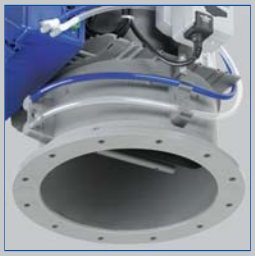
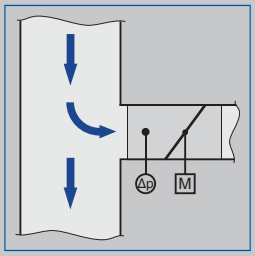
VAV terminal units
Type TVLK

Easy cleaning of sensor tubes

Variant with nozzle
and connecting circular spigot



Variant with bluff body
and flange



For all upstream conditions

Tested to VDI 6022

Optimised for use in laboratories and on fume cupboards

Plastic circular VAV terminal units for aggressive extract air in laboratories and production facilities

- Casing and damper blade made of flame-resistant polypropylene
- Compact construction, only 400 mm long
- High control accuracy even in case of unfavourable upstream conditions
- Combination with fast-running actuators (air management systems)
- Volume flow rate measurement with bluff body or nozzle
- Slide-out sensor tubes allow for easy cleaning
- Closed blade air leakage to EN 1751, class 4
- Casing air leakage to EN 1751, class C

Optional equipment and accessories

- With flanges on both ends
- Plastic secondary silencer Type CAK for the reduction of air-regenerated noise

1

Type		Page
TVLK	General information	1.1 – 185
	Order code	1.1 – 189
	Aerodynamic data	1.1 – 193
	Quick sizing	1.1 – 195
	Dimensions and weight – TVLK	1.1 – 196
	Dimensions and weight – TVLK-FL	1.1 – 197
	Installation details	1.1 – 198
	Specification text	1.1 – 199
	Basic information and nomenclature	1.5 – 1

Variants

Product examples

VAV terminal unit, variant TVLK, with bluff body and connecting circular spigot

VAV terminal unit, variant TVLK, with bluff body and flange

VAV terminal unit, variant TVLK, with nozzle and connecting circular spigot

VAV terminal unit, variant TVLK, with nozzle and flange

Description

For detailed information on the LABCONTROL control system see the Control Systems catalogue.

For detailed information on control components see Chapter K5 – 1.3.

Application
- Circular LABCONTROL VAV terminal units of Type TVLK, made of plastic, to control the volume flow rate of fume cupboards and fume hoods
- Suitable for contaminated air
- Closed-loop volume flow control using an external power supply
- Shut-off by means of switching (equipment supplied by others)

Variants
- TVLK: VAV terminal unit
- TVLK-FL: VAV terminal unit with flanges on both ends

Nominal sizes
- Bluff body: 250 – 100, 250 – 160
- Nozzle: 250 – D08, 250 – D10, 250 – D16
- Bluff body available in two sizes and nozzle available in three sizes for different volume flow rate ranges

Attachments
- LABCONTROL: Control components (attachments) for air management systems
- Universal controller: Controller, differential pressure transducer and actuators for special applications

Accessories
- Matching flanges for both ends, including seals

Useful additions
- Plastic secondary silencer Type CAK for demanding acoustic requirements

Special characteristics
- High control accuracy even in case of unfavourable upstream conditions
- Integral slide-out differential pressure sensor with 3 mm measuring holes (resistant to dust and pollution)
- No metal parts come into contact with the airflow
- Factory set-up or programming and aerodynamic function testing
- Volume flow rate can be measured and subsequently adjusted on site; additional adjustment tool or configuration software may be necessary

Parts and characteristics
- Ready-to-commission unit which consists of mechanical parts and control components (attachments)
- Averaging differential pressure sensor for volume flow rate measurement; can be removed for cleaning
- Damper blade
- Factory assembled control components (attachments) complete with wiring and tubing
- Aerodynamic functional testing on a special test rig prior to shipping of each unit
- Unit carries test label with relevant data

Construction features
- Circular casing
- Short casing: 392 mm without flange, 400 mm with flange
- Spigot suitable for ducts according to DIN 8077
- Both spigots with same diameter (250 mm)
- Position of the damper blade indicated externally at shaft extension

Materials and surfaces
- Casing and damper blade made of flame-resistant polypropylene (PP), flammability to UL 94, V-0
- Differential pressure sensor (with bluff body, or nozzle) and plain bearing made of polypropylene (PP)
- Damper blade seal made of thermoplastic elastomers (TPE)

Installation and commissioning
- Installation orientation must be as shown on the sticker

Standards and guidelines
- Hygiene conforms to VDI 6022
- Closed blade air leakage to EN 1751, class 4
- Meets the increased requirements of DIN 1946, part 4, with regard to the acceptable closed blade air leakage
- Casing air leakage to EN 1751, class C

Maintenance
- Maintenance-free as construction and materials are not subject to wear
- Zero point correction of the static differential pressure transducer should be carried out once per year (recommendation)

1

Attachments: VARYCONTROL control components for Type TVLK

Order code detail	Control function	Controller	Differential pressure transducer	Actuator
Universal controller, static				
BP3	Volume flow rate	Universal controller with MP bus interface TROX/Belimo	Static, integral	Actuator
BPG				Fast-running actuator
BB3		Universal controller TROX/Belimo		Actuator

Attachments: LABCONTROL control components for Type TVLK

Order code detail	Control function	Controller	Differential pressure transducer	Actuator
EASYLAB				
ELAB	Fume cupboard Room supply air Room extract air Room pressure Single controller	EASYLAB controller TCU3	Static, integral	Fast-running actuator
TCU-LON-II				
TMA	Fume cupboard Room supply air Room extract air Room pressure	Electronic controller TCU-LON-II with LonWorks interface	Static, integral	Fast-running actuator
TMB				Fast-running actuator (brushless motor)

Technical data

Nominal sizes	250 mm
Volume flow rate range	30 – 515 l/s or 108 – 1854 m^3/h
Volume flow rate control range	Approx. 15 to 100 % of the nominal volume flow rate
Minimum differential pressure	5 – 130 Pa
Maximum differential pressure	1000 Pa
Operating temperature	10 – 50 °C

Function

Functional description

For measuring the volume flow rate the VAV terminal unit is fitted either with a bluff body and a differential pressure sensor or with a nozzle. The control components (attachments) include a differential pressure transducer that transforms the differential pressure (effective pressure) into an electric signal, a controller, and an actuator.

- Fume cupboard control: The volume flow rate setpoint depends on the control strategy for the fume cupboard and is based on the face velocity, the sash position, or a constant value.
- Volume flow control: The volume flow rate setpoint comes from an external unit.

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.

Schematic illustration of the TVLK

① Nozzle (optional)
② EASYLAB control component
③ Casing
④ Actuator
⑤ Bluff body and sensor tubes

1

Volume flow rate ranges

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 duct pressure must be ensured for all operating conditions and for all control units. The measurement points for fan speed control must be selected accordingly.

Volume flow ranges and minimum pressure differences for the TVLK with EASYLAB or TCU-LON II

Nominal size	$\dot{V}$		①	②	③	④	$\Delta\dot{V}$
			$\Delta p_{st\ min}$				
	l/s	m³/h	Pa				± %
250-100	55	198	5	5	5	5	10
	140	504	15	15	15	15	7
	220	792	35	35	35	35	6
	360	1296	85	85	85	90	5
250-160	30	108	5	5	5	5	10
	80	288	25	25	25	25	7
	120	432	50	50	50	50	6
	195	702	130	130	130	130	5
250-D08	95	342	5	5	5	5	10
	210	756	10	10	10	10	7
	315	1134	20	20	20	20	6
	515	1854	45	50	55	55	5
250-D10	55	198	5	5	5	5	10
	140	504	10	10	10	10	7
	220	792	20	20	20	20	6
	360	1296	50	50	55	55	5
250-D16	30	108	5	5	5	5	10
	80	288	15	15	15	15	7
	120	432	30	30	30	30	6
	195	702	70	70	75	75	5

① TVLK
② TVLK with circular silencer CAK, insulation thickness 50 mm, length 500 mm
③ TVLK with circular silencer CAK, insulation thickness 50 mm, length 1000 mm
④ TVLK with circular silencer CAK, insulation thickness 50 mm, length 1500 mm

The volume flow rates given for VAV terminal units depend on the nominal size and on the control component (attachment) that is installed. The table gives the minimum and maximum values for a VAV terminal unit. Some control components may only have a limited volume flow rate range. This applies in particular to control components with a static differential pressure transducer. For volume flow rate ranges for all control components refer to our Easy Product Finder design programme.

Volume flow rate ranges and minimum differential pressure values for the TVLK with VARYCONTROL Universal controller

Nominal size	$\dot{V}$		①	②	③	④	$\Delta\dot{V}$
			$\Delta p_{st\ min}$				
	l/s	m^3/h	Pa				± %
250-100	**65**	**234**	5	5	5	5	10
	180	**648**	25	25	25	25	7
	290	**1044**	55	55	55	60	6
	360	**1296**	85	85	85	90	5
250-160	**35**	**126**	5	5	5	5	10
	100	**360**	35	35	35	35	7
	160	**576**	90	90	90	90	6
	195	**702**	130	130	130	130	5
250-D08	**95**	**342**	5	5	5	5	10
	210	**756**	10	10	10	10	7
	315	**1134**	20	20	20	20	6
	515	**1854**	45	50	55	55	5
250-D10	**65**	**234**	5	5	5	5	10
	180	**648**	15	15	15	15	7
	290	**1044**	35	35	35	35	6
	360	**1296**	50	50	55	55	5
250-D16	**35**	**126**	5	5	5	5	10
	100	**360**	20	20	20	20	7
	160	**576**	50	50	50	50	6
	195	**702**	70	70	75	75	5

① TVLK
② TVLK with circular silencer CAK, insulation thickness 50 mm, length 500 mm
③ TVLK with circular silencer CAK, insulation thickness 50 mm, length 1000 mm
④ TVLK with circular silencer CAK, insulation thickness 50 mm, length 1500 mm

The volume flow rates given for VAV terminal units depend on the nominal size and on the control component (attachment) that is installed. The table gives the minimum and maximum values for a VAV terminal unit. Some control components may only have a limited volume flow rate range. This applies in particular to control components with a static differential pressure transducer. For volume flow rate ranges for all control components refer to our Easy Product Finder design programme.

1

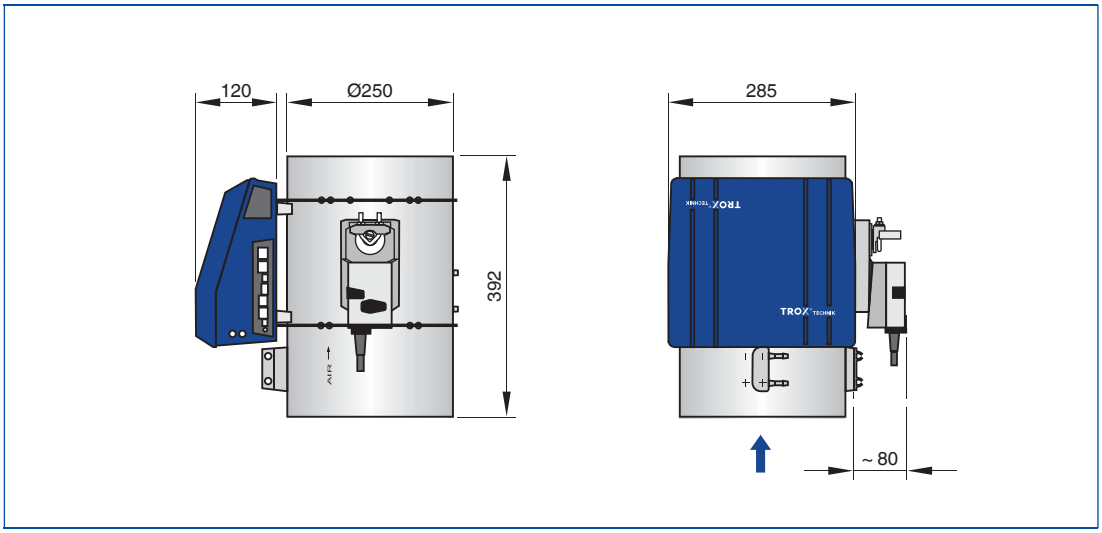
Description

- VAV terminal unit for the control of variable air volume flow rates
- Spigot to make connections to the ducting

VAV terminal unit, variant TVLK, with connecting circular spigot

Dimensions

TVLK



Weight

Nominal size	m
	kg
250	5.1

1

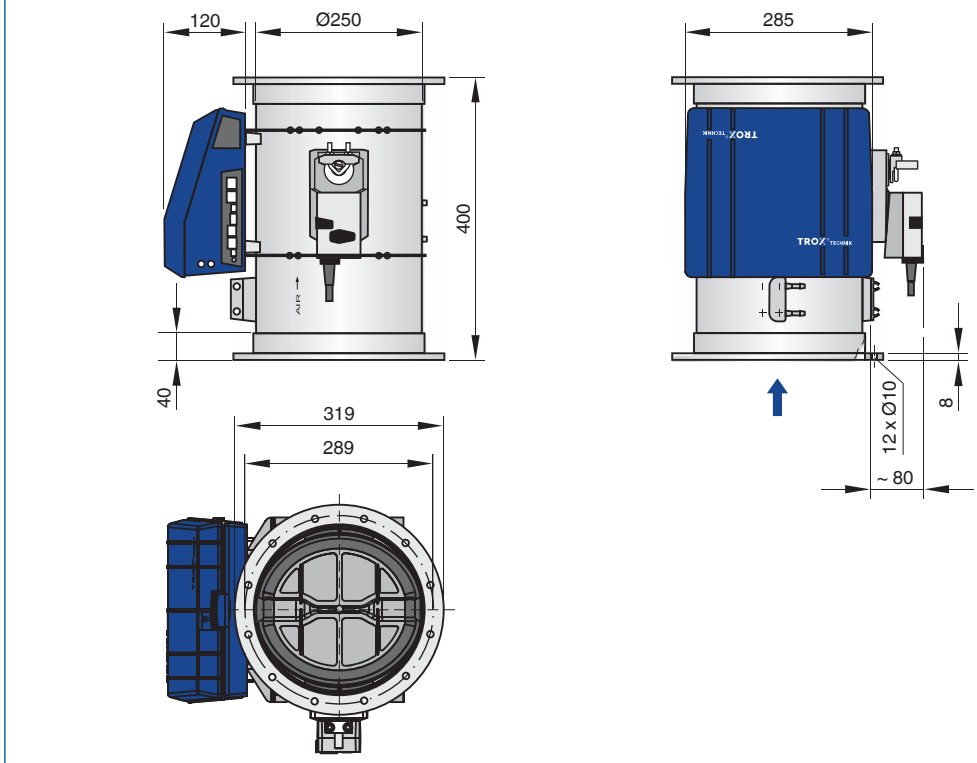
Description

- VAV terminal unit for the control of variable air volume flow rates
- With flanges to make detachable connections to the ductwork

VAV terminal unit, variant TVLK, with flange

Dimensions

TVLK-FL



Weight

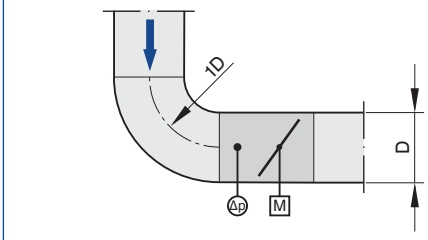
Nominal size	m
	kg
250	5.7

1

Upstream conditions

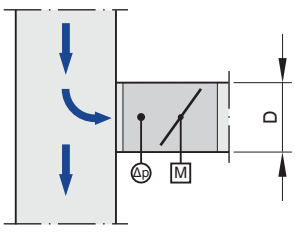
The volume flow rate accuracy ΔV̇ applies to all upstream conditions.

Bend



A bend with a centre line curvature radius of at least 1D – without an additional straight duct section upstream of the VAV terminal unit – has only a negligible effect on the volume flow rate accuracy.

Junction

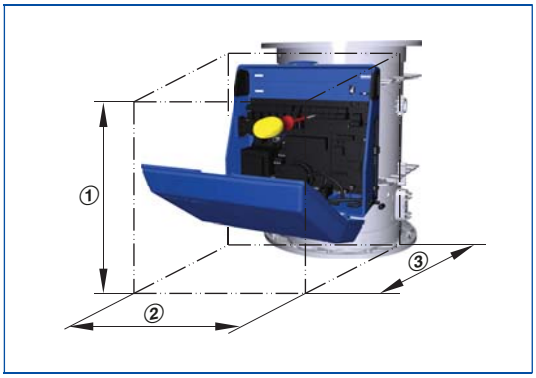


The stated volume flow rate accuracy ΔV̇ will be achieved even when the VAV terminal unit is installed in a branch just off the main duct. Even the installation on the dome of a fume cupboard will have no adverse effect.

Space requirement 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.

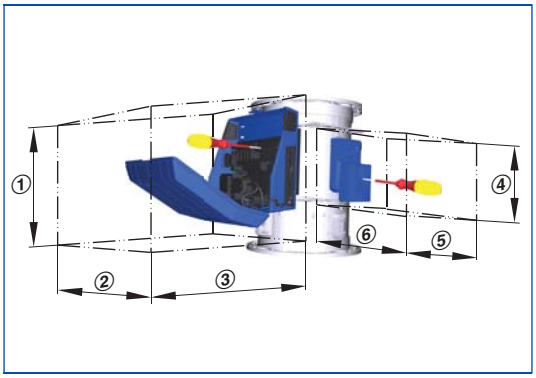
Access to attachments



Space required

Attachments	①	②	③
	mm		
VARYCONTROL			
Universal controller	300	320	300

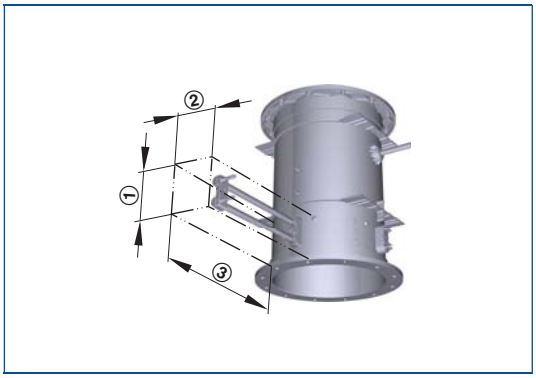
Access to attachments



Space required

Attachments	①	②	③	④	⑤	⑥
	mm					
LABCONTROL						
EASYLAB	350	350	400	300	250	300
TCU-LON-II	320	250	300	250	200	250

Access to sensor tubes for cleaning

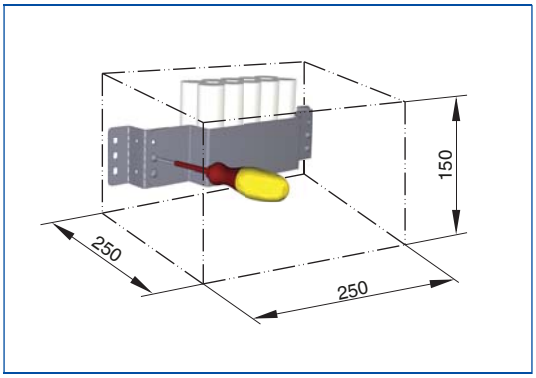


Space required

Nominal size	①	②	③
	mm		
250-1 Bluff body**	100	160	D
250-D Nozzle**	100	160	100

D: Casing diameter

Access to attachments



Separate space for fixing and accessing the battery pack (LABCONTROL EASYLAB accessory)

1

Standard text

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

Circular VAV terminal units made of flame-resistant plastic, for variable air volume systems and fume cupboards. Suitable for the control of extract air containing aggressive media since all components coming into contact with the airflow are made of plastic (no interior metal parts). Ready-to-commission unit which consists of the mechanical parts and the electronic control components (attachments). Each unit contains an averaging differential pressure sensor with bluff body or a nozzle for volume flow rate measurement, and a damper blade. Factory assembled control components (attachments) complete with wiring and tubing.
Differential pressure sensor with 3 mm measuring holes (resistant to dust and pollution)
Spigot, suitable for ducts according to DIN 8077.
Position of the damper blade indicated externally at shaft extension.
Closed blade air leakage to EN 1751, class 4.
Casing air leakage to EN 1751, class C.

Special characteristics

- High control accuracy even in case of unfavourable upstream conditions
- Integral slide-out differential pressure sensor with 3 mm measuring holes (resistant to dust and pollution)
- No metal parts come into contact with the airflow
- Factory set-up or programming and aerodynamic function testing
- Volume flow rate can be measured and subsequently adjusted on site; additional adjustment tool or configuration software may be necessary

Materials and surfaces

- Casing and damper blade made of flame-resistant polypropylene (PP), flammability to UL 94, V-0
- Differential pressure sensor (with bluff body, or nozzle) and plain bearing made of polypropylene (PP)
- Damper blade seal made of thermoplastic elastomers (TPE)

Technical data

- Nominal sizes: 250 mm
- Volume flow rate range: 30 to 515 l/s or 108 to 1854 m^3/h
- Volume flow rate control range: approx. 15 – 100 % of the nominal volume flow rate
- Minimum differential pressure: 5 – 130 Pa
- Maximum differential pressure: 10 – 50 °C

Attachments

Variable volume flow control with electronic EASYLAB controller for fume cupboards.

- Supply voltage 24 V AC
- Fast and stable control
- Static differential pressure measurement
- Fast-running actuator
- Easy commissioning due to plug and play communication system
- Controller is a modular system and can be expanded
- Volume flow rate monitoring

Sizing data

- $\dot{V}$ _____ [m^3/h]
- Δp_{st} _____ [Pa]
- L_{PA} air-regenerated noise _____ [dB(A)]
- L_{PA} Case-radiated noise _____ [dB(A)]

Order options

VARYCONTROL

1 Type

TVLK VAV terminal unit, plastic

2 Flange

No entry: none
☐ **FL** Flanges on both ends

3 Nominal size

☐ **250 – 100** Bluff body 100
☐ **250 – 160** Bluff body 160
☐ **250 – D08** Nozzle D08
☐ **250 – D10** Nozzle D10
☐ **250 – D16** Nozzle D16

4 Accessories

No entry: none
☐ **GK** Matching flanges for both ends

5 Attachments (control component)

Example
☐ **BB3** Universal controller with static differential pressure transducer
☐ **BPG** Universal controller with MP bus interface and static differential pressure transducer, fast-running actuator

6 Operating mode

☐ **E** Single
☐ **M** Master
☐ **S** Slave
☐ **F** Constant value

7 Signal voltage range

For the actual and setpoint value signals
☐ **0** 0 – 10 V DC (only BP3 and BPG)
☐ **2** 2 – 10 V DC

8 Volume flow rates [m^3/h or l/s]

$\dot{V}_{min}$ – $\dot{V}_{max}$ for factory setting

Order options

LABCONTROL

EASYLAB

1 Type

TVLK VAV terminal unit, plastic

2 Flange

No entry: none

☐ **FL** Flanges on both ends

3 Nominal size

☐ **250 – 100** Bluff body 100

☐ **250 – 160** Bluff body 160

☐ **250 – D08** Nozzle D08

☐ **250 – D10** Nozzle D10

☐ **250 – D16** Nozzle D16

4 Accessories

No entry: none

☐ **GK** Matching flanges for both ends

5 Attachments (control component)

ELAB EASYLAB controller TCU3
with fast-running actuator

6 Equipment function

With face velocity transducer

☐ **FH-VS** Face velocity control
With sash distance sensor

☐ **FH-DS** Linear control strategy

☐ **FH-DV** Safety-optimised control strategy
With switching steps
for on-site switch contacts

☐ **FH-2P** 2 switching steps

☐ **FH-3P** 3 switching steps
Without signalling

☐ **FH-F** Volume flow rate constant value

7 Expansion modules

Option 1: Supply voltage
No entry: 24 V AC

☐ **T** EM-TRF for 230 V AC

☐ **U** EM-TRF-USV for 230 V AC, provides uninterruptible power supply (UPS)

Option 2: Communication interface
No entry: none

☐ **L** EM-LON for LonWorks FTT-10A

☐ **B** EM-BAC-MOD-01 for BACnet MS/TP

☐ **M** EM-BAC-MOD-01 for Modbus RTU

☐ **I** EM-IP for BACnet/IP, Modbus/IP and webserver

☐ **R** EM-IP with real time clock

Option 3:
Automatic zero point correction
No entry: none

☐ **Z** EM-AUTOZERO Solenoid valve for automatic zero point correction

Option 4: Lighting
No entry: none

☐ **S** EM-LIGHT Wired socket for the connection of lighting and for switching the lighting on/off using the control panel (only with EM-TRF or EM-TRF-USV)

8 Operating values [m^3/h or l/s]

Depending on the equipment function
VS: $\dot{V}_{min} - \dot{V}_{max}$
DS: $\dot{V}_{min} - \dot{V}_{max}$
DV: $\dot{V}_{min} - \dot{V}_{max}$
2P: $\dot{V}_1 / \dot{V}_2$
3P: $\dot{V}_1 / \dot{V}_2 / \dot{V}_3$
F: $\dot{V}_1$

Useful additions

Control panel for fume cupboard controller, for displaying the functions of the control system according to EN 14175

☐ **BE-SEG-**** OLED display

☐ **BE-LCD-01** 40-character display

1

Order options
LABCONTROL
EASYLAB

1 Type
TVLK VAV terminal unit, plastic

2 Flange
No entry: none
☐ **FL** Flanges on both ends

3 Nominal size
☐ **250 – 100** Bluff body 100
☐ **250 – 160** Bluff body 160
☐ **250 – D08** Nozzle D08
☐ **250 – D10** Nozzle D10
☐ **250 – D16** Nozzle D16

4 Accessories
No entry: none
☐ **GK** Matching flanges for both ends

5 Attachments (control component)
ELAB EASYLAB controller TCU3 with fast-running actuator

6 Equipment function
Control with single controller
EC Extract air controller

7 External volume flow rate setting
☐ **E0** Voltage signal 0 – 10 V DC
☐ **E2** Voltage signal 2 – 10 V DC
☐ **2P** On-site switch contacts for 2 switching steps
☐ **3P** On-site switch contacts for 3 switching steps
☐ **F** Volume flow rate constant value, without signalling

8 Expansion modules
Option 1: Supply voltage
No entry: 24 V AC
☐ **T** EM-TRF for 230 V AC
☐ **U** EM-TRF-USV for 230 V AC, provides uninterruptible power supply (UPS)

Option 2: Communication interface
No entry: none
☐ **L** EM-LON for LonWorks FTT-10A
☐ **B** EM-BAC-MOD-01 for BACnet MS/TP
☐ **M** EM-BAC-MOD-01 for Modbus RTU
☐ **I** EM-IP for BACnet/IP, Modbus/IP and webserver
☐ **R** EM-IP with real time clock

Option 3:
Automatic zero point correction
No entry: none
☐ **Z** EM-AUTOZERO Solenoid valve for automatic zero point correction

9 Operating values [m³/h or l/s, Pa]
E0, E2: $\dot{V}_{min}$ / $\dot{V}_{max}$
2P: $\dot{V}_1$ / $\dot{V}_2$
3P: $\dot{V}_1$ / $\dot{V}_2$ / $\dot{V}_3$
F: $\dot{V}_1$

Order options
LABCONTROL
TCU-LON-II

1 Type
TVLK VAV terminal unit made of plastic

2 Flange
No entry: none
☐ **FL** Flanges on both ends

3 Nominal size [mm]
☐ **250 – 100** Bluff body 100
☐ **250 – 160** Bluff body 160
☐ **250 – D08** Nozzle D08
☐ **250 – D10** Nozzle D10
☐ **250 – D16** Nozzle D16

4 Accessories
No entry: none
☐ **GK** Matching flanges for both ends

5 Attachments (control component)
☐ **TMA** TCU-LON-II with fast-running actuator
☐ **TMB** TCU-LON-II with fast-running actuator (brushless motor)

6 Equipment function
☐ **FH** Fume cupboard
Face velocity control with face velocity transducer
☐ **RE** Extract air controller (Room Extract)

7 Operating values [m³/h or l/s]
FH: $\dot{V}_{min}$ – $\dot{V}_{max}$
RE: $\dot{V}_{day}$ / $\dot{V}_{night}$ / $\dot{V}_{constant}$

Useful additions
Control panel for fume cupboard controller, for displaying the functions of the control system according to EN 14175
☐ **BE-TCU-LON-II** Control panel