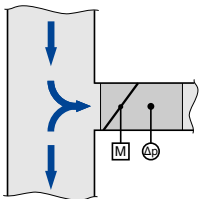# VAV terminal units

TA-Silenzio

Easy controller, Compact controller

TROX UNIVERSAL controller, TROX LABCONTROL controller

Rectangular connections on both ends

For all upstream conditions

Conforms to VDI 6022

For extract air systems with demanding acoustic requirements and low airflow velocities

Rectangular VAV terminal units for the extract air control in buildings with variable air volume systems, demanding acoustic requirements and low airflow velocities

- Highly effective integral attenuator
- Optimised for airflow velocities of 0.7 – 7 m/s
- High control accuracy, even in case of unfavourable upstream conditions
- Compact construction with rectangular connections on both ends
- Electronic control components for different applications (Easy, Compact, Universal, and LABCONTROL)
- Closed blade air leakage to EN 1751, up to class 4
- Casing leakage to EN 1751, 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

General information

Application
- Rectangular VAV terminal units for use in ventilation and air conditioning systems
- For controlling, restricting or shutting off airflows in extract air systems with low velocities and demanding acoustic requirements
- Integral attenuator
- Closed-loop volume flow control using an external power supply
- For variable or constant volume flow systems
- Shut-off by means of switching (by others)
- Can also be used for differential pressure control with suitable control components

Special features
- Hygiene tested and certified
- Direct connection to ductwork
- Factory set-up or programming and aerodynamic function testing
- Parameters can also later be set on the control component; additional adjustment device may be necessary

Nominal sizes
- 125, 160, 200, 250, 315

Variants
- TA-Silenzio: Extract air unit
- TA-Silenzio-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 with potentiometers
- Compact controller: compact unit consisting of controller with potentiometers, effective pressure transducer and actuator
- Universal controller: controller, effective pressure transducer and actuators for special applications
- LABCONTROL: Control components for air management systems

Useful additions
- Secondary silencer Type TS

Construction features
- Rectangular casing
- Replaceable seals
- Flanges on both ends for the connection to ductwork
- Position of the damper blade indicated externally at shaft extension
- Thermal and acoustic insulation (lining)

Materials and surfaces
- Casing made of galvanised sheet steel
- Damper blade and effective pressure sensor made of aluminium
- Lining is mineral wool
- Plastic plain bearings

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 a protection against erosion from 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
- Other standards and guidelines in accordance with the hygiene certificate

Casing leakage
- EN 1751, Class C

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

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

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, with a Compact controller, or with individual components (Universal).

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.

Schematic illustration of the TA-Silenzio
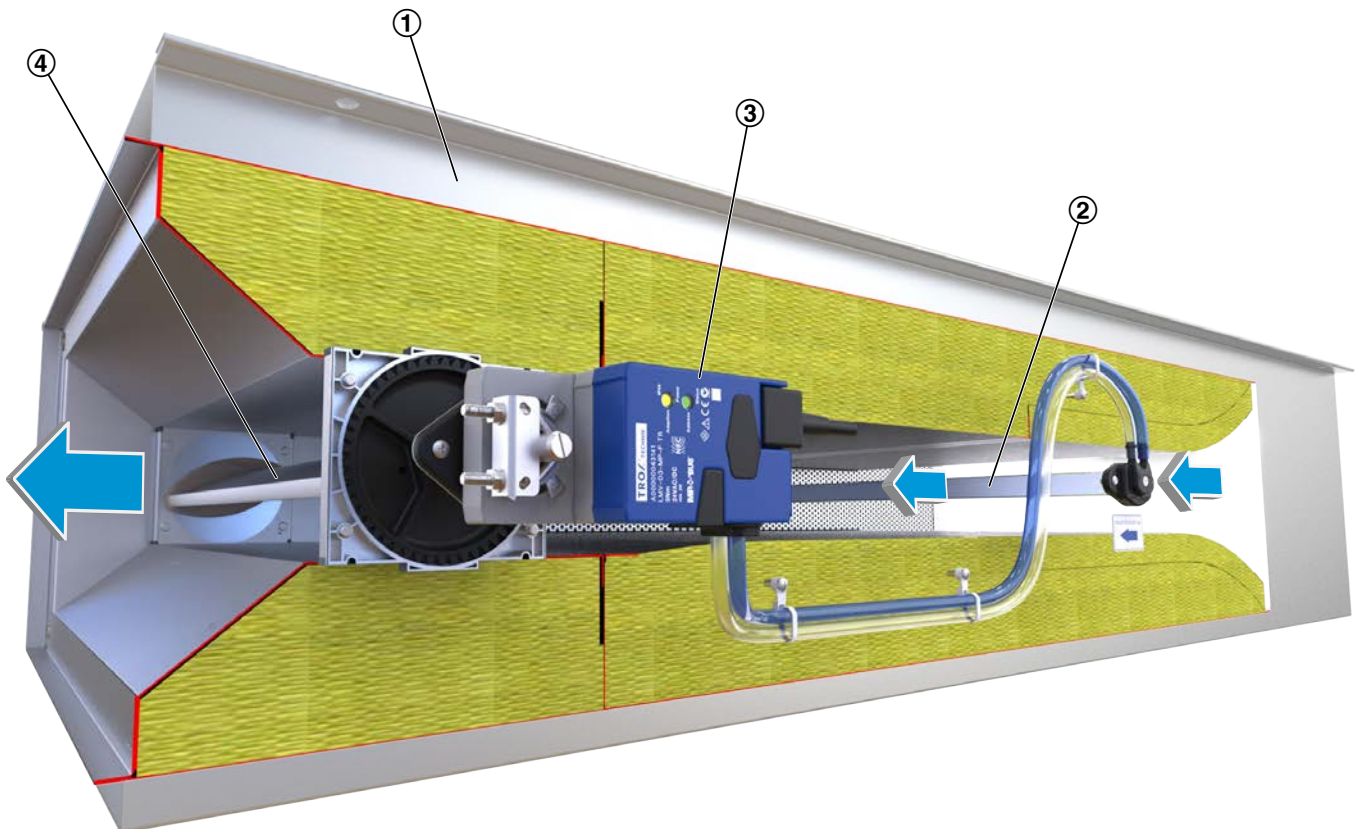
① Effective pressure sensor
② Indicator light
③ Control components, e.g. an Easy controller
④ Damper blade with seal

Technical data

Nominal sizes	125 – 315
Volume flow rate range	30 – 840 l/s or 108 – 3024 m³/h
Volume flow rate control range (unit with dynamic differential pressure measurement)	Approx. 10 to 100 % of the nominal volume flow rate
Minimum differential pressure	5 – 65 Pa
Maximum differential pressure	1000 Pa
Operating temperature	10 – 50 °C
Nominal sizes	125 – 315
Volume flow rate range	27 – 1093 l/s or 95 – 3937 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 109 Pa (without secondary silencer)
Maximum differential pressure	1000 Pa
Operating temperature	10 to 50 °C

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 ($\Delta_{pstat,min}$) 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 of dynamic measurement principle – Easy (potentiometer)

Attachment: Easy

NS	qv [l/s]	qv [m³/h]	Δpstmin [Pa] ①	Δpstmin [Pa] ②	Δqv [±%]
125	27	95	2	3	8
125	79	283	13	23	6
125	131	472	35	63	5
125	183	660	68	123	4
160	42	150	2	3	8
160	124	447	11	21	6
160	207	745	30	58	5
160	289	1042	58	113	4
200	60	213	2	3	9
200	176	634	12	26	6
200	293	1056	32	71	5
200	410	1477	62	138	5
250	75	269	2	3	9
250	223	801	13	23	6
250	371	1334	34	62	5
250	518	1866	66	121	5
315	126	452	2	3	9
315	375	1349	13	20	6
315	624	2245	36	56	5
315	872	3142	70	108	5

① Basic unit

② Basic unit with secondary silencer TS

Volume flow rate ranges and minimum differential pressure values

Control component measurement principle – q_v Extended

Attachments: BC0, BL0, BM0, BM0-J6

NS	qv [l/s]	qv [m³/h]	Δpstmin [Pa] ①	Δpstmin [Pa] ②	Δqv [±%]
125	27	95	2	3	8
125	94	339	18	33	5
125	162	584	53	97	5
125	230	828	106	194	4
160	42	150	2	3	8
160	149	535	16	30	5
160	256	920	45	88	5
160	362	1305	90	177	4
200	60	213	2	3	9
200	211	759	17	37	6
200	363	1305	49	108	5
200	514	1851	98	216	5
250	75	269	2	3	9
250	266	959	18	32	6
250	458	1649	52	95	5
250	649	2338	103	190	5
315	126	452	2	3	9
315	448	1614	19	29	6

NS	qv [l/s]	qv [m³/h]	Δpstmin [Pa]		Δqv [±%]
			①	②	
315	771	2775	55	85	5
315	1093	3937	109	170	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_v As standard

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

NS	qv [l/s]	qv [m³/h]	Δpstmin [Pa]		Δqv [±%]
			①	②	
125	27	95	2	3	8
125	81	292	14	25	6
125	136	488	37	68	5
125	190	684	73	133	4
160	42	150	2	3	8
160	128	460	12	22	6
160	214	770	32	62	5
160	300	1080	62	121	4
200	60	213	2	3	9
200	181	652	13	27	6
200	303	1092	34	76	5
200	425	1531	67	148	5
250	75	269	2	3	9
250	229	824	13	24	6
250	383	1379	36	66	5
250	537	1934	71	130	5
315	126	452	2	3	9
315	385	1387	14	22	6
315	645	2322	38	59	5
315	904	3257	75	116	5

① Basic unit

② Basic unit with secondary silencer TS

* Discontinued control component

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]	Δpstmin [Pa]		Δqv [±%]
			①	②	
125	27	95	2	3	8
125	81	292	14	25	6
125	136	488	37	68	5
125	190	685	73	133	4
160	42	150	2	3	8
160	128	460	12	22	6
160	214	770	32	62	5
160	300	1080	62	121	4
200	60	213	2	3	9
200	181	652	13	27	6

NS	qv [l/s]	qv [m³/h]	Δpstmin [Pa]		Δqv [±%]
			①	②	
200	303	1092	34	76	5
200	425	1531	67	148	5
250	75	269	2	3	9
250	229	824	13	24	6
250	383	1379	36	66	5
250	537	1934	71	130	5
315	126	452	2	3	9
315	385	1387	14	22	6
315	645	2322	38	59	5
315	904	3257	75	116	5

① Basic unit

② Basic unit with secondary silencer TS

* Discontinued control component

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}

Controller, including sound attenuator variants
(total flow rate range of type)

NS	qv [l/s]	qv [m³/h]	150 Pa		500 Pa	
			①	②	①	②
125	27	95	< 15	< 15	20	< 15
125	94	339	27	17	34	23
125	162	584	33	24	39	29
125	230	828	35	n.V.	41	33
160	42	150	15	< 15	21	< 15
160	149	535	29	19	35	24
160	256	920	32	24	38	28
160	362	1305	34	n.V.	41	30
200	60	213	< 15	< 15	20	< 15
200	211	759	25	< 15	31	19
200	363	1305	29	20	35	24
200	514	1851	31	n.V.	37	28
250	75	269	< 15	< 15	20	< 15
250	266	959	25	< 15	31	19
250	458	1649	28	18	34	23
250	649	2338	31	n.V.	37	26
315	126	452	16	< 15	22	< 15
315	448	1614	24	< 15	30	18
315	771	2775	28	19	34	22
315	1093	3937	30	n.V.	36	26

Air-regenerated noise L_{PA} [dB(A)] with static differential pressure Δ_{pst} of 150 or 500 Pa

① Basic unit

② Basic unit with secondary silencer TS

n.V./abbreviation: Specified static differential pressure Δ_{pst} is less than the minimum differential pressure $\Delta_{pst\,min}$

Quick sizing table case-radiated noise L$_{PA}$
Controller including acoustic cladding variants
(total flow rate range of type)

NS	qv [l/s]	qv [m³/h]	150 Pa		500 Pa	
			①	②	①	②
125	27	95	< 15	< 15	16	< 15
125	94	339	23	22	31	28
125	162	584	29	30	37	36
125	230	828	33	34	41	40
160	42	150	< 15	< 15	20	15
160	149	535	27	26	34	32
160	256	920	33	33	40	39
160	362	1305	37	38	44	44
200	60	213	< 15	< 15	20	< 15
200	211	759	27	25	34	31
200	363	1305	33	32	40	38
200	514	1851	37	37	44	43
250	75	269	< 15	< 15	21	< 15
250	266	959	28	25	35	31
250	458	1649	34	33	41	39
250	649	2338	38	37	45	43
315	126	452	17	< 15	25	18
315	448	1614	32	30	39	35
315	771	2775	38	37	45	43
315	1093	3937	42	42	49	47

Case-radiated noise L$_{PA}$ [dB(A)] with static differential pressure Δ$_{pst}$ of 150 or 500 Pa
① Basic unit
② Basic unit with acoustic cladding

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 the general properties of the product. Texts for variants can be generated with our Easy Product Finder design program.

Specification text
Rectangular VAV terminal units for variable and constant air volume systems, for demanding acoustic requirements, suitable for extract air, available in 5 nominal sizes. High control accuracy even in case of unfavourable upstream conditions. 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. Both ends suitable for the connection of ducts. Casing with acoustic and thermal insulation. Position of the damper blade indicated externally at shaft extension. The damper blade is factory set to open position, which allows a ventilation airflow even without control; this does not apply to variants with defined safe position NC (normally closed). Meets the hygiene requirements of VDI 6022, DIN 1946, Part 4, as well as EN 13779 and VDI 3803.

Special features
- Hygiene tested and certified
- Direct connection to ductwork
- Factory set-up or programming and aerodynamic function testing
- Parameters can also later be set on the control component; additional adjustment device may be necessary

Materials and surfaces
- Casing made of galvanised sheet steel
- Damper blade and effective pressure sensor made of aluminium
- Lining is mineral wool
- Plastic plain bearings

Mineral wool:
- RAL quality mark RAL-GZ 388
- 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 from airflow velocities of up to 20 m/s
- Inert to fungal and bacterial growth

Connection type
- With flanges on both ends
- Both ends suitable for the connection of ducts.

Technical data
- Nominal sizes: 125 – 315

- Volume flow rate range: 27 – 872 l/s or 95 – 3142 m³/h
- Minimum differential pressure: up to 109 Pa (without secondary silencer)
- Maximum differential pressure: 1000 Pa
- Closed blade air leakage to EN 1751, class 4. Casing air leakage to EN 1751, class C.

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 of the volume flow rates without adjustment device using q_{vmin} and q_{vmax} potentiometers
- Electrical connections with screw terminals, no junction box required
- Aerodynamic functional testing of each volume flow controller on a test rig at the factory; the test result is given on a sticker on the controller
- No inflow lengths required
- Acoustic data to ÖNORM EN ISO 5135:1999
- Maximum system deviation 5 % at q_{vmax}, without inflow length

Specification text attachment
Variable volume flow control with electronic Easy controller for applying a reference value and capturing an actual value to be integrated with 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: CLOSE, OPEN, q_{vmin} and q_{vmax}
- Potentiometers with percentage scales to set the volume flow rates q_{vmin} and q_{vmax}
- 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 _____ [m³/h]
- Δ_{pst} _____ [Pa]

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)

$$\text{TA-Silenzio} - \text{D} / 200 / \text{Easy}$$

| | | | |
|1| 2 | 3 | 4|

1 Type
TA-Silenzio VAV terminal unit, extract air
2 Acoustic cladding
No entry: none
D with acoustic cladding

3 Nominal size [mm]
125, 160, 200, 250, 315
4 Attachments (control component)
Easy Volume flow controller, dynamic, analogue interface, setting of $q_{v_{min}}$ and $q_{v_{max}}$ with potentiometers (provided on site)

Order example: TA–Silenzio/125/Easy

Acoustic cladding	None
Nominal size	125
Attachments (control component)	Easy volume flow controller, dynamic, setting q_{vmin} and q_{vmax} with potentiometers

Order code for volume flow control (with VARYCONTROL attachment)

$$\text{TA-Silenzio} - \text{D} / 200 / \text{XD4} / \text{V} 0 / 400 - 1200 \ [\text{m}^3/\text{h}] / \text{NO}$$

| | | | | | | |
|1| 2 | 3 | 4 | 6 7 | 8 | 9|

1 Type
TA-Silenzio VAV terminal unit, extract air
2 Acoustic cladding
No entry: none
D with acoustic cladding
3 Nominal size [mm]
125, 160, 200, 250, 315
4 Attachments (control component)
For example
BC0 Compact controller
XD4 Universal controller (VARYCONTROL)
6 Operating mode
F Constant value mode, one setpoint value (no external switch contact)

V Variable operation (adjustable setpoint value range)
7 Signal voltage range
For the actual and setpoint value signals
0 0 – 10 V DC
2 2 – 10 V DC
8 Operating values for factory setting
Volume flow rate [m³/h or l/s]
$q_{v_{const}}$ (with operating mode F)
$q_{v_{min}} - q_{v_{max}}$ (with operating mode V)
9 Damper blade position
Only with spring return actuators
NO power off to open (Normally Open)
NC power off to close (Normally Closed)

Order example: TA–Silenzio/250/BC0/V0/500–1500 m³/h

Acoustic cladding	None
Nominal size	250
Attachments (control component)	Compact controller
Operating mode	Variable
Signal voltage range	0 – 10 V DC
Operating values	q_{vmin} = 500 m³/h q_{vmax} = 1500 m³/h

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

TA-Silenzio – D / 200 / TUNF / RE / M / 0 / UMZ / … / NC
| | | | | | | | |
1   2   3   4   5   6   7   8   9   10

1 Type
TA-Silenzio VAV terminal unit, extract air
2 Acoustic cladding
No entry: none
D with acoustic cladding
3 Nominal size [mm]
125, 160, 200, 250, 315
4 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)
5 Equipment function
Room control
RE Extract air controller (Room Extract)
6 Operating mode
F Room master or single controller, constant setpoint value
M Room master or single controller, variable setpoint value
S Slave controller (only with room solutions)
7 Signal voltage range
0 0 – 10 V DC
2 2 – 10 V DC
8 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

9 Operating values for factory setting
Volume flow rate [m³/h or l/s]

For operating mode F
$q_{v_{const}}$: constant volume flow rate[1, 2]

Other parameters are only relevant for the room master as part of a room solution[3]; for single controllers enter 0
$q_{v_{const\_Supply}}$: constant supply air (room value)
$q_{v_{const\_Extract}}$: constant extract air (room value)
$q_{v_{diff}}$: supply air/extract air difference (room value)

For operating mode M
$q_{v_{min}}$: minimum volume flow rate[1, 2]
$q_{v_{max}}$: maximum volume flow rate[1, 2]

Other parameters are only relevant for the room master as part of a room solution[3]; for single controllers enter 0
$q_{v_{const\_Supply}}$: constant supply air (room value)
$q_{v_{const\_Extract}}$: constant extract air (room value)
$q_{v_{diff}}$: 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:
[1] Single controller: $q_{v_{min}}$, $q_{v_{max}}$ or $q_{v_{const}}$ apply to the controller
[2] Room solutions: $q_{v_{min}}$, $q_{v_{max}}$, $q_{v_{const}}$ apply to the room
[3] For more information on room solutions with several TROX UNIVERSAL controllers connected with plug and play and for order examples please refer to the product datasheet
10 Damper blade position
Only with spring return actuators
NO Power off to open (Normally Open)
NC Power off to close (Normally Closed)
Useful additions
Optional room control panel
BE-LCD with 40-character display

Order example: TA-Silenzio-D/315/TUN/RE/S/0/Z

Acoustic cladding	With
Nominal size	315
Attachments (control component)	Controller TROX UNIVERSAL, static transducer, slow-running actuator
Equipment function	Extract air control
Volume flow rate setting	Slave
Signal voltage range	0 – 10 V DC
Expansion of attachments	With expansion module EM-AUTOZERO, Solenoid valve for automatic zero point correction of measurement point
Operating values	None (slave)

Order code for differential pressure control (with VARYCONTROL attachment)

TA-Silenzio – D / 200 / XF4 / PRE / V 0 / 30 – 60 [Pa] / NO
      | | | | | | | | |
      1   2   3   4   5   6 7   8   9

1 Type
TA-Silenzio VAV terminal unit, extract air
2 Acoustic cladding
No entry: none
D with acoustic cladding
3 Nominal size [mm]
125, 160, 200, 250, 315
4 Attachments (control component)
For example
XF0 Compact controller for duct pressure
XF4 Universal controller for duct pressure (VARYCONTROL)
5 Equipment function/Installation location
PDE Duct pressure controller – extract air (Pressure Duct Extract)
PRE Room pressure controller – extract air (Pressure Room Extract)
6 Operating mode

F Constant value mode, one setpoint value (no external switch contact)
V Variable operation (adjustable setpoint value range)
7 Signal voltage range
For the actual and setpoint value signals
0 0 – 10 V DC
2 2 – 10 V DC
8 Operating values for factory setting
Differential pressure [Pa]
For duct pressure control, enter the differential pressure [Pa] as an absolute value
Δp_{const} (with operating mode F)
$\Delta p_{min} - \Delta p_{max}$ (with operating mode V)
9 Damper blade position
Only with spring return actuators
NO power off to open (Normally Open)
NC power off to close (Normally Closed)

Order example: TA-Silenzio/250/PDE/XF4/F2/500 Pa/NO

Acoustic cladding	None
Nominal size	250
Attachments (control component)	VARYCONTROL Universal controller duct pressure, interface analogue with safe position and display
Equipment function	Duct pressure control, extract air
Operating mode	Constant value
Signal voltage range	2 – 10 V
Operating value	Δp_{const} = 500 Pa
Damper blade position	Power off to OPEN (NO)

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

TA-Silenzio – D / 200 / TUNF / PRE / MFP / 0 / UMZ / … / NC
     1   2   3   4   5   6   7   8   9 10

1 Type
TA-Silenzio VAV terminal unit, extract air
2 Acoustic cladding
No entry: none
D with acoustic cladding
3 Nominal size [mm]
125, 160, 200, 250, 315
4 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)
5 Equipment function
Pressure control
PDE Duct pressure controller – extract air (Pressure Duct Extract)
PRE Room pressure controller – extract air (Pressure Room Extract)
6 Operating mode
MFP Single controller or room master, constant pressure setpoint
MVP Single controller or room master, variable pressure setpoint
with room solutions only:
SFP Slave, constant pressure setpoint
SVP Slave, variable pressure setpoint
7 Signal voltage range
0 0 – 10 V DC
2 2 – 10 V DC
8 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: Volume flow rate measurement

No entry: none
V with EM-V for volume flow rate measurement at the differential pressure controller
Option 4: Automatic zero point correction
No entry: none
Z with EM-AUTOZERO solenoid valve for automatic zero point correction (only in combination with with EM-V)
9 Operating values for factory setting
Volume flow rate [m³/h or l/s], pressure [Pa]
For operating mode MFP and SFP
Δp_{const}: constant differential pressure

For operating mode MVP and SVP
Δp_{min}: minimum differential pressure
Δp_{max}: maximum differential pressure

Other parameters for operating modes MFP and MVP
Only relevant for the room master as part of a room solution[1]; for single controller enter 0
$q_{v_{min}}$: minimum volume flow rate (room value)
$q_{v_{max}}$: maximum volume flow rate (room value)
$q_{v_{const\_Supply}}$: constant supply air (room value)
$q_{v_{const\_Extract}}$: constant extract air (room value)
$q_{v_{diff}}$: supply air/extract air difference (room value)
Please note
[1] 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
10 Damper blade position
Only with spring return actuators
NO power off to open (Normally Open)
NC power off to close (Normally Closed)
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
Optional room control panel
BE-LCD with 40-character display

Order example: TA-Silenzio-D/315/TUS/PRE/MVP/2/V/10 Pa/30 Pa/750 m³/h/2500 m³/h/0/0/100 m³/h

Acoustic cladding	With
Nominal size	315
Attachments (control component)	Controller TROX UNIVERSAL, static transducer, fast-running actuator
Equipment function	Room pressure control extract air
Differential pressure setting	Master, variable pressure control
Signal voltage range	2 – 10 V DC
Expansion of attachments	Volume flow rate measurement
Operating values	Pressure range: Δp_{min}-Δp_{max}: 10 – 30 Pa Volume flow rate range q_{vmin} - q_{vmax}: 750 – 2500 m³/h (room values)

Constant supply/extract air q_{vconst_CLOSED}, q_{vconst_Ex}: 0 m³/h (room values)

Supply air/extract air difference: q_{vDiff}: 100 m³/h (room value)

Order code for room control (with EASYLAB attachment)

TA-Silenzio – D / 200 / ELAB / S / RE / UMZ / LAB / …
 1   2   3   4   5   6   8   9   10

1 Type
TA-Silenzio VAV terminal unit, extract air
2 Acoustic cladding
No entry: none
D with acoustic cladding
3 Nominal size [mm]
125, 160, 200, 250, 315
4 Attachments (control component)
ELAB EASYLAB controller TCU3
5 Actuators
S Fast-running actuator (3 s)
SD Fast-running actuator (3 s), with digital communication interface (TROX HPD)
6 Equipment function
Room control
RE Extract air controller (Room Extract)
PC Room pressure controller (Pressure Control)
8 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
9 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)
10 Operating values for factory setting
Volume flow rate [m³/h or l/s], pressure [Pa]

Only required when room management function is active; total room extract air/supply air
q_{v_1}: standard mode
q_{v_2}: reduced operation
q_{v_3}: increased operation
q_{v_4}: constant supply air
q_{v_5}: constant extract air
q_{v_6}: Supply air/extract air difference
Δp_{set}: setpoint pressure (only with differential pressure control)
Useful additions
Room control panel (only for units with RMF)
BE-LCD 40-character display
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 others, e.g.
PT-699 Measuring range ±50 Pa or ±100 Pa
PT-GB604 Measuring range ±100 Pa

Order example: TA-Silenzio/160/ELAB/SD/RE/IZ/LAB

Acoustic cladding	None
Nominal size	160
Attachments (control component)	EASYLAB controller TCU3
Actuator	Fast-running actuator (3 s), with digital communication interface (TROX HPD)
Equipment function	Extract air control
Expansion of attachments	With expansion module Type EM-IP BACnet/Modbus-IP interface, web server with expansion module EM-AUTOZERO, Solenoid valve for automatic zero point correction of measurement point
Additional function	Extract air led system for laboratories Room management function has been deactivated
Operating values	Not required

Order code for single operation (with EASYLAB attachment)

TA-Silenzio – D / 200 / ELAB / S / EC – E0 / UMZ / …
　　　　　　　|　　|　　|　　|　　|　|　　|　　|　　|
　　　　　　　1　　2　3　　4　　5　6　　7　　8　10

1 Type
TA-Silenzio VAV terminal unit, extract air
2 Acoustic cladding
No entry: none
D with acoustic cladding
3 Nominal size [mm]
125, 160, 200, 250, 315
4 Attachments (control component)
ELAB EASYLAB controller TCU3
5 Actuators
S Fast-running actuator (3 s)
SD Fast-running actuator (3 s), with digital communication interface (TROX HPD)
6 Equipment function
Single operation
EC Single controller – extract air (Extract Controller)
7 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)
8 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
10 Operating values for factory setting
Volume flow rate [m³/h or l/s]
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: TA–Silenzio/200/ELAB/S/EC/E0/300-1000

Acoustic cladding	None
Nominal size	200
Attachments (control component)	EASYLAB controller TCU3
Actuator	Fast-running actuator (3 s)
Equipment function	Extract air controller
External volume flow rate setting	Voltage signal 0 – 10 V DC
Operating values	q_{vmin} = 300 m³/h q_{vmax} = 1000 m³/h

Variants

VAV terminal unit TA-Silenzio

▪ VAV terminal unit for variable extract air volume flow control

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VAV terminal unit, variant TA-Silenzio-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 ducts for the room under consideration must have adequate acoustic insulation (to be provided by others) on the fan end
▪ Acoustic cladding cannot be retrofitted

Material

Standard construction

–	Casing	Galvanised sheet steel
–	Effective pressure sensor	Aluminium
–	Damper blade	Aluminium
–	Damper blade seal	Polyethylene, PE
–	Shaft and linkage	Galvanised steel
–	Plain bearings	Plastic
–	Gears	Plastic, ABS

With acoustic cladding (optional)

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

Dimensions and weight

VAV terminal unit without acoustic cladding (TA-Silenzio)
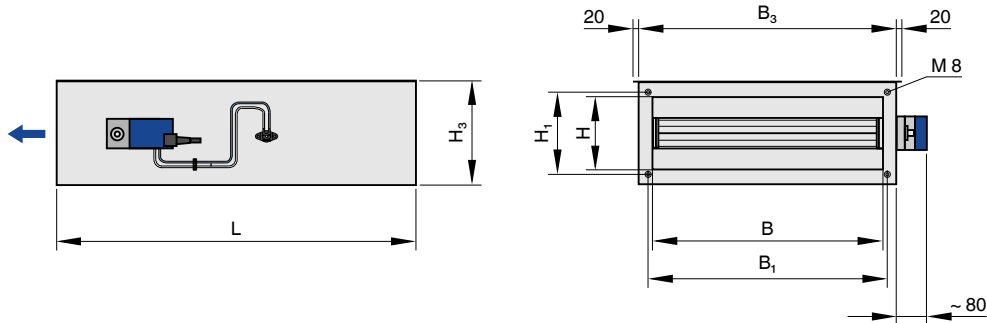
Notes:

Total length L is the total casing length.

The length of the installed unit is approx. 24 mm less. See flange detail.

The illustration shows control component type Easy, Compact. For individual dimensions see section 'Space required for commissioning and maintenance'.

Dimensions/Weight for TA-Silenzio

NS	B	H	L	B_1	B_3	H_1	H_3	kg
125	198	152	1035	232	300	186	236	17
160	308	152	1035	342	410	186	236	21
200	458	210	1250	492	560	244	281	32
250	598	201	1250	632	700	235	311	41
315	798	252	1250	832	900	286	361	54

VAV terminal unit with acoustic cladding (TA-Silenzio-D)
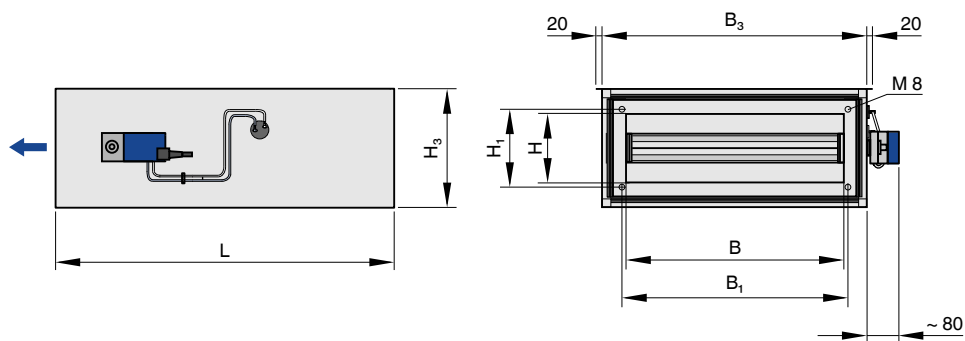
Notes:

Total length L is the total casing length.

The length of the installed unit is approx. 24 mm less. See flange detail.

The illustration shows control component type Easy, Compact. For individual dimensions see section 'Space required for commissioning and maintenance'.

Dimensions/Weight for TA-Silenzio-D

NG	B	H	L	B₁	B₃	H₁	H₃	kg
125	198	152	1035	232	380	186	316	32
160	308	152	1035	342	490	186	316	38
200	458	210	1250	492	640	244	361	64
250	598	201	1250	632	780	235	391	72
315	798	252	1250	832	980	286	441	91

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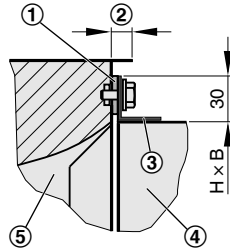
1 Compressible seal, to be provided by others
2 Flanges on both ends indented by approx. 12 mm
3 Flange
4 Duct
5 VAV terminal unit

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
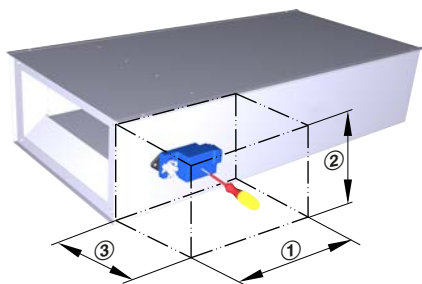
Product examples

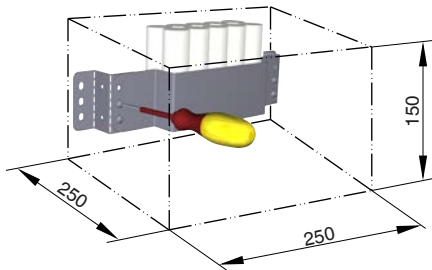Schematic illustration of required installation space   BC0, XB4, BUDNF, TUN

Space required

Attachment	①	②	③
Easy controller			
Easy	700	300	300

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

* Discontinued control component

Accessibility to the battery pack

Schematic illustration of required installation space

Note: Additional space for fixing and accessing the battery pack (optional accessory for TROX UNIVERSAL or LABCONTROL EASYLAB control component).

Product example

TZ-Silenzio/.../TUN/.../U with attachment

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
- TA-Silenzio-D: For constructions with acoustic cladding, ducts on the room end should have cladding up to the acoustic cladding of the controller
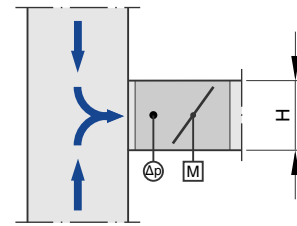
Upstream conditions
The volume flow rate accuracy Δ_{qv} applies to all upstream conditions.

**Illustration example vertical**

Convergence of 2 airflows, vertical
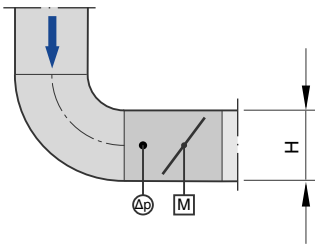
A bend – without a straight duct section upstream of the VAV terminal unit – has only a negligible effect on the volume flow rate accuracy$_{qv}$.
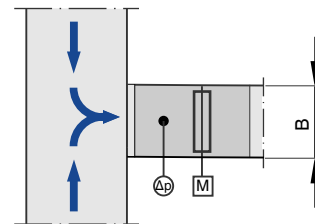
The stated volume flow rate accuracy Δ_{qv} will be achieved, even when the VAV terminal unit is installed at a junction and at the point of convergence of two airflows.

Illustration example horizontal
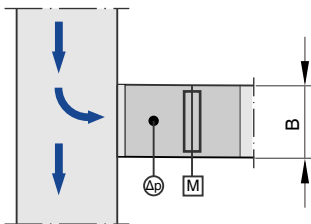
Convergence of 2 airflows, horizontal

The stated volume flow rate accuracy Δ_{qv} will be achieved even when the VAV terminal unit is installed (vertically or horizontally) in a branch just off the main duct.

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

VARYCONTROL control components

Attachment	Controlled variable	Interface	Effective pressure transducer	Actuator	Manufacturer
Easy controller, dynamic					
Easy	q_v	0 – 10 V	integrated	Slow running integrated	(1)
Compact controller, dynamic					
BL0 **	qv	LonWorks FTT 10 interface	integrated	Slow running integrated	②
BM0-J6	qv	Modbus RTU/BACnet MS/TP with RJ12 socket (for X-AIRCONTROL)	integrated	Slow running integrated	②
LN0	qv	0 – 10 V or 2 – 10 V	integrated	Slow running integrated	⑤
LK0	qv	KNX interface	integrated	Slow running integrated	⑤
XB0	q_v	0 – 10 V or 2 – 10 V	integrated	Slow running integrated	(1)
Compact controller, static					
XD0	qv	0 – 10 V or 2 – 10 V	integrated	Slow running integrated	③
XF0	Δp	0 – 10 V or 2 – 10 V	integral, control range adjustable 25 - 550 Pa	Slow running integrated	③
Universal controller, dynamic					
B13 *	qv	0 – 10 V or 2 – 10 V	integrated	Slow running separate	②
B1B *	qv	0 – 10 V or 2 – 10 V	integrated	Spring return actuator separate	②
BUDN	qv	0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP	integrated	Slow running separate	②
BUDNF	qv	0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP	integrated	Spring return actuator separate	②
XB4	qv	0 – 10 V or 2 – 10 V	integrated	Spring return actuator separate	③
VARYCONTROL Universal controller, static					
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

Attachment	Controlled variable	Interface	Effective pressure transducer	Actuator	Manufacturer
BBB *	qv	2 – 10 V	individual component	Spring return actuator separate	②
BR3 *	Δp	0 – 10 V or 2 – 10 V or MP bus interface	individual component 100 Pa	Slow running separate	②
BRB *	Δp	0 – 10 V or 2 – 10 V or MP bus interface	individual component 100 Pa	Spring return actuator separate	②
BRG *	Δp	0 – 10 V or 2 – 10 V or MP bus interface	individual component 100 Pa	fast-running separate	②
BS3 *	Δp	0 – 10 V or 2 – 10 V or MP bus interface	individual component 600 Pa	Slow running separate	②
BSB *	Δp	0 – 10 V or 2 – 10 V or MP bus interface	individual component 600 Pa	Spring return actuator separate	②
BSG *	Δp	0 – 10 V or 2 – 10 V or MP bus interface	individual component 600 Pa	fast-running separate	②
BG3 *	Δp	2 – 10 V	individual component 100 Pa	Slow running separate	②
BGB *	Δp	2 – 10 V	individual component 100 Pa	Spring return actuator separate	②
BH3 *	Δp	2 – 10 V	individual component 600 Pa	Slow running separate	②
BHB *	Δp	2 – 10 V	individual component 600 Pa	Spring return actuator separate	②
BUSN	qv	0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP	integrated	Slow running separate	②
BUSNF	qv	0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP	integrated	Spring return actuator separate	②
BUSS	qv	0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP	integrated	fast-running separate	②
BUPN	Δp	0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP	integrated Control range adjustable 25 - 450 Pa	Slow running separate	②
BUPNF	Δp	0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP	integrated Control range adjustable 25 - 450 Pa	Spring return actuator separate	
BURN	Δp	0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP	integrated Control range adjustable -50 ... -10 Pa or 10 ... 50 Pa	Slow running separate	②
BURNF	Δp	0 - 10 V or 2 - 10 V or MP-Bus or Modbus RTU or BACnet MS/TP	integrated Control range adjustable -50 ... -10 Pa or 10 ... 50 Pa	Spring return actuator separate	②

Attachment	Controlled variable	Interface	Effective pressure transducer	Actuator	Manufacturer
XD4	qv	0 – 10 V or 2 – 10 V	integrated	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 being phased out

** Control component to be discontinued - do not include in new projects

qv Volume flow rate

Δp Differential pressure

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

TROX UNIVERSAL control components

Attachment	Controlled variable	Interface	Effective pressure transducer	Actuator	Manufacturer
TROX UNIVERSAL-Regler – statisch					
TUN	qv, Δp	TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: Modbus, BACnet, web server	qv = integral Δp = separate	Slow running separate	①
TUNF	qv, Δp	TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: Modbus, BACnet, web server	qv = integral Δp = separate	Spring return actuator separate	①
TUS	qv, Δp	TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: Modbus, BACnet, web server	qv = integral Δp = separate	fast-running separate	①
TUSD	qv, Δp	TROX Plug&Play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: Modbus, BACnet, web server	qv = integral Δp = separate	fast-running with digital communication interface (TROX HPD), separate	①

q_v Volume flow rate

Δ_p Differential pressure

① TROX

LABCONTROL EASYLAB control components

Attachment	Controlled variable	Interface	Effective pressure transducer	Actuator	Manufacturer
EASYLAB Regler – statisch					
ELAB	qv, Δp *	TROX plug and play communication system and 0 - 10 V or 2 - 10 V or with optional accessories: Modbus, BACnet, web server	qv = integral Δp = 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

Nomenclature

Dimensions of rectangular units

B [mm]
Duct width

B₁ [mm]; [in]
Screw hole pitch of flange (horizontal)

B₂ [mm]; [in]
Overall dimension of flange (width)

H [mm]
Duct height

H₁ [mm]
Screw hole pitch of flange (vertical)

H₂ [mm]
Overall dimension of flange (height)

Dimensions of circular units

ØD [mm]; [in]
Basic units made of sheet steel: Outer diameter of the spigot; basic units made of plastic: Inside diameter of the spigot

ØD₁ [mm]; [in]
Pitch circle diameter of flanges

ØD₂ [mm]; [in]
Outer diameter of flanges

L [mm]; [in]
Length of unit including connecting spigot

L₁ [mm]; [in]
Length of casing or acoustic cladding

n [ ]
Number of flange screw holes

T [mm]; [in]
Flange thickness

General information

m [kg]; [lb]
Unit weight including the minimum required attachments (control component)

NS [mm]; [in]
Nominal size

f_m [Hz]
Octave band centre frequency

L_PA [dB(A)]
A-weighted sound pressure level of air-regenerated noise of the CAV controller, system attenuation taken into account

L_PA1 [dB(A)]
A-weighted sound pressure level of air-regenerated noise of the CAV controller with secondary silencer, system attenuation taken into account

L_PA2 [dB(A)]
A-weighted sound pressure level of case-regenerated noise of the CAV controller, system attenuation taken into account

L_PA3 [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_vNom [m3/h]; [l/s]; [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_{vmax}.). Upper limit of the setting range and maximum volume flow rate setpoint value for the VAV terminal unit.

q_vmin Unit [m3/h]; [l/s]; [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 $q_{vmin\ unit,}$ (if q_{vmin} equals zero) may result in unstable control or shut-off.

q_vmax [m3/h]; [l/s]; [CFM]
Client-adjustable upper limit of the operating range for the VAV terminal unit: q_{vmax}. can be set to less than or equal to q_{vNom} 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 ($q_{vmax,}$ see characteristics.

q_vmin [m3/h]; [l/s]; [CFM]
Client-adjustable lower limit of the operating range of the VAV terminal unit: q_{vmin} should be set to less than or equal to q_{vmax}. q_{vmin} must not be set to less than $q_{vmin\ unit,}$ as the control may become unstable or the damper blade may close. q_{vmin} 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 ($q_{vmin,}$ see characteristics.

q_v [m3/h]; [l/s]; [CFM]
Volume flow rate

Δ_qv [%]
Volume flow rate accuracy in relation to the setpoint (tolerance)

Δp_st [Pa]; [inWg]
Static differential pressure

Δp$_{stmin}$ [Pa]; [inWg]

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 [mm]; [in]

All lengths are given in millimetres [mm] 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 mainly consists of a controller with differential pressure transducer (integrated or external), and an integrated actuator (Easy and Compact controllers) or external actuator (Universal or LABCONTROL controller). Important distinguishing features: Transducer: dynamic transducer for clean air, or static transducer for polluted air. Actuator: Standard actuator (slow-running), spring return actuator for fail-safe position, or fast-running actuator. 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.