

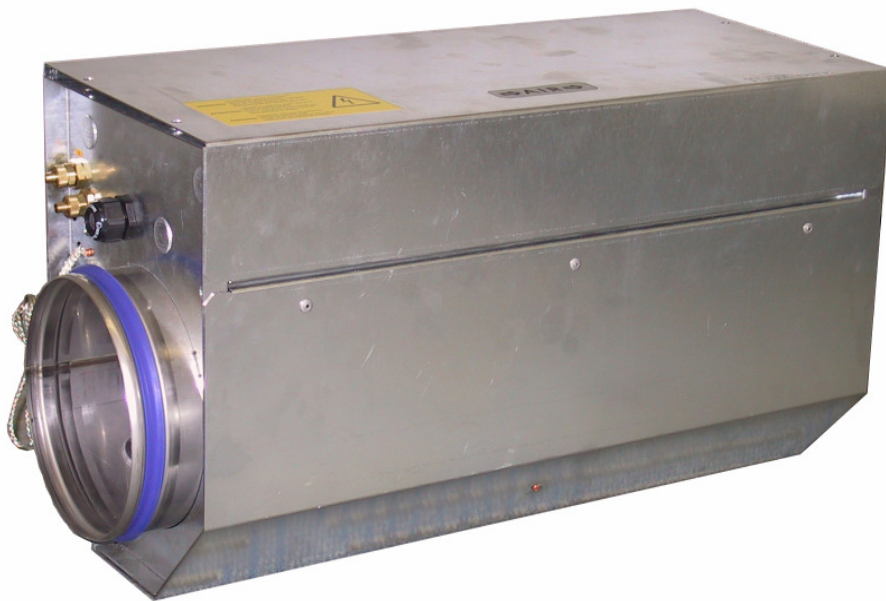
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**Product Information**  
**Ex Volume Flow Controller**  
**TVR-Ex – TES/TEF**



**TVR-Ex**



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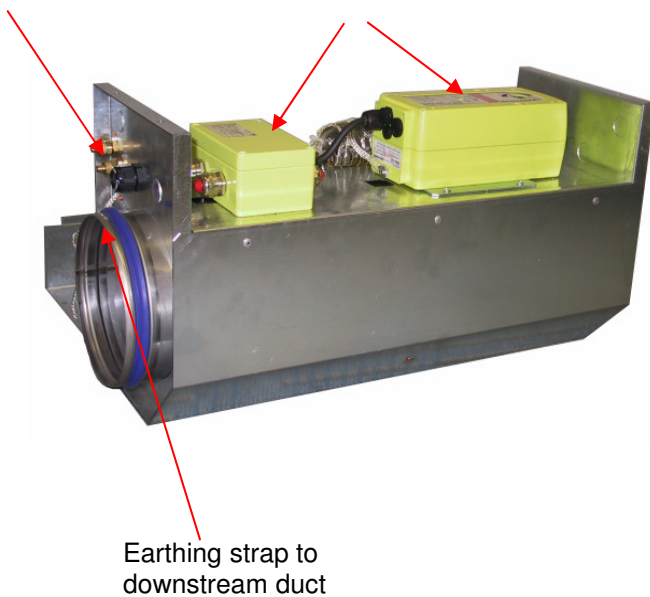
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**Volume flow controller**

The VAV controller TVR-Ex with the TES component is used for controlling variable volume flows of supply and exhaust air in Group II potentially explosive atmosphere, zones 1 and 2. The housing of the TVR-Ex controller is made from galvanised sheet metal. All parts and components that are exposed to the process air are made from stainless steel (1.4301) and are therefore resistant to chemicals. The controller is designed and certified in compliance with ATEX requirements. All electrical components mounted in the potentially explosive atmosphere are ATEX certified and verified by the manufacturer's certificates supplied with the unit.

Ex screw connections for pressure adapter and voltage supply

Ex connection box and Ex actuator



Earthing strap to downstream duct

**Control system**

The TVR-Ex – TES VAV controller consists of the Ex components in the Ex zone and an electronic controller that must be installed in a control cabinet outside the potentially explosive atmosphere. The block diagram on page 3 shows the exact system layout.

The control system is suitable for individual room control operations, supply and exhaust air, as well as for operation in 2-point mode on fume cupboards with high-speed control. The controller features a microprocessor that runs a non-erasable stored program for the purpose of solving the system-specific control tasks.

Master/slave functions: Up to 6 masters can be connected to a slave controller and correspondingly balanced. The volume flow is kept constant, irrespective of the duct pressure, in a closed control loop.

The type of actuator used is also available as a spring return actuator (TEF) or equipped with limit switches.

The electronic controller is currently available only as a digital controller with analogue communication.

Only an authorised service technician is permitted to put this control system into operation.

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### Use as an fume cupboard controller:

In line with this concept, fume cupboards require “constant” control. Operating mode selection is therefore possible by means of external, potential-free circuits (Vmax, Vmin, full shut-off). The pick-off for the monitoring device of the fume cupboards is to be taken from the alarm contacts of the controller. Visualisation (visual- and acoustic alarm) is provided by the explosion proved monitoring that have to be supplied by the laboratory equipment manufacturer.

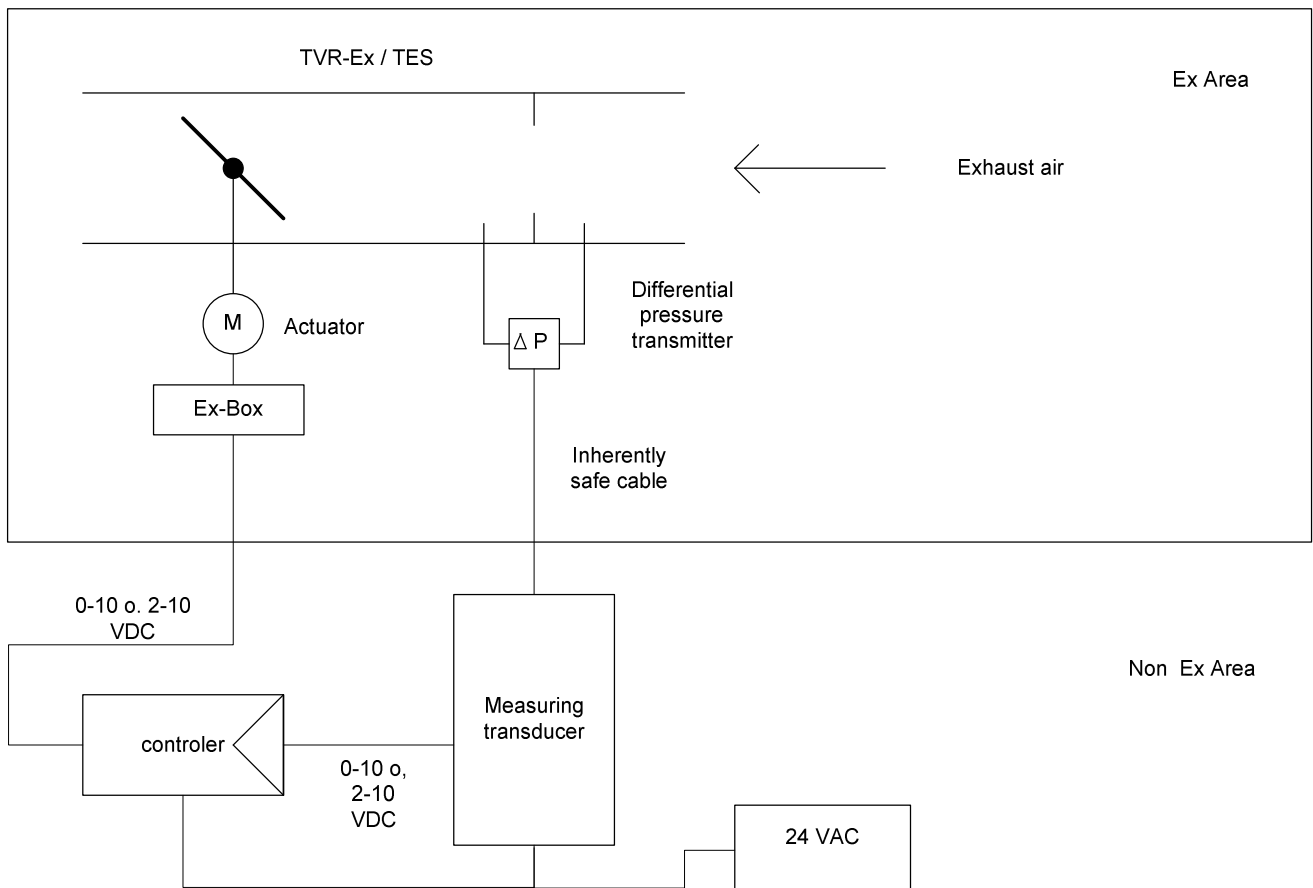
### Use as an individual room controller:

Effective room control in terms of supply air, exhaust air and balancing is possible through 6 connectable master sources. Additional Ex protection components are necessary for further auxiliary functions.

#### Auxiliary functions:

- Room pressure controlled by volume flow-pressure cascade
- Room temperature controlled by volume flow shift

### Block diagram



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### Technical data

Volume flow ranges and sound level in dB(A) by $\Delta p_g = 200 \text{ Pa}$								
Size	Volume flow		$\Delta P_g \text{ min}$	$\Delta \dot{V}$	air generated noise			
					Lpa		Lpa1	
	l/s	m <sup>3</sup> /h	Pa	± %	without silencer	with round silencer Typ CS/CF length in mm		
						500	1000	1500
125	15	54	20	15	37	24	14	10
	61	220	20	7	48	39	33	30
	107	234	55	6	52	44	38	36
	150	540	90	5	55	45	38	35
160	25	90	20	15	42	30	20	16
	100	360	25	8	51	42	37	34
	175	630	40	7	54	45	41	38
	250	900	70	5	56	48	42	40
200	40	144	20	15	44	34	25	22
	161	580	20	7	50	43	37	36
	282	1015	35	5	53	47	43	42
	405	1458	65	5	56	48	43	42
250	60	216	20	15	41	32	25	23
	247	888	20	7	49	43	37	35
	432	1554	25	5	50	44	40	39
	615	2214	45	5	54	46	41	40

For the complete overview of all acoustical data please see the TVR leaflet.

### Control system

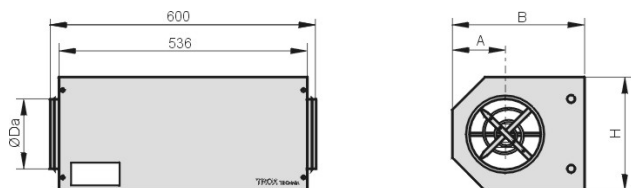
- Suitable for all types of gasses, mist, vapours in zone 1 and 2
- Operating temperature:
  - between 10C and 50C
  - type of protection – exterior housing IP42
- ATEX certification
  -  II 2 G c II T5/T6
- Total power intake approx. 145 VA

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*Available main dimensions of TVR-Ex duct module:*



<b>D</b>	<b>dDa</b>	<b>A</b>	<b>B</b>	<b>H</b>
125	124	128.5	290	221
160	159	111.0	290	221
200	199	181.5	380	311
250	249	156.5	380	311

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**Specification text*****Explosion-protected supply air/exhaust air controller (TVR-Ex/TES)***

VAV regulator for variable volume flow systems for controlling supply and exhaust air. Consisting of galvanised sheet metal housing as well as controller tube, control damper and sensors made from stainless steel (1.4301). Control damper is airtight as per DIN EN 1751 Class 4 and 3 at nominal size 125. The controller is designed and manufactured in compliance with ATEX requirements and ATEX certified. Includes an average value-forming differential pressure sensor and factory-fitted Ex actuator with Ex terminal box. The control system is approved for its intended purpose in Group II potentially explosive atmosphere, zone 1 and 2.

Subsequent measurement and adjustment of minimum and maximum volume flow rates possible.

***Control system:***

Volume flow controller used for individual room control and fume cupboard control, 2-point mode with high-speed actuator.

The controller features a microprocessor that runs a non-erasable stored program for the purpose of solving the system-specific control tasks.

Master/slave functions: Up to 6 masters can be connected to a slave controller and correspondingly balanced.

The electronic controller is not of explosion-protected design and must therefore be installed in a corresponding control cabinet outside the potentially explosive atmosphere.

The volume flow is kept constant, irrespective of the duct pressure, in the closed control loop. The actual value of the volume flow is determined by means of a pressure sensor, Ex design and ATEX certified. The control damper is adjusted corresponding to the deviation from the set value.

The controller must be put into operation on site by authorised service personnel.

With the aid of a service terminal, the system operator can read and vary the required control parameters such as  $V_{max}$ ,  $V_{min}$ , etc. All changes are saved even in the event of power failure. The service terminal is not included in the scope of delivery.

***Control components:***

- Pressure sensor for potentially explosive atmospheres of zone 1 and 2 for acquiring volume flow and Ex transducer (both ATEX certified)
- Microprocessor-based controller (24 VAC voltage supply)
- Reference signals from other controllers (fume cupboards) or a control centre via 0-10 V signal

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- High-speed actuator of Ex design, 7 sec. for potentially explosive atmospheres, zone 1, 2, 21 and 22 (ATEX certified), optionally available as spring return actuator

Differential pressure range 20 to 300 Pa  
Max. short-term differential pressure 900 Pa  
Volume flow range 70–2214m<sup>3</sup>/h  
Housing 600mm long  
Available in sizes 125, 160, 200, 250mm

*Materials:*

Galvanised sheet metal housing  
Stainless steel controller tube  
Stainless steel control damper  
Aluminium sensor tubes  
Plastic bearings

*ATEX certification*

 **II 2 G c II T5/T6**

Make: Trox Labcontrol  
Type: TVR-Ex – TES/TEF