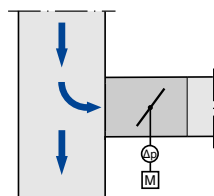




Differential pressure measurement via damper blade



Compact controller with display



Installation directly on the main duct



Conforms to VDI 6022

VAV terminal units

TVE-Q



Compact solution for low airflow velocities

Rectangular air terminal units for use in variable volume systems at low airflow velocities, even under unfavourable upstream conditions

- Tubeless differential pressure measurement at the damper blade
 - Differential pressure transmission via a differential pressure duct in the shaft
 - Connection terminals with protective cover, no junction boxes required
 - Any airflow direction for dynamic transducers
 - Suitable for airflow velocities from 157.48 – 1574.80 fpm
 - Compact dimensions for installation in confined ceiling spaces
 - Plug-and-play solution in conjunction with X-AIRCONTROL room control
 - Exact measurement even at low airflow velocities
 - Any installation orientation, even with static transducers
 - Leakage airflow with closed damper blade in accordance with EN 1751, at least Class 2
 - Casing air leakage in accordance with EN 1751, at least class ATC3
 - Volume flow range 1:10
 - Individual testing, parameterisation and adjustment of each TVE-Q on a test rig under airflow
 - Individual report of testing, parameterisation and adjustment available online
- Optional equipment and accessories
- Acoustic cladding for the reduction of case-radiated noise
 - Secondary silencer to reduce air-regenerated noise
 - Hot water heat exchanger Type WT for reheating

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General information

Application

- Square VAV terminal units for use in ventilation and air conditioning systems (AHUs)
- For almost all tasks when controlling, restricting, or shutting off supply and extract air flows
- Also for unfavourable upstream conditions at low air velocities
- Closed-loop volume flow control using an external power supply
- For variable or constant volume flow systems
- Shut-off by override control (by the client)

Special characteristics

- High differential pressure signal with small angle of attack
- Factory set-up or programming and aerodynamic function testing
- Volume flow rate can be measured and subsequently adjusted. Additional adjustment tool may be required (depending on the variant of the control component)
- Tubeless differential pressure measurement via damper blade
- Differential pressure transmission through differential pressure duct in axis
- Any airflow direction if dynamic transducer is used
- Any installation orientation also with static transducer
- Suitable for air velocities from 0.8 - 8 m/s
- Compact dimensions for use in confined ceiling areas

Nominal sizes

- 8 × 4, 12 × 4
- 8 × 8, 12 × 8, 16 × 8, 20 × 8, 24 × 8, 12 × 12, 16 × 12,
- 20 × 12, 24 × 12

Variants

- TVE-Q: VAV terminal unit
- TVE-Q-D: VAV terminal unit with acoustic cladding
- Units with acoustic cladding and/or secondary silencer Type TX for demanding acoustic requirements

Construction

- Galvanised sheet steel
- P1: Powder-coated, silver grey (RAL 7001)

Parts and characteristics

- Ready-to-commission unit which consists of mechanical parts and control components.
- Damper blade with integrated measuring unit
- Axis with differential pressure duct for measured value transmission
- Control component factory mounted
- Each unit is tested on a special aerodynamic test rig at the factory
- Documentation of the test rig data with a test label or a volume flow scale on the unit
- High control accuracy even in case of unfavourable upstream conditions

Attachments

- EASY controller: compact unit consisting of controller with potentiometers, differential pressure transducer and actuator
- Compact controller: compact unit consisting of controller, differential pressure transducer and actuator
- Compact controller Modbus: variant with Modbus RTU interface and display; Plug-and-play solution in conjunction with X-AIRCONTROL room control
- Compact controller BACnet: Variant with BACnet-MS/TP interface and display; can also be converted to Modbus RTU by the customer

Useful additions

- Secondary silencer Type TX for the reduction of air-regenerated noise
- Hot water heat exchanger Type WT for reheating the airflow

Construction features

- Rectangular casing
- Flanges on both ends, suitable for air duct profiles
- Position of the damper blade can be seen from the outside via position indicator
- Simple exchange of the control components possible
- Acoustic cladding cannot be retrofitted

Material and surfaces

Galvanised sheet steel variant

- Casing, damper blade made of galvanised sheet steel
- Shaft made of PA6 (H ≤ 200) or aluminium (H > 200)
- Damper blade seal and sealing plug made of EPDM
- Bearing bushes made of PBT or TPU
- Fixing (screws, rivets) galvanised steel, aluminium

Powder-coated variant (P1)

- Casing, damper blade galvanised with powder coating, RAL 7001, silver-grey
- Shaft made of PA6 (H ≤ 200) or aluminium (H > 200)
- Damper blade seal and sealing plug made of EPDM
- Bearing bushes made of PBT or TPU
- Fastening (screws, rivets) stainless steel, aluminium

Variant with acoustic cladding (-D)

- Acoustic cladding made of galvanised sheet steel
- Lining made of mineral wool

Mineral wool

- According to EN 13501, fire rating class A1, non-combustible
- RAL quality mark RAL-GZ 388
- Non-hazardous to health thanks to high biosolubility according to the German Hazardous Substance Ordinance and Note Q of the European Regulation (EC) No. 1272/2008

Standards and guidelines

Meets the hygiene requirements of

- EN 16798, Part 3
- VDI 6022, Sheet 1
- DIN 1946, Part 4



- For further standards and guidelines, please refer to the hygiene certificate

Casing air leakage

- EN 1751, ATC3

Leakage airflow with the damper blade closed:

- EN1751, depending on size class 2 - 3

For further information, see "Manufacturer's declaration on static leakage testing"

Maintenance

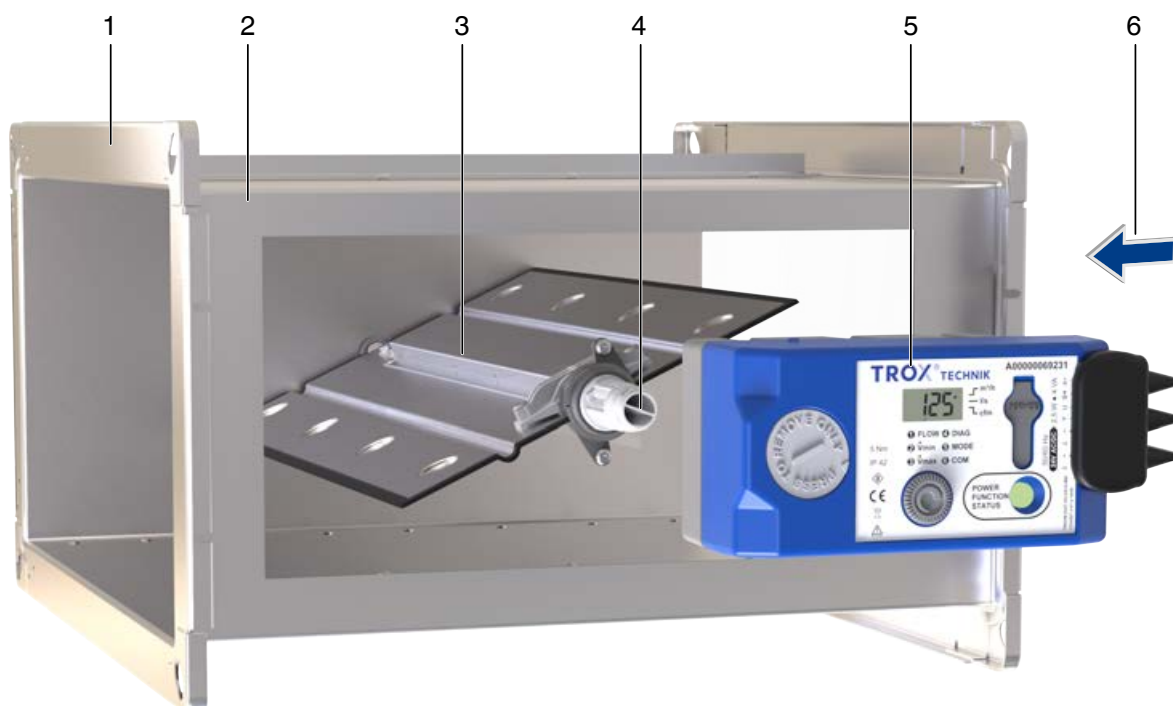
- Maintenance-free as construction and materials are not subject to wear and tear

Function

Functional description

The damper blade works as a control element and as a differential pressure sensor. Through the differential pressure duct in the shaft, the detected differential pressure reaches the transducer (static or dynamic), and is converted into an electrical

signal and compared with the setpoint value. In case of a control deviation, the integrated actuator changes the position of the damper blade. Thereby, the volume flow rate is kept constant in close tolerances over the entire differential pressure range.



- 1 Flange for air duct profiles
- 2 Casing
- 3 Damper blade including differential pressure sensor
- 4 Shaft with differential pressure duct
- 5 Electronic control component
- 6 Preferred airflow direction

Technical data

Nominal sizes	8 × 4, 12 × 4 8 × 8, 12 × 8, 16 × 8, 20 × 8, 24 × 8, 12 × 12, 16 × 12, 20 × 12, 24 × 12
Volume flow rate range	33.9-3,051.19 cfm or 58 – 5184 m³/h
Volume flow rate control range (controller with dynamic differential pressure measurements)	approx. 10 - 100 % of the nominal volume flow rate
Minimum differential pressure	up to 0.20 in. w.g. (without secondary silencer)
Maximum differential pressure	Control component with dynamic transducer: 3.61 in. w.g., Control component with static transducer: 2.41 in. w.g.
Operating temperature	50 to 122 °F

Quick sizing

Quick sizing tables provide a good overview of the minimum pressure differences, the volume flow accuracy Δq_v and the expected sound pressure levels in the room. 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 obtained by using our Easy Product Finder design programme. The nominal size is initially selected according to the given volume flow rates q_{vmin} and q_{vmax} .

Volume flow rate ranges and minimum differential pressure values

The minimum differential pressure of VAV terminal units is an important factor in designing the ductwork and in rating the fan including speed control. It must be ensured that for all operating conditions and for all terminal units, a sufficient differential pressure is applied to each controller (Δp_{stmin}). The measurement point(s) for fan speed control must be selected accordingly. The volume flow rate range for VAV terminal units depends on the nominal size and on the control component (attachment) used.

Volume flow ranges and minimum differential pressures

Controller for dynamic and static measuring principle

Attachments: Easy, XB0, XM0, XM0-J6, XDMB0, XSMB0, XSMB0-J6

B	H	q_v [cfm]	q_v [m³/h]	Δp_{stmin} [in. w.g.]		Δq_v [±%]
			q_v [m³/h]	(1) without silencer	(2) with silencer	Δq_v [±%]
8	4	36.02	58	0.06	0.06	18
8	4	135.61	231	0.1	0.2	8
8	4	237.31	404	0.14	0.44	6
8	4	339.02	576	0.2	0.82	5
12	4	52.97	87	0.06	0.06	18
12	4	203.41	346	0.1	0.20	8
12	4	355.97	605	0.13	0.43	6
12	4	508.53	864	0.19	0.81	5
8	8	69.92	116	0.05	0.06	18
8	8	271.22	462	0.1	0.16	8
8	8	474.63	807	0.12	0.32	6
8	8	678.04	1152	0.15	0.53	5
12	8	103.83	173	0.05	0.06	18
12	8	406.82	691	0.1	0.16	8
12	8	711.94	1210	0.12	0.32	6
12	8	1017.06	1728	0.14	0.53	5
16	8	137.73	231	0.05	0.05	18
16	8	542.43	922	0.09	0.15	8
16	8	949.26	1613	0.12	0.31	6
16	8	1356.08	2304	0.14	0.53	5
500	200	169.51	288	0.05	0.05	18

B	H	q _v [cfm]	q _v [m³/h]	Δp _{stmin} [in. w.g.]		Δq _v [±%]
			qv [m³/h]	(1) without silencer	(2) with silencer	Δqv [±%]
20	8	678.04	1152	0.09	0.15	8
20	8	1186.57	2016	0.11	0.31	6
20	8	1695.1	2880	0.13	0.52	5
24	8	205.53	346	0.04	0.05	18
24	8	813.65	1383	0.08	0.15	8
24	8	1423.89	2420	0.11	0.3	6
24	8	2034.12	3456	0.13	0.52	5
12	12	154.68	260	0.05	0.05	18
12	12	610.24	1038	0.09	0.16	8
12	12	1068.92	1815	0.12	0.31	6
12	12	1525.59	2592	0.14	0.52	5
16	12	205.53	346	0.04	0.05	18
16	12	813.65	1383	0.08	0.15	8
16	12	1423.89	2420	0.11	0.3	6
16	12	2034.12	3456	0.13	0.52	5
20	12	254.27	432	0.04	0.05	18
20	12	1017.06	1728	0.08	0.14	8
20	12	1779.86	3024	0.1	0.3	6
20	12	2542.66	4320	0.13	0.51	5
24	12	307.24	519	0.04	0.04	18
24	12	1222.6	2074	0.08	0.14	8
24	12	2135.82	3629	0.1	0.29	6
24	12	3051.19	5184	0.12	0.51	5

(1) Basic unit

(2) Basic unit with secondary silencer TX

Quick sizing table for sound pressure levels

The quick sizing tables include common sound insulation and attenuation values. If the sound pressure level is above the permissible value, a larger air terminal unit and/or a silencer or acoustic cladding are required. For more information on the acoustic data, see Basic Information and Nomenclature.

Quick sizing table for air-regenerated noise L_{PA}

Controller including silencer variants

B	H	q _v [cfm]	q _v [m³/h]	0.6 in. w.g.		2.01 in. w.g.	
			qv [m³/h]	(1) without silencer	(2) with silencer	(1) without silencer	(2) with silencer
8	4	36.02	58	30	15	40	22
8	4	135.61	231	40	25	50	32
8	4	237.31	404	45	30	52	35
8	4	339.02	576	45	n.V.	55	40
12	4	52.97	87	25	10	35	17
12	4	203.41	346	37	22	47	32
12	4	355.97	605	42	30	52	35
12	4	508.53	864	45	n.V.	55	40
8	8	69.92	116	32	20	42	27
8	8	271.22	462	42	30	52	37
8	8	474.63	807	45	30	52	40
8	8	678.04	1152	45	32	55	40



B	H	q_v [cfm]	q_v [m³/h]	0.6 in. w.g.		2.01 in. w.g.	
			q_v [m³/h]	(1) without silencer	(2) with silencer	(1) without silencer	(2) with silencer
12	8	103.83	173	35	20	47	30
12	8	406.82	691	45	27	55	37
12	8	711.94	1210	45	27	57	40
12	8	1017.06	1728	45	30	57	40
16	8	137.73	231	30	17	42	27
16	8	542.43	922	37	25	50	35
16	8	949.26	1613	40	25	50	37
16	8	1356.08	2304	40	30	52	37
20	8	169.51	288	32	15	45	25
20	8	678.04	1152	40	25	50	35
20	8	1186.57	2016	42	25	52	35
20	8	1695.1	2880	42	30	55	37
24	8	205.53	346	32	17	45	27
24	8	813.65	1383	37	25	50	35
24	8	1423.89	2420	40	25	50	35
24	8	2034.12	3456	40	30	52	37
12	12	154.68	260	35	17	47	27
12	12	610.24	1038	40	22	52	32
12	12	1068.92	1815	40	25	52	35
12	12	1525.59	2592	40	30	52	35
16	12	205.53	346	40	20	52	32
16	12	813.65	1383	40	20	50	35
16	12	1423.89	2420	40	25	52	35
16	12	2034.12	3456	40	30	52	35
20	12	254.27	432	35	15	50	30
20	12	1017.06	1728	37	20	50	32
20	12	1779.86	3024	37	25	50	32
20	12	2542.66	4320	37	30	50	35
24	12	307.24	519	40	20	52	32
24	12	1222.60	2074	40	22	52	35
24	12	2135.82	3629	40	25	52	35
24	12	3051.19	5184	40	30	52	35

(1) Basic unit

(2) Basic unit with secondary silencer TX

n.a.: Specified static differential pressure Δp_{st} is smaller than minimum differential pressure Δp_{stmin} .Quick sizing table for casing-radiated noise L_{PA}

B	H	q_v [cfm]	q_v [m³/h]	0.6 in. w.g. dB(A)		2.01 in. w.g. dB(A)	
				(1) without acoustic cladding	(2) with acoustic cladding	(1) without acoustic cladding	(2) with acoustic cladding
8	4	36.02	58	5	<5	20	15
8	4	135.61	231	15	7	30	22
8	4	237.31	404	20	10	32	25
8	4	339.02	576	20	12	35	27
12	4	52.97	87	7	<5	20	17
12	4	203.41	346	17	10	30	25



B	H	q _v [l/s]	q _v [m³/h]	0.6 in. w.g. dB(A)		2.01 in. w.g. dB(A)	
				(1) without acoustic cladding	(2) with acoustic cladding	(1) without acoustic cladding	(2) with acoustic cladding
12	4	355.97	605	20	12	35	27
12	4	508.53	864	22	15	35	30
8	8	69.92	116	7	<5	20	17
8	8	271.22	462	17	10	30	25
8	8	474.63	807	20	12	35	27
8	8	678.04	1152	22	15	35	30
12	8	103.83	173	10	<5	22	20
12	8	406.82	691	17	12	30	25
12	8	711.94	1210	22	15	35	27
12	8	1017.06	1728	25	17	37	32
16	8	137.73	231	10	<5	22	20
16	8	542.43	922	20	12	32	27
16	8	949.26	1613	22	15	35	30
16	8	1356.08	2304	25	17	37	32
20	8	169.51	288	10	<5	22	20
20	8	678.04	1152	20	12	32	27
20	8	1186.57	2016	25	15	37	32
20	8	1695.1	2880	25	17	40	35
24	8	205.53	346	10	<5	25	20
24	8	813.65	1383	20	12	32	27
24	8	1423.89	2420	25	15	37	32
24	8	2034.12	3456	25	17	40	35
12	12	154.68	260	10	<5	25	22
12	12	610.24	1038	20	12	35	27
12	12	1068.92	1815	25	15	37	32
12	12	1525.59	2592	25	17	40	35
16	12	205.53	346	10	<5	25	22
16	12	813.65	1383	20	12	35	27
16	12	1423.89	2420	25	15	37	32
16	12	2034.12	3456	25	17	40	35
20	12	245.27	432	10	<5	25	22
20	12	1017.06	1728	20	12	35	27
20	12	1779.86	3024	25	15	37	32
20	12	2542.66	4320	25	17	40	35
24	12	307.24	519	10	<5	25	22
24	12	1222.6	2074	20	12	35	27
24	12	2135.82	3629	25	20	37	35
24	12	3051.19	5184	27	22	40	37

Casing-radiated noise L_{PA} [dB(A)] at static differential pressure Δ_{pst} 0.6 in. w.g. or 2.01 in. w.g.

1 Basic device

2 Basic device with acoustic cladding

Note:

Information on casing-radiated noise for combinations of basic device and optional acoustic cladding and secondary silencer can be determined using the Easy Product Finder design programme.

Specification text

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Specification text

VAV terminal units in rectangular design for variable and constant volume flow systems, for supply air or extract air, in several nominal sizes. High control accuracy of set volume flow rates, even in unfavourable upstream conditions. Control range at least 1:10. Differential pressure measurement and control via damper blade. Tubeless differential pressure transmission through differential pressure duct in shaft Ready-to-commission unit which consists of the mechanical parts and the factory mounted electronic control component. Position of the damper blade indicated on the outside of the control component. Damper blade open on delivery, thus ensuring airflow even without control function, fulfils the hygiene requirements according to EN 16798 Part 3, VDI 3803 Sheet 1, VDI 6022 Sheet 1, DIN 1946, Part 4

Special characteristics

- High differential pressure signal with small angle of attack
- Factory set-up or programming and aerodynamic function testing
- Volume flow rate can be measured and subsequently adjusted. Additional adjustment tool may be required (depending on the variant of the control component)
- Tubeless differential pressure measurement via damper blade
- Differential pressure transmission through differential pressure duct in axis
- Any airflow direction if dynamic transducer is used
- Any installation orientation also with static transducer
- Suitable for air velocities from 157.48 - 1574.8 fpm
- Compact dimensions for use in confined ceiling areas

Materials and surfaces

- Casing and damper blade made of galvanised sheet steel
- Shaft made of PA6, UL94-V0 ($H \leq 200$) or aluminium ($H > 200$)
- Closed-cell damper blade seal made of EPDM
- Bearings made of plastic

Equivalence criteria

- Declaration of Hygiene Conformity in accordance with VDI 6022, part 1 (01/2018), ÖNORM H 6020 (03/2015) and ÖNORM H 6021 (08/2016)
- Meets the hygiene requirements according to EN 16798 Part 3, VDI 6022 Sheet 1, DIN 1946 Part 4
- Acoustic data determined in accordance with ÖNORM EN ISO 5135
- Independent of airflow direction - airflow in both directions
- Suitable for airflow velocities of 157.48 - 1574.8 fpm
- No upstream section required (even after a T-piece)

- Maximum control deviation of 5 % at q_{vmax} without upstream section
- Setting the volume flow without adjustment device via V_{min} and V_{max} potentiometer
- Electrical connections with screw terminals, no additional terminal boxes required
- A test report documenting factory parameterisation, functional testing and adjustment under airflow, based on reference measurements on a regularly validated test rig in accordance with DIN EN ISO 9001, is provided.

Connection type

- Flanges on both ends, suitable for duct connections

Technical data

- Minimum differential pressure: up to 0.2 in. w.g. (without secondary silencer)

Maximum differential pressure

- Control component with dynamic transducer: 3.61 in. w.g.
- Control component with static transducer: 2.41 in. w.g.

Leakage airflow with closed damper blade according to EN 1751, class 2 or 3 depending on nominal size.

- Casing air leakage according to EN1751: class ATC3

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.

- 24 V AC/DC supply voltage
- 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 so that commissioning and subsequent adjustment are simplified
- Volume flow rate control range: approx. 10 – 100% of the nominal volume flow rate
- Visible indicator light for signalling the various operating conditions
- Electrical connections with screw terminals.
- Double screw terminals for looping the supply voltage, i.e. for simple connection of voltage transmission to the next controller.

Life cycle assessment

A life cycle assessment is available for the product type in the form of an environmental product declaration (EPD), which has been checked and published by a programme holder.



Order code

Order code for volume flow control (with Easy controller)

TVE-Q – D / 12 × 8 / Easy
1 2 4 5

1 Type

TVE-Q VAV terminal unit

2 Acoustic cladding

No entry: without acoustic cladding

D with acoustic cladding

4 Nominal size [in.]

Specify width × height

5 Attachments (control component)

Easy Volume flow controller, dynamic, analogue interface, setting of q_{vmin} and q_{vmax} with potentiometers, provided by the client

Order example: TVE-Q-D/12×8/Easy

Type

TVE-Q - VAV terminal unit

Acoustic cladding

with acoustic cladding

Nominal size [in.]

Width 12, height 8

Attachments (control component)

Volume flow controller, dynamic, analogue interface, setting q_{vmin} and q_{vmax} with potentiometers, provided by the client

Order code for volume flow control (with VARYCONTROL attachment)

TVE-Q – D – P1 / 12 × 8 / XB0 / V 0 / 117.72 – 529.72 [cfm]

1 Type

TVE-Q VAV terminal unit

2 Acoustic cladding

No entry: without acoustic cladding

D With acoustic cladding

3 Material

No entry: galvanised sheet steel

P1 Air duct powder-coated RAL 7001 (silver grey)

4 Nominal size [in.]

Specify width × height

5 Attachment (control component)

XB0 Dynamic volume flow controller, analogue interface

XM0 Dynamic volume flow controller with display, interface Modbus RTU or analogue

XM0-J6 Dynamic volume flow controller with display, Modbus RTU interface, RJ12 socket (for X-AIRCONTROL)

XDMB0 Dynamic volume flow controller with display, Modbus RTU or BACnet MS/TP or analogue interface

XSMB0 Static volume flow controller with display, Modbus RTU or BACnet MS/TP or analogue interface

XSMB0-J6 Static volume flow controller with display, Modbus

RTU interface, RJ12 socket (for X-AIRCONTROL)

6 Operating mode

For attachments XB0, XM0, XDMB0, XSMB0

F Fixed value operation, one setpoint (no external switch contact)

V Variable operation (setpoint specification via analogue signal)

For attachments XM0, XM0-J6, XDMB0, XSMB0, XSMB0-J6

M Modbus RTU interface (setpoint specification via Modbus register)

For attachments XDMB0, XSMB0

B BACnet-MS/TP interface (setpoint specification via BACnetObject)

7 Signal voltage range

Only with operating mode F or V

0 0 – 10 V DC

2 2 – 10 V DC

8 Operating values for factory setting

Volume flow rate [cfm or l/s]

q_{vconst} (for operating mode F)

$q_{vmin} - q_{vmax}$ (for operating mode V, M, B)

Order example: TVE-Q-D-P1/20×8/XB0/V0/500.29-1294.87 [cfm]

Type	TVE-Q - VAV terminal unit
Acoustic cladding	with acoustic cladding
Material	Duct powder-coated RAL 7001 (silver grey)
Nominal size [in.]	Width 20, height 8
Attachment (control component)	Volume flow controller, dynamic, analogue interface
Operating type	Variable operation
Signal voltage range	0 – 10 V DC
Operating values for factory setting	500.29-1294.87 [cfm]

Order example: TVE-Q-D-P1/12×8/XM0/M/353.15-824.01 [cfm]

Type	TVE-Q - VAV terminal unit
Acoustic cladding	with acoustic cladding
Material	Duct powder-coated RAL 7001 (silver grey)
Nominal size [in.]	Width 12, height 8
Attachment (control component)	Volume flow controller, dynamic, analogue interface and Modbus RTU, display
Operating type	Variable operation
Bus interface	Modbus RTU
Operating values for factory setting	353.15-824.01 [cfm]

Variants

VAV terminal unit variant TVE-Q (standard, galvanised steel)



Materials

Standard construction

Order code detail	Part	Material
-	Casing	Galvanised steel
	Damper blade	EPDM, closed cell
	Damper blade seal	Aluminium
	Differential pressure sensor	up to H ≤ 8: PA6
	Axis (drive side)	from H > 8: aluminium
	Bearing bush (drive side)	PBT
	Axis (non-drive side)	Steel (free cutting steel)
	Bearing bush (non-drive side)	TPU
	Sealing plug	EPDM, solid material
	Sealing ring	EVA
	Fixing (screws, rivets)	Galvanised steel, stainless steel, aluminium

VAV control unit variant TVE-Q-P1 (powder-coated)



Control component for type TVE

Materials

Powder-coated construction

Order code detail	Part	Material
P1	Casing	Galvanised steel with powder coating, RAL
	Damper blade	7001, silver-grey
	Damper blade seal	EPDM, closed cell
	Differential pressure sensor	Aluminium
	Axis (drive side)	up to H ≤ 8: PA6 from
		H > 8: aluminium PBT
	Bearing bush (drive side)	Stainless steel
	Shaft (non-drive side)	TPU
	Bearing bush (non-drive side)	EPDM, solid material EVA
	Sealing plug	Stainless steel, aluminium
	Sealing ring	
	Fixing (screws, rivets)	

VAV terminal unit, variant TVE-Q-D

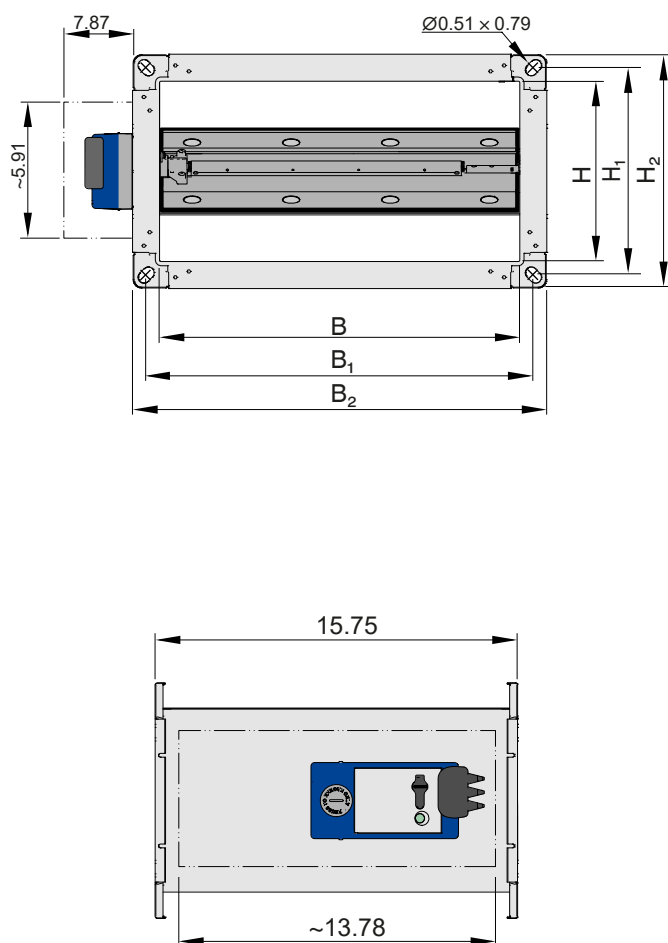


Option Dämmschale

Order code detail	Component	Material
D	Lining	Mineral wool to EN 13501, building material class A1, non-combustible
	Acoustic cladding	Galvanised sheet steel

Dimensions and weight

Control unit (TVE-Q)

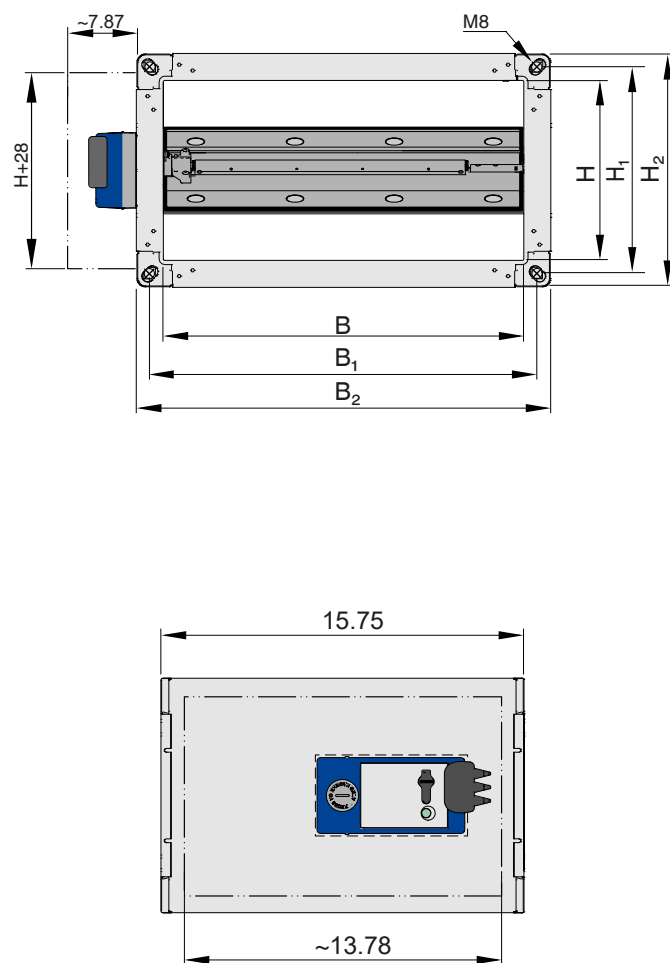


Dimensions and weights [lbs] for TVE-Q

NS	B	H	B ₁	B ₂	H ₁	H ₂	lbs
8 × 4	7.87	3.94	9.06	10.24	5.12	6.3	7.28
12 × 4	11.81	3.94	12.99	14.17	5.12	6.3	9.04
8 × 8	7.87	7.87	9.06	10.24	9.06	10.24	9.26
12 × 8	11.81	7.87	12.99	14.17	9.06	10.24	11.46
16 × 8	15.75	7.87	16.93	18.11	9.06	10.24	13.45
20 × 8	19.69	7.87	20.87	22.05	9.06	10.24	16.76
24 × 8	23.62	7.87	24.8	25.98	9.06	10.24	18.3
12 × 12	11.81	11.81	12.9	14.17	12.99	14.17	18.3
16 × 12	15.75	11.81	16.93	18.11	12.99	14.17	20.28
20 × 12	19.69	11.81	20.87	22.05	12.99	14.17	24.25
24 × 12	23.62	11.81	24.8	25.98	12.99	14.17	27.12

Note: Weights including electronic control component

Terminal unit (TVE-Q-D)

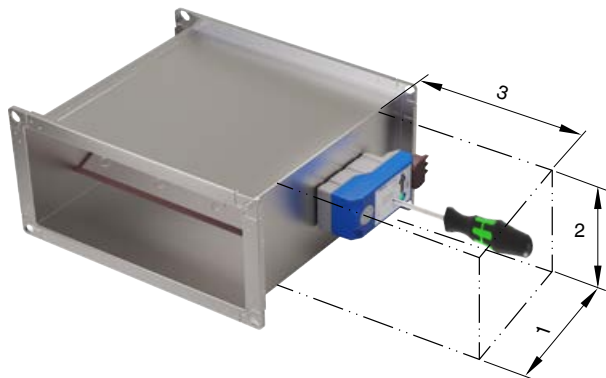


Dimensions and weights [lbs] for TVE-Q-D

NS	B	H	B1	B2	H1	H2	lbs
8 × 4	7.87	3.94	9.06	10.24	5.12	6.3	13.67
12 × 4	11.81	3.94	12.99	14.17	5.12	6.3	17.86
8 × 8	7.87	7.87	9.06	10.24	9.06	10.24	18.3
12 × 8	11.81	7.87	12.99	14.17	9.06	10.24	21.83
16 × 8	15.75	7.87	16.93	18.11	9.06	10.24	25.35
20 × 8	19.69	7.87	20.87	22.05	9.06	10.24	30.42
24 × 8	23.62	7.87	24.8	25.98	9.06	10.24	34.39
12 × 12	11.81	11.81	12.99	14.17	12.99	14.17	31.75
16 × 12	15.75	11.81	16.93	18.11	12.99	14.17	34.17
20 × 12	19.69	11.81	20.87	22.05	12.99	14.17	38.58
24 × 12	23.62	11.81	24.8	25.98	12.99	14.17	41.89

Note: Weights including electronic control component

Access to control components, mounted on one side



Space required for single-sided installation

Attachment	(1)	(2)	(3)
Easy controller: Easy	9.84	7.87	11.81
Compact controller: XB0, XM0, XM0-J6, XDMB0, XSMB0, XSMB0-J6	9.84	7.87	11.81

Space required for commissioning and maintenance

For commissioning and maintenance, sufficient space must be kept clear near attachments. It may be necessary to provide sufficiently sized inspection openings to make sure the attachments are easily accessible.

Note:

For the TVE-Q variant with acoustic cladding, a screw accessibility (2) of approx. 9.06 in. is recommended.

Product details

Installation and commissioning

- Largely independent of installation orientation
- When designing air duct connections, such as branches from a main duct, DIN EN 1505 must be observed.
- TVE-Q-D: for variants with acoustic cladding, the room-side air ducts must be insulated by the customer up to the acoustic cladding of the device.
- For safety reasons, the control component performs a reference run to the damper open position at start-up and after the use of service tools.

For further information, refer to the "Commissioning and operation" chapter in the installation and operating manual.

Upstream conditions

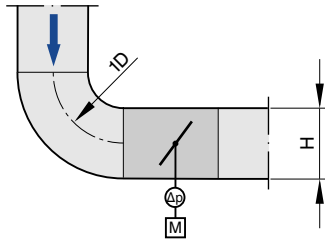
The differential pressure determining the volume flow rate is measured at the damper blade and averaged. Therefore, the volume flow rate accuracy Δq_v is independent from the upstream length. However, for branches from the main duct, it depends on the installation variant of the air terminal unit in the branch duct.

Note on airflow entering via an open air duct (extract air mode)

Airflow entering at the open end of an air duct causes strong turbulence and also affects the volume flow rate accuracy. In this case, an upstream section or a flow straightener is required.

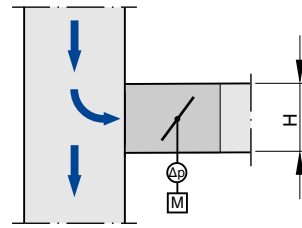
For further information on this specific installation situation, see the installation and operating manual.

Bend, vertical



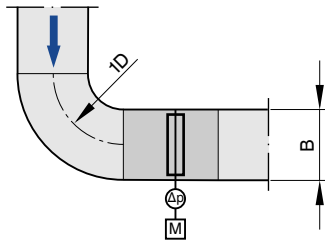
A bend without additional straight upstream flow length in front of the VAV control unit has no significant influence on the volume flow rate accuracy Δq_v .

Junction, vertical



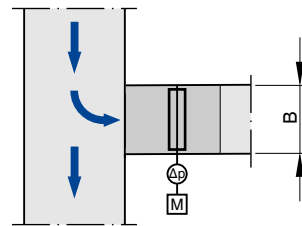
A junction from main duct causes strong turbulence. The specified volume flow rate accuracy Δq_v can be achieved for installation variants 1 and 2 without an upstream section. For installation variants 3 and 4, the specified volume flow rate accuracy Δq_v can also be achieved without an upstream section if the installation position of the control unit is adapted to the air direction in the main duct.

Bend, horizontal



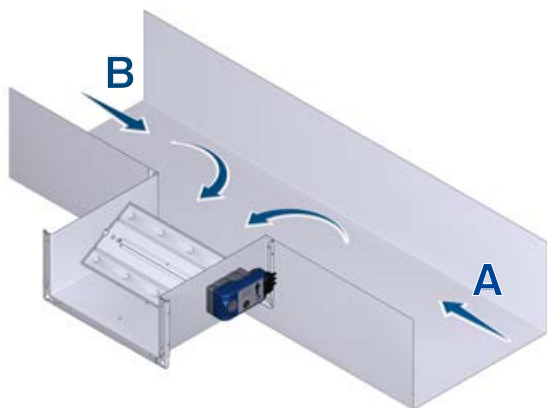
A bend without additional straight upstream flow length in front of the VAV control unit has no significant influence on the volume flow rate accuracy Δq_v .

Junction, horizontal



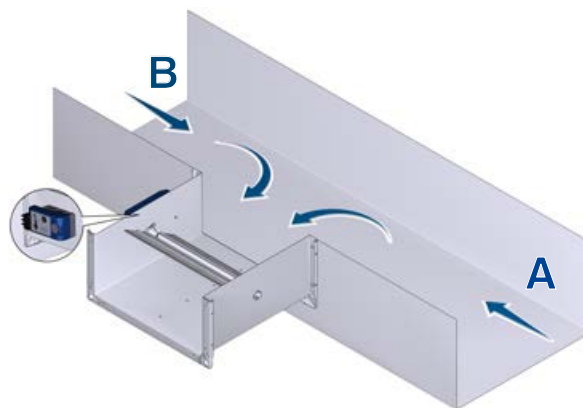
A junction from main duct causes strong turbulence. The specified volume flow rate accuracy Δq_v can be achieved for installation variants 1 and 2 without an upstream section. For installation variants 3 and 4, the specified volume flow rate accuracy Δq_v can also be achieved without an upstream section if the installation position of the control unit is adapted to the air direction in the main duct.

Junction from main duct: Installation variant 1



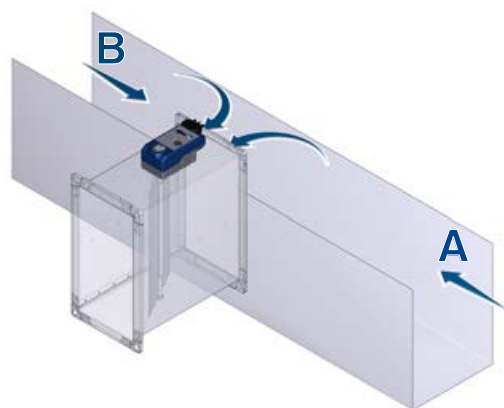
Airflow direction A or B have no significant influence on Δq_v .

Junction from main duct: Installation variant 2



Airflow direction A or B have no significant influence on Δq_v .

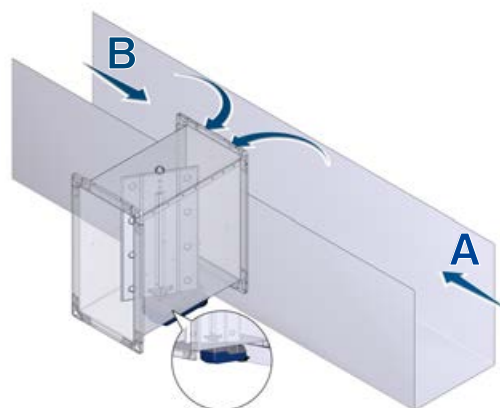
Junction from main duct: Installation variant 3



For airflow direction A in the main duct: specified volume flow rate accuracy Δq_v achievable.

For airflow direction B in the main duct: for the specified volume flow rate accuracy Δq_v a surcharge of 10 % must be taken into account in the upper third of the nominal volume flow range.

Junction from main duct: Installation variant 4



For airflow direction A in the main duct: for the specified volume flow rate accuracy Δq_v a surcharge of 10 % must be taken into account in the upper third of the nominal volume flow range.

For airflow direction B in the main duct: specified volume flow rate accuracy Δq_v achievable.

TVE-Q control components VARYCONTROL

Attachment	Controlled variable	Interface	Effective pressure transducer	Actuator	Manufacturer
Easy controller, dynamic					
Easy	q_v	0 – 10 V	integrated	slow-acting integrated	(1)
Compact controller, dynamic					
XB0	q_v	0 – 10 V or 2 – 10 V	integrated	slow-acting integrated	(1)
XM0	q_v	0 - 10 V or 2 - 10 V or Modbus RTU	integrated	slow-acting integrated	(1)
XM0-J6	q_v	Modbus RTU interface with RJ12 socket (for X-AIRCONTROL)	integrated	slow-acting integrated	1
XDMB0	q_v	0 - 10 V or 2 - 10 V or Modbus RTU or BACnet MS/TP	integrated	slow-acting integrated	(1)
Compact controller, static					
XSMB0	q_v	0 – 10 V or 2 – 10 V or Modbus RTU or BACnet MS/TP	integrated	slow-running, integrated	(1)
XSMB0	q_v	0 – 10 V or 2 – 10 V or Modbus RTU or BACnet MS/TP	integrated	slow-running, integrated	(1)

q_v Volume flow

1 TROX

Nomenclature

Dimensions of rectangular units

B [in.]

Duct width

B₁ [in.]

Screw hole pitch of air duct profile (horizontal)

B₂ [in.]

Overall dimension of air duct profile (width)

H [in.]

Duct height

H₁ [in.]

Screw hole pitch of air duct profile (vertical)

H₂ [in.]

Overall dimension of air duct profile (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

ØD₁ [in.]

Pitch circle diameter of flanges

ØD₂ [in.]

Outer diameter of flanges

L [in.]

Length of unit including connecting spigot

L₁ [in.]

Length of casing or acoustic cladding

n []

Number of flange screw holes

T [in.]

Flange thickness

General information

m [lbs]

Unit weight including the minimum required attachments (control component)

NS [in.]

Nominal size

f_m [Hz]

Octave band centre frequency

L_{PA} [dB(A)]

Sound pressure level of air-regenerated noise of the VAV terminal unit, A-weighted system attenuation taken into account

L_{PA1} [dB(A)]

Sound pressure level of air-regenerated noise of the VAV terminal unit with secondary silencer, A-weighted system attenuation taken into account

L_{PA2} [dB(A)]

Sound pressure level of case-radiated noise of the VAV terminal unit, A-weighted system attenuation taken into account

L_{PA3} [dB(A)]

Sound pressure level of case-radiated noise of the VAV terminal unit with acoustic cladding, A-weighted system attenuation taken into account

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

q_{vNom} [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} [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} [cfm]

Adjustable by others at 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} [cfm]

Adjustable by others at lower limit of the operating range for the VAV terminal unit: q_{vmin} should be set to less than or equal to q_{vmax}. q_{vmin} 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 [cfm]

Volume flow rate

Δ_{qv} [%]

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

Δp_{st} [in w.g.]

Static differential pressure

Δp_{stmin} [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 VAV terminal unit 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-acting
- 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.