



VAV TERMINAL UNIT,  
VARIANT TVA



EASY CONTROLLER,  
COMPACT CONTROLLER

Easy controller, Compact controller



TROX UNIVERSAL  
CONTROLLER, TROX  
LABCONTROL  
CONTROLLER

TROX UNIVERSAL controller,  
TROX LABCONTROL controller



CIRCULAR CONNECTION  
ON THE FAN END

Circular connection on the fan end



RECTANGULAR  
CONNECTION ON THE  
ROOM END

Rectangular connection on the room end

## TVA

### FOR EXTRACT AIR SYSTEMS WITH DEMANDING ACOUSTIC REQUIREMENTS

VAV terminal units for extract air control in buildings with variable air volume systems and demanding acoustic requirements

- Highly effective integral attenuator
- Box style construction for the reduction of the airflow velocity
- Electronic control components for different applications (Easy, Compact, Universal, and LABCONTROL)
- Closed blade air leakage to EN 1751, up to class 4
- Casing air leakage to EN 1751, up to class C

#### Optional equipment and accessories

- Acoustic cladding for the reduction of case-radiated noise
- Secondary silencer Type TS for the reduction of air-regenerated noise



## TESTED TO VDI 6022

Tested to VDI 6022

## General information

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### Application

- Rectangular VAV terminal units for use in ventilation and air conditioning systems
- For control, inductor and shut-off tasks in the extract air area with high acoustic requirements
- Integral attenuator
- Closed-loop volume flow control using an external power supply
- For variable or constant volume flow systems
- Shut-off via override control by others
- Can also be used for duct or room pressure control with suitable control components

### Special features

- Integral attenuator with at least 26 dB insertion loss at 250 Hz
- Hygiene tested and certified
- Factory set-up or programming and aerodynamic function testing
- Setting and subsequent parameterisation on the control component possible, separate setting device may be required

### Nominal sizes

125, 160, 200, 250, 315, 400

### Variants

- TVA: Extract air unit
- TVA-D: Extract air unit with acoustic cladding
- Units with acoustic cladding and/or secondary silencer Type TS for very demanding acoustic requirements
- Acoustic cladding cannot be retrofitted

### Parts and characteristics

- Ready-to-commission unit which consists of mechanical parts and control components
- Averaging effective pressure sensor for volume flow rate measurement
- Damper blade
- Integral attenuator
- Factory assembled control components complete with wiring and tubing
- Aerodynamic functional testing on a special test rig prior to shipping of each unit
- Set-up data is given on a label or volume flow rate scale affixed to the unit
- High control accuracy even in case of unfavourable upstream conditions

### Attachments

- EASY controller: Compact unit consisting of controller with potentiometers, effective pressure transducer and actuator
- Compact controller: Compact unit consisting of controller with potentiometers, effective pressure transducer and actuator
- Universal controllers: Controllers, differential pressure transducers and actuators for special applications
- LABCONTROL: Control components for air management systems

### Accessories

- Double lip seal (factory fitted)

### Useful additions

- Secondary silencer Type TS

### Construction features

- Rectangular casing
- Spigot on the fan end suitable for circular ducts to EN 1506 or EN 13180
- Spigot with groove for double lip seal
- Connection on the room end suitable for ducts
- Baffle plate is fitted after the damper blade for optimum aerodynamic performance
- Position of the damper blade indicated externally at shaft extension
- Thermal and acoustic insulation (lining)

### Materials and surfaces

Casing and damper blade made of galvanised sheet steel

- Damper blade seal made of TPE plastic
- Lining is mineral wool
- Effective pressure sensor made of aluminium
- Plastic plain bearings
- Shaft and linkage made of galvanised steel

Variant with acoustic cladding (-D)

- Acoustic cladding made of galvanised sheet steel
- Lining is mineral wool
- Rubber elements for the insulation of structure-borne noise

Mineral wool

- To EN 13501, fire rating Class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Non-hazardous to health thanks to being highly biosoluble in accordance with the Ordinance on Hazardous Substances and Note Q of the European Directive (EC) No. 1272/2008
- Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

### Standards and guidelines

Fulfils the hygiene requirements of

- EN 16798, Part 3
- VDI 6022, Sheet 1
- DIN 1946, Part 4
- Further standards, guidelines in accordance with hygiene certificate

Casing leakage: NS 125 – 200

- EN 1751, Class C

NS 250 – 400

- EN 1751, Class B

Closed blade air leakage:

- EN 1751, Class 4
- Meets the increased requirements of DIN 1946, Part 4, with regard to the acceptable closed damper blade air leakage

### Maintenance

- Maintenance-free as construction and materials are not subject to wear

## TECHNICAL INFORMATION

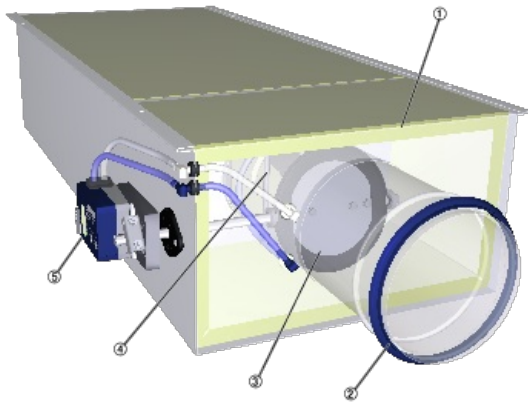
Function, Technical data, Quick sizing, Specification text, Order code, Related Products



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The VAV terminal unit is fitted with an effective pressure sensor for measuring the volume flow rate. The control components (attachments) include an

effective pressure transducer that transforms the effective pressure into an electric signal, a controller, and an actuator; the control functions can be achieved with an Easy controller or with a Compact controller or with individual components (Universal or LABCONTROL). For most applications, the setpoint value comes from a room temperature controller. The controller compares the actual value with the setpoint value and alters the control signal of the actuator if there is a difference between the two values. An integral attenuator reduces the noise that is created by the restriction of the airflow. Due to the larger rectangular cross section at the room end, the airflow velocity is about half the velocity in the circular duct.



- ① Integral sound attenuator
- ② Double lip seal
- ③ Damper blade
- ④ Effective pressure sensor
- ⑤ Control components, e.g. an Easy controller

Nominal sizes	125 – 400 mm
Volume flow rate range	14 – 2007 l/s or 50 – 7228 m³/h
Volume flow rate control range (unit with dynamic effective pressure measurement)	Approx. 10 – 100 % of the nominal volume flow rate
Minimum differential pressure	Up to 258 Pa (without circular silencer)
Maximum differential pressure	1000 Pa
Operating temperature	10 to 50 °C

Quick sizing tables provide a good overview of the minimum differential pressures, the volume flow rate accuracy and the room sound pressure levels that can be expected. Intermediate values may be achieved by interpolation.

The sound power levels for calculating the sound pressure levels were measured in the TROX laboratory according to DIN EN ISO 5135 - see "Basic information and nomenclature".

Precise results and spectral data for all control components can be calculated with our Easy Product Finder design program. The first selection criteria for the nominal size are the actual volume flow rates  $q_{vmin}$  and  $q_{vmax}$ .

**Volume flow rate ranges and minimum differential pressure values**

The minimum differential pressure of VAV terminal units is an important factor in designing the ductwork and in rating the fan including speed control. It must be ensured that for all operating conditions and for all terminal units a sufficient pressure differential is applied to each controller ( $\Delta p_{stat,min}$ ). The measurement points for fan speed control must be selected accordingly. The volume flow rates given for VAV terminal units depend on the nominal size and on the control component (attachment) that is installed.

Volume flow rate ranges and minimum differential pressure values  
 Control component dynamic measurement principle - Easy (potentiometer)  
 Attachment: Easy

NS	qv [l/s]	qv [m³/h]	Δp <sub>stmin</sub> [Pa]		Δqv [±%]
			①	②	
125	14	50	2	2	20
125	56	201	21	26	9
125	98	353	65	81	7
125	140	504	131	164	5
160	24	83	2	2	19
160	94	339	22	28	9
160	165	595	66	84	6
160	236	851	135	172	5
200	37	133	2	3	19
200	150	540	27	37	9
200	263	948	81	112	6
200	376	1355	165	228	5
250	58	208	2	3	19
250	236	848	22	34	9
250	413	1488	68	103	6
250	591	2128	139	211	5
315	96	344	2	3	19
315	390	1405	26	34	9
315	685	2467	80	104	6
315	980	3528	163	211	5
400	157	563	2	2	19
400	638	2298	22	27	9
400	1120	4033	67	82	6
400	1602	5768	137	167	5

① Basic unit

② Basic unit with secondary silencer TS

Volume flow rate ranges and minimum differential pressure values

Control component dynamic measurement principle – q<sub>v</sub> Extended

Attachments: BC0, BL0 \*\*, BM0, BM0-J6

NS	qv [l/s]	qv [m³/h]	Δp <sub>stmin</sub> [Pa]		Δqv [±%]
			①	②	
125	14	50	2	2	20
125	68	244	31	39	8
125	121	437	99	123	6
125	175	631	205	256	5
160	24	83	2	2	19
160	114	411	32	40	8
160	205	738	102	129	6
160	296	1066	211	269	5
200	37	133	2	3	19
200	182	655	39	54	8
200	327	1176	124	172	6
200	471	1698	258	358	5
250	58	208	2	3	19
250	285	1027	33	49	8
250	513	1847	105	159	6
250	740	2666	218	330	5
315	96	344	2	3	19
315	473	1703	38	50	8
315	851	3062	123	159	6
315	1228	4421	256	332	5
400	157	563	2	2	19
400	774	2785	32	39	8
400	1391	5006	103	126	6
400	2007	7228	215	262	5

① Basic unit

② Basic unit with secondary silencer TS

\*\* Control component to be discontinued in the future - please do not plan for new projects.

Volume flow rate ranges and minimum differential pressure values

Control component dynamic measurement principle - q<sub>v</sub> As standard

Attachments: BUDN, BUDNF, LNO, LK0, XB0, XB4, (B13 \*, B1B \*)

NS	qv [l/s]	qv [m³/h]	Δp <sub>stmin</sub> [Pa]		Δqv [±%]
			①	②	
125	14	50	2	2	20
125	58	207	23	28	9
125	101	365	69	86	6
125	145	522	141	176	5
160	24	83	2	2	19
160	97	349	23	29	9
160	171	616	71	90	6
160	245	882	145	184	5
200	37	133	2	3	19
200	155	557	28	39	9
200	272	980	86	119	6
200	390	1404	177	245	5
250	58	208	2	3	19
250	243	874	24	36	9
250	428	1539	73	110	6
250	612	2205	149	226	5
315	96	344	2	3	19
315	402	1448	28	36	8
315	709	2553	86	111	6
315	1015	3657	175	227	5
400	157	563	2	2	19
400	658	2368	23	29	8
400	1159	4173	72	88	6
400	1660	5978	147	180	5

① Basic unit

② Basic unit with secondary silencer TS

\* Control component already discontinued

Volume flow rate ranges and minimum differential pressure values

Control component of static measurement principle

Attachments: BUSN, BUSNF, BUSS, XD0, XD4, TUN, TUNF, TUS, TUSD, ELAB (BP3 \*, BPG \*, BPB \*, BB3 \*, BBB \*)

NS	qv [l/s]	qv [m³/h]	Δp <sub>stmin</sub> [Pa]		Δqv [±%]
			①	②	
125	21	73	3	4	16
125	62	223	26	32	8
125	103	372	72	89	6
125	145	522	141	176	5
160	35	123	3	4	16
160	104	376	27	34	8
160	175	629	74	94	6
160	245	882	145	184	5
200	55	195	4	5	16
200	166	598	32	45	8
200	278	1001	90	125	6
200	390	1404	177	245	5
250	85	306	3	5	16
250	261	939	27	41	8
250	437	1572	76	115	6
250	612	2205	149	226	5
315	142	508	4	5	15
315	433	1558	32	42	8
315	724	2607	89	116	6
315	1015	3657	175	227	5
400	231	830	3	4	15
400	707	2546	27	33	8
400	1184	4262	75	92	6
400	1660	5978	147	180	5

① Basic unit

② Basic unit with secondary silencer TS

\* Control component already discontinued

Quick sizing table for sound pressure level

The quick sizing tables are based on generally accepted attenuation and insulation levels. If the sound pressure level exceeds the required level, a larger air terminal unit and/or a silencer or acoustic cladding is required. For more information on the acoustic data, see basic information and nomenclature.

**Quick sizing table for air-regenerated noise  $L_{PA}$**   
including sound attenuator variants  
(entire volume flow rate range of the type)

NS	qv [l/s]	qv [m³/h]	150 Pa		500 Pa	
			①	②	①	②
125	14	50	< 15	< 15	16	< 15
125	68	244	24	16	29	20
125	121	437	28	20	33	24
125	175	631	n.V.	n.V.	34	27
160	24	83	< 15	< 15	18	< 15
160	114	411	29	18	33	23
160	205	738	31	22	37	28
160	296	1066	n.V.	n.V.	38	30
200	37	133	< 15	< 15	19	< 15
200	182	655	19	< 15	28	< 15
200	327	1176	18	n.V.	28	19
200	471	1698	n.V.	n.V.	28	25
250	58	208	< 15	< 15	20	< 15
250	285	1027	19	< 15	27	< 15
250	513	1847	19	n.V.	28	19
250	740	2666	n.V.	n.V.	28	25
315	96	344	< 15	< 15	17	< 15
315	473	1703	24	< 15	30	17
315	851	3062	26	n.V.	33	22
315	1228	4421	n.V.	n.V.	35	26
400	157	563	< 15	< 15	20	< 15
400	774	2785	16	< 15	27	15
400	1391	5006	< 15	20	29	22
400	2007	7228	n.V.	n.V.	29	28

Air-regenerated noise  $L_{PA}$  [dB(A)] with static differential pressure  $\Delta_{pst}$  from 150 or 500 Pa

① Basic unit

② Basic unit with secondary silencer TS

Rqd.: Specified static differential pressure  $\Delta_{pst}$  is smaller than the required minimum differential pressure  $\Delta_{pst \text{ min}}$ .

**Quick sizing table case-radiated noise  $L_{PA}$**   
including acoustic cladding variants  
(entire volume flow rate range of the type)

NS	qv [l/s]	qv [m³/h]	150 Pa		500 Pa	
			①	②	③	④
125	14	50	15	< 15	21	16
125	68	244	24	18	31	26
125	121	437	27	20	35	29
125	175	631	n.V.	n.V.	36	31
160	24	83	< 15	< 15	18	< 15
160	114	411	22	17	31	25
160	205	738	25	20	35	29
160	296	1066	n.V.	n.V.	36	31
200	37	133	< 15	< 15	19	< 15
200	182	655	23	18	31	26
200	327	1176	25	20	35	31
200	471	1698	n.V.	n.V.	37	33
250	58	208	< 15	< 15	15	< 15
250	285	1027	20	17	31	27
250	513	1847	23	20	36	32
250	740	2666	n.V.	n.V.	39	35
315	96	344	< 15	< 15	21	16
315	473	1703	27	22	36	31
315	851	3062	29	25	40	36
315	1228	4421	n.V.	n.V.	43	38
400	157	563	21	15	30	24
400	774	2785	31	25	41	35
400	1391	5006	32	26	44	38
400	2007	7228	n.V.	n.V.	45	39

Case-radiated noise  $L_{PA}$  [dB(A)] with static differential pressure  $\Delta_{pst}$  from 150 or 500 Pa

① Basic unit

② Basic unit with acoustic cladding

Rqd.: Specified static differential pressure  $\Delta_{pst}$  is smaller than the required minimum differential pressure  $\Delta_{pst \text{ min.}}$ .

Note:  
Information on case-radiated noise for combinations of basic unit and optional acoustic cladding and secondary silencer can be found in the Easy Product Finder design program.

## Application

Rectangular VAV terminal units for variable and constant air volume systems, suitable for extract air, available in 6 nominal sizes. High volume flow rate control accuracy. Ready-to-commission unit which consists of the mechanical parts and the electronic control components. Each unit contains an averaging effective pressure sensor for volume flow rate measurement, a damper blade, and an integral sound attenuator. Factory-assembled control components complete with wiring and tubing. Effective pressure sensor with 3 mm measuring holes, hence resistant to contamination. Baffle plate is fitted after the damper blade for optimum acoustic and aerodynamic performance. Casing with acoustic and thermal insulation. Position of the damper blade indicated externally at shaft extension. Damper blade is supplied open so that the air flow will be ensured, even without the control function, except variants with defined safe position NC (normally closed). Meets the hygiene requirements of EN 16798, Part 3, of VDI 6022, Sheet 1, and of DIN 1946, Part 4.

## Special features

- Integral attenuator with at least 26 dB insertion loss at 250 Hz
- Hygiene tested and certified
- Factory set-up or programming and aerodynamic function testing
- Setting and subsequent parameterisation on the control component possible, separate setting device may be required

## Materials and surfaces

- Casing and damper blade made of galvanised sheet steel
- Damper blade seal made of TPE plastic
- Lining is mineral wool
- Effective pressure sensor made of aluminium
- Plastic plain bearings

## Mineral wool

- To EN 13501, fire rating Class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Non-hazardous to health thanks to being highly biosoluble in accordance with the Ordinance on Hazardous Substances and Note Q of the European Directive (EC) No. 1272/2008



- Faced with glass fibre fabric as protection against erosion through airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

### Connection

Fan side spigot with groove for lip seal, suitable for connecting ducts according to EN 1506 or EN 13180. Room end suitable for the connection of ducts.

### Technical data

- Nominal sizes: 125 to 400 mm
- Volume flow rate range: 14 – 1602 l/s or 50 – 5768 m<sup>3</sup>/h
- Minimum differential pressure: Up to 258 Pa
- Maximum differential pressure: 1000 Pa
- Closed blade air leakage to EN 1751, Class 4
- Casing air leakage according to EN 1751, Class C (nominal sizes 125 - 250, Class B)

### Specification text for attachment

Variable volume flow control with electronic Easy controller to connect an external control signal; actual value signal can be integrated into the central BMS.

- Supply voltage 24 V AC/DC
- Signal voltages 0 – 10 V DC
- Possible override controls with external switches using volt-free contacts: CLOSED, OPEN,  $q_{vmin}$  and  $q_{vmax}$
- Potentiometers with percentage scales to set the volume flow rates  $q_{vmin}$  and  $q_{vmax}$  without adjustment device
- The actual value signal relates to the nominal volume flow rate such that commissioning and subsequent adjustment are simplified
- Volume flow rate control range: approx. 10 – 100 % of the nominal volume flow rate
- Clearly visible external indicator light for signalling the functions: Set, not set, and power failure
- Electrical connections with screw terminals
- Double terminals for looping the supply voltage, i.e. for the simple connection of voltage transmission to the next controller

### Sizing data

- $q_v$  \_\_\_\_\_ [m<sup>3</sup>/h]
- $\Delta p_{st}$  \_\_\_\_\_ [Pa]

### Air-regenerated noise

- $L_{PA}$  \_\_\_\_\_ [dB(A)]

### Case-radiated noise

- $L_{PA}$  \_\_\_\_\_ [dB(A)]

### Equivalence criteria

- Declaration of hygiene conformity in accordance with VDI 6022, Sheet 1 (01/2018), ÖNORM H 6020 (02/2007) and ÖNORM H 6021 (09/2003)
- Setting the volume flow rates without adjustment device via  $v_{min}$ - and  $v_{max}$ - potentiometer
- Electrical connections with screw terminals, no additional terminal boxes required
- Aerodynamic functional testing of each volume flow controller on test rigs at the factory, before a label is affixed to the controller
- Acoustic data measured to ÖNORM EN ISO 5135:1999

### Order code for volume flow control (with Easy attachment)

TVA	-	D	/	160	/	D1	/	Easy
1		2		3		4		5

### 1 Type

TVA VAV terminal unit, extract air

### 2 Acoustic cladding

No entry required: None

D With acoustic cladding

### 3 Nominal size [mm]

125, 160, 200, 250, 315, 400

### 4 Accessories

No entry required: None  
D1 Double lip seal (one side)

**5 Attachments (control components)**

Easy Volume flow controller, dynamic, analogue interface, setting  $q_{vmin}$  and  $q_{vmax}$  with potentiometers

**Order example: TVA-D/400/Easy**

Acoustic cladding Yes  
Nominal size 400 mm  
Attachments (control units) Easy controller, dynamic, analogue interface,  
Adjustment  $q_{vmin}$  and  $q_{vmax}$  with potentiometers

**Order code for volume flow control (with VARYCONTROL attachment)**

TVA	-	D	/	160	/	D1	/	XD4	/	V	/	0	/	200 – 900 [m <sup>3</sup> /h]	/	NO
1		2		3		4		5		7		8		9		10

**1 Type**

TVA VAV terminal unit, extract air

**2 Acoustic cladding**

No entry required: None  
D With acoustic cladding

**3 Nominal size [mm]**

125, 160, 200, 250, 315, 400

**4 Accessories**

No entry required: None  
D1 Double lip seal (one side)

**5 Attachments (control components)**

for example  
BC0 Compact controller  
XD4 Universal controller (VARYCONTROL)

**7 Operating mode**

F Constant value (a setpoint value)  
V Variable (setpoint value range)

**8 Signal voltage range**

For the actual and setpoint value signals  
0 0 – 10 V DC  
2 2 – 10 V DC

**9 Operating values for factory setting**

Volume flow rates [m<sup>3</sup>/h or l/s]  
 $q_{vconst}$  (in operating mode F)  
 $q_{vmin} - q_{vmax}$  (in operating mode V)

**10 Damper blade position**

Only spring return actuators  
NO Power off to OPEN  
NC Power off to CLOSE

**Order example: TVA-D/160/D1/BC0/V0/200–800 m<sup>3</sup>/h**

Acoustic cladding	Yes
Nominal size	160 mm
Accessories	Double lip seal
Attachments (control component)	Compact controller
Operating mode	Variable
Signal voltage range	0 – 10 V DC
Volume flow rate	q <sub>vmin</sub> = 200 m <sup>3</sup> /h q <sub>vmax</sub> = 800 m <sup>3</sup> /h

### Order code for volume flow control (with TROX UNIVERSAL attachment)

TVA	–	D	/	160	/	D1	/	TUNF	/	RE	/	M	/	0	/	UMZ	/	...	/	NC
1		2		3		4		5		6		7		8		9		10		11

#### 1 Type

TVA VAV terminal unit, extract air

#### 2 Acoustic cladding

No entry required: None

D With acoustic cladding

#### 3 Nominal size [mm]

125, 160, 200, 250, 315, 400

#### 4 Accessories

No entry required: None

D1 Double lip seal (one side)

#### 5 Attachments (control components)

TROX UNIVERSAL controller with

TUN Actuator (150 s)

TUNF Spring return actuator (150 s)

TUS Fast-running actuator (3 s)

TUSD Fast-running actuator (3 s), with digital communication interface (TROX HPD)

#### 6 Equipment function

Room control

RE Extract air control (Room Exhaust)

#### 7 Volume flow rate setting

M Master (RMF function)

S Slave

F Constant flow rate controller

#### 8 Signal voltage range

0 0 – 10 V DC

2 2 – 10 V DC

#### 9 Expansion of attachments

Option 1: Power supply

No entry required: 24 V AC/DC

T EM-TRF for 230 V AC

U EM-TRF-USV for 230 V AC, provides uninterruptible power supply (UPS)

Option 2: Digital communication interface

No entry required: None

B EM-BAC-MOD-01 for BACnet MS/TP

M EM-BAC-MOD-01 for Modbus RTU

I EM-IP for BACnet/IP, Modbus/IP and web server

R EM-IP with real time clock

Option 3: Automatic zero point correction

No entry required: None

Z EM-AUTOZERO with solenoid valve

## 10 Operating values for factory setting

Volume flow rates [m<sup>3</sup>/h or l/s]

Master (RMF function)

q<sub>v,min</sub>: Minimum volume flow rate

q<sub>v,max</sub>: Maximum volume flow rate

q<sub>v,const\_Supply air</sub>: Constant supply air

q<sub>v,const\_Extract air</sub>: Constant extract air

q<sub>v,Diff</sub>: Supply air/extract air difference

Constant value

q<sub>v,const</sub>: Constant volume flow rate

Slave

No entry required

## 11 Damper blade position

Only spring return actuators

NO Power off to OPEN

NC Power off to CLOSE

Useful additions

Room control panel

BE-LCD 40-character display

## Order example: TVA/250/TUSD/RE/S/0/Z

Nominal size 250 mm

Attachments (control component) Controller TROX UNIVERSAL, fast-running actuator (3 s) with digital communication interface (TROX HPD)

Equipment function Extract air control

Volume flow rate setting Slave

Signal voltage characteristic 0 – 10 V DC

Extension of attachments With expansion module EM-AUTOZERO, solenoid valve for automatic zero point correction

## Order code for differential pressure control (with VARYCONTROL attachment)

TVA	-	D	/	160	/	D1	/	XF4	/	PRE	/	V	/	0	/	30 – 60 [Pa]	/	NO
1		2		3		4		5		6		7		8		9		10

### 1 Type

TVA VAV terminal unit, extract air

### 2 Acoustic cladding

No entry required: None

D With acoustic cladding

### 3 Nominal size [mm]

125, 160, 200, 250, 315, 400

### 4 Accessories

No entry required: None

D1 Double lip seal (one side)

### 5 Attachments (control components)

for example

XF0 Compact controller for duct pressure

XF4 Universal controller for duct pressure (VARYCONTROL)

### 6 Equipment function/installation location

PDE Duct pressure control, extract air

PRE Room pressure control, extract air

### 7 Operating mode

F Constant value (a setpoint value)

V Variable (setpoint value range)

### 8 Signal voltage range

For the actual and setpoint value signals

0 0 – 10 V DC

2 2 – 10 V DC

### 9 Operating values for factory setting

For duct pressure control, differential pressure [Pa] always as an absolute value without sign.

$\Delta p_{const}$  (in operating mode F)

$\Delta p_{min} - \Delta p_{max}$  (in operating mode V)

### 10 Damper blade position

Only spring return actuators

NO Power off to OPEN

NC Power off to CLOSE

### Order example: TVA/250/D1/XF0/PDE/V2/100 – 400 Pa

Nominal size	250
Accessories	Double lip seal on one side (circular spigot)
Attachments (control components)	Compact controller duct pressure control
Equipment function/installation location	Duct pressure control, extract air
Operating mode	Variable
Signal voltage characteristics	2 – 10 V DC
Operating values	$\Delta p_{min} = 100 \text{ Pa}$ $\Delta p_{max} = 400 \text{ Pa}$

### Order code for differential pressure control (with TROX UNIVERSAL attachment)

TVA	-	D	/	160	/	D1	/	TUNF	/	PRE	/	MFP	-	0	/	UMZ	/	...	/	NC
1		2		3		4		5		6		7		8		9		10		11

### 1 Type

TVA VAV terminal unit, extract air

### 2 Acoustic cladding

No entry required: None

D With acoustic cladding

### 3 Nominal size [mm]

125, 160, 200, 250, 315, 400

### 4 Accessories

No entry required: None

D1 Double lip seal (one side)

### 5 Attachments (control components)

TROX UNIVERSAL controller with

TUN Actuator (150 s)

TUNF Spring return actuator (150 s)

TUS Fast-running actuator (3 s)

TUSD Fast-running actuator (3 s), with digital communication interface (TROX HPD)

### 6 Equipment function

Differential pressure control

PRE Room pressure control, extract air

PDE Duct pressure control, extract air

### 7 Differential pressure setting

MFP Master, constant pressure control

MVP Master, variable differential pressure control

SFP Slave, constant pressure control

SVP Slave, variable differential pressure control

## 8 Signal voltage range

0 0 – 10 V DC

2 2 – 10 V DC

## 9 Expansion of attachments

Option 1: Power supply

No entry required: 24 V AC/DC

T EM-TRF for 230 V AC

U EM-TRF-USV for 230 V AC, provides uninterruptible power supply (UPS)

Option 2: Digital communication interface

No entry required: None

B EM-BAC-MOD-01 for BACnet MS/TP

M EM-BAC-MOD-01 for Modbus RTU

I EM-IP for BACnet/IP, Modbus/IP and web server

R EM-IP with real time clock

Option 3: Volume flow rate measurement

No entry required: None

V EM-V Volume flow rate measurement for differential pressure control

Option 4: Automatic zero point correction

No entry required: None

Z EM-AUTOZERO solenoid valve (only with V)

## 10 Operating values for factory setting

Pressure [Pa], volume flow rates [m<sup>3</sup>/h or l/s]

Slave SVP

$\Delta p_{\min}$ : Minimum differential pressure

$\Delta p_{\max}$ : Maximum differential pressure

Slave SFP

$\Delta p_{\text{const}}$ : Constant differential pressure

Master MFP and MVP – same as slave, but additionally:

$q_{v,\min}$ : Minimum volume flow rate

$q_{v,\max}$ : Maximum volume flow rate

$q_{v,\text{const\_Supply air}}$ : Constant supply air

$q_{v,\text{const\_Extract air}}$ : Constant extract air

$q_{v,\text{Diff}}$ : Supply air/extract air difference

## 11 Damper blade position

Only spring return actuators

NO Power off to OPEN

NC Power off to CLOSE

## Useful additions

Room control panel

BE-LCD 40-character display

Order differential pressure transducer for room or duct pressure control separately e.g.

PT-699 for room pressure control

PT-699-DUCT for duct pressure control, including tube and pressure tap

## Order example: TVA/125/TUSD/PRE/SFP/0/V/20 Pa

Nominal size	125 mm
Attachments (control components)	Controller TROX UNIVERSAL; fast-running actuator (3 s) with digital communication interface (TROX HPD)
Equipment function	Room pressure control, extract air
Effective pressure setting	Slave, constant pressure control
Signal voltage characteristics	0 – 10 V DC
Extension of attachments	with expansion module EM-V, Volume flow rate measurement for differential pressure control
Operating values	$\Delta p_{\text{const}} = 20 \text{ Pa}$

**Order code for room control (with EASYLAB attachment)**

TVA	-	D	/	160	/	D1	/	ELAB	/	S	/	RE	/	UMZ	/	LAB	/	...
1		2		3		4		5		6		7		9		10		11

**1 TypeTVA**

VAV terminal unit, extract air

**2 Acoustic cladding**

No entry required: None

D With acoustic cladding

**3 Nominal size [mm]**

125

160

200

250

315

400

**4 Accessories**

No entry required: None

D1 Double lip seal (one side)

**5 Attachments (control components)**

ELAB EASYLAB controller TCU3

**6 Actuators**

S Fast-running actuator (3 s)

SD Fast-running actuator (3 s), with digital communication interface (TROX HPD)

**7 Equipment function**

Room control

RE Extract air control (Room Supply)

PC Differential pressure control (Pressure Control)

**9 Expansion modules**

Option 1: Power supply

No entry required: 24 V AC/DC

T EM-TRF for 230 V AC

U EM-TRF-USV for 230 V AC, provides uninterruptible power supply (UPS)

Option 2: Digital communication interface

No entry required: None

B EM-BAC-MOD-01 for BACnet MS/TP

M EM-BAC-MOD-01 for Modbus RTU

I EM-IP for BACnet/IP, Modbus/IP and web server

R EM-IP with real time clock

Option 3: Automatic zero point correction

No entry required: None

Z EM-AUTOZERO Solenoid valve for automatic zero point correction

**10 Additional functions**

Without room management function

LAB Extract air led system (laboratories)

CLR Supply air led system (clean rooms)

With room management function

LAB-RMF Extract air led system

CLR-RMF Supply air led system

## 11 Operating values for factory setting

Volume flow rates [m<sup>3</sup>/h, l/s], pressure [Pa](only required when room management function is active)

Total extract air/supply air of room

q<sub>v1</sub>: Standard mode

q<sub>v2</sub>: Reduced operation

q<sub>v3</sub>: Increased operation

q<sub>v4</sub>: Constant supply air

q<sub>v5</sub>: Constant extract air

q<sub>v6</sub>: Supply air/extract air difference

Δ<sub>pset</sub>: Setpoint pressure (only with differential pressure control)

### Useful additions

Room control panel (only for devices with RMF)

BE-LCD 40-character display

Differential pressure transducer for room pressure control equipment function must be ordered separately, e.g.

PT-699 Measuring range ±50 Pa or ±100 Pa

PT-GB604 Measuring range ±100 Pa

### Order example: TVA/200/ELAB/S/RE/TZ/CLR

Acoustic cladding	None
Nominal size	200 mm
Attachments (control component)	EASYPAC controller TCU3
Actuator	Fast-running actuator (3 s)
Equipment function	Extract air control (Room Exhaust) With expansion module EM-TRF
Expansion modules	Transformer for 230 V AC supply With expansion module EM-AUTOZERO solenoid valve for automatic zero point correction
Additional function	Supply air led system (clean rooms) Room management function not activated

### Order code for single operation (with EASYPAC attachment)

TVA	-	D	/	160	/	D1	/	ELAB	/	S	/	EC	-	E0	/	UMZ	/	...
1		2		3		4		5		6		7		8		9		11

#### 1 TypeTVA

VAV terminal unit, extract air

#### 2 Acoustic cladding

No entry required: None

D With acoustic cladding

#### 3 Nominal size [mm]

125

160

200

250

315

400

#### 4 Accessories

No entry required: None

D1 Double lip seal (one side)

#### 5 Attachments (control components)

ELAB EASYPAC controller TCU3

#### 6 Actuators

S Fast-running actuator (3 s)

SD Fast-running actuator (3 s), with digital interface (TROX HPD)

#### 7 Equipment function

Single operation



## EC Extract air controller

### 8 External volume flow rate setting

E0 Voltage signal 0 – 10 V DC

E2 Voltage signal 2 – 10 V DC

2P Switch contacts (provided by others) for 2 switching steps

3P Switch contacts (provided by others) for 3 switching steps

F Volume flow rate constant value, without signalling

### 9 Expansion modules

#### Option 1: Power supply

No entry required: 24 V AC/DC

T EM-TRF for 230 V AC

U EM-TRF-USV for 230 V AC, provides uninterruptible power supply (UPS)

#### Option 2: Digital communication interface

No entry required: None

B EM-BAC-MOD-01 for BACnet MS/TP

M EM-BAC-MOD-01 for Modbus RTU

I EM-IP for BACnet/IP, Modbus/IP and web server

R EM-IP with real time clock

#### Option 3: Automatic zero point correction

No entry required: None

Z EM-AUTOZERO Solenoid valve for automatic zero point correction

### 11 Operating values for factory setting

Volume flow rates [m<sup>3</sup>/h or l/s]

Depending on external volume flow rate setting

E0, E2:  $q_{vmin}/q_{vmax}$

2P:  $q_{v1}/q_{v2}$

3P:  $q_{v1}/q_{v2}/q_{v3}$

F:  $q_{v1}$

### Order example: TVA-D/125/ELAB/S/EC/F/350 m<sup>3</sup>/h

Acoustic cladding	Yes
Nominal size	125 mm
Attachments (control component)	EASYPAC controller TCU3
Actuator	Fast-running actuator (3 s)
Equipment function	Extract air controller
External volume flow rate setting	Volume flow rate constant value, without signalling
Operating value	$q_{v1} = 350 \text{ m}^3/\text{h}$

### Attachments

[Type Easy](#)

[Type Compact, dynamic](#)

[Type Compact, static](#)

[Type Universal, dynamic](#)[Type Universal, static](#)

[Type EASYPAC TCU3](#)

### Additional products

[Type TS](#)



## VAV TERMINAL UNIT, VARIANT TVA

- VAV terminal unit for the control of variable extract air volume flows

## VAV TERMINAL UNIT, VARIANT TVA-D

- VAV terminal unit with acoustic cladding for the control of variable extract air volume flows
- For rooms where the case-radiated noise of the unit is not sufficiently reduced by a false ceiling
- The circular ducts for the room under consideration must have adequate acoustic insulation (provided by others) on the fan end
- For an optimal solution, the customer should also insulate the room-side rectangular ducts
- Acoustic cladding cannot be retrofitted

## MATERIAL

### Standard construction

Order code detail	Part	Material
-	Casing	Galvanised sheet steel
-	Effective pressure sensor	Aluminium tube
-	Damper blade	Galvanised sheet steel
-	Damper blade seal	Thermoplastic elastomer (TPE)
-	Shaft and linkage	Galvanised steel
-	Plain bearings	Thermoplastic elastomer (TPE)
-	Lining	Mineral wool according to EN 13501, building material Class A1, non-combustible

### Option double lip seal

Order code detail	Part	Material
D1	Double lip seal	Rubber, EPDM

### Option acoustic cladding

Order code detail	Part	Material
D	Acoustic cladding casing	Galvanised sheet steel
D	Insulation of structure-borne noise	Polyethylene, PE
D	Lining	Mineral wool according to EN 13501, fire rating Class A1, non-combustible

### VAV terminal unit, variant TVA



### VAV terminal unit, variant TVA-D



**Dimensions/Weights for TVA**

NS	B	H	L	ØD	A	B <sub>1</sub>	B <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	kg
125	198	152	1220	124	185	232	300	186	236	21
160	308	152	1205	159	170	342	410	186	236	25
200	458	210	1460	199	138	492	560	244	281	33
250	598	201	1540	249	97	632	700	235	311	55
315	798	252	1685	314	245	832	900	286	361	73
400	898	354	1995	399	176	932	1000	388	446	118

**Dimensions/Weights for TVA**

NS	B	H	L	ØD	A	B <sub>1</sub>	B <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	kg
125	198	152	1220	124	145	232	380	186	316	41
160	308	152	1205	159	130	342	490	186	316	50
200	458	210	1460	199	98	492	640	244	361	63
250	598	201	1540	249	57	632	780	235	391	95
315	798	252	1685	314	205	832	980	286	441	133
400	898	354	1995	399	136	932	1080	388	526	193

**Space required for commissioning and maintenance**

Sufficient space must be kept clear near any attachments to allow for commissioning and maintenance. It may be necessary to provide sufficiently sized inspection access openings.

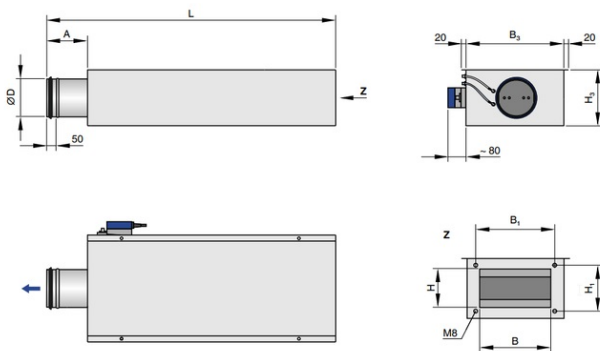
Space required

Attachment	①	②	③
VARYCONTROL			
Easy controller: Easy	400	300	300
Compact controller: BC0, BL0 **, BM0, BM0-J6, LK0, LN0, XB0, XD0, XF0	400	300	300
Universal controller: B13 *, B1B *, BP3 *, BPB *, BPG *, BB3 *, BBB *, BR3 *, BRB *, BRG *, BS3 *, BSB *, BSG *, BG3 *, BGB *, BH3 *, BHB *, BUDN, BUDNF, BUPN, BUPNF, BURN, BURNF, BUSN, BUSNF, BUSS, XB4, XD4, XF4	700	300	300
TROX UNIVERSAL			
TROX UNIVERSAL: TUN, TUNF, TUS, TUSD	900	350	400
LABCONTROL			
EASYLAB: ELAB	900	350	400

\* Control components already discontinued

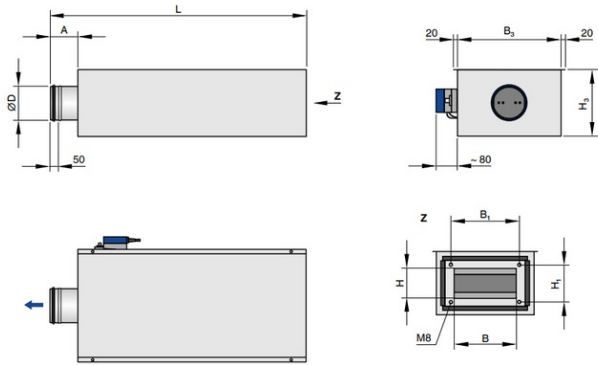
\*\* Control component to be discontinued in the future - please do not plan for new projects

#### VAV terminal unit without acoustic cladding (TVA)



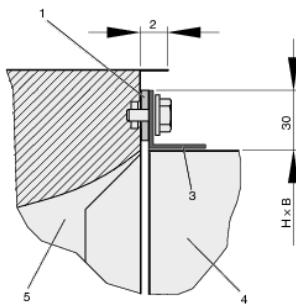
Notes: Total length L relates to the total casing length. Connection length in assembled state is reduced by approx. 12 mm. See details of flange. The illustration shows control component type Easy, Compact. For individual dimensions, see section on space requirements for commissioning and maintenance.

#### VAV terminal unit with acoustic cladding (TVA-D)



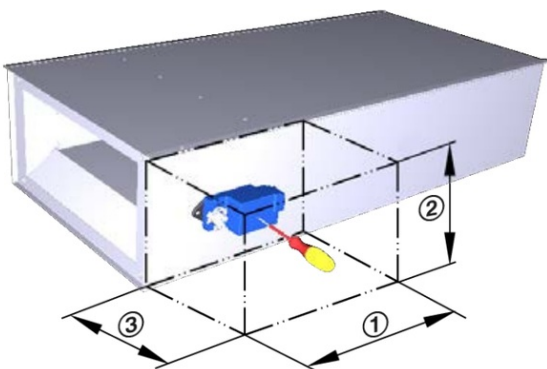
Notes: Total length L relates to the total casing length. Connection length in assembled state is reduced by approx. 12 mm. See details of flange. The illustration shows control component type Easy, Compact. For individual dimensions, see section on space requirements for commissioning and maintenance.

#### Detail of flange



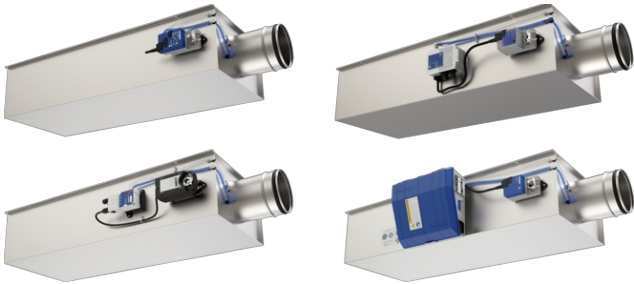
- ① Compressible seal, to be provided by others
- ② Flange indented approx. 12 mm on both sides
- ③ Flange
- ④ Duct
- ⑤ VAV terminal unit

#### Access to attachments



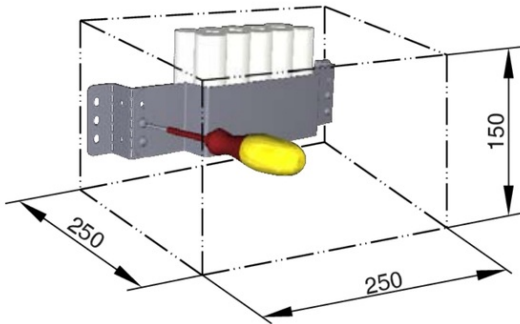
Schematic illustration of required installation space

### Product examples



Attachments BC0, XD4, BUDN, TUN

### Accessibility of the battery pack



Schematic illustration of required installation space

Note: Separate installation space for fixing and accessing the battery pack (optional accessories for TROX UNIVERSAL or LABCONTROL EASYLAB control components).

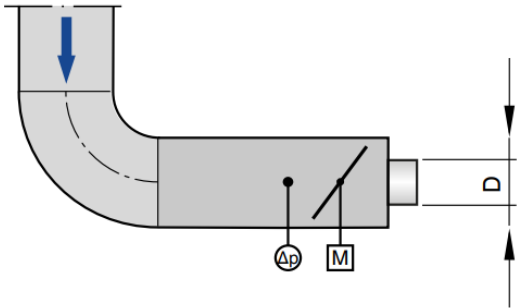
### Installation and commissioning

- Any installation orientation (except units with static effective pressure transducer)
- Return edges of the casing with drilled holes suitable for M10 threaded rods
- TVA-D: For constructions with acoustic cladding, ducts on the room side should have cladding up to the acoustic cladding of the controller

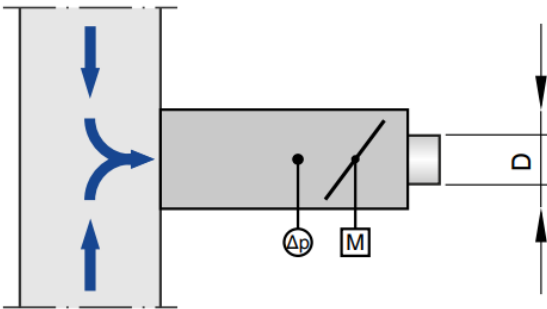
### Upstream conditions

The volume flow rate accuracy  $\Delta_q$ , applies to straight upstream section. Bends, junctions or a narrowing or widening of the duct cause turbulence that may affect measurement. Duct connections, e.g. branches off the main duct, must comply with EN 1505.

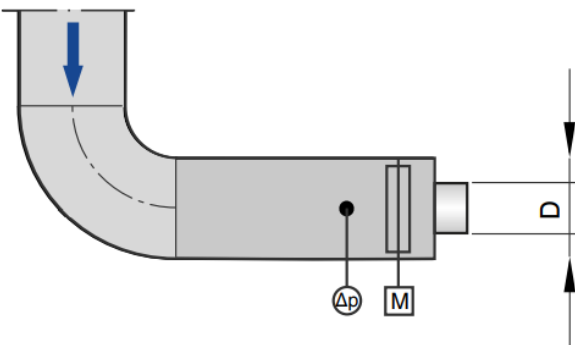
### Bend vertical



Convergence of 2 airflows, vertical

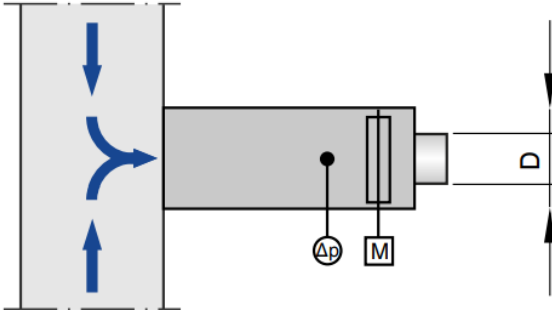


Bend horizontal



A bend – without a straight duct section upstream of the VAV terminal unit – has only a negligible effect on the volume flow rate accuracy.

Convergence of 2 airflows, horizontal



The stated volume flow rate accuracy  $\Delta_{qv}$  will be achieved, even when the VAV terminal unit is installed at a junction and at the point of convergence of two airflows.

#### Control components VARYCONTROL

Attachment	Controlled variable	Interface	Effective pressure transducer	Actuator	Manufacturer
<b>Easy controller, dynamic</b>					
Easy	qv	0 – 10 V	integral	slow-running integral	①
<b>Compact controller, dynamic</b>					
BC0	-	0 – 10 V or 2 – 10 V or MP bus interface	integral	slow-running integral	②
BL0 **	qv	LonWorks FTT 10 interface	integral	slow-running integral	②
BM0	qv	Modbus RTU/BACnet MS/TP	integral	slow-running integral	②
BMO-J6	qv	Modbus RTU/BACnet MS/TP with RJ12 socket (for X-AIRCONTROL)	integral	slow-running integral	②
LN0	qv	0 – 10 V or 2 – 10 V	integral	slow-running integral	⑤
LK0	qv	KNX interface	integral	slow-running integral	⑤
XB0	qv	0 – 10 V or 2 – 10 V	integral	slow-running integral	③
<b>Compact controller, static</b>					
XD0	qv	0 – 10 V or 2 – 10 V	integral	slow-running integral	③
XF0	$\Delta p$	0 – 10 V or 2 – 10 V	integral, control range adjustable 25 - 550 Pa	slow-running integral	③
<b>Universal controller, dynamic</b>					



Attachment	Controlled variable	Interface	Effective pressure transducer	Actuator	Manufacturer
B13 *	qv	0 – 10 V or 2 – 10 V	integral	slow-running separate	②
B1B *	qv	0 – 10 V or 2 – 10 V	integral	spring return actuator separate	②
BUDN	qv	0 - 10 V or 2 - 10 V or MP bus or Modbus RTU or BACnet MS/TPTP	integral	slow-running separate	②
BUDNF	qv	0 - 10 V or 2 - 10 V or MP bus or Modbus RTU or BACnet MS/TPTP	integral	spring return actuator separate	②
XB4	qv	0 – 10 V or 2 – 10 V	integral	spring return actuator separate	③
<b>Universal controller, static</b>					
BP3 *	qv	0 – 10 V or 2 – 10 V or MP bus interface	individual component	slow-running separate	②
BPB *	qv	0 – 10 V or 2 – 10 V or MP bus interface	individual component	spring return actuator separate	②
BPG *	qv	0 – 10 V or 2 – 10 V or MP bus interface	individual component	fast-running separate	②
BB3 *	qv	2 – 10 V	individual component	slow-running separate	②
BBB *	qv	2 – 10 V	individual component	spring return actuator separate	②
BR3 *	$\Delta p$	0 – 10 V or 2 – 10 V or MP bus interface	individual component 100 Pa	slow-running separate	②
BRB *	$\Delta p$	0 – 10 V or 2 – 10 V or MP bus interface	individual component 100 Pa	spring return actuator separate	②
BRG *	$\Delta p$	0 – 10 V or 2 – 10 V or MP bus interface	individual component 100 Pa	fast-running separate	②
BS3 *	$\Delta p$	0 – 10 V or 2 – 10 V or MP bus interface	individual component 600 Pa	slow-running separate	②
BSB *	$\Delta p$	0 – 10 V or 2 – 10 V or MP bus interface	individual component 600 Pa	spring return actuator separate	②
BSG *	$\Delta p$	0 – 10 V or 2 – 10 V or MP bus interface	individual component 600 Pa	fast-running separate	②
BG3 *	$\Delta p$	2 – 10 V	individual component 100 Pa	slow-running separate	②
BGB *	$\Delta p$	2 – 10 V	individual component 100 Pa	spring return actuator separate	②
BH3 *	$\Delta p$	2 – 10 V	individual component 600 Pa	slow-running separate	②
BHB *	$\Delta p$	2 – 10 V	individual component 600 Pa	spring return actuator separate	②
BUPN	$\Delta p$	0 - 10 V or 2 - 10 V or MP bus or Modbus RTU or BACnet MS/TPTP	integral Control range adjustable 25 – 450 Pa	slow-running separate	②
BURNF	$\Delta p$	0 - 10 V or 2 - 10 V or MP bus or Modbus RTU or BACnet MS/TPTP	integral Control range adjustable -50 ... -10 Pa or 10 ... 50 Pa	spring return actuator separate	②
BURN	$\Delta p$	0 - 10 V or 2 - 10 V or MP bus or Modbus RTU or BACnet MS/TPTP	integral Control range adjustable -50 ... -10 Pa or 10 ... 50 Pa	slow-running separate	②
BUPNF	$\Delta p$	0 - 10 V or 2 - 10 V or MP bus or Modbus RTU or BACnet MS/TPTP	integral Control range adjustable 25 – 450 Pa	spring return actuator separate	②

Attachment	Controlled variable	Interface	Effective pressure transducer	Actuator	Manufacturer
BUSN	q <sub>v</sub>	0 - 10 V or 2 - 10 V or MP bus or Modbus RTU or BACnet MS/TPTP	integral	slow-running separate	②
BUSNF	q <sub>v</sub>	0 - 10 V or 2 - 10 V or MP bus or Modbus RTU or BACnet MS/TPTP	integral	spring return actuator separate	②
BUSS	q <sub>v</sub>	0 - 10 V or 2 - 10 V or MP bus or Modbus RTU or BACnet MS/TPTP	integral	fast-running separate	②
XD4	q <sub>v</sub>	0 - 10 V or 2 - 10 V	integral	spring return actuator separate	③
XF4	Δp	0 - 10 V or 2 - 10 V	integral, control range adjustable 25 - 550 Pa	spring return actuator separate	③

\* Control component already discontinued

\*\* Control component to be discontinued in the future - please do not plan for new projects

q<sub>v</sub> Volume flow rate

Δp Differential pressure

① TROX, ② TROX/Belimo, ③ TROX/Gruner, ⑤ Siemens

Control components TROX UNIVERSAL

Attachment	Controlled variable	Interface	Effective pressure transducer	Actuator	Manufacturer
<b>Universal controller, static</b>					
TUN	q <sub>v</sub> , Δp	TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: LonWorks, Modbus, BACnet, web server	q <sub>v</sub> = integral Δp = separate	slow-running separate	①
TUNF	q <sub>v</sub> , Δp	TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: LonWorks, Modbus, BACnet, web server	q <sub>v</sub> = integral Δp = separate	spring return actuator separate	①
TUS	q <sub>v</sub> , Δp	TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: LonWorks, Modbus, BACnet, web server	q <sub>v</sub> = integral Δp = separate	fast-running separate	①
TUSD	q <sub>v</sub> , Δp	TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: LonWorks, Modbus, BACnet, Webserver	q <sub>v</sub> = integral Δp = separate	fast-running with digital communication interface (TROX HPD), separate	①

q<sub>v</sub> Volume flow rate

Δp Differential pressure

① TROX

Control components LABCONTROL EASYLAB

Attachment	Controlled variable	Interface	Effective pressure transducer	Actuator	Manufacturer
EASYLAB					
ELAB	qv, $\Delta p$ *	TROX plug and play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: Modbus, BACnet, web server	qv = integral $\Delta p$ = separate	fast-running, separate  or  fast-running with digital communication interface (TROX HPD), separate	③

① TROX

\* Controlled variable depending on the VAV terminal unit type

- TVR, TVRK: Fume cupboard, room supply air, room extract air, room pressure, single controller
- TVLK: Fume cupboard, single controller
- TVJ, TVT: Room supply air, room extract air, room pressure, single controller
- TVZ, TZ-Silenzio: Room supply air, room pressure, single controller
- TVA, TA-Silenzio: Room extract air, room pressure, single controller