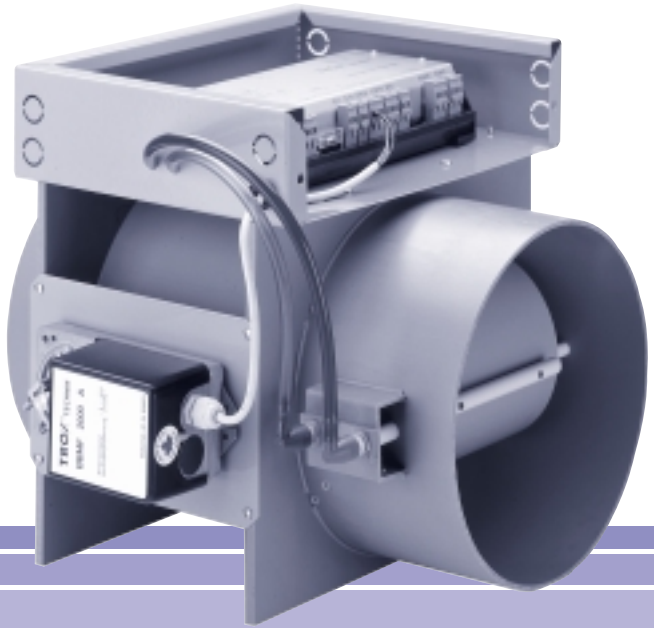
LABCONTROL

Control Devices for Laboratories

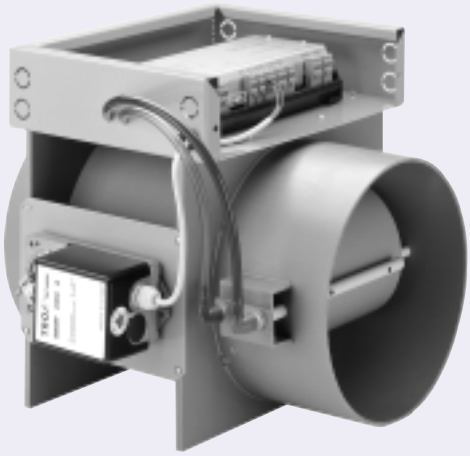
Type TVLK



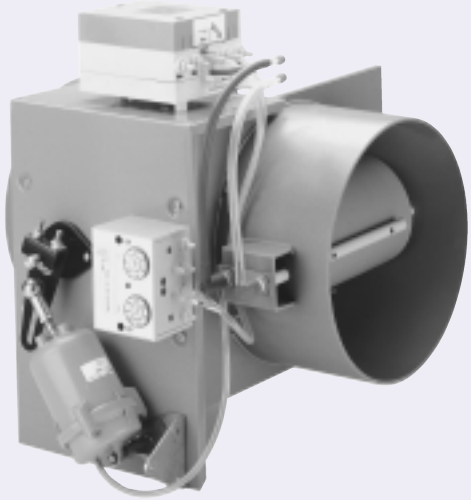
TROX® TECHNIK

Contents · Description

TVLK electronic construction with TCU-LON



TVLK pneumatic control



Area of Application

Air-conditioning systems for laboratory areas must meet special requirements. Preventing the escape of hazardous substances is regarded as a priority. As an energy-saving measure, laboratory fume cupboards can be operated with variable volume flow in accordance with DIN 12924 if the minimum air intake velocity is not exceeded. The volume flow control unit Type TVLK was designed for these special areas of application, where there are also aggressive media in the airflow and air inlet conditions are unfavourable. Due to the high cost of installation there is normally only a small space available in the ceiling area and the units have to be fitted directly above the fume cupboard. Volume flow control units through which contaminated air flows must be manufactured in durable materials.
By combining high-performance with low installation and maintenance costs the Type TVLK fulfils all these requirements.

The most important advantages:

- All components coming into contact with the extract air are made of resistant PPS. There are no metal parts in the contact with the airflow
- Overall length of controller 400 mm
- Standard diameter 250 mm
- Electronic or pneumatic control
  (optional electronic control LON-Bus capable)
- Volume flow ranges: electronic approx. 8 : 1,
  pneumatic approx 5 : 1
- Resistant to unfavourable air entry conditions
- Easy maintenance. The removable effective pressure sensor is designed to avoid the possibility of incorrect reinstallation
- Available with flanges and matching flanges on request
- For critical acoustic requirements the TVLK can be combined with plastic circular attenuators Type CAK
- All components fitted to the VAV controller are pre-hosed and pre-wired

Construction Characteristics

Casing

- Same 250 mm spigot diameter on both sides
- With optional flange both sides
- Compact 400 mm construction length
- Leakage flow rate to class 11, VD1 3803 or DIN V 24194

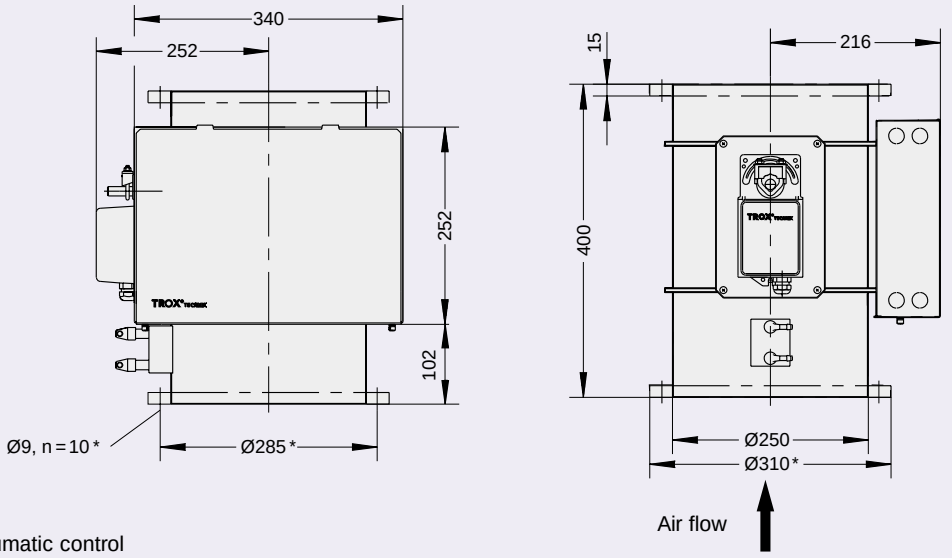
Volume flow control

- Electronic or pneumatic.
  Electronic construction with LONbus connection on request
- The extract air control can be varied to prevent the escape of pollutants from the fume cupboard and save energy at the same
- Highly accurate volume flow rates without extended straight air supply duct
- Differential pressure range from 80 to 1000 Pa
- Damper blade gives complete shut-off
- Volume flow rate is factory set and every unit factory-tested
- Vertical or horizontal installation (see label on unit)
- Maintenance-free damper blade mechanism
- Operating temperature 10 to 50 °C
- Volume flow can be measured and adjusted on site
- Electronic control can have parameters set using software and laptop

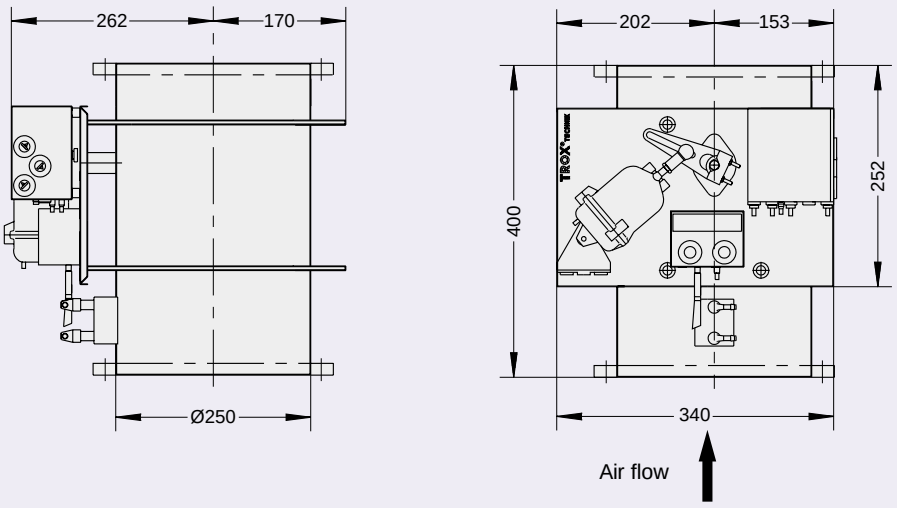
Materials

- Housing and damper blade in flame resistant polypropylene (PPS)
- Polypropylene (PP) bearings
- Chloroprene rubber damper blade seal (CR)
- Removable plastic differential pressure sensor (PP)

TVLK, electronic control



TVLK, pneumatic control



* For flange construction

Control

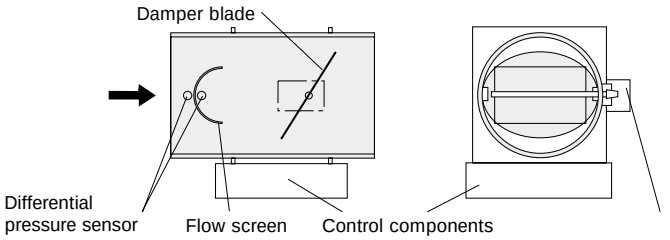
Volume flow control: Method of operation

The effective pressure measured on the differential pressure sensor is given by a transmitter as an output signal to the electronic or pneumatic controller.
This compares the actual value with the required value. If there is a control deviation the damper blade is adjusted accordingly by the actuator and the volume control is maintained at a constant level to close tolerances across the whole differential pressure range.

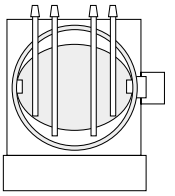
Fume cupboard: Method of operation

A main area of application for Type TVLK is the control of laboratory fume cupboards. Here the output signal of an air intake velocity transmitter is connected to the electronic or pneumatic volume flow controller.
The controller is given a minimum air intake velocity as the required value. The controller compares the actual and required value and changes the volume flow rate of the extract air on the fume cupboard according to the sash setting.

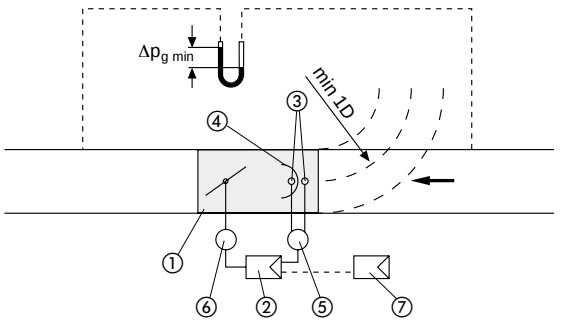
Construction with flow screen
Size 250-110, ... 250-180



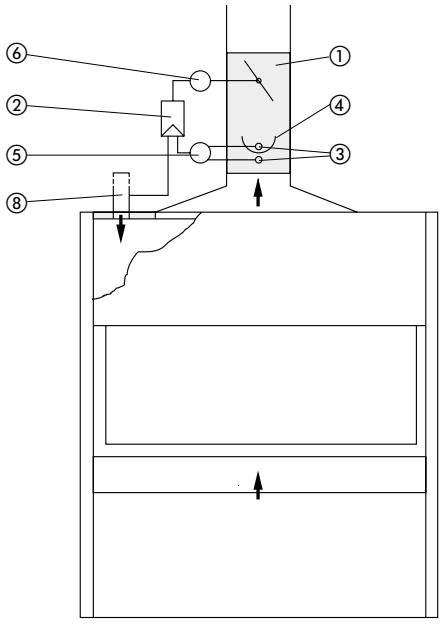
Construction without flow screen
Size 250-0



Volume flow control



Fume cupboard control



① TVLK
② Volume flow controller
③ Differential pressure sensor
④ Flow screen
⑤ Diaphragm pressure transducer
⑥ Actuator
⑦ Room temperature controller
⑧ FCC-E transmitter
(Air intake velocity sensor)

Technical Data · Dimensions · Nomenclature

Technical Data TCU-LON

Supply voltage : 24 VAC ±10%, 50 Hz
Power consumption
max. 50 VA
Permissible temperature range : 10 - 40°C
Fuse protection : Miniature fuse 2.5 A

Technical data FCC-P

Operating pressure : 1.3 ± 0.1 bar;
Conditioned
instrument compressed air,
(oil -, dust- and water- free)
Output pressure
(actuating signal) : 0.2 to 1.0 bar
Air consumption : 80 l_n/h
Spigot diameter : 4 mm

Table 1: C-values differential pressure sensor

Type	C l/s	C m³/h
250 - 0	47.2	169.9
250 - 110	23.6	85.0
250 - 140	20.3	73.1
250 - 180	15.0	54.0

Calculation formula

at ρ = 1.2 kg/m³

$$\dot{V} = C \cdot \sqrt{\Delta p_W}$$

Table 2: Volume flow ranges
Flow data TCU-LON

Type	Volume flow l/s	Volume flow m³/h	$\Delta p_{g\ min}$ Pa	$\Delta \dot{V}$ ±%
250-0	65	234	15	10
	250	900	30	7
	435	1566	40	5
	615	2214	50	5
250-110	40	144	5	10
	140	504	15	7
	240	864	40	5
	340	1224	80	5
250-140	35	126	5	10
	115	414	20	7
	200	720	45	5
	280	1008	90	5
250-180	25	90	5	10
	85	306	25	7
	145	522	50	5
	210	756	90	5

Table 3: Volume flow ranges
Flow data FCC-P (RLP 100)

Type	Volume flow l/s	Volume flow m³/h	$\Delta p_{g\ min}$ Pa	$\Delta \dot{V}$ ±%
250-0	50	180	10	10
	235	846	25	7
	416	1498	40	5
	600	2160	50	5
250-110	25	90	5	10
	120	432	15	7
	210	756	35	5
	305	1098	75	5
250-140	20	72	5	10
	90	324	20	7
	165	594	40	5
	235	846	80	5
250-180	15	54	5	10
	65	234	20	7
	115	414	40	5
	165	594	80	5

Nomenclature

f_m in Hz: Octave band centre frequency
L_W in dB: Sound power level (re 1pW) of flow generated noise in connecting duct

L_{W1} in dB: Sound power level (re 1pW) of case radiated noise with 3 m plastic duct on supply side

(All noise measured in reverberation room. Sound power data calculated and corrected to ISO 5135, December 1997)

L in dB(A): Sound pressure level (re 20 µPa) of flow generated noise, A-weighted, allowing for end reflection attenuation and room attenuation of 8 dB/oct

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

NC : NC weighting of sound pressure spectrum, allowing for room attenuation of 8dB/oct

Δp_g in Pa: Total pressure differential

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

$\dot{V}$ in l/s bzw. m³/h: Volume flow rate

$\Delta \dot{V}$ in ± %: Volume flow accuracy of set volume flow rates

B in mm: Nominal length of Trox Type CAK circular attenuator

Flow Generated Noise

Without circular attenuator

Example

Given: TVLK with 110 mm flow screen
(Type 250-110)
$\dot{V}$ = 40 l/s and 144 m³/h
Δp_g = 250 Pa
Permitted sound level in room 52 dB(A),
to DIN 12924 with 5dB room attenuation

Required: Flow generated noise in room

Method

f_m	63	125	250	500	1000	2000	4000	8000
L_w	49	49	48	45	43	40	31	25
End reflection attenu.[2)]	14	9	4	1	0	0	0	0
Room attenuation [2)]	5	5	5	5	5	5	5	5
	30	35	39	38	35	36	26	20
A-weighting	–26	–16	– 9	– 3	0	+1	+1	– 1
Corrected level	4	19	30	36	38	36	27	19

Result: 42 dB(A) using logarithmic addition, requirement met. [1)]

1) No acoustic allowance made for fume cupboard. (sash window closed). For more accurate calculations request acoustic data from manufacturer of the fume cupboard

2) See VDI 2081

Table 4: Flow generated noise, supply airside

Type	‡		Δp_g = 100 Pa										Δp_g = 250 Pa										Δp_g = 500 Pa										Δp_g = 1000 Pa									
			L_w in dB										L_w in dB										L_w in dB										L_w in dB									
			f_m in Hz										f_m in Hz										f_m in Hz										f_m in Hz									
	l/s	m³/h	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
250 - 0	65	234	47	45	41	38	37	29	19	<	31	27	44	48	47	45	46	46	36	28	42	38	49	51	50	50	49	53	48	46	49	45	54	47	36	36	39	45	53	49	48	47
	250	900	58	54	49	52	46	43	35	27	43	38	62	60	56	57	54	53	48	41	51	45	62	64	59	60	58	58	55	50	56	50	65	65	62	63	63	63	62	58	61	56
	435	1566	55	60	55	56	49	45	40	36	47	42	69	69	61	62	58	55	51	45	55	49	72	73	66	65	63	62	59	54	60	54	72	75	68	68	67	67	65	61	65	59
	615	2214	52	63	59	59	50	46	42	42	49	45	68	73	64	65	60	56	52	46	57	52	78	78	70	69	66	64	60	55	63	56	78	82	73	72	70	69	67	63	67	61
250 - 110	40	144	49	50	46	41	34	25	16	<	32	25	49	49	48	45	43	40	31	25	39	33	52	50	49	48	47	48	46	49	46	43	52	46	44	45	51	52	52	54	50	49
	140	504	57	60	54	51	44	38	31	25	42	37	60	64	60	58	53	49	44	38	50	44	60	65	63	62	58	56	52	50	55	49	60	64	63	63	63	62	59	58	60	54
	240	864	59	62	56	54	47	41	35	29	45	41	67	70	65	63	57	52	48	42	54	50	68	72	69	68	63	60	56	52	60	55	68	72	71	70	68	66	63	60	65	59
	340	1224	58	59	55	54	49	43	37	33	45	40	70	73	68	65	58	53	48	42	56	52	71	77	73	71	66	62	58	54	63	59	73	78	76	75	71	68	65	61	68	62
250 - 140	35	126	50	53	48	43	35	27	19	15	33	28	49	52	49	45	43	41	31	23	39	33	51	55	53	48	47	48	47	55	48	49	52	47	42	43	48	49	53	52	49	47
	115	414	58	61	56	52	44	38	31	25	43	38	62	67	62	58	53	49	43	37	50	44	62	68	65	62	58	56	52	48	55	49	62	68	65	64	63	62	59	58	60	54
	200	720	61	61	55	54	47	40	33	28	44	40	68	72	66	64	57	52	47	41	55	51	69	74	71	68	63	60	55	51	60	55	69	75	73	71	68	66	62	59	65	59
	280	1008	60	59	53	53	48	42	35	31	44	39	72	74	68	67	60	53	49	43	57	54	75	78	74	71	66	62	58	54	63	59	75	80	77	75	70	68	64	60	67	62
250 - 180	25	90	52	55	49	43	35	27	20	26	34	28	49	54	51	45	40	36	28	23	37	30	41	41	40	37	38	41	40	32	37	34	48	44	44	41	47	47	49	48	46	43
	85	306	63	64	58	53	44	37	30	26	44	39	71	71	65	59	54	49	44	38	51	46	70	72	67	62	58	56	52	48	56	49	65	69	68	64	64	62	59	59	60	54
	145	522	60	60	55	52	45	39	32	27	43	38	71	75	69	64	57	51	47	40	55	51	76	81	74	69	63	60	55	51	61	56	72	78	76	71	68	66	62	59	65	59
	210	756	53	51	48	48	46	41	33	27	40	33	71	75	71	67	58	52	47	40	57	54	77	86	79	73	66	61	56	52	65	61	78	85	82	76	71	69	64	59	69	63

< values lower than 15

Flow Generated Noise

with circular attenuator Type CAK

Example

Given: TVLK with 140 mm flow screen (Type 250-140)
$\dot{V}$ = 200 l/s and 720 m³/h
Δp_g = 250 Pa
Permissible sound level in room 52 dB(A),
to DIN 12924 with 5dB room attenuation

Required: Flow generated noise in room

Method 1, without circular attenuator

f_m	63	125	250	500	1000	2000	4000	8000
L_w 2)	68	72	66	64	57	52	47	41
End reflection attenu. 4)	14	9	4	1	0	0	0	0
Room attenuation 4)	5	5	5	5	5	5	5	5
A-weighting	–26	–16	– 9	– 3	0	+1	+1	– 1
Corrected Level	23	42	48	55	52	48	43	35

Result: L approx. 58 dB(A), requirement not met. 1)

Method 2, with circular attenuator CAK, length 5 m

f_m	63	125	250	500	1000	2000	4000	8000
L_w 3)	66	67	61	53	35	38	38	35
End reflection attenu. 4)	14	9	4	1	0	0	0	0
Room attenuation 4)	5	5	5	5	5	5	5	5
A-weighting	–26	–16	– 9	– 3	0	+1	+1	– 1
Corrected Level	21	37	43	44	30	34	34	29

Result : L approx. 48 dB(A), requirement met. 1)

1) No acoustic allowance made for fume cupboard (sash window open). For more accurate calculations request acoustic data from manufacturer of the fume cupboard
2) Values without circular attenuator from Table 4, Page 6
3) Values with circular attenuator from Table 5, Page 7
4) See VDI 2081

Table 5: Flow generated noise supply airside, with circular attenuator CAK

Type	B	‡		Δp_g = 100 Pa										Δp_g = 250 Pa									
				L_w in dB										L_w in dB									
				f_m in Hz								L in dB(A)	NC	f_m in Hz								L in dB(A)	NC
	in mm	l/s	m³/h	63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000		
250-0	500	65	234	48	42	37	29	16	<	<	<	21	<	49	44	43	36	24	28	26	15	28	21
		250	900	59	52	45	43	25	29	28	25	33	28	62	57	52	48	33	40	40	33	40	34
		435	1566	55	54	50	44	32	29	25	26	35	29	68	67	57	53	37	41	43	37	44	39
		615	2214	51	56	54	44	37	28	22	26	37	30	66	69	60	56	43	42	41	37	47	43
	1000	65	234	50	40	33	25	<	<	<	<	17	<	50	43	39	30	16	25	31	19	27	26
		250	900	60	51	42	38	19	17	21	15	28	23	62	54	46	40	24	29	33	28	32	28
		435	1566	56	58	48	42	30	26	23	25	33	27	69	64	53	47	33	32	35	30	39	32
		615	2214	53	63	51	44	38	32	25	32	37	30	71	71	57	52	41	38	36	37	44	38
250-110	500	40	144	45	46	42	32	<	<	<	<	24	16	49	46	46	37	21	26	24	15	29	21
		140	504	57	56	49	43	23	22	21	24	33	28	61	60	57	50	32	35	35	29	41	36
		240	864	60	59	52	46	26	26	26	26	36	32	67	66	61	55	36	38	39	36	45	41
		340	1224	56	57	51	46	29	27	27	26	36	32	72	70	63	57	37	38	40	37	48	43
	1000	40	144	47	44	38	27	<	<	<	<	20	<	48	46	42	31	14	20	28	15	26	23
		140	504	57	53	45	37	15	14	17	13	28	21	59	58	51	42	23	26	30	26	34	27
		240	864	59	56	47	39	18	15	18	14	30	24	66	64	56	47	27	29	33	28	39	33
		340	1224	58	55	48	38	22	18	20	17	31	23	73	68	59	51	30	30	34	29	42	36
250-140	500	35	126	50	49	45	36	18	16	15	<	27	20	52	49	48	39	23	30	33	22	32	27
		115	414	60	58	51	45	25	25	24	25	35	30	60	61	55	48	30	33	34	28	39	33
		200	720	62	59	53	49	28	26	25	26	39	35	66	67	61	53	35	38	38	35	44	39
		280	1008	63	60	54	51	29	26	26	26	40	37	71	70	64	57	38	40	40	39	48	43
	1000	35	126	52	43	36	24	<	<	<	<	18	<	46	48	43	32	<	19	24	15	26	18
		115	414	56	55	45	36	15	13	16	15	29	21	60	60	52	42	22	24	29	26	35	28
		200	720	60	58	48	42	19	17	20	24	33	27	66	65	57	47	26	28	32	30	40	33
		280	1008	62	58	49	44	21	19	22	29	34	29	71	68	60	50	29	30	34	34	43	37
250-180	500	25	90	55	52	46	35	<	<	<	<	28	21	46	50	47	35	17	20	19	<	28	22
		85	306	62	60	53	44	22	21	20	25	36	29	73	67	60	51	31	33	35	35	43	38
		145	522	59	56	49	43	23	22	22	21	33	28	73	71	65	56	36	36	38	37	48	43
		210	756	50	48	42	38	22	22	22	13	27	22	73	72	66	58	38	37	39	37	50	45
	1000	25	90	52	51	41	27	3	2	5	8	23	15	52	53	46	33	<	<	18	23	28	21
		85	306	61	59	49	38	14	13	17	25	32	25	72	67	57	45	23	25	30	35	40	34
		145	522	61	57	47	40	16	14	18	21	31	25	72	70	61	50	27	27	33	36	44	38
		210	756	59	52	43	41	16	14	18	10	29	25	72	71	62	53	30	28	34	36	45	40

Type	B	‡		Δp_g = 500 Pa										Δp_g = 1000 Pa									
				L_w in dB										L_w in dB									
				f_m in Hz								L in dB(A)	NC	f_m in Hz								L in dB(A)	NC
	in mm	l/s	m³/h	63	125	250	500	1000	2000	4000	8000			63	125	250	500	1000	2000	4000	8000		
250-0	500	65	234	56	52	52	45	30	35	39	45	40	40	55	46	33	20	<	17	27	28	24	23
		250	900	66	61	56	52	37	45	46	42	45	41	66	63	59	53	40	48	52	49	49	46
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		615	2214	79	74	65	60	44	50	53	46	52	47	78	78	69	63	48	55	60	55	57	54
	1000	65	234	49	46	41	33	19	31	37	39	34	35	56	49	44	38	27	36	45	48	42	43
		250	900	65	59	50	43	27	36	41	37	38	36	67	61	54	46	31	40	48	45	44	42
		435	1566	73	68	56	49	34	39	46	40	44	40	74	71	61	52	37	45	53	48	49	47
		615	2214	79	72	61	53	42	41	46	41	47	40	79	77	65	56	43	47	55	50	52	49
250-110	500	40	144	51	50	49	42	27	35	38	38	36	33	50	47	46	40	31	41	44	48	42	43
		140	504	64	63	60	54	37	43	44	42	46	40	62	63	61	56	42	48	51	50	49	45
		240	864	69	70	66	59	42	46	47	43	50	46	70	70	68	62	46	51	54	51	54	49
		340	1224	73	74	69	62	44	47	49	45	53	49	77	76	72	66	50	54	56	53	58	53
	1000	40	144	48	46	42	34	18	30	37	41	34	36	51	49	45	39	25	37	46	52	44	47
		140	504	61	60	54	46	28	34	39	38	39	34	63	62	56	49	32	41	48	46	45	42
		240	864	68	66	60	51	32	36	41	37	43	37	71	68	62	54	36	43	49	46	48	43
		340	1224	74	70	63	55	35	39	43	39	47	41	81	73	66	58	39	44	51	47	51	45
250-140	500	35	126	53	51	49	42	28	40	43	49	42	44	57	53	51	47	35	46	51	53	48	48
		115	414	62	62	58	52	35	42	43	42	44	38	65	64	61	54	40	48	52	49	49	46
		200	720	68	68	64	56	39	44	46	42	48	43	71	70	66	59	43	50	53	49	52	47
		280	1008	73	72	68	60	42	47	48	43	52	47	75	73	69	62	45	52	54	50	54	48
	1000	35	126	51	52	47	38	20	30	37	40	35	35	54	52	47	40	26	38	46	50	43	45
		115	414	62	61	55	46	27	32	38	36	39	32	62	61	55	47	31	39	47	45	43	41
		200	720	69	67	60	51	30	35	40	38	44	38	70	69	62	53	35	41	48	45	47	42
		280	1008	74	71	64	54	33	37	42	40	47	42	75	74	66	57	37	43	49	46	50	43
250-180	500	25	90	52	54	52	42	26	32	35	42	37	36	49	47	44	37	27	35	41	42	37	37
		85	306	74	70	65	54	37	41	43	42	48	43	67	65	63	55	40	46	50	51	49	46
		145	522	78	78	71	60	42	45	46	46	54	50	75	75	71	63	46	51	53	52	55	51
		210	756	78	84	75	65	45	47	48	48	58	55	81	82	78	68	50	54	56	52	60	58
	1000	25	90	50	52	49	36	16	23	30	44	35	38	49	44	38	30	17	28	37	37	32	33
		85	306	73	70	62	49	28	33	38	39	44	39	65	66	60	50	32	38	44	46	45	42
		145	522	77	78	67	55	33	36	41	40	50	47	74	75	69	57	37	42	48	47	51	48
		210	756	77	82	71	59	36	37	42	40	54	53	80	80	75	62	41	45	50	49	56	55

< values lower than 15

Case Radiated Noise

Example

Given: TVLK with 140 mm Flow screen (Type 250-140)
$\dot{V}$ = 115 l/s and 414 m³/h
Δp_g = 250 Pa
Permissible sound level in room 52 dB(A),
to DIN 12924 with 5dB room attenuation

Required: Case radiated noise in room

Method

f_m	63	125	250	500	1000	2000	4000	8000
L_w	43	36	33	34	42	43	35	31
Room attenuation [2]	5	5	5	5	5	5	5	5
A-weighting	–26	–16	– 9	– 3	0	+1	+1	– 1
Corrected level	12	15	19	26	37	39	31	25

Result: 42 dB(A) using logarithmic addition, requirement met. [1]

1) No acoustic allowance made for fume cupboard (sash window open) For more accurate calculations request acoustic data from manufacturer of the fume cupboard
2) See VDI 2081

Table 6: Case radiated noise

Type	‡		Δp_g = 100 Pa										Δp_g = 250 Pa										Δp_g = 500 Pa										Δp_g = 1000 Pa									
			L_w in dB										L_w in dB										L_w in dB										L_w in dB									
			f_m in Hz										f_m in Hz										f_m in Hz										f_m in Hz									
	l/s	m³/h	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
250 - 0	65	234	39	28	18	17	26	24	<	<	21	17	32	27	26	25	33	39	28	23	33	32	34	32	32	32	38	47	41	45	42	40	42	37	39	40	49	53	48	49	49	45
	250	900	41	33	25	32	33	30	20	<	28	23	44	38	33	33	39	44	35	27	39	36	47	44	42	40	43	49	43	39	44	42	50	48	49	49	51	55	51	49	51	47
	435	1566	40	35	32	40	37	34	23	16	33	27	49	43	39	42	46	44	35	29	41	37	56	50	45	44	50	53	45	40	48	45	55	55	54	52	54	59	54	50	55	51
	615	2214	44	39	40	48	44	42	31	27	41	35	44	41	43	49	46	44	33	27	43	37	62	52	49	49	55	55	46	42	51	47	63	58	56	54	57	61	55	51	57	54
250 - 110	40	144	35	27	25	26	27	26	19	<	23	19	35	29	26	32	35	35	27	24	32	28	32	27	24	30	38	41	36	38	37	34	38	34	31	31	41	42	39	42	40	38
	140	504	36	30	26	26	33	31	22	15	28	24	39	35	33	35	43	44	36	32	40	36	40	37	37	40	49	51	44	43	47	44	44	41	42	47	56	58	51	51	54	50
	240	864	39	33	30	30	34	32	22	16	30	25	45	40	37	37	45	46	38	32	42	38	46	43	42	44	52	54	47	44	50	47	48	47	46	50	58	60	54	52	56	53
	340	1224	41	35	35	37	36	34	24	21	32	27	50	44	40	40	46	45	37	31	42	38	51	48	45	46	54	55	47	44	51	48	52	51	50	51	60	62	55	53	58	54
250 - 140	35	126	29	25	23	23	25	24	17	<	22	17	33	26	22	23	31	33	23	20	28	25	33	30	23	23	31	37	33	25	32	30	41	35	29	20	22	23	23	20	22	17
	115	414	37	31	26	26	33	32	23	16	29	24	43	36	33	34	42	43	35	31	39	36	40	38	37	41	49	50	43	40	46	43	43	39	40	46	54	54	48	48	51	47
	200	720	38	33	29	29	35	33	23	16	30	26	51	44	37	37	45	46	38	33	42	39	46	44	42	44	52	54	46	43	49	46	48	46	46	50	58	60	54	52	56	53
	280	1008	39	35	32	33	36	33	23	17	31	26	55	49	40	40	47	48	40	33	44	41	51	48	45	45	53	55	48	45	51	47	52	51	49	51	59	62	56	53	58	54
250 - 180	25	90	31	27	19	17	23	21	<	<	18	<	35	24	18	20	28	29	19	16	25	21	33	25	20	22	32	34	30	27	30	27	37	28	23	25	36	39	37	30	36	32
	85	306	42	34	27	26	32	30	21	15	28	23	47	40	34	34	42	42	34	29	38	34	47	40	38	40	49	49	42	39	45	42	45	39	38	44	53	53	47	48	50	46
	145	522	43	36	32	33	35	32	22	16	30	25	50	44	39	38	45	44	37	31	41	37	55	49	44	44	53	53	45	43	49	45	51	46	45	51	58	60	52	51	56	52
	210	756	42	37	37	44	38	34	23	18	36	31	51	45	42	41	47	45	38	32	43	38	58	55	48	47	55	55	47	44	51	47	58	51	51	53	61	62	55	52	58	55

< values lower than 15

Specification Text TVLK

Circular plastic VAV controller for variable volume flow systems and for laboratory fume cupboards. Can be used to control the volume flow rate of aggressive media, as all components coming into contact with the airflow are made of plastic (no internal metal components). Compact 400 mm construction length. Resistant to unfavourable air entry conditions. 250 mm spigot diameter; 4 types, with flow screens for all normal volume flow ranges. Comprising casing with damper blade and integral differential pressure sensor to provide the mean value.
The sensor element can be easily removed for cleaning when necessary without dismantling the VAV controller.

Electronic control

Variable volume flow control with electronic controller for connecting a reference variable from a room temperature controller or an air intake velocity transducer to the fume cupboard control. The static differential pressure is measured by a diaphragm pressure transmitter. Supply voltage 24 VAC, signal voltage 0-10 VDC or 2 to 10 VDC. Minimum and maximum volume flow control rates and air intake velocity can be measured and adjusted on site by connecting a terminal (laptop with appropriate software) to the controller or service terminal.

Electronic control LON-Bus capable

Variable volume flow control with electronic LON-bus capable controller for connecting a reference variable from a room temperature controller or an air intake velocity transmitter to the fume cupboard control. The static differential pressure is measured with a diaphragm pressure transducer. The intake velocity is measured by an integral visual and audible alarm for fume cupboard control. Supply voltage 24 VAC, signal voltage 0-10 VDC. Minimum and maximum volume flow control rates and air intake velocity can be measured and adjusted on site by connecting a terminal (laptop with appropriate software) to the controller or service terminal.

Pneumatic control

Variable volume flow control with pneumatic controller for connecting a reference variable; static differential pressure measured with an integral diaphragm pressure transducer, PI control, standard signal 0.2 to 1.0 bar, NO/NZ, DW.

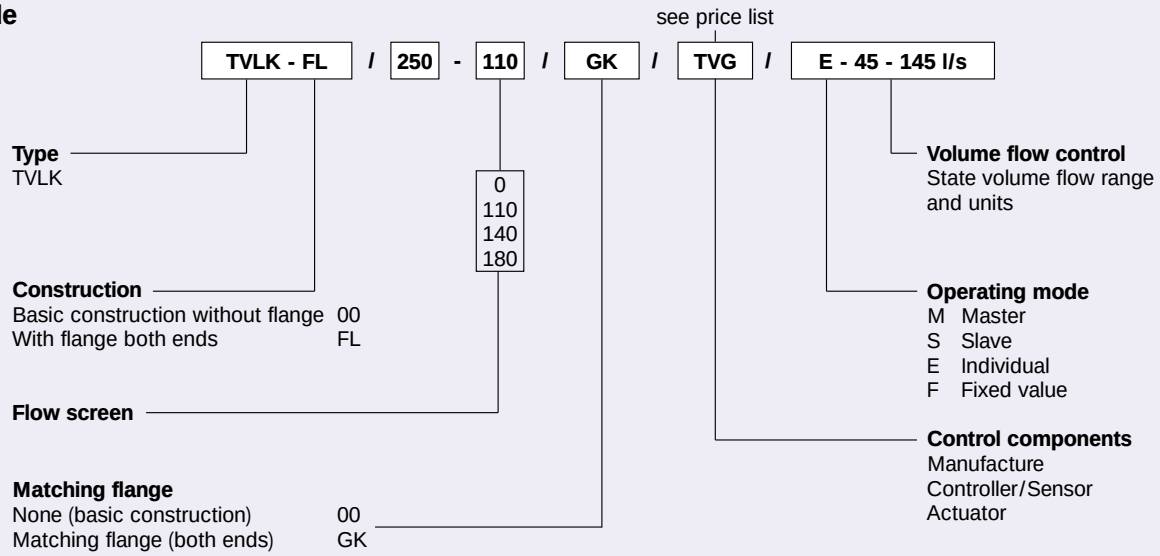
Manufacture: TROX LABCONTROL

Specification Text Attenuators Type CSAK

PPS plastic circular attenuators for use in circular ventilation duct with aggressive media for the attenuation of fan and other noise, e.g. as produced by volume flow control units.

Construction:
Exterior jacket and perforated internal circular duct in flame resistant polypropylene. Mineral wool non-combustible to DIN 4102 A2; protected by glass fibe scrim against corrosion caused by airflow up to air velocity of 20m/s. Standard construction with circular spigot on both ends, optional flange.

Order code



Order Example

Make : TROX-LABCONTROL
Type: TVLK-FL / 250 - 110 / GK / TVG / E-45-145 l/s