



Easy controller, Compact controller



TROX UNIVERSAL controller,  
TROX LABCONTROL controller



Circular connection on the fan end



Rectangular connection on the room end



Tested to VDI 6022

# VAV terminal units

## 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

|                     |    |                       |    |
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## General information

### 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 characteristics

- 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

5, 6, 8, 10, 12, 16

### 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)

### Material 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 3937 fpm
- 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 5 – 8

- 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



## Disclosure of Chemicals

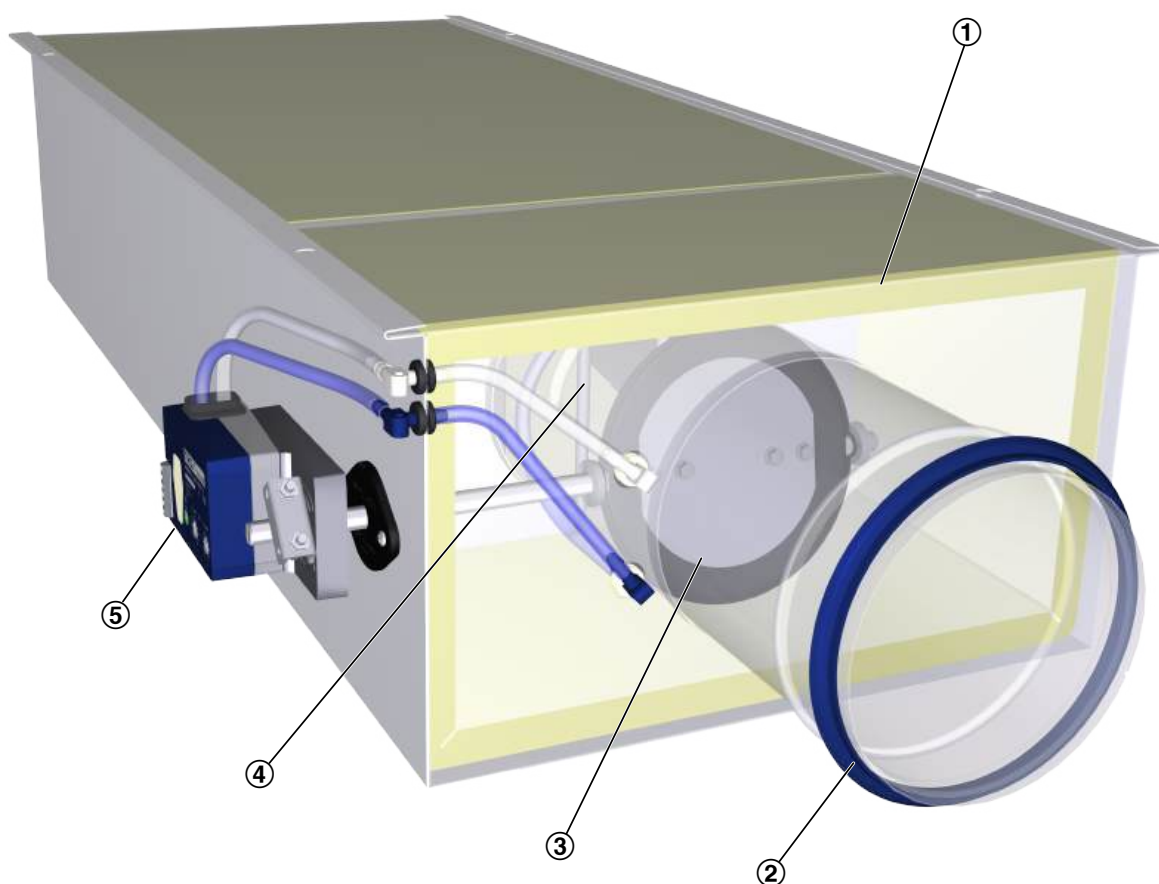
RoHS EU Directive 2011/65/EU (RoHS) This product or individual variants comply with EU Directive 2011/65/EU (RoHS) on the restriction of the use of certain hazardous substances in electrical and electronic equipment. For more information, please refer to our Environmental Product Declarations.

REACH 1907/2006 (EC Regulation REACH) This product or individual variants comply with the provisions of EC Regulation No. 1907/2006, also known as REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals). For more information, please refer to our Environmental Product Declarations.

## Function

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

## Technical data

|                                                                                   |                                                    |
|-----------------------------------------------------------------------------------|----------------------------------------------------|
| Nominal sizes                                                                     | 5 – 16 in.                                         |
| Volume flow rate range                                                            | 29.66 – 4,252.6 cfm 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 1.04 in. w.g. (without circular silencer)    |
| Maximum differential pressure                                                     | 4.02 w.g                                           |
| Operating temperature                                                             | 50 to 122 °F                                       |

## Quick sizing

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. Sufficient static differential pressure ( $\Delta p_{stat,min}$ ) must be ensured for all operating conditions and for all controllers. 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 [cfm] | qv [m³/h] | $\Delta p_{stat,min}$ [in.w.g.] |      | $\Delta q_v [\pm\%]$ |
|----|----------|-----------|---------------------------------|------|----------------------|
|    |          |           | 1                               | 2    |                      |
| 5  | 29.66    | 50        | 0.01                            | 0.01 | 20                   |
| 5  | 118.66   | 201       | 0.08                            | 0.1  | 9                    |
| 5  | 207.65   | 353       | 0.26                            | 0.33 | 7                    |
| 5  | 296.64   | 504       | 0.53                            | 0.66 | 5                    |
| 6  | 50.85    | 83        | 0.01                            | 0.01 | 19                   |
| 6  | 199.17   | 339       | 0.09                            | 0.11 | 9                    |
| 6  | 349.62   | 595       | 0.26                            | 0.34 | 6                    |
| 6  | 500.06   | 851       | 0.54                            | 0.69 | 5                    |
| 8  | 78.4     | 133       | 0.01                            | 0.01 | 19                   |
| 8  | 317.83   | 540       | 0.11                            | 0.15 | 9                    |
| 8  | 557.27   | 948       | 0.33                            | 0.45 | 6                    |
| 8  | 796.7    | 1355      | 0.66                            | 0.92 | 5                    |
| 10 | 122.9    | 208       | 0.01                            | 0.01 | 19                   |
| 10 | 500.06   | 848       | 0.09                            | 0.14 | 9                    |
| 10 | 875.1    | 1488      | 0.27                            | 0.41 | 6                    |
| 10 | 1252.26  | 2128      | 0.56                            | 0.85 | 5                    |
| 12 | 203.41   | 344       | 0.01                            | 0.01 | 19                   |
| 12 | 826.36   | 1405      | 0.1                             | 0.14 | 9                    |
| 12 | 1451.43  | 2467      | 0.32                            | 0.42 | 6                    |
| 12 | 2076.50  | 3528      | 0.65                            | 0.85 | 5                    |
| 16 | 332.66   | 563       | 0.01                            | 0.01 | 19                   |
| 16 | 1351.65  | 2298      | 0.09                            | 0.11 | 9                    |
| 16 | 2373.15  | 4033      | 0.27                            | 0.33 | 6                    |



| NS | qv [cfm] | qv [m³/h] | Δpstmin [in. w.g.] |      | Δqv [±%] |
|----|----------|-----------|--------------------|------|----------|
|    |          |           | 1                  | 2    |          |
| 16 | 3,394.45 | 5768      | 0.55               | 0.67 | 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 [cfm] | qv [m³/h] | Δpstmin [in. w.g.] |      | Δqv [±%] |
|----|----------|-----------|--------------------|------|----------|
|    |          |           | 1                  | 2    |          |
| 5  | 29.66    | 50        | 0.01               | 0.01 | 20       |
| 5  | 144.08   | 244       | 0.12               | 0.16 | 8        |
| 5  | 256.38   | 437       | 0.4                | 0.49 | 6        |
| 5  | 370.8    | 631       | 0.82               | 1.03 | 5        |
| 6  | 50.85    | 83        | 0.01               | 0.01 | 19       |
| 6  | 241.55   | 411       | 0.13               | 0.16 | 8        |
| 6  | 434.37   | 738       | 0.41               | 0.52 | 6        |
| 6  | 627.19   | 1066      | 0.85               | 1.08 | 5        |
| 8  | 78.4     | 133       | 0.01               | 0.01 | 19       |
| 8  | 385.64   | 655       | 0.16               | 0.22 | 8        |
| 8  | 692.87   | 1176      | 0.5                | 0.69 | 6        |
| 8  | 998.98   | 1698      | 1.44               | 1.44 | 5        |
| 10 | 122.9    | 208       | 0.01               | 0.01 | 19       |
| 10 | 603.88   | 1027      | 0.13               | 0.2  | 8        |
| 10 | 1087.99  | 1847      | 0.42               | 0.64 | 6        |
| 10 | 1567.97  | 2666      | 0.88               | 1.32 | 5        |
| 12 | 203.41   | 344       | 0.01               | 0.01 | 19       |
| 12 | 1003.22  | 1703      | 0.15               | 0.2  | 8        |
| 12 | 1804.17  | 3062      | 0.49               | 0.64 | 6        |
| 12 | 2603     | 4421      | 1.03               | 1.33 | 5        |
| 16 | 332.66   | 563       | 0.01               | 0.01 | 19       |
| 16 | 1604.02  | 2785      | 0.13               | 0.16 | 8        |
| 16 | 2947.38  | 5006      | 0.41               | 0.51 | 6        |
| 16 | 4252.6   | 7228      | 0.86               | 1.05 | 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 -  $q_v$  As standard

Attachments: BUDN, BUDNF, LN0, LK0, XB0, XB4, (B13 \*, B1B \*)

| NS | $q_v$ [cfm] | $q_v$ [m³/h] | $\Delta p_{stmin}$ [in w.g.] |      | $\Delta q_v$ [±%] |
|----|-------------|--------------|------------------------------|------|-------------------|
|    |             |              | 1                            | 2    |                   |
| 5  | 29.66       | 50           | 0.01                         | 0.01 | 20                |
| 5  | 122.9       | 207          | 0.09                         | 0.11 | 9                 |
| 5  | 214.01      | 365          | 0.28                         | 0.35 | 6                 |
| 5  | 307.24      | 522          | 0.57                         | 0.71 | 5                 |
| 6  | 50.85       | 83           | 0.01                         | 0.01 | 19                |
| 6  | 205.53      | 349          | 0.09                         | 0.12 | 9                 |
| 6  | 362.33      | 616          | 0.29                         | 0.36 | 6                 |
| 6  | 519.13      | 882          | 0.58                         | 0.74 | 5                 |
| 8  | 78.4        | 133          | 0.01                         | 0.01 | 19                |
| 8  | 328.43      | 557          | 0.11                         | 0.16 | 9                 |
| 8  | 576.34      | 980          | 0.35                         | 0.48 | 6                 |
| 8  | 826.36      | 1404         | 0.71                         | 0.98 | 5                 |
| 10 | 122.9       | 208          | 0.01                         | 0.01 | 19                |
| 10 | 514.89      | 874          | 0.1                          | 0.14 | 9                 |
| 10 | 906.88      | 1539         | 0.29                         | 0.44 | 6                 |
| 10 | 1296.75     | 2205         | 0.6                          | 0.91 | 5                 |
| 12 | 203.41      | 344          | 0.01                         | 0.01 | 19                |
| 12 | 851.77      | 1448         | 0.11                         | 0.14 | 8                 |
| 12 | 1502.24     | 2553         | 0.35                         | 0.45 | 6                 |
| 12 | 2150.6      | 3657         | 0.7                          | 0.91 | 5                 |
| 16 | 332.66      | 563          | 0.01                         | 0.01 | 19                |
| 16 | 1294.22     | 2368         | 0.09                         | 0.12 | 8                 |
| 16 | 2455.78     | 4173         | 0.29                         | 0.35 | 6                 |
| 16 | 3517.34     | 5978         | 0.59                         | 0.72 | 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 [cfm] | qv [m³/h] | Δpstmin [in w.g.] |      | Δqv [±%] |
|----|----------|-----------|-------------------|------|----------|
|    |          |           | 1                 | 2    |          |
| 5  | 44.5     | 73        | 0.01              | 0.02 | 16       |
| 5  | 131.37   | 223       | 0.1               | 0.13 | 8        |
| 5  | 218.24   | 372       | 0.29              | 0.36 | 6        |
| 5  | 307.24   | 522       | 0.57              | 0.71 | 5        |
| 6  | 74.16    | 123       | 0.01              | 0.02 | 16       |
| 6  | 220.36   | 376       | 0.11              | 0.14 | 8        |
| 6  | 370.8    | 629       | 0.3               | 0.38 | 6        |
| 6  | 519.13   | 882       | 0.58              | 0.74 | 5        |
| 8  | 116.54   | 195       | 0.02              | 0.02 | 16       |
| 8  | 351.74   | 598       | 0.13              | 0.18 | 8        |
| 8  | 588.85   | 1001      | 0.36              | 0.5  | 6        |
| 8  | 826.36   | 1404      | 0.71              | 0.98 | 5        |
| 10 | 180.1    | 306       | 0.01              | 0.02 | 16       |
| 10 | 553.03   | 939       | 0.11              | 0.16 | 8        |
| 10 | 925.95   | 1572      | 0.31              | 0.46 | 6        |
| 10 | 1296.75  | 2205      | 0.6               | 0.91 | 5        |
| 12 | 300.88   | 508       | 0.02              | 0.02 | 15       |
| 12 | 917.47   | 1558      | 0.13              | 0.17 | 8        |
| 12 | 1534.07  | 2607      | 0.36              | 0.47 | 6        |
| 12 | 2150.66  | 3657      | 0.7               | 0.91 | 5        |
| 16 | 489.46   | 830       | 0.01              | 0.02 | 15       |
| 16 | 1498     | 2546      | 0.11              | 0.13 | 8        |
| 16 | 2508.66  | 4262      | 0.3               | 0.37 | 6        |
| 16 | 3517.34  | 5978      | 0.59              | 0.72 | 5        |

1 Basic unit

2 Basic unit with secondary silencer TS

\* Control component already discontinued

## Quick sizing table for sound pressure levels

The quick sizing tables are based on generally accepted attenuation 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 [cfm] | qv [m³/h] | 0.6 in.w.g. |      | 2.01 in. w.g. |     |
|----|----------|-----------|-------------|------|---------------|-----|
|    |          |           | 1           | 2    | 1             | 2   |
| 5  | 29.66    | 50        | <15         | <15  | 15            | <15 |
| 5  | 144.08   | 244       | 25          | 15   | 30            | 20  |
| 5  | 256.38   | 437       | 27          | 20   | 32            | 25  |
| 5  | 370.8    | 631       | n.V.        | n.V. | 35            | 27  |
| 6  | 50.58    | 83        | <15         | <15  | 17            | <15 |
| 6  | 241.55   | 411       | 30          | 17   | 32            | 22  |
| 6  | 434.37   | 738       | 30          | 22   | 37            | 27  |
| 6  | 627.19   | 1066      | n.V.        | n.V. | 37            | 30  |
| 8  | 78.4     | 133       | <15         | <15  | 20            | <15 |
| 8  | 385.64   | 655       | 20          | <15  | 27            | <15 |
| 8  | 692.87   | 1176      | 17          | n.V. | 27            | 20  |
| 8  | 997.99   | 1698      | n.V.        | n.V. | 27            | 25  |
| 10 | 122.9    | 208       | <15         | <15  | 20            | <15 |
| 10 | 603.88   | 1027      | 20          | <15  | 27            | <15 |
| 10 | 1086.99  | 1847      | 20          | n.V. | 27            | 20  |
| 10 | 1567.97  | 2666      | n.V.        | n.V. | 27            | 25  |
| 12 | 302.41   | 344       | <15         | <15  | 17            | <15 |
| 12 | 1002.23  | 1703      | 25          | <15  | 30            | 17  |
| 12 | 1802.64  | 3062      | 25          | n.V. | 32            | 22  |
| 12 | 2601.98  | 4421      | n.V.        | n.V. | 35            | 25  |
| 16 | 332.66   | 563       | <15         | <15  | 20            | <15 |
| 16 | 1639.99  | 2785      | 15          | <15  | 27            | 15  |
| 16 | 2946.33  | 5006      | <15         | 20   | 30            | 22  |
| 16 | 4252.6   | 7228      | n.V.        | n.V. | 30            | 27  |

Air-regenerated noise  $L_{PA}$  [dB(A)] with static differential pressure  $\Delta_{pst}$  from 0.6 or 2.01 in. w.g.

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  $\Delta_{pst min}$ .

## Quick sizing table case-radiated noise $L_{PA}$

including acoustic cladding variants

(entire volume flow rate range of the type)

| NS | qv [cfm] | qv [m³/h] | 0.6 in. w.g. |      | 2.01 in. w.g. |     |
|----|----------|-----------|--------------|------|---------------|-----|
|    |          |           | 1            | 2    | 1             | 2   |
| 5  | 29.66    | 50        | 15           | <15  | 20            | 15  |
| 5  | 144.08   | 244       | 25           | 17   | 30            | 25  |
| 5  | 256.38   | 437       | 27           | 20   | 35            | 30  |
| 5  | 370.8    | 631       | n.V.         | n.V. | 35            | 30  |
| 6  | 50.85    | 83        | <15          | <15  | 17            | <15 |
| 6  | 241.55   | 411       | 22           | 17   | 30            | 25  |
| 6  | 434.37   | 738       | 25           | 20   | 35            | 30  |
| 6  | 627.19   | 1066      | n.V.         | n.V. | 35            | 30  |
| 8  | 78.4     | 133       | <15          | <15  | 20            | <15 |
| 8  | 385.64   | 655       | 22           | 17   | 30            | 25  |
| 8  | 692.87   | 1176      | 25           | 20   | 35            | 30  |
| 8  | 997.99   | 1698      | n.V.         | n.V. | 37            | 32  |
| 10 | 122.9    | 208       | <15          | <15  | 20            | <15 |
| 10 | 603.88   | 1027      | 20           | 17   | 30            | 25  |
| 10 | 1086.99  | 1847      | 22           | 20   | 35            | 32  |
| 10 | 1567.97  | 2666      | n.V.         | n.V. | 40            | 35  |
| 12 | 203.41   | 344       | <15          | <15  | 20            | <15 |
| 12 | 1002.23  | 1703      | 22           | 22   | 35            | 30  |
| 12 | 1802.64  | 3062      | 27           | 25   | 40            | 35  |
| 12 | 2601.98  | 4421      | n.V.         | n.V. | 42            | 37  |
| 16 | 332.66   | 563       | 20           | 15   | 30            | 25  |
| 16 | 1639.99  | 2785      | 30           | 25   | 40            | 35  |
| 16 | 2946.33  | 5006      | 32           | 25   | 45            | 37  |
| 16 | 4252.6   | 7228      | n.V.         | n.V. | 45            | 40  |

Case-radiated noise  $L_{PA}$  [dB(A)] with static differential pressure  $\Delta_{pst}$  from 0.6 or 2.01 in. w.g.

1 Basic unit

2 Basic unit with acoustic cladding

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

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.

## Specification text

This specification text describes just one variant of the product and applies to many applications. Texts for variants can be generated with our 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 0.12 in. 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 3,937.01 fpm
- Inert to fungal and bacterial growth

### Connection type

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: 5 to 16 in.
- Volume flow rate range: 29.66 – 3394.45 cfm or 50 – 5768 m<sup>3</sup>/h
- Minimum differential pressure: Up to 1.04 in. w.g.
- Maximum differential pressure: 4.01 in. w.g.
- Closed blade air leakage to EN 1751, Class 4
- Casing air leakage according to EN 1751, Class C (nominal sizes 5 - 10, Class B)

### 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

### Specification text 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 voltage-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

- $q_v$  [cfm]
- $\Delta p_{st}$  [in. w.g.]



## Air-regenerated noise

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

## Case-radiated noise

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



## Order code

Order code for volume flow control (with Easy controller)

**TVA – D / 6 / D1 / Easy**

| | | | |  
1 2 3 4 5

### 1 Type

**TVA** VAV terminal unit, extract air

### 2 Acoustic cladding

No entry: none

**D** with acoustic cladding

### 3 Nominal size [in.]

**5, 6, 8, 10, 12, 16**

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

**Acoustic cladding**

**Nominal size**

**Attachments (control units)**

### 4 Accessories

No entry: none

**D1** Double lip seal (one end)

### 5 Attachments (control component)

**Easy** Volume flow controller, dynamic, analogue interface,  
setting of  $q_{vmin}$  and  $q_{vmax}$  with potentiometers (provided on site)

Yes

16 in.

Easy controller, dynamic, analogue interface,

Adjustment  $q_{vmin}$  and  $q_{vmax}$  with potentiometers

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

TVA – D / 6 / D1 / XD4 / V / 0 / 117.72 – 529.72 [cfm] / NO

|   |   |   |   |   |   |   |   |   |

1   2   3   4   5   7   8   9   10

### 1 Type

**TVA** VAV terminal unit, extract air

### 2 Acoustic cladding

No entry: none

**D** with acoustic cladding

### 3 Nominal size [in.]

**5, 6, 8, 10, 12, 16**

### 4 Accessories

No entry: none

**D1** Double lip seal (one end)

### 5 Attachments (control component)

For example

**BC0** Compact controller

**XD4** Universal controller (VARYCONTROL)

### 7 Operating mode

**F** Constant value mode, one setpoint value (no external switch contact)

**V** Variable operation (adjustable 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 rate [cfm]

$q_{Vconst}$  (with operating mode F)

$q_{Vmin} - q_{Vmax}$  (with operating mode V)

### 10 Damper blade position

Only with spring return actuators

**NO** power off to open (Normally Open)

**NC** power off to close (Normally closed)

**Order example: TVA-D/6/D1/BC0/V0/117.72–470.86 cfm**

#### Acoustic cladding

Nominal size

Yes.

Accessories

6 in

Attachments (control component)

Double lip seal

Operating mode

Compact controller

Signal voltage range

Variable

Volume flow rate

0 – 10 V DC

$q_{Vmin} = 117.72$  cfm

$q_{Vmax} = 470.86$  cfm

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

**TVA – D / 6 / 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: none

**D** with acoustic cladding

### 3 Nominal size [in.]

**5, 6, 8, 10, 12, 16**

### 4 Accessories

No entry: none

**D1** Double lip seal (one end)

### 5 Attachments (control component)

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 controller (Room Extract)

### 7 Operating mode

**F** Single controller, fixed set value

**M** Single controller or room master, variable setpoint value

**S** Slave controller (only with room solutions)

### 8 Signal voltage range

**0** 0 – 10 V DC

**2** 2 – 10 V DC

### 9 Expansion modules

Option 1: Power supply

No entry: 24 V AC/DC supply

**T** with EM-TRF for 230 V AC mains supply

**U** with EM-TRF-USV (including battery pack) for uninterruptible 230 V AC power supply (UPS)

Option 2: Digital communication interface

No entry: none

**B** with EM-BAC-MOD for BACnet MS/TP

**M** with EM-BAC-MOD for Modbus RTU

### Order example: TVA/10/TUSD/RE/S/0/Z

**Nominal size**

**Attachments (control component)**

**Equipment function**

**Volume flow rate setting**

**Signal voltage characteristic**

**Extension of attachments**

**I** with EM-IP for BACnet IP, Modbus IP and web server

**R** with EM-IP (including real time clock, RTC) for BACnet IP, Modbus IP and web server

Option 3: Automatic zero point correction

No entry: none

**Z** with EM-AUTOZERO, solenoid valve for automatic zero point correction

### 10 Operating values for factory setting

Volume flow rate [cfm]

For operating mode F

$q_{Vconst}$ : constant volume flow rate<sup>1</sup>

For operating mode M

$q_{Vmin}$ : minimum volume flow rate<sup>1, 2</sup>

$q_{Vmax}$ : maximum volume flow rate<sup>1, 2</sup>

Other parameters are only relevant for the room master as part of a room solution<sup>3</sup>; for single controllers enter 0

$q_{Vconst\_Supply}$ : constant supply air (room value)

$q_{Vconst\_Extract}$ : constant extract air (room value)

$q_{VDiff}$ : supply air/extract air difference (room value)

For operating mode S

No parameters are required for the slave controller; all entries have to be made on the room master

For volume flow rate operating values please note:

<sup>1</sup> Single controller:  $q_{Vmin}$ ,  $q_{Vmax}$  or  $q_{Vconst}$  apply to the controller

<sup>2</sup> Room solutions:  $q_{Vmin}$ ,  $q_{Vmax}$ ,  $q_{Vconst\_Supply/Extract}$  apply to the room

<sup>3</sup> For more information on room solutions with several directly connected TROX UNIVERSAL controllers (Plug&Play) and for order examples, please refer to the product data sheet

### 11 Damper blade position

Only with spring return actuators

**NO** de-energised OPEN (Normally Open)

**NC** de-energised CLOSED (Normally Closed)

### Useful additions

Optional room control panel

**CP-TOUCH** with Touch display

10 in.

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

Extract air control

Slave

0 – 10 V DC

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

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

TVA – D / 6 / D1 / XF4 / PRE / V / 0 / 0.12 – 0.24 [in. w.g.] / NO

|   |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|---|----|
|   |   |   |   |   |   |   |   |   |    |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

### 1 Type

**TVA** VAV terminal unit, extract air

### 2 Acoustic cladding

No entry: none

**D** with acoustic cladding

### 3 Nominal size [in.]

**5, 6, 8, 10, 12, 16**

### 4 Accessories

No entry: none

**D1** Double lip seal (one end)

### 5 Attachments (control component)

For example

**XF0** Compact controller for duct pressure

**XF4** Universal controller for duct pressure (VARYCONTROL)

### 6 Equipment function/installation location

**PDE** Duct pressure controller – extract air (Pressure Duct Extract)

**PRE** Room pressure controller – extract air (Pressure Room Extract)

### 7 Operating mode

**F** Constant value mode, one setpoint value (no external switch contact)

**V** Variable operation (adjustable 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

Differential pressure [in. w.g.]

For duct pressure control, enter the differential pressure [in. w.g.] as an absolute value.

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

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

### 10 Damper blade position

Only with spring return actuators

**NO** power off to open (Normally Open)

**NC** power off to close (Normally Closed)

## Order example: TVA/10/D1/XF0/PDE/V2/0.4 – 1.61 in. w.g.

Nominal size

10 in.

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

$\Delta p_{\text{min}} = 0.4$  in. w.g.

$\Delta p_{\text{max}} = 1.61$  in. w.g.

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

TVA – D / 6 / 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

**R** with EM-IP (including real time clock, RTC) for BACnet IP, Modbus IP and web server

### 2 Acoustic cladding

No entry: none

**D** with acoustic cladding

Option 3: Volume flow rate measurement

No entry: none

**V** with EM-V for volume flow rate measurement at the differential pressure controller

### 3 Nominal size [in.]

**5, 6, 8, 10, 12, 16**

Option 4: Automatic zero point correction

No entry: none

**Z** with EM-AUTOZERO solenoid valve for automatic zero point correction (only in combination with EM-V)

### 4 Accessories

No entry: none

**D1** Double lip seal (one end)

### 10 Operating values for factory setting

Volume flow rate [cfm], pressure [in. w.g.]

### 5 Attachments (control component)

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)

For operating mode MFP and SFP

$\Delta p_{const}$ : constant differential pressure

For operating mode MVP and SVP

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

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

### 6 Equipment function

Pressure control

**PRE** Room pressure controller – extract air (Pressure Room Extract)

**PDE** Duct pressure controller – extract air (Pressure Duct Extract)

Other parameters for operating modes MFP and MVP

Only relevant for the room master as part of a room solution<sup>1</sup>; for single controller enter 0

$q_{vmin}$ : minimum volume flow rate (room value)

$q_{vmax}$ : maximum volume flow rate (room value)

$q_{vconst\_Supply}$ : constant supply air (room value)

$q_{vconst\_Extract}$ : constant extract air (room value)

$q_{vDiff}$ : supply air/extract air difference (room value)

### 7 Operating mode

**MFP** Single controller or room master, constant pressure setpoint

**MVP** Single controller or room master, variable pressure setpoint  
With room solutions

**SFP** Slave, constant pressure setpoint

**SVP** Slave, variable pressure setpoint

Please note

<sup>1</sup> For more information on room solutions with several directly connected TROX UNIVERSAL controllers (Plug&Play) and for order examples, please refer to the product data sheet

### 8 Signal voltage range

**0** 0 – 10 V DC

**2** 2 – 10 V DC

### 11 Damper blade position

Only with spring return actuators

**NO** Power off to open (Normally Open)

**NC** Power off to close (Normally closed)

### 9 Expansion modules

Option 1: Power supply

No entry: 24 V AC/DC

**T** with EM-TRF for 230 V AC mains supply

**U** with EM-TRF-USV (including battery pack) for uninterruptible 230 V AC power supply (UPS)

### Useful additions

Differential pressure transducers required for room or duct pressure control have to be ordered separately or provided by others, e.g.

**PT-699** Differential pressure transducer for room pressure control

**PT-699-DUCT** Differential pressure transducers for duct pressure control, including duct pressure measurement kit

Option 2: Digital communication interface

No entry: none

**B** with EM-BAC-MOD for BACnet MS/TP

**M** with EM-BAC-MOD for Modbus RTU

**I** with EM-IP for BACnet IP, Modbus IP and web server

Optional room control panel

**CP-TOUCH** with Touch display

**Order example: TVA/6/TUSD/PRE/SFP/0/V/0.08 in. w.g.**

|                                  |                                                                                                           |
|----------------------------------|-----------------------------------------------------------------------------------------------------------|
| Nominal size                     | 5 in.                                                                                                     |
| Attachments (control components) | TROX UNIVERSAL controller, 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 characteristic    | 0 – 10 V DC                                                                                               |
| Expansion modules                | With expansion module EM-V,<br>for volume flow rate measurement with the differential pressure controller |
| Operating values                 | $\Delta p_{\text{const}} = 0.08 \text{ in. w.g.}$                                                         |

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

TVA – D / 6 / D1 / ELAB / S / RE / UMZ / LAB / ...

|   |   |   |   |   |   |   |   |    |    |
|---|---|---|---|---|---|---|---|----|----|
|   |   |   |   |   |   |   |   |    |    |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 9 | 10 | 11 |

### 1 Type

**TVA** VAV terminal unit, extract air

### 2 Acoustic cladding

No entry: none

**D** with acoustic cladding

### 3 Nominal size [in.]

**5, 6, 8, 10, 12, 16**

### 4 Accessories

No entry: none

**D1** Double lip seal (one end)

### 5 Attachments (control component)

**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 controller (Room Extract)

**PC** Room pressure controller (Pressure Control)

### 9 Expansion modules

Option 1: Power supply

No entry: 24 V AC/DC supply

**T** with EM-TRF for 230 V AC mains supply

**U** with EM-TRF-USV (including battery pack) for uninterruptible 230 V AC power supply (UPS)

Option 2: Digital communication interface

No entry: none

**B** with EM-BAC-MOD for BACnet MS/TP

**M** with EM-BAC-MOD for Modbus RTU

**I** with EM-IP for BACnet IP, Modbus IP and web server

**R** with EM-IP (including real time clock, RTC) for BACnet IP, Modbus IP and web server

Option 3: Automatic zero-point adjustment

No entry: none

**Z** with EM-AUTOZERO, solenoid valve for automatic zero point correction

### 10 Additional functions

Without room management function

**LAB** extract air led system (Laboratory)

**CLR** supply air led system (Clean Room)

Room management function is active

**LAB-RMF** extract air led system (Laboratory) - with room management function (RMF)

**CLR-RMF** supply air led system (Clean Room) with room management function (RMF)

### 11 Operating values for factory setting

Volume flow rates [cfm], pressure [in.w.g.]

Only required when room management function is active; total room extract air/supply air

$q_{v1}$ : standard mode

$q_{v2}$ : reduced operation

$q_{v3}$ : increased operation

$q_{v4}$ : constant supply air

$q_{v5}$ : constant extract air

$q_{v6}$ : Supply air/extract air difference

$\Delta p_{set}$ : setpoint pressure (only with differential pressure control)

### Useful additions

Room control panel (only for units with RMF)

**CP-TOUCH-4.3** Touch control panel with 4.3"

Differential pressure transducers required for room pressure control have to be ordered separately or provided by the client, e.g.

**PT-699** Measuring range  $\pm 0.2$  in. w.g. or  $\pm 0.4$  in. w.g.

**PT-GB604** Measuring range  $\pm 0.4$  in. w.g.

### Order example: TVA/8/ELAB/S/RE/TZ/CLR

Acoustic cladding

Nominal size

Attachments (control components)

Actuator

Equipment function

Expansion modules

Additional function

Without  
0.3 in.

EASYLAB controller TCU3

fast-running actuator (3 s)

Extract air controller

With expansion module EM-TRF

transformer for 230 V AC supply

with expansion module EM-AUTOZERO

solenoid valve for automatic zero point correction

supply air led system (clean rooms)

Room management function not active

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

TVA – D / 6 / D1 / ELAB / S / EC – E0 / UMZ / ...

|   |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|---|----|
|   |   |   |   |   |   |   |   |   |    |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 11 |

### 1 Type

**TVA** VAV terminal unit, extract air

### 2 Acoustic cladding

No entry: none

**D** with acoustic cladding

### 3 Nominal size [in.]

**5, 6, 8, 10, 12, 16**

### 4 Accessories

No entry: none

**D1** Double lip seal (one end)

### 5 Attachments (control component)

**ELAB** EASYLAB 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** Single controller – extract air (Extract Controller)

### 8 External volume flow rate setting

**E0** Variable, signal voltage range 0 – 10 V DC

**E2** Variable, signal voltage range 2 – 10 V DC

**2P** 2 switching steps (for one switch contact, by others)

**3P** 3 switching steps (for two switch contacts, by others)

**F** Constant value mode, one setpoint value (no external switch contact)

### 9 Expansion modules

Option 1: Power supply

No entry: 24 V AC/DC

**T** with EM-TRF for 230 V AC mains supply

**U** with EM-TRF-USV (including battery pack) for uninterruptible 230 V AC power supply (UPS)

Option 2: Digital communication interface

No entry: none

**B** With EM-BAC-MOD for BACnet MS/TP

**M** with EM-BAC-MOD for Modbus RTU

**I** with EM-IP for BACnet IP, Modbus IP and web server

**R** with EM-IP (including real time clock, RTC) for BACnet IP, Modbus IP and web server

Option 3: Automatic zero point correction

No entry: none

**Z** with EM-AUTOZERO solenoid valve for automatic zero point correction

### 11 Operating values for factory setting

Volume flow rates [cfm]

Depends on external volume flow rate setting

**E0:**  $q_{v_{min}} - q_{v_{max}}$

**E2:**  $q_{v_{min}} - q_{v_{max}}$

**2P:**  $q_{v_1}/q_{v_2}$

**3P:**  $q_{v_1}/q_{v_2}/q_{v_3}$

**F:**  $q_{v_1}$

**Order example: TVA-D/5/ELAB/S/EC/F/206 cfm Acoustic cladding**

**Nominal size**

**Attachments (control components)**

**Actuator**

**Equipment function**

**External volume flow rate setting**

**Operating value**

With

5 in.

EASYLAB controller TCU3

fast-running actuator (3 s)

Single controller – extract air

Constant value mode, one setpoint value (no external switch contact)

$q_{v_1} = 206$  cfm

## Variants

### 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**

&lt;/p&gt;

## 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 to EN 13501, fire rating class A1, non-combustible |

## Option double lip seal

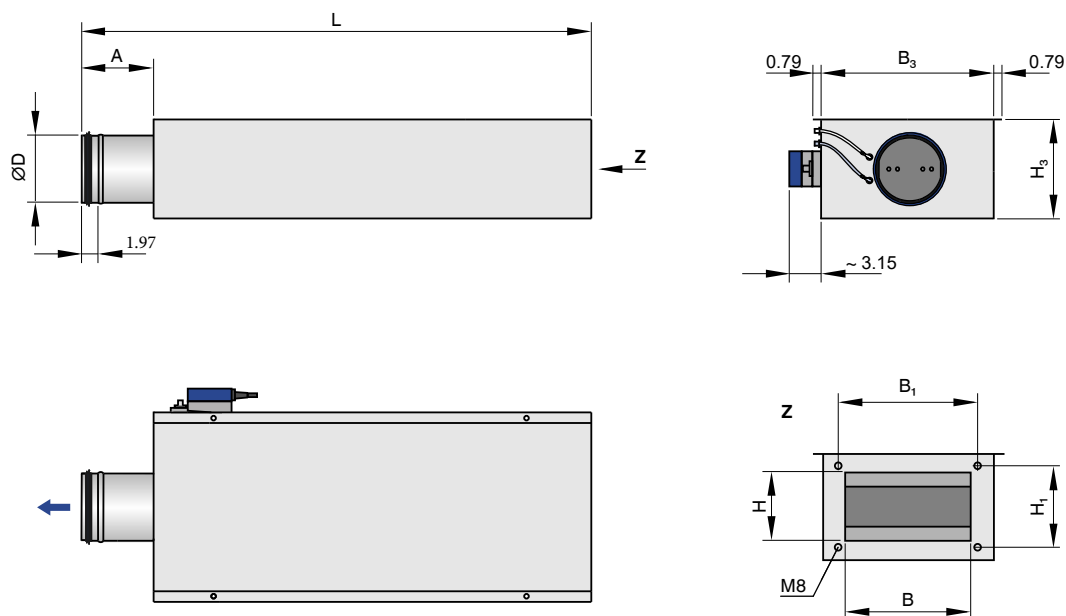
| Order code detail | Part            | Material     |
|-------------------|-----------------|--------------|
| D1                | Double lip seal | Rubber, EPDM |

## Option acoustic cladding

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

## Dimensions and weight

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



#### Notes:

Total length L relates to the total casing length.

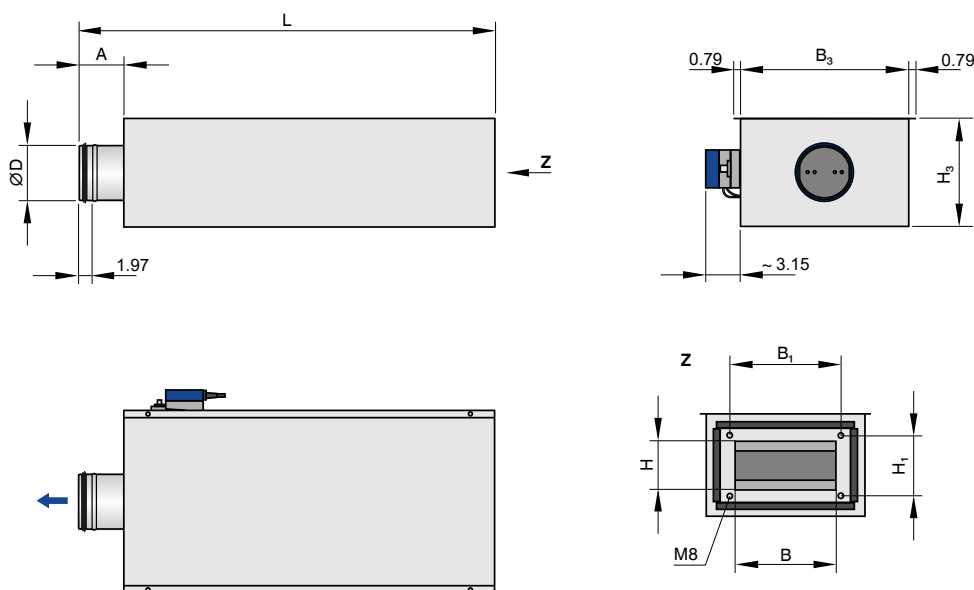
Connection length in assembled state is reduced by approx. 0.47 in. See details of flange.

The illustration shows control component type Easy, Compact. For individual dimensions, see section on space requirements for commissioning and maintenance.

#### Dimensions/Weights for TVA

| NS | B     | H     | L     | ØD    | A    | B <sub>1</sub> | B <sub>3</sub> | H <sub>1</sub> | H <sub>3</sub> | lbs    |
|----|-------|-------|-------|-------|------|----------------|----------------|----------------|----------------|--------|
| 5  | 7.8   | 5.98  | 48.03 | 4.88  | 7.28 | 9.13           | 11.81          | 7.32           | 9.29           | 46.3   |
| 6  | 12.13 | 5.98  | 47.44 | 6.26  | 6.69 | 13.46          | 16.14          | 7.32           | 9.29           | 55.12  |
| 8  | 18.03 | 8.27  | 57.48 | 7.83  | 5.43 | 19.37          | 22.05          | 9.61           | 11.06          | 72.75  |
| 10 | 23.54 | 7.91  | 60.63 | 9.8   | 3.82 | 24.88          | 27.56          | 9.25           | 12.24          | 121.25 |
| 12 | 31.42 | 9.92  | 66.34 | 12.36 | 9.65 | 32.76          | 35.43          | 11.26          | 14.21          | 160.94 |
| 16 | 35.35 | 13.94 | 78.54 | 15.71 | 6.93 | 36.69          | 39.37          | 15.28          | 17.56          | 260.15 |

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



### Notes:

Total length L relates to the total casing length.

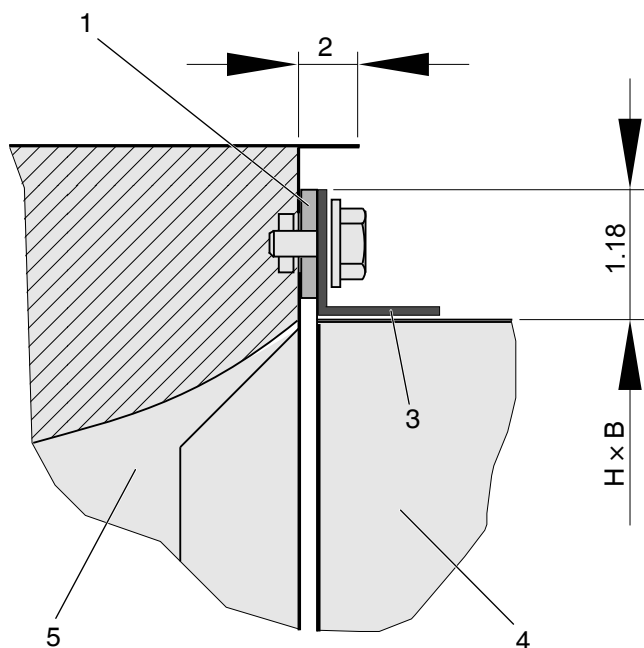
Connection length in assembled state is reduced by approx. 0.47 in. See details of flange.

The illustration shows control component type Easy, Compact. For individual dimensions, see section on space requirements for commissioning and maintenance.

### Dimensions/Weights for TVA-D

| NS | B     | H     | L     | ØD    | A    | B <sub>1</sub> | B <sub>3</sub> | H <sub>1</sub> | H <sub>3</sub> | lbs    |
|----|-------|-------|-------|-------|------|----------------|----------------|----------------|----------------|--------|
| 5  | 7.8   | 5.98  | 48.03 | 4.88  | 5.71 | 9.13           | 14.96          | 7.32           | 12.44          | 90.39  |
| 6  | 12.13 | 5.98  | 47.44 | 6.26  | 5.12 | 13.46          | 19.29          | 7.32           | 12.44          | 110.23 |
| 8  | 18.03 | 8.27  | 57.48 | 6.26  | 3.86 | 19.37          | 25.2           | 9.61           | 14.21          | 138.89 |
| 10 | 23.54 | 7.91  | 60.63 | 9.8   | 2.24 | 24.88          | 30.71          | 9.25           | 15.39          | 209.44 |
| 12 | 31.42 | 9.92  | 66.34 | 12.36 | 8.07 | 32.76          | 38.58          | 11.26          | 17.36          | 293.21 |
| 16 | 35.35 | 13.94 | 78.54 | 15.71 | 5.35 | 36.69          | 42.52          | 15.28          | 20.71          | 425.49 |

## Detail of flange

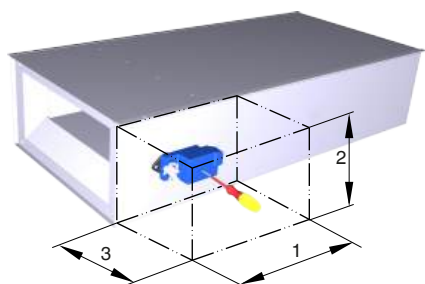


- 1 Compressible seal, to be provided by others
- 2 Flange indented approx. 0.47 in. on both sides
- 3 Flange
- 4 Duct
- 5 VAV terminal unit

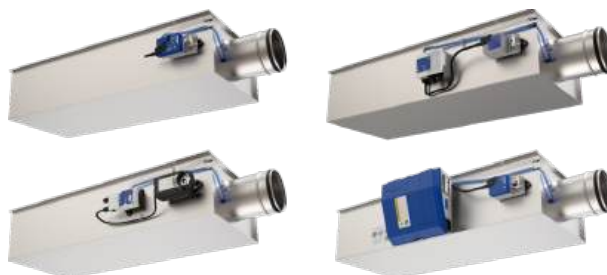
## Space required for commissioning and maintenance

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.

## Access to attachments



## Product examples



Schematic illustration of required installation space

Attachments BC0, XD4, BUDN, TUN

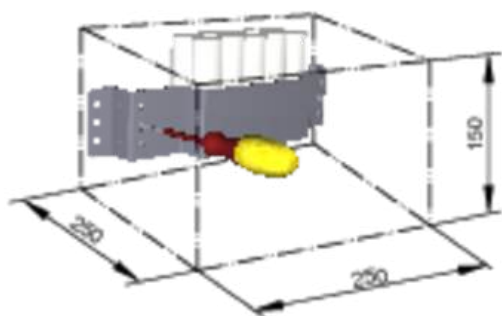
## Space required

| Attachment                                                                                                                                                                                                                                | 1     | 2     | 3     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|
| <b>VARYCONTROL</b>                                                                                                                                                                                                                        |       |       |       |
| Easy controller: Easy                                                                                                                                                                                                                     | 15.75 | 11.81 | 11.81 |
| Compact controller: BC0, BL0<br>**, BM0, BM0-J6, LK0, LN0,<br>XB0, XD0, XF0                                                                                                                                                               | 15.75 | 11.81 | 11.81 |
| Universal controller: B13 *, B1B<br>*, BP3 *, BPB *, BPG *, BB3 *,<br>BBB *, BR3 *, BRB *, BRG *,<br>BS3 *, BSB *, BSG *, BG3 *,<br>BGB *, BH3 *, BHB *, BUDN,<br>BUDNF, BUPN, BUPNF,<br>BURN, BURNF, BUSN,<br>BUSNF, BUSS, XB4, XD4, XF4 | 27.56 | 11.81 | 11.81 |
| <b>TROX UNIVERSAL</b>                                                                                                                                                                                                                     |       |       |       |
| TROX UNIVERSAL: TUN,<br>TUNF, TUS, TUSD                                                                                                                                                                                                   | 35.43 | 13.78 | 15.75 |
| <b>LABCONTROL</b>                                                                                                                                                                                                                         |       |       |       |
| EASYLAB: ELAB                                                                                                                                                                                                                             | 35.43 | 13.78 | 15.75 |

\* Control components already discontinued

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

### 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).

## Product details

### 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

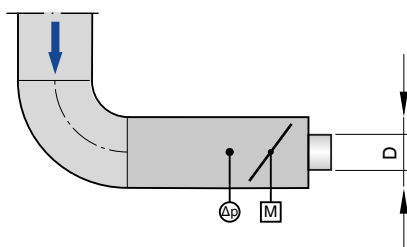
The volume flow rate accuracy  $\Delta_{qv}$  applies to a straight upstream section of the duct. Bends, junctions or a narrowing or widening of the duct cause turbulences that may affect measurement. Duct connections, e.g. junctions off the main duct, must comply with EN 1505.

### Note on inflow via an open duct (extract air mode)

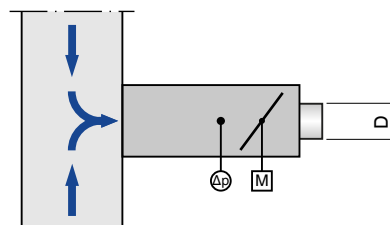
The inflow at the open end of a duct causes strong turbulence and also has an influence on the volume flow rate accuracy. In this case, an upstream section or an inflow aid is required.

For further information on this specific installation situation, see the installation and operating manual.

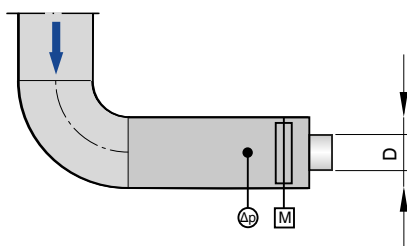
### Bend vertical



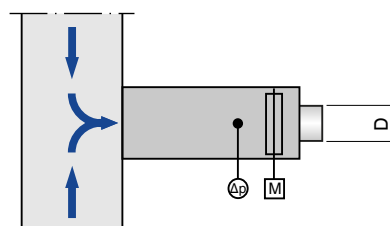
### Convergence of 2 airflows, vertical



### Bend horizontal



### Convergence of 2 airflows, 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.

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 |
|------------------------------------------|---------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------|--------------|
| Easy controller, dynamic                 |                     |                                                              |                                                                                                                 |                                    |              |
| Easy                                     | $q_v$               | 0 – 10 V                                                     | integrated                                                                                                      | Slow running<br>integrated         | (1)          |
| Compact controller, dynamic              |                     |                                                              |                                                                                                                 |                                    |              |
| BC0                                      | $q_v$               | 0 – 10 V or 2 – 10 V or MP bus interface                     | integrated                                                                                                      | Slow running<br>integrated         | 2            |
| BM0                                      | $q_v$               | Modbus RTU/BACnet MS/TP                                      | integrated                                                                                                      | Slow running<br>integrated         | 2            |
| BM0-J6                                   | $q_v$               | Modbus RTU/BACnet MS/TP with RJ12 socket (for X-AIRCONTROL)  | integrated                                                                                                      | Slow running<br>integrated         | 2            |
| LN0                                      | $q_v$               | 0 – 10 V or 2 – 10 V                                         | integrated                                                                                                      | Slow running<br>integrated         | ⑤            |
| LK0                                      | $q_v$               | KNX interface                                                | integrated                                                                                                      | Slow running<br>integrated         | ⑤            |
| XB0                                      | $q_v$               | 0 – 10 V or 2 – 10 V                                         | integrated                                                                                                      | Slow running<br>integrated         | (1)          |
| Compact controller, static               |                     |                                                              |                                                                                                                 |                                    |              |
| SB0N                                     | $q_v, \Delta p$     | 0 – 10 V or 2 – 10 V or BACnet MS/TP or Sauter SLC           | integral, 1.2 in. w.g.                                                                                          | slow-running, integrated           | ④            |
| SB0S                                     | $q_v, \Delta p$     | 0 – 10 V or 2 – 10 V or BACnet MS/TP or Sauter SLC           | integral, 1.2 in. w.g.                                                                                          | fast-running, integrated           | ④            |
| XD0                                      | $q_v$               | 0 – 10 V or 2 – 10 V                                         | integrated                                                                                                      | Slow running<br>integrated         | 3            |
| XF0                                      | $\Delta p$          | 0 – 10 V or 2 – 10 V                                         | integral, control range adjustable 25 - 550 Pa or 0.1 – 2.2 in. w.g.                                            | Slow running<br>integrated         | 3            |
| Universal controller, dynamic            |                     |                                                              |                                                                                                                 |                                    |              |
| BUDN                                     | $q_v$               | 0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP | integrated                                                                                                      | Slow running<br>separate           | 2            |
| BUDNF                                    | $q_v$               | 0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP | integrated                                                                                                      | Spring return actuator<br>separate | 2            |
| XB4                                      | $q_v$               | 0 – 10 V or 2 – 10 V                                         | integrated                                                                                                      | Spring return actuator<br>separate | 3            |
| VARYCONTROL Universal controller, static |                     |                                                              |                                                                                                                 |                                    |              |
| BUPN                                     | $\Delta p$          | 0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP | integrated<br>Control range adjustable 25 - 450 Pa or 0.1 – 1.8 in. w.g.                                        | Slow running<br>separate           | 2            |
| BURNF                                    | $\Delta p$          | 0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP | integrated<br>Control range adjustable -50 – -10 Pa or 10 – 50 Pa/ -0.2 – -0.04 in. w.g. or 0.2 – 0.04 in. w.g. | Spring return actuator<br>separate | 2            |

| Attachment | Controlled variable | Interface                                                    | Effective pressure transducer                                                                                   | Actuator                           | Manufacturer |
|------------|---------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------|--------------|
| BURN       | $\Delta p$          | 0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP | integrated<br>Control range adjustable -50 – -10 Pa or 10 – 50 Pa/ -0.2 – -0.04 in. w.g. or 0.2 – 0.04 in. w.g. | Slow running<br>separate           | 2            |
| BUPNF      | $\Delta p$          | 0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP | integrated<br>Control range adjustable 25 -450 Pa or 0.1 – 1.8 in.                                              | Spring return actuator<br>separate | 2            |
| BUSN       | $q_v$               | 0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP | w.g.<br>integrated                                                                                              | Slow running<br>separate           | 2            |
| BUSNF      | $q_v$               | 0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP | integrated                                                                                                      | Spring return actuator<br>separate | 2            |
| BUSS       | $q_v$               | 0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP | integrated                                                                                                      | fast-running<br>separate           | 2            |
| XD4        | $q_v$               | 0 – 10 V or 2 – 10 V                                         | integrated                                                                                                      | Spring return actuator<br>separate | 3            |
| XF4        | $\Delta p$          | 0 – 10 V or 2 – 10 V                                         | integral, control range adjustable 25 - 550 Pa or 0.1 – 2.2 in. w.g.                                            | Spring return actuator<br>separate | 3            |

 $q_v$  Volume flow rate

 $\Delta p$  Differential pressure

1 TROX, 2 TROX/Belimo, 3 TROX/Gruner, 4 Sauter, 5 Siemens

## Control components TROX UNIVERSAL

| Attachment                         | Controlled variable | Interface                                                                                                             | Effective pressure transducer            | Actuator                                                               | Manufacturer |
|------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------------------------------------------------------------|--------------|
| TROX UNIVERSAL controller – static |                     |                                                                                                                       |                                          |                                                                        |              |
| TUN                                | $q_v, \Delta p$     | TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: Modbus, BACnet, web server | $q_v$ = integriert, $\Delta p$ = separat | Slow running<br>separate                                               | ①            |
| TUNF                               | $q_v, \Delta p$     | TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: Modbus, BACnet, web server | $q_v$ = integriert, $\Delta p$ = separat | Spring return actuator<br>separate                                     | ①            |
| TUS                                | $q_v, \Delta p$     | TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: Modbus, BACnet, web server | $q_v$ = integriert, $\Delta p$ = separat | fast-running<br>separate                                               | ①            |
| TUSD                               | $q_v, \Delta p$     | TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: Modbus, BACnet, web server | $q_v$ = integriert, $\Delta p$ = separat | fast-running with digital communication interface (TROX HPD), separate | ①            |

$q_v$  Volume flow rate  
 $\Delta p$  Differential pressure  
 ① TROX

## Control components LABCONTROL EASYLAB

| Attachment                | Controlled variable | Interface                                                                                                                 | Effective pressure transducer            | Actuator                                                                                         | Manufacturer |
|---------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------|--------------|
| EASYLAB Regler – statisch |                     |                                                                                                                           |                                          |                                                                                                  |              |
| ELAB                      | $q_v, \Delta p$ *   | TROX plug and play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: Modbus, BACnet, web server | $q_v$ = integriert, $\Delta p$ = separat | fast-running, separate or fast-running with digital communication interface (TROX HPD), separate | ①            |

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

## Nomenclature

### Dimensions of rectangular units

**B** [in.]

Duct width

**B<sub>1</sub>** [in.]

Screw hole pitch of flange (horizontal)

**B<sub>2</sub>** [in.]

Overall dimension of flange (width)

**H** [in.]

Duct height

**H<sub>1</sub>** [in.]

Screw hole pitch of flange (vertical)

**H<sub>2</sub>** [in.]

Overall dimension of flange (height)

### Dimensions of circular units

**ØD** [in.]

Basic units made of sheet steel: Outer diameter of the spigot;  
basic units made of plastic: Inside diameter of the spigot

**ØD<sub>1</sub>** [in.]

Pitch circle diameter of flanges

**ØD<sub>2</sub>** [in.]

Outer diameter of flanges

**L** [in.]

Length of unit including connecting spigot

**L<sub>1</sub>** [in.]

Length of casing or acoustic cladding

**n** [ ]

Number of flange screw holes

**T** [in.]

Flange thickness

### General information

**m** [lb]

Unit weight including the minimum required attachments (control component)

**NS** [in.]

Nominal size

**f<sub>m</sub>** [Hz]

Octave band centre frequency

**L<sub>PA</sub>** [dB(A)]

A-weighted sound pressure level of air-regenerated noise of the CAV controller, system attenuation taken into account

**L<sub>PA1</sub>** [dB(A)]

A-weighted sound pressure level of air-regenerated noise of the CAV controller with secondary silencer, system attenuation taken into account

**L<sub>PA2</sub>** [dB(A)]

A-weighted sound pressure level of case-regenerated noise of the CAV controller, system attenuation taken into account

**L<sub>PA3</sub>** [dB(A)]

A-weighted sound pressure level of case-regenerated noise of the CAV controller with acoustic cladding, system attenuation taken into account

Note on acoustic data: All sound pressure levels are based on a reference value of 20 µPa.

**q<sub>vNom</sub>** [cfm]

Nominal flow rate (100 %): The value depends on product type, nominal size and control component (attachment). Values are published on the internet and in technical leaflets and defined in the Easy Product Finder design programme. Reference value for calculating percentages (e.g. q<sub>vmax</sub>). Upper limit of the setting range and maximum volume flow rate setpoint value for the VAV terminal unit.

**q<sub>vmin Unit</sub>** [cfm]

Technical minimum volume flow: The value depends on product type, nominal size and control component (attachment). Values are defined in the Easy Product Finder design programme Lower limit of the setting range and minimum volume flow rate setpoint value for the VAV terminal unit. Setpoint values below q<sub>vmin unit</sub>, (if q<sub>vmin</sub> equals zero) may result in unstable control or shut-off.

**q<sub>vmax</sub>** [cfm]

Adjustable by others at upper limit of the operating range for the VAV terminal unit: q<sub>vmax</sub> can be set to less than or equal to q<sub>vnom</sub> on the terminal unit. In case of analogue control of volume flow controllers (typically used), the maximum value of the setpoint signal (10 V) is assigned to the set maximum value (q<sub>vmax</sub>) (see characteristics).

**q<sub>vmin</sub>** [cfm]

Adjustable by others at lower limit of the operating range for the VAV terminal unit: q<sub>vmin</sub> should be set to less than or equal to q<sub>vmax</sub>. q<sub>vmin</sub> to less than q<sub>vmin unit</sub>, as the control may become unstable or the damper blade may close. q<sub>vmin</sub> may equal zero. In case of analogue control of volume flow controllers (typically used), the minimum value of the setpoint signal (0 or 2 V) is assigned to the set minimum value (q<sub>vmin</sub>) (see characteristics).

**q<sub>v</sub>** [cfm]

Volume flow rate

**Δ<sub>qv</sub>** [%]

Volume flow rate accuracy in relation to the setpoint (tolerance)

**Δp<sub>st</sub>** [in w.g.]

Static differential pressure

**Δp<sub>stmin</sub>** [in w.g.]

Static minimum differential pressure: The static minimum differential pressure is equal to the pressure loss of the VAV terminal unit when the damper blade is open, caused by flow resistance (damper blade). If the pressure on the CAV controller is too low, the setpoint volume flow rate may not be achieved, not even when the damper blade is open. Important factor in designing the ductwork and in rating the fan including speed control. Sufficient static differential pressure must be ensured for all operating conditions and for all controllers, and the measurement point or points for speed control must have been selected accordingly to achieve this.

#### Lengths [in]

All lengths are given in inches [in] unless stated otherwise.

#### Basic unit

Unit for controlling volume flow rates without an attached control component. The main components include the casing with sensor(s) to measure the differential pressure and the damper blade to restrict the volume flow. The basic unit is also referred

to as a VAV terminal unit. Important distinguishing features: Geometry or unit shape, material and connection variants, acoustic characteristics (e.g. optional acoustic cladding or integrated silencers), range of volume flow.

#### Control component

Electronic unit(s) mounted on the basic unit to control the volume flow rate, or the duct pressure, or the room pressure by adjusting the damper blade position. The electronic unit essentially consists of a controller with differential pressure transmitter (integrated or external) and an integrated actuator (Easy and Compact controller).

Important distinguishing features:

- Transmitter: dynamic transmitter for clean air or static transmitter for contaminated air
- Actuator: Standard actuator, slow-running
- Interface technology: analogue interface or digital bus interface for connecting and recording signals and data

#### Volume flow controller

Consists of a basic unit with an attached control component.