Control components for VAV terminal units

Type Easy

Quick and easy handling

Control components for VAV terminal units,
to be mounted on the terminal unit for easy operation

- Simplified ordering and on-site assignment to rooms as selection is based on the nominal size of the duct
- Rapid volume flow rate setting without additional device
- Indicator light simplifies functional checking
- Proven technology of the Compact volume flow controllers
- Suitable for constant and variable volume flows as well as for $\dot{V}_{min}$ / $\dot{V}_{max}$ switching

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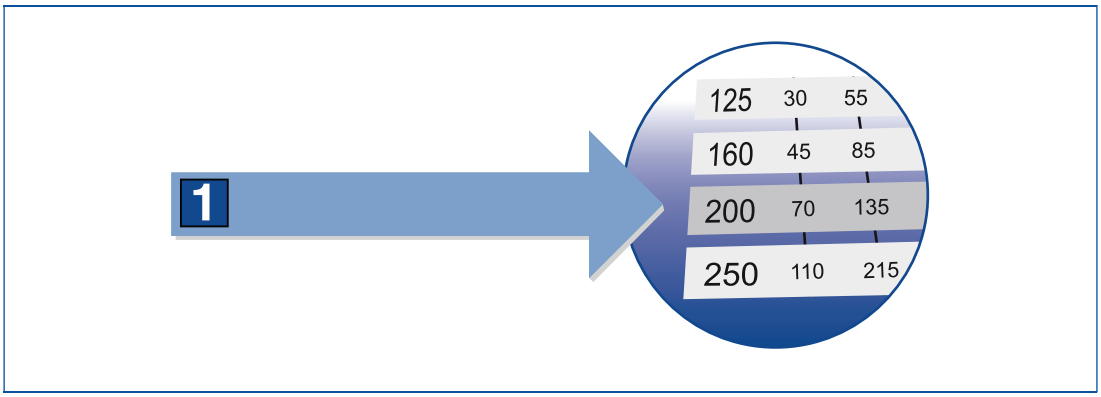
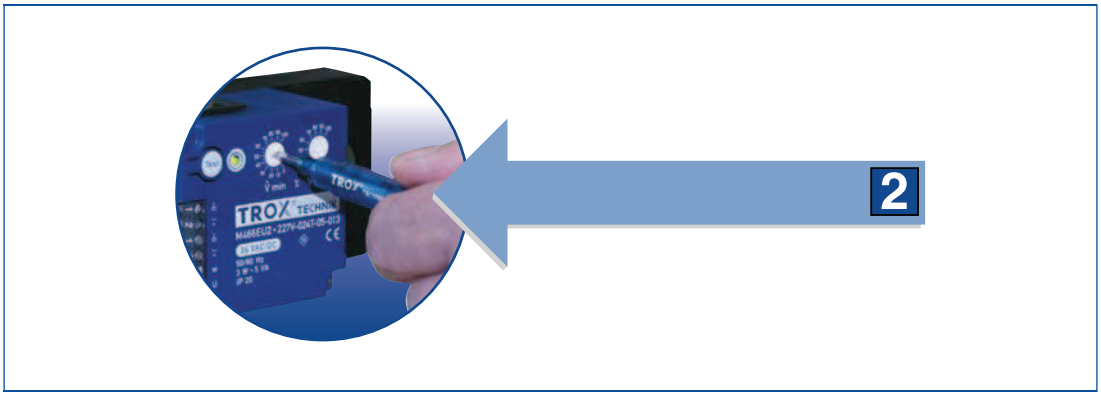
The Easy principle

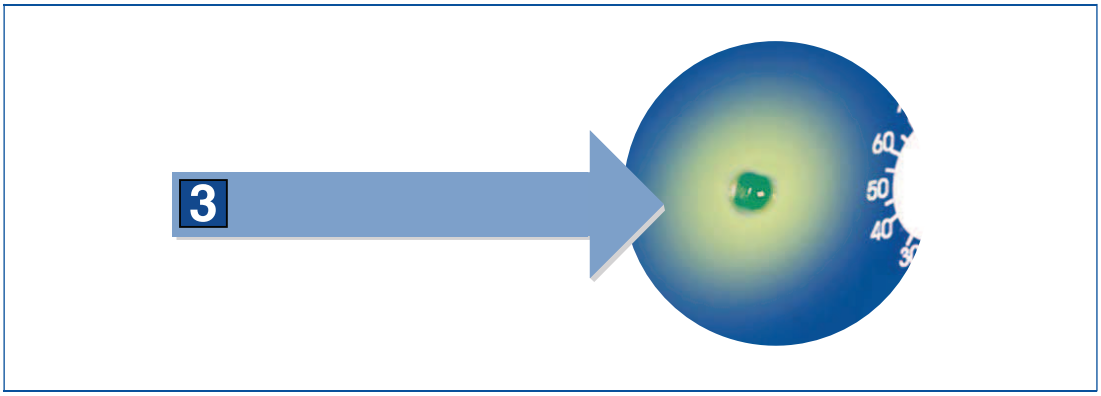
Select nominal size



Set flow rates



Green light: Ready!



Description

Easyregler LMV-D3A

Example

Application

- Electronic volume flow controllers of Type Easy are compact, all-in-one control devices for VAV terminal units
- Dynamic differential pressure transducer, electronic controller, and actuator are fitted together in one casing
- Suitable for different control tasks depending on how the input for the setpoint value signal is used
- The output signals of the room temperature controller, central BMS, air quality controller or similar units control the volume flow rate setpoint
- Override control by means of switches or relays
- Volume flow rate actual value is available as linear voltage signal

Standard filtration in comfort air conditioning systems allows for use of the controller in the supply air without additional dust protection. Since a partial volume flow is passed through the transducer in order to measure the volume flow rate, please note:

- With heavy dust levels in the room, suitable extract air filters must be provided.
- If the air is polluted with fluff or sticky particles, or if it contains aggressive media, Easy controllers cannot be used

Signal voltage range

- 0 – 10 V DC

Operating modes

Variable volume flow

- $\dot{V}_{min}$: minimum volume flow rate
- $\dot{V}_{max}$: maximum volume flow rate

Constant value

- $\dot{V}_{min}$: constant volume flow rate
- $\dot{V}_{max}$: 100 %

Commissioning

- Use the potentiometer to set the minimum or maximum volume flow rate (by others)
- Take the adjustment value from the volume flow rate scale (sticker on each VAV terminal unit)
- Comply with the volume flow rate control range, do not set a volume flow rate which is below the minimum flow rate
- Once the VAV terminal unit has been installed and wired, and the volume flow rate has been set, the unit is ready for operation
- Remove the transparent cover of the Easy controller only temporarily for wiring and commissioning

Easy controllers for VAV terminal units

Part number	Type	Type of VAV terminal unit
M466EU1	LMV-D3AL-F	LVC
M466EU2	227V-024T-05-013	LVC
M466ES1	LMV-D3A-F	TVR
M466DC3	227V-024T-05-002	TVR
M466ES3	SMV-D3A	TVJ, TVT
M466ES2	LMV-D3A	TZ-Silenzio, TA-Silenzio, TVZ, TVA

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Function

Functional description

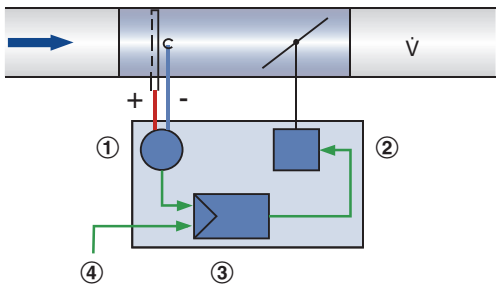
The volume flow rate is determined by measuring the differential pressure (effective pressure). For this purpose the VAV terminal unit is fitted with a differential pressure sensor.
The integral differental pressure transducer transforms the effective pressure into a voltage signal. The volume flow rate actual value is hence available as a voltage signal. The factory setting is such that 10 V DC always corresponds to the nominal volume flow rate ($\dot{V}_{nom}$).
The volume flow rate setpoint value comes from a higher-level controller (e.g. room temperature controller, air quality controller, central BMS) or from switch contacts. Variable volume flow control results in a value between $\dot{V}_{min}$ and $\dot{V}_{max}$.
It is possible to override the room temperature control, e.g. by a complete shut-off of the duct.

The controller compares the volume flow rate setpoint value to the actual value and controls the integral actuator accordingly.
The volume flow rate parameters $\dot{V}_{min}$ and $\dot{V}_{max}$ can be set on potentiometers.

Volume flow control

- 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.
- The factory set volume flow rate parameters can be altered by the customer

Principle of operation – Easy and Compact controllers



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

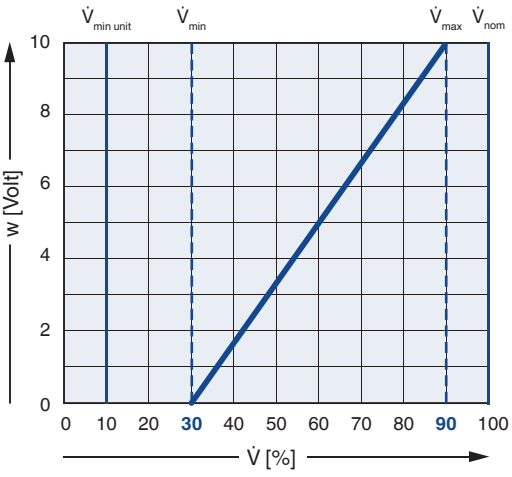
Easy controller

① Easy controller
② $\dot{V}_{max}$ - Potentiometer
③ $\dot{V}_{min}$ - Potentiometer
④ Indicator light
⑤ Service button
⑥ Connections for effective pressure sensor
⑦ Protective cover
⑧ Shaft clamp

Illustration shows LMV-D3A-F

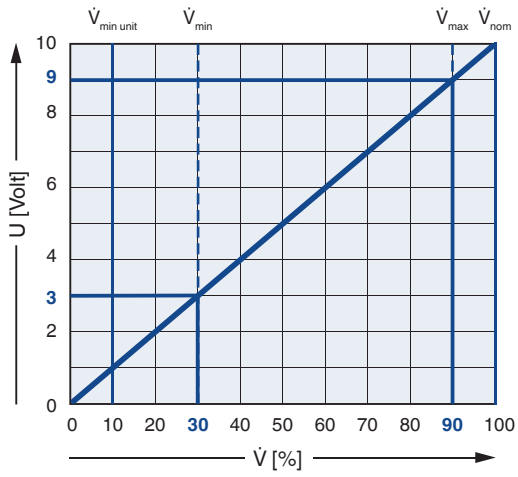
Characteristics

Characteristic of the setpoint value signal



$$\dot{V}_{Soll} = \frac{w}{10} (\dot{V}_{max} - \dot{V}_{min}) + \dot{V}_{min}$$

Characteristic of the actual value signal



$$\dot{V}_{Ist} = \frac{U}{10} \dot{V}_{Nenn}$$

Technical data

Easy controller
LMV-D3AL-F

Easy controller LMV-D3AL-F

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.
Running time for 90°	120 – 150 s
Setpoint value signal input	0 – 10 V DC, R_a > 100 kΩ
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 2004/108/EC, low voltage to 2006/95/EC

Easy controller
227V-024T-05-013

Easy controller 227V-024T-05-013

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	5 VA max.
Power rating (DC)	3 W max.
Running time for 90°	100 s
Setpoint value signal input	0 – 10 V DC, R_a > 100 kΩ
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 according to 2004/108/EC

Easy controller
LMV-D3A-F

Easy controller LMV-D3A und LMV-D3A-F

Supply voltage (AC)	24 V AC ± 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.
Running time for 90°	110 – 150 s
Setpoint value signal input	0 – 10 V DC, R_a > 100 kΩ
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 according to 2004/108/EC

Easy controller
227V-024T-05-002

Easy controller 227V-024T-05-002

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC ± 20 %
Power rating (AC)	5 VA max.
Power rating (DC)	3 W max.
Running time for 90°	100 s
Setpoint value signal input	0 – 10 V DC, R_a > 100 kΩ
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 according to 2004/108/EC

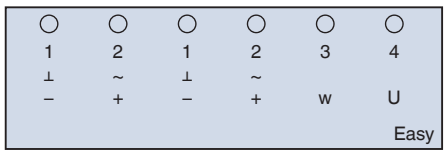
Easy controller SMV-D3A

Easy controller SMV-D3A

Supply voltage (AC)	24 V AC ± 20 %, 50/60 Hz
Supply voltage (DC)	24 V DC –10/+20 %
Power rating (AC)	6 VA max.
Power rating (DC)	3 W max.
Running time for 90°	110 – 150 s
Setpoint value signal input	0 – 10 V DC, R_a > 100 kΩ
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 according to 2004/108/EC

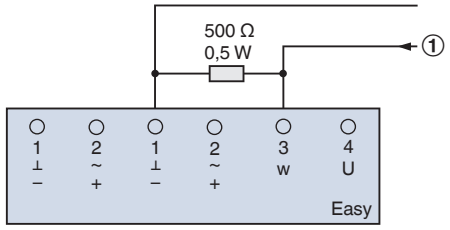
Electrical connection

Terminal connections



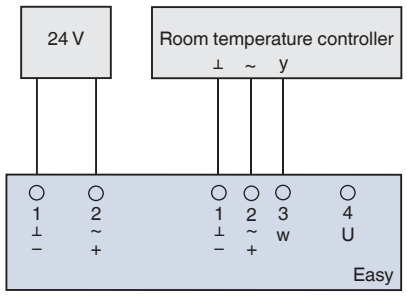
1 ⊥, –: Ground
2 ~, +: Supply voltage 24 V
3 w: Setpoint value signal 0 – 10 V DC
4 U: Actual value signal 0 – 10 V DC

Setpoint value signal 0 – 20 mA



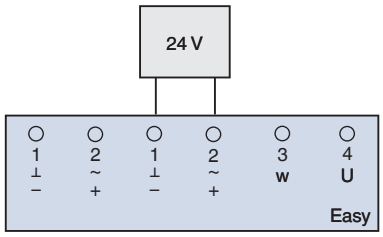
① Setpoint value signal 0 – 20 mA

Variable volume flow control



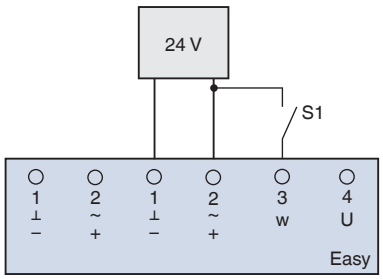
The supply voltage and the remote room temperature controller must be connected as shown.

Constant volume flow control



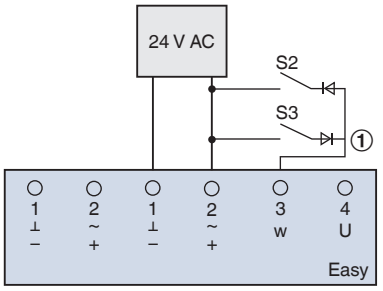
As soon as the 24 V supply voltage is applied, the controller runs the set $\dot{V}_{min}$ value as a constant volume flow rate.

$\dot{V}_{min}$/$\dot{V}_{max}$ switching for one controller



Switch S1 enables switching between the two constant volume flow rates $\dot{V}_{min}$ and $\dot{V}_{max}$.

Override control OPEN/CLOSED



① Diode 1N 4007

External switches (volt-free contacts) can be used to OPEN or CLOSE the damper blade, thereby overriding other control settings (only for AC voltage).
Switch S2 closed:.....Damper blade CLOSED
Switch S3 closed:..... Damper blade OPEN
All override controls can be combined both with each other and with the different switching options.

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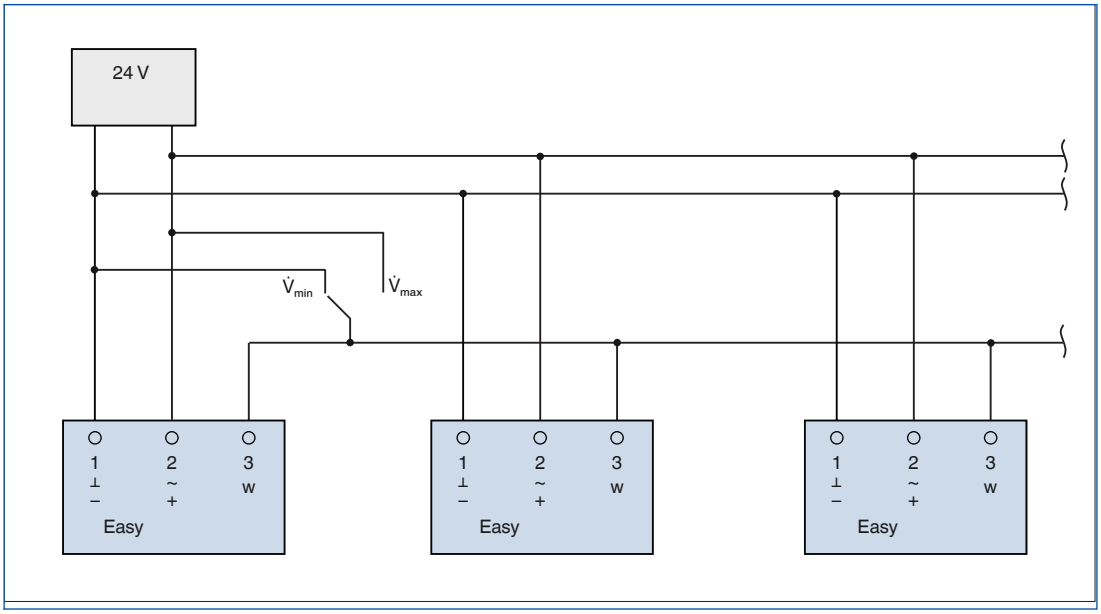
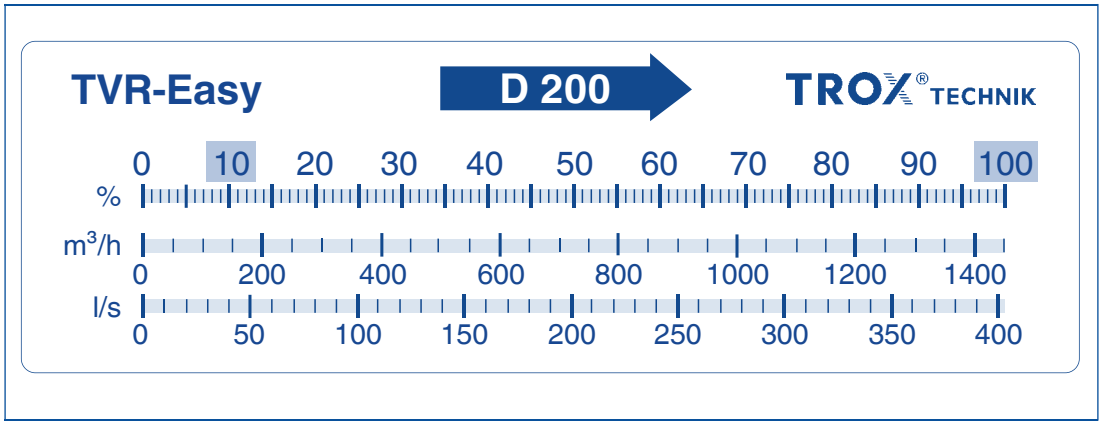
Easy controllers connected in parallel



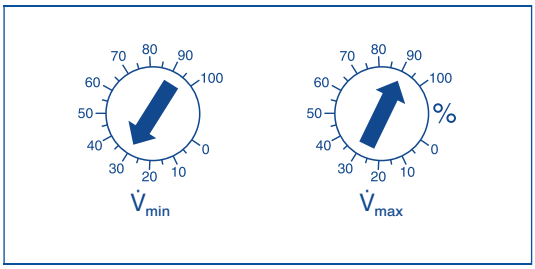
Commissioning

Volume flow rate scale for TVR-Easy



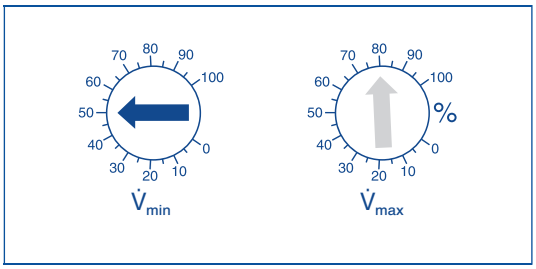
Each VAV terminal unit with Easy controller carries a sticker with a volume flow rate scale to determine the setting values at the customer's site (see example: TVR Easy, nominal size 200).
The percentages refer to the control range that can be used.

Variable volume flow control



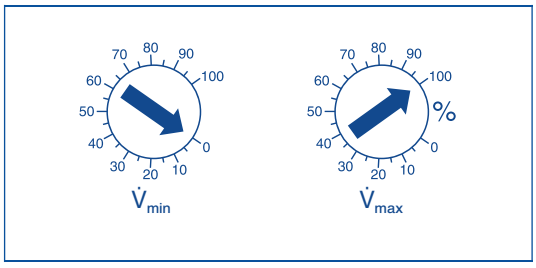
The required volume flow rates must be set by others. If $\dot{V}_{min}$ is set higher than $\dot{V}_{max}$, $\dot{V}_{min}$ is provided as a constant volume flow rate even if a setpoint value signal is transmitted.

Constant volume flow control



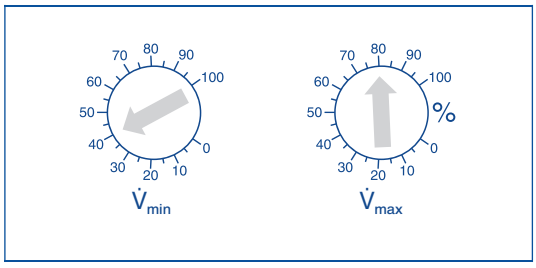
The constant volume flow rate is set using the $\dot{V}_{min}$ potentiometer. The setting of the $\dot{V}_{max}$ potentiometer is in this case irrelevant.

Control input signal from the central BMS



To have the central BMS determine the volume flow rate, the $\dot{V}_{min}$ potentiometer must be set to 0 % and the $\dot{V}_{max}$ potentiometer to 100 %.
If the setpoint value signal falls below 0.1 V DC, the damper blade closes (shut-off). Since the setpoint signal may or may not fall below 0.1 V DC, override control is recommended for shut-off.

Factory setting



Units are delivered with settings $\dot{V}_{min}$ = 40 % and $\dot{V}_{max}$ = 80 %.