pA}	L_{pA1}	L_{pA2}	L_{pA3}	L_{pA}	L_{pA1}	L_{pA2}	L_{pA3}
							without silencer	with TX silencer	without additional acoustic cladding	with additional acoustic cladding	without silencer	with TX silencer	without additional acoustic cladding	with additional acoustic cladding	without silencer	with TX silencer	without additional acoustic cladding	with additional acoustic cladding
mm	l/s	m ³ /h	± %	EN	TX ¹⁾													
200	100	40	144	13	50	10	32	18	22	<	41	22	29	21	47	28	35	26
		80	288	9	50	30	38	27	30	24	46	32	36	29	52	36	41	34
		120	432	6	50	65	42	32	34	29	49	38	40	34	56	43	46	39
		160	576	5	50	110	43	35	37	32	51	41	44	38	58	47	49	42
300		65	234	13	50	10	35	20	25	17	43	25	32	24	50	30	38	29
		130	468	9	50	30	41	29	33	26	49	34	39	32	55	39	44	36
		195	702	6	50	70	43	34	37	32	50	39	43	37	57	44	48	41
		260	936	5	50	120	44	36	40	35	52	42	46	40	58	47	51	44
300	150	105	378	13	50	10	38	22	27	19	46	28	34	25	52	33	40	30
		210	756	9	50	30	42	29	34	27	49	35	40	32	56	40	46	37
		315	1134	6	50	65	44	34	39	32	51	40	45	38	57	44	50	42
		420	1512	5	50	110	45	37	42	36	52	42	48	41	58	47	53	45
300	200	130	468	13	50	10	42	21	29	19	51	30	37	27	57	37	43	33
		260	936	9	50	30	43	26	33	24	52	34	41	32	59	41	48	39
		390	1404	6	50	65	44	30	36	28	52	38	44	36	60	45	51	42
		520	1872	5	50	110	44	32	39	31	53	41	46	39	60	47	53	45
400		210	756	13	50	10	39	20	29	19	48	28	36	26	55	35	43	33
		420	1512	9	50	30	40	24	33	25	49	33	41	32	56	39	47	39
		630	2268	6	50	75	41	28	36	28	49	36	44	36	57	43	50	43
		840	3024	5	50	110	42	31	39	32	50	39	46	40	57	45	52	45
500		230	828	13	50	10	37	18	26	16	46	26	34	25	53	33	41	31
		460	1656	9	50	30	38	23	31	23	47	31	39	31	54	37	45	37
		690	2484	6	50	65	38	26	34	27	47	35	42	35	54	41	48	41
		920	3312	5	50	110	39	29	37	30	48	37	44	38	55	43	50	44
600		255	918	13	50	10	35	17	25	16	44	25	33	24	50	32	39	30
		510	1836	9	50	25	36	22	30	22	44	30	37	30	51	36	44	36
		765	2754	6	50	50	37	25	33	26	45	33	41	34	52	40	47	40
		1020	3672	5	50	110	37	28	35	30	46	36	43	37	53	42	50	44
400	250	220	792	13	50	5	41	20	29	18	49	29	36	26	56	35	43	33
		440	1584	9	50	25	41	25	33	24	51	33	41	32	57	39	47	38
		660	2376	6	50	50	42	29	36	27	51	37	43	35	58	43	50	41
		880	3168	5	50	110	43	31	38	30	52	39	46	38	58	46	52	44
500		300	1080	13	50	10	38	19	27	17	47	27	36	26	54	34	42	32
		600	2160	9	50	30	39	23	32	23	48	32	40	31	55	38	47	38
		900	3240	6	50	65	40	27	35	27	49	35	43	35	56	42	49	41
		1200	4320	5	50	110	41	30	37	31	49	38	45	38	56	44	51	44
600		320	1152	13	50	5	37	17	26	16	45	25	34	24	52	32	40	31
		640	2304	9	50	25	37	22	30	22	46	30	38	30	53	36	45	36
		960	3456	6	50	50	38	26	33	26	47	34	41	34	54	40	48	40
		1280	4608	5	50	110	38	28	36	29	48	37	45	38	55	43	51	44

1) also to be taken into consideration

2) 4 dB/octave ceiling reduction and 5 dB/octave room attenuation have been allowed for in the calculation of case-radiated noise
Acoustic data for differential pressure up to 1000 Pa, see on-line design programme "Air terminal units".

< indicates values below 15

