



Set flow rates

Control components for VAV terminal units

Easy



VAV terminal unit type TVR with an Easy controller



VAV terminal unit type TVE with an Easy controller

For easy adjustment

Control components for VAV terminal units for easy operation directly on the terminal unit



Easy controller for TVE-Q series



Easy controller for types TVJ / TVT

- Controller, dynamic differential pressure transducer and actuator in one casing
- Use in ventilation and air conditioning systems, only with clean air
- Simplified ordering and on site assignment to rooms as selection is based on the nominal size of the duct
- Simple volume flow rate setting without additional adjustment device
- Indicator light simplifies functional check
- With push button for triggering a function test
- Proven technology of the Compact volume flow controllers
- Suitable for constant and variable volume flow rates as well as q_{vmin} - q_{vmax} switching

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General information

Application

- All-in-one control device for VAV terminal units
- Dynamic differential pressure transducer, control electronics and actuator combined in a single casing
- For clean air in ventilation and air conditioning systems
 - The standard filtration enables use in the supply air without additional dust protection measures
 - Application examples: Offices and classrooms
- In the event of a strong occurrence of dust, install appropriate extract air filters upstream, as a partial volume flow is routed through the transducer for volume flow rate measurement.
- If the air is heavily contaminated with dust, fluff, sticky, moist components, an attachment with a static differential pressure transducer must be used depending on the terminal unit type, e.g. XD0 or XS0
 - Application examples: Extract air from changing rooms and shower areas, hospital bedrooms
- Various control options based on setpoint value default setting
- Room temperature controllers, building automation and control systems, air quality controllers and others control the variable volume flow control by specifying setpoint values via an analogue signal
- Override control for activating q_{vmin} , q_{vmax} , shut-off or OPEN position can be set with a switch or relay
- The volume flow rate actual value is available as a linear voltage signal

If air is contaminated with dust, lint, sticky, moist or slightly aggressive particles:

- do not use an Easy controller

Construction

- LMV-D3AL-F TR for LVC
- TR0VE-024T-10I-DD15 for TVE, TVE-Q
- LMV-D3A-F TR for TVR
- LMV-D3A TR for TZ-Silenzio, TA-Silenzio, TVZ, TVA

- 327V-024T-15-004 for TVJ, TVT up to and including 39.37×19.69
- SMV-D3A TR for TVT from 39.37×23.62

Parts and characteristics

- Transducer based on dynamic measuring principle can only be used with clean air since a partial volume flow is passed through the transducer
- Mechanical stops for limiting the damper blade positions (not for TVE and TVE-Q)
- Actuators with overload protection
- Transparent protective cap or terminal cover (depending on version)

Interface

- Analogue signal 0 – 10 V DC

Control strategy

- The volume flow controller works independent of the duct pressure
- Differential pressure fluctuations do not result in permanent volume flow rate changes
- To prevent the control from becoming unstable, a dead band is allowed within which the damper blade does not move
- Volume flow parameters can be easily changed by the customer

Operating modes

- Operating mode variable volume flow rate, q_{vmin} : minimum volume flow rate, q_{vmax} : maximum volume flow rate
- Operating mode Constant value, q_{vmin} : Constant volume flow rate, q_{vmax} : 100 %

Commissioning

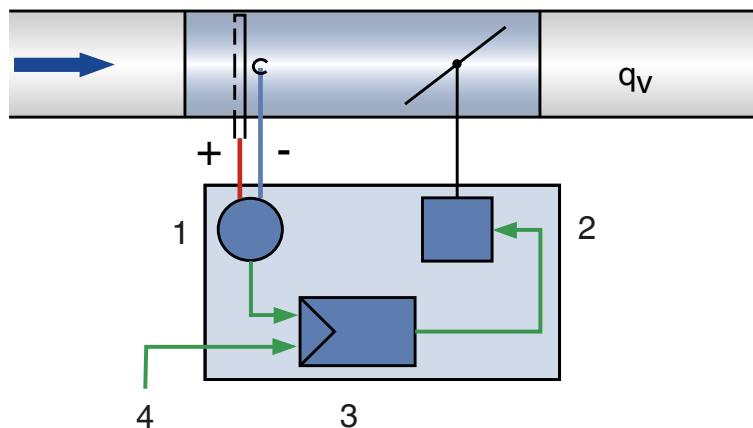
- Operating values q_{vmin} , q_{vmax} to be set on site with potentiometer on the outside of the housing without additional adjustment tools

Function

Air terminal units control the volume flow in a closed loop, which means: measurement – comparison – adjustment.
The volume flow rate is obtained by measuring a differential pressure. This is done with a differential pressure sensor. The integrated differential pressure transducer converts the differential pressure into a voltage signal. The actual volume flow rate is available as a voltage signal. The factory setting is such that 10 V DC always corresponds to the nominal flow rate (q_{vNom}). The volume flow setpoint is specified by a higher-level controller (e.g. room temperature controller, air quality controller, building

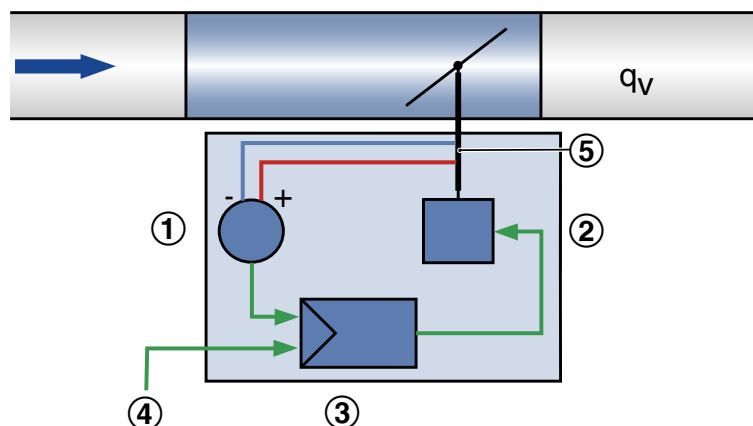
management system) or by switching contacts. Variable volume flow control can be set between q_{vmin} and q_{vmax} . It is possible to override the room temperature control by forced switching, e.g. for a shut-off.
The controller compares the volume flow setpoint with the current actual value and adjusts the internal actuator according to the control deviation.
Volume flow parameter q_{vmin} and q_{vmax} can be set on potentiometers.

Principle of operation – LVC, TVR, TZ-Silenzio, TA-Silenzio, TVZ, TVA, TVJ, TVT



- 1 Differential pressure transducer
- 2 Actuator
- 3 Volume flow controller
- 4 Setpoint value signal

Functional principle of the TVE and TVE-Q control unit series



- 1 Differential pressure transducer
- 2 Actuator
- 3 Volume flow controller
- 4 Setpoint value signal
- 5 Shaft with effective pressure channel

Specification text

This specification text describes the general properties of the product.

Category

Easy controller for volume flow with potentiometer setting for

q_{vmin} , q_{vmax}

Application

- Control of a constant or variable volume flow rate setpoint
- Electronic controller for applying a reference value and capturing an actual value signal
- The actual value signal relates to the nominal volume flow rate so that commissioning and subsequent adjustment are simplified
- Stand-alone operation or integration with a central BMS

Area of application

- Dynamic transducer for clean air in ventilation and air conditioning systems

Actuator

- Integral; slow running (run time 100–270 s for 90°)

Installation orientation

- Either direction

Connection

- Double terminal for supply voltage to connect up to 3 controllers
- No terminal box required.

Supply voltage

- 24 V AC/DC

Interface/signalling

- Analogue signal 0 – 10 V DC

Interface information

- Volume flow setpoint; actual volume flow rate
- The actual value signal relates to the nominal volume flow rate so that commissioning and subsequent adjustment are simplified

Special functions

- Clearly visible external indicator light for signalling the functions: Set, not set, and power failure
- Activation of V_{min} , V_{max} , closed, open by external switch contacts/circuitry

Parameter setting

- Specific parameters for VAV terminal unit are factory-set
- Operating values q_{vmin} , q_{vmax} to be set on site with potentiometer on the outside of the housing without additional adjustment tools

Factory condition

- Functional test under air using reference measurement on a regularly validated test bench in accordance with EN ISO 9001 to check the function and control accuracy of the complete volume flow controller
- Adjustment of the device-specific parameters under air by reference measurement on a regularly validated test bench in accordance with EN ISO 9001
- The test report of the factory parameterisation, functional test and adjustment must be made available after delivery of the volume flow controller

Equivalence criteria

- Setting the volume flow rates without an adjustment device using V_{min} and V_{max} potentiometer
- Electrical connections with screw terminals, no additional terminal boxes required
- The test report of the factory parameterisation, functional test and adjustment under air by reference measurement on a regularly validated test bench in accordance with EN ISO 9001 is made available



Order code

Control component Easy (in combination with TVR as an example)

TVE – D / 8 / D2 / Easy

1 2 5 6 7

1 Type

TVE VAV air terminal unit

2 Acoustic cladding

No entry: without acoustic cladding

D with acoustic cladding

5 Nominal size [in.]

4, 5, 6, 8, 10, 12, 16

6 Accessories

No entry: without accessories

D2 Lip seals on both ends

G2 Matching flanges both ends

7 Attachment (control component)

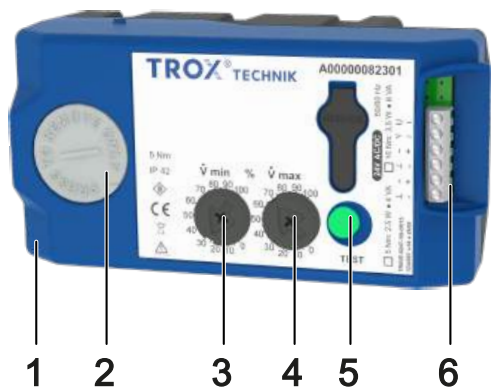
Easy Volume flow controller, dynamic, analogue interface, setting q_{vmin} and q_{vmax} on site with potentiometers

Order example: TVE-D/8/D2/Easy

Type	TVE: VAV terminal unit
Acoustic cladding	with acoustic cladding
Nominal size [in.]	8
Accessories	Double lip seal both ends
Attachments (control component)	Volume flow controller, dynamic, analogue interface, setting q_{vmin} and q_{vmax} on site with potentiometers

Variants

Easy controller type 1 (only TVE, TVE-Q)



Easy controller type 1 (only TVE, TVE-Q)



- 1: Easy controller
- 2: Release button and damper blade position indicator
- 3: $\dot{q}_{vmin}$ -Potentiometer
- 4: $\dot{q}_{vmax}$ -Potentiometer
- 5: Push-button for the test function with LED for displaying the operating states
- 6: Terminals

- 1: Terminal cover (part of the supply package)

Easy controller type 2 with positive locking



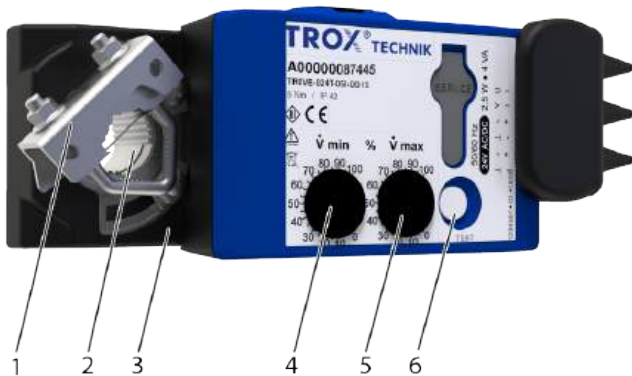
- 1: Connections for pressure transducer
- 2: Easy controller
- 3: Axle connection with positive locking
- 4: LED for indicating operating states
- 5: Button for test function
- 6: Terminals

Easy controller type 2 with clamping device



- 1: q_{vmin} -Potentiometer
- 2: q_{vmax} -Potentiometer
- 3: Axle connection with clamping device

Easy controller type 2 (TVJ, TVT*)



* up to and including 39.37 × 19.69

- 1: Clamping device
- 2: Axle connection
- 3: Easy controller
- 4: q_{vmin} -Potentiometer
- 5: q_{vmax} -Potentiometer
- 6: Push-button for the test function

Technical data

Easy controllers for VAV terminal units

Part number	Type	VAV terminal units
M466EU1	LMV-D3AL-F TR (type 2)	LVC
A00000082301	TR0VE-024T-10I-DD15 (type 1)	TVE, TVE-Q
M466ES1	LMV-D3A-F TR (type 2)	TVR
M466ES2	LMV-D3A TR (type 2)	TZ-Silenzio, TA-Silenzio, TVZ, TVA
A00000087445	327V-024T-15-004 (type 3)	TVJ (all dimensions) TVT (up to and including 39.37 × 19.69)
M466ES3	SMV-D3A TR (type 2)	TVT from 39.37 × 23.62

Easy controller LMV-D3AL-F



Easy controller LMV-D3AL-F TR for VAV terminal unit LVC

Type of measurement/installation orientation	Dynamic measurements, any installation orientation
Supply voltage (AC)	24 V AC ± 20%, 50/60 Hz
Supply voltage (DC)	24 V DC -10/+20 %
Power rating (AC)	3.5 VA max.
Power rating (DC)	2 W max.
Run time for 90°	120 – 150 s
Setpoint value signal input	0 – 10 V DC, Ra > 100 kΩ
Actual value signal output	0 – 10 V DC, 0.5 mA max.
IEC protection class	III (protective extra-low voltage)
Protection level	IP 20
EC conformity	EMC to 2014/30/EU, low voltage to 2014/35/EU

Easy controller TR0VE-024T-10I-DD15 for VAV terminal units TVE and TVE-Q



Easy controller TR0VE-024T-10I-DD15 for VAV terminal unit TVE and TVE-Q

Type of measurement/installation orientation	Dynamic measurements, any installation orientation
Supply voltage (AC)	24 V AC $\pm$ 20%, 50/60 Hz
Supply voltage (DC)	24 V DC $\pm$ 20 %
Connected load	Rating TVE DN 100 - 160: 4 VA TVE DN 200 - 400: 6 VA TVE-Q up to height 200: 4 W TVE-Q up to height 300: 6 W Power consumption (during operation) TVE DN 100 - 160: 2.5 W TVE DN 200 - 400: 3.5 W TVE-Q up to height 200: 2.5 W TVE-Q up to height 300: 3.5 W Power consumption (during idle state) 1 W
Run time for 90°	100 s
Setpoint value signal input	0 – 10 V DC, $R_a > 100 \text{ k}\Omega$
Actual value signal output	0 – 10 V DC, 5 mA max.
IEC protection class	III (protective extra-low voltage)
Protection level	IP 42 (with the terminal cover attached)
EC conformity	EMC to 2014/30/EU

Easy controller LMV-D3A TR for VAV terminal units TZ-Silenzio, TA-Silenzio, TVZ and TVA



Easy controller LMV-D3A-F TR for VAV terminal unit TVR



Easy controller

For VAV control units TVR, TZ-Silenzio, TA-Silenzio, TVZ, TVA

Type of measurement/installation orientation	Dynamic measurements, any installation orientation
Supply voltage (AC)	24 V AC $\pm$ 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC -10/+20 %
Power rating (AC)	5 VA max.
Power rating (DC)	2.5 W max.
Run time for 90°	110 – 150 s
Setpoint value signal input	0 – 10 V DC, $R_a > 100 \text{ k}\Omega$
Actual value signal output	0 – 10 V DC, 0.5 mA max.
IEC protection class	III (protective extra-low voltage)
Protection level	IP 20
EC conformity	EMC to 2014/30/EU

Easy controller 327V-024T-15-004 for VAV terminal unit TVJ (all dimensions), TVT (up to 1000 x 500)



Easy controller 327V-024T-15-004 for VAV terminal units TVJ (all dimensions), TVT (up to 1000 x 500)

Type of measurement/installation orientation	Dynamic measurements, any installation orientation
Supply voltage (AC)	24 V AC $\pm$ 20%, 50/60 Hz
Supply voltage (DC)	24 V DC $\pm$ 20 %
Power rating (AC)	4 VA max.
Power rating (DC)	2 W max.
Run time for 90°	150 s
Signal input setpoint value	0 – 10 V DC, $R_a > 100 \text{ k}\Omega$
Signal output actual value	0 – 10 V DC, max. 5 mA
IEC protection class	III (Protective extra-low voltage)
Protection level	IP 42 (with the terminal cover attached)
EC conformity	EMC to 2014/30/EU

Easy controller SMV-D3A TR for VAV terminal unit TVT from NW 1000 x 600



Easy controller SMV-D3A TR for VAV terminal unit TVT from NW 1000 x 600

Type of measurement/installation orientation	Dynamic measurements, any installation orientation
Supply voltage (AC)	24 V AC $\pm$ 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC -10/+20 %
Power rating (AC)	6 VA max.
Power rating (DC)	3 W max.
Run time for 90°	110 – 150 s
Setpoint value signal input	0 – 10 V DC, $R_a > 100 \text{ k}\Omega$
Actual value signal output	0 – 10 V DC, max. 0,5 mA
IEC protection class	III (protective extra-low voltage)
Protection level	IP 20
EC conformity	EMC to 2014/30/EU

Cut-out LED button



1 LED push button

Description of status LEDs and error messages regarding control components for terminal unit TVE, TVE-Q

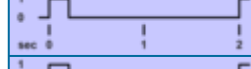
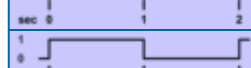
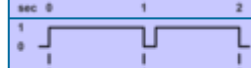
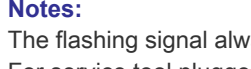
Triggering a test function for Easy attachment group

Pressing the LED push button for > 2 s starts a test run.

The control damper is moved from the current position to the open and closed position.

The volume flow controller then returns to control mode.

Description of status and error messages over LEDs and display

LED flashing signal	Status
	no power supply connected
	Service tool plugged in. On-site network connection deactivated. Forced controls from the service tool have priority
	Undervoltage detected. Supply voltage outside the tolerance range. Control function not guaranteed
	TROX service technicians provide information. Incomplete parameterisation was detected during power-on/reset *
	Drive overload detected (block) *
	Synchronisation drive after Power Up *
	Test mode enabled *
	Overpressure sensor (Overpressure) *
	Setpoint or forced control position not yet reached (display changes between e.g. Hi = high and actual value) *
	Forced control position reached (display changes between e.g. Hi = High and actual value) *
	Offset: Is signalled as long as the drive does not rotate to readjust the setpoint value *

Notes:

The flashing signal always describes a 2-second interval. 1 = LED lights up, 0 = LED does not light up.

For service tool plugged in (display: Pc) and undervoltage detected (display: Lou), no special flashing signal appears on the LED button. Instead, one of the operating states marked with an asterisk (*) is displayed.

Explanation status and error messages via LED flashing signal for attachments with article number M466ES1, M466ES2, M466ES3, M466EU1

LED	Operating status
OFF	▪ No power ▪ Easy controller defect
ON	Flow rate setpoint value has been reached
Blinking slowly (0.5 Hz)	▪ Actual value ≠ setpoint value ▪ Controller is trying to achieve the setpoint or ▪ Test in progress ▪ Synchronisation in progress
Blinking rapidly (2.5 Hz)	Direction of rotation has been changed

Product details

Analogue interface (0-10 V DC)

With the Easy controller, the analogue interface for the signal voltage range is set to 0 - 10 V DC and cannot be changed. The assignment of volume flow setpoint or actual value to voltage signals is shown in the characteristics diagram. The signal voltage range applies equally to setpoint and actual value signals.

Setpoint value setting

For a variable air volume control range (e.g. control input signal by temperature controller or air quality controller), the setpoint value is set with an analogue signal at terminal Y or w.

The signal voltage range 0 - 10 V DC is matched to the volume flow rate range set on the control component $q_{vmin} - q_{vmax}$. No additional adjustment device is required to set the working range. The setting is made by the client at the potentiometers which are attached to the control component and which can be easily adjusted at a later date.

Set are q_{vmin} and q_{vmax} as a percentage value of the nominal flow rate of the terminal unit. Setting can also be read from the scale sticker located on the terminal unit.

For fixed-value operation (constant volume flow rate), no analogue signal is required at the Y or w terminal.

The value determined by the q_{vmin} -potentiometer is set by the fixed volume flow rate value.

Actual value as feedback for monitoring or tracking control

The actual volume flow rate measured by the controller can be captured as a voltage signal at terminal U

The signal voltage range 0 - 10 V DC is set to the volume flow rate range 0 - q_{vnom} of the air terminal unit.

Override control

For specific operating situations, the volume flow controller can be set to a special operating mode (override control).

Possible modes: Control q_{vmin} , control q_{vmax} , damper blade in open position (OPEN) or damper blade closed (CLOSED).

Override control by wiring at signal input Y or w

With suitable wiring at signal input Y, the override controls can be controlled according to the connection diagrams via wiring with external switch contacts/relays. OPEN and CLOSED are only available when the controller is supplied with alternating voltage (AC) is available.

The override control can thus also be used to implement a simple 2-point control with switching between two operating values, e.g. for day and night operation with different fixed volume flow values.

Override control CLOSED by control signal Y or w

The override control CLOSE can also be activated under certain conditions via the control signal Y or w (setpoint).

Prerequisite:

Potentiometer $q_{vmin} = 0$ and the setpoint signal falls below the shut-off level.

If the setpoint signal falls below the shut-off level, the damper blade is moved to the shut-off position

Shut-off level:

Easy controller for terminal unit types TVE and TVE-Q:

shut-off level = 0.3 V DC

Easy controller for all other terminal unit types:

shut-off level = 0.5 V DC

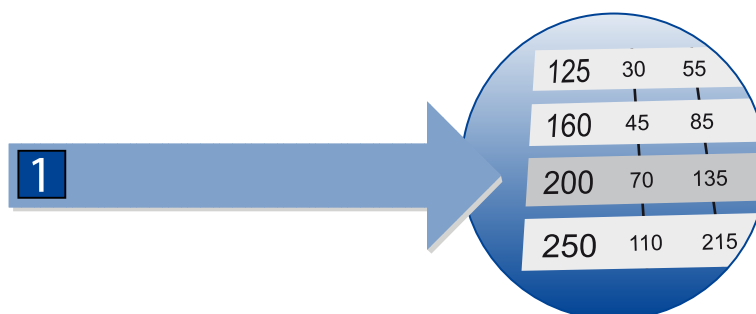
Note:

In practice, falling below the shut-off level of 0.3 V DC or 0.5 V DC cannot always be ensured, depending on the project environment. Therefore, an override control by means of wiring at signal input Y or w for the shut-off function is recommended.

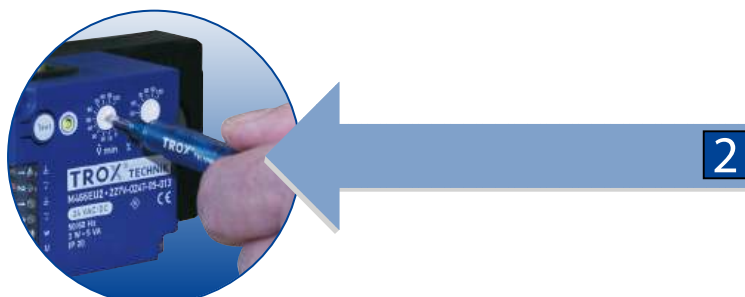
Commissioning

- Take the adjustment values from the volume flow rate scale (sticker on each VAV terminal unit)
- Use the potentiometer to set the minimum or maximum volume flow rate (set by the client)
- Comply with the volume flow rate control range, do not set a volume flow rate which is below the minimum volume flow rate
- Volume flow rate control range TVE: 4 – 100%
- Volume flow rate control range TVE: 10 – 100%
- Volume flow rate control range of LVC, TVR, TZ-Silenzio, TA-Silenzio, TVZ and TVA: 10 – 100%
- Volume flow rate control range of TVJ and TVT: 20 – 100%
- Once the VAV terminal unit has been installed and wired, and the volume flow rate has been set, the unit is ready for operation
- Only remove the transparent protective cover or terminal cover of the Easy controller briefly for wiring or commissioning

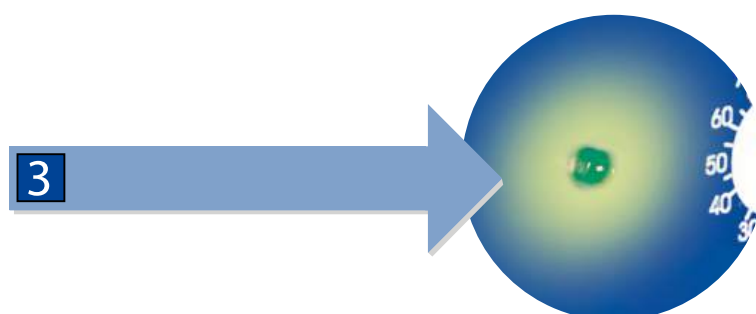
Select nominal size



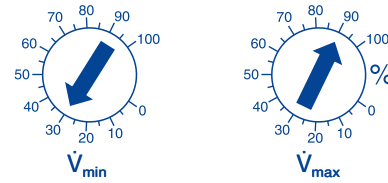
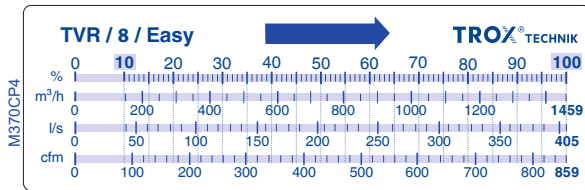
Set flow rates



Green light: Ready!



Variable volume flow control



Analogue interface 0 – 10 V

The analogue interface is permanently set for the signal voltage range 0 - 10 V. The assignment of volume flow setpoint or actual value to voltage signals is shown in the characteristics diagram.

- Set voltage range always applies equally to setpoint and actual value signals

Each VAV terminal unit with Easy controller carries a sticker with a volume flow rate scale to determine the setting values at the customer's site (see example: TVR Easy, nominal size 200). The percentages refer to the control range that can be used. Numbers on the right-hand label edge document the 100 % value, i.e. the size-dependent nominal volume flow q_{vnom} of the respective control unit.

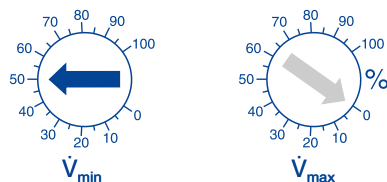
The required volume flow rates must be provided by the client.

- If q_{vmin} is set higher than q_{vmax} , q_{vmin} is provided as a constant volume flow rate even if a setpoint value signal is transmitted.
- If q_{vmin} is set to 0%, then control is between shut-off and q_{vmax}
- If the setpoint signal falls below the shut-off level, the damper blade moves to the shut-off position

Shut- off level

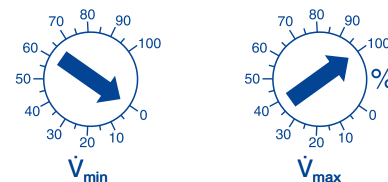
- Easy controller for terminal unit types TVE and TVE-Q: shut-off level = 0.3 V DC
- Easy controller for all other terminal unit types: shut-off level = 0.5 V DC

Constant volume flow control



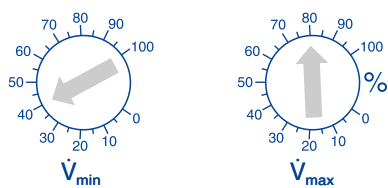
The constant volume flow rate is set using the q_{vmin} potentiometer. The setting of the q_{vmax} potentiometer is in this case irrelevant.

Control input signal from the central BMS



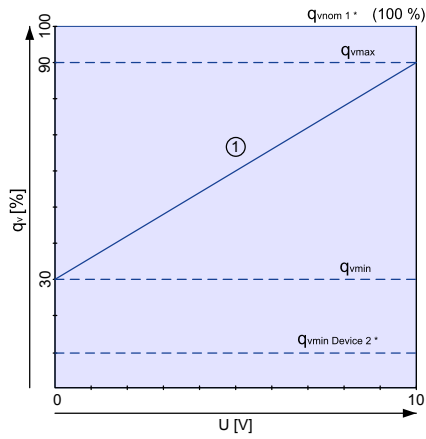
If the volume flow rate is to be specified by the MCE, the q_{vmin} potentiometer set to 0 % and the q_{vmax} potentiometer to 100%.

- If the setpoint signal falls below the shut-off level, the damper blade moves to the shut-off position
- In practice, falling below the shut-off level of 0.3 V DC or 0.5 V DC cannot always be ensured. So shut-off by override control is recommended.

Factory setting

Units are factory set to $q_{vmin} = 40\%$ and $q_{vmax} = 80\%$ set. This sets a variable volume flow control in the operating range of 40 – 80 % of the respective nominal volume flow rate of the terminal unit.

Characteristic of the setpoint value signal



① Signal voltage range 0 – 10 V

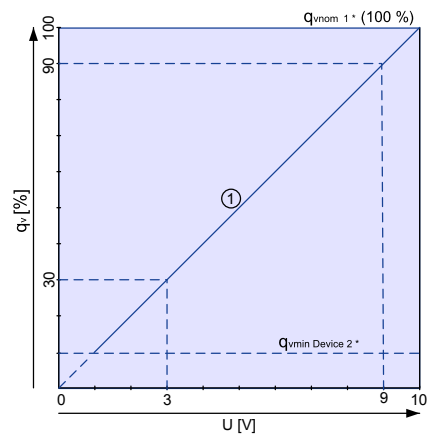
1* = q_{vnom} : Nominal volume flow rate (q_{vnom})

2* = $q_{vmin Device}$: Acceptable minimum volume flow ($q_{vminUnit}$)

Calculation of volume flow rate setpoint value at 0 – 10 V

$$q_{vset} = \frac{Y}{10 V} \times (q_{vmax} - q_{vmin}) + q_{vmin}$$

Characteristic of the actual value signal



① Signal voltage range 0 – 10 V

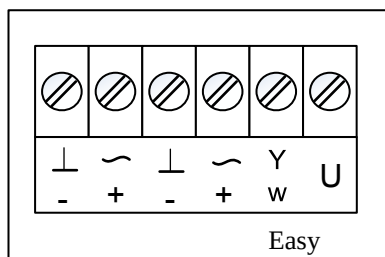
1* = q_{vnom} : Nominal volume flow rate (q_{vnom})

2* = $q_{vmin device}$: Acceptable minimum volume flow ($q_{vmin unit}$)

Calculation of actual volume flow rate at 0 – 10 V

$$q_{vact} = \frac{U}{10 V} \times q_{vnom}$$

Terminal connections



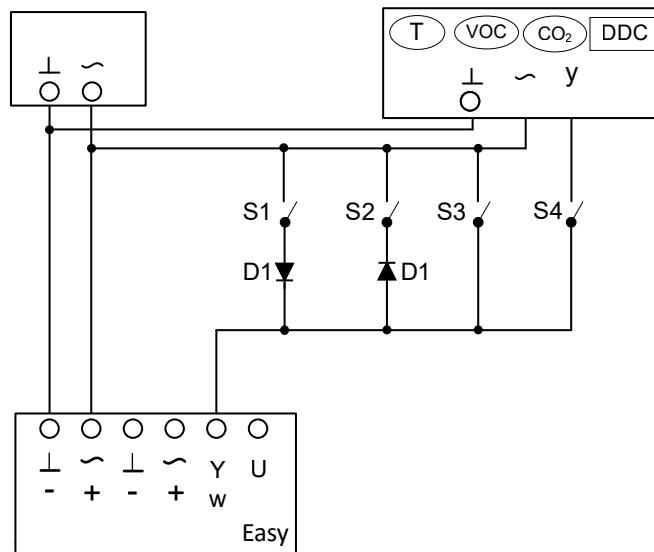
⊥, –: Ground

~, +: Supply voltage 24 V

Y, w: Setpoint value signal 0 – 10 V DC

U: Actual value signal 0 – 10 V DC

Signalling 0 – 10 V DC and override controls



Nomenclature

⊥, – = Ground, Zero

~, + = Supply voltage 24 V AC/DC

Y, w = Setpoint value signal and override control

U = Actual value signal

Notes

T, VOC, CO₂, DDC = Setpoint value default setting q_v

D1 = Diode for override control, e.g. 1N4007

- When combining several override controls the switches must be interlocked to prevent short-circuits
- Setpoint and actual value signal always 0 - 10 V DC

Switch settings

Constant value mode q_{vmin} (Override control q_{vmin})

- All switches (connections) S1 - S4 must be open,
- No wiring is required except for the supply voltage

Regular operation $q_{vmin} - q_{vmax}$

- E.g. for room temperature control
- Only switch (connection) S4 may be closed

Override control q_{vmax}

- Only switch (connection) S3 may be closed

Override control, damper blade OPEN

- Only switch (connection) S1 may be closed
- Only with AC voltage supply

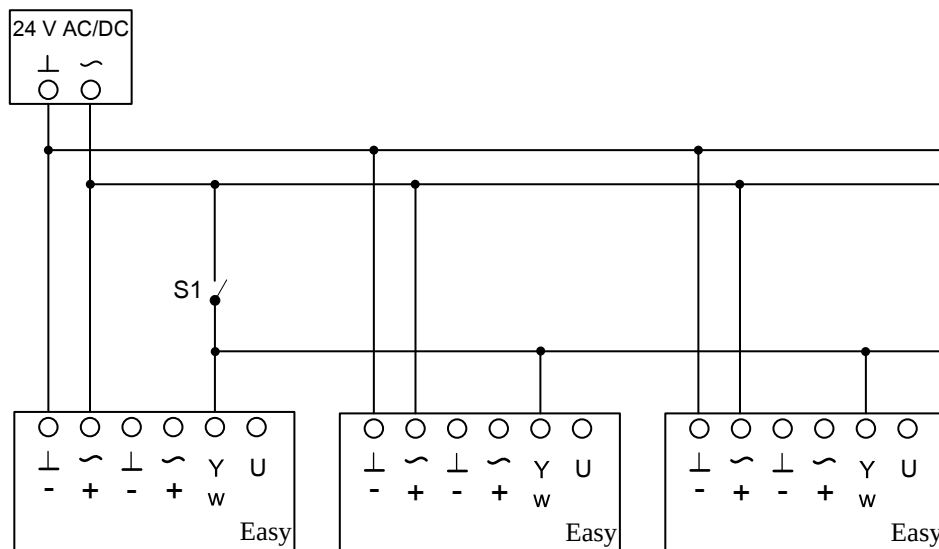
Override control, damper blade CLOSED

- Only switch (connection) S2 may be closed
- Only with AC voltage supply

Damper blade CLOSED with setpoint value signal

- Only switch (connection) S4 may be closed
- Further boundary conditions: q_{vmin} -setting = 0
- Control damper CLOSED is activated when command signal Y or w < shut-off level
- Easy controller shut-off level for terminal unit types TVE and TVE-Q: 0.3 V DC
- Easy controller shut-off level for all other terminal unit types: 0.5 V DC

Parallel connection of several Easy controllers



⊥, -: Ground

~, +: Supply voltage 24 V

Y, w: Setpoint value signal 0 – 10 V DC

U: Actual value signal 0 – 10 V DC

Switch functions:

S1 = Switch OPEN = minimum volume flow rate q_{vmin}

S1 = Switch CLOSED = maximum volume flow rate q_{vmax}

Nomenclature

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

Volume flow controller

Consists of a basic unit with an attached control component.

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

MCE

Management and control equipment (MCE)