Control units

BM0-J6

Bus interface Modbus RTU

Bus interface BACnet MS/TP



X-AIRCONTROL zone module Modbus



Control component with dynamic transducer with Modbus RTU interface and BACnet MS/TP interface for X-AIRCONTROL

Compact unit for VAV terminal unit TVR, TVJ, TVT, TZ-Silenzio, TA-Silenzio, TVZ, TVA, TVM

- Controller, dynamic differential pressure transducer and actuator in one casing
- Use in ventilation and air conditioning systems, only with clean air
- Simple plug connection RJ12 for supply voltage and communication
- Compatible with X-AIRCONTROL zone module Modbus
- Volume flow rates q_{vmin} and q_{vmax} are pre-set in the factory and saved in the controller as changed parameters
- High data transparency through standardised bus communication Modbus RTU or BACnet MS/TP
- Setpoint value settings, override controls, parameter adjustment via bus communication or X-AIRCONTROL
- Service access for manual adjustment devices and PC configuration software

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General information

Application

- All-in-one control engineering 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 the specification of the setpoint value
- The room temperature controller, central BMS, air quality controller or similar units control the variable volume flow control by specifying the setpoint values via a communication interface.
- Suitable for room control X-AIRCONTROL zone module Modbus
- Simple connection for supply voltage and communication with common RJ12 connection socket
- Override controls for activating q_{vmin}, q_{vmax}, shut-off, OPEN position via Modbus register, BACnet objects or X-AIRCONTROL possible
- Volume flow rate actual value is available as a network data point
- Damper blade position is available as a network data point
- Standard filtration in comfort air conditioning systems allows for use of the controller in the supply air without additional dust protection

With heavy dust levels in the room
- Install appropriate exhaust air filters upstream, as a partial volume flow is routed through the transducer for volume flow rate measurement

If the air is contaminated with dust, fluff or sticky components
- Use an attachment assembly with static differential pressure transducer

Control strategy

- The volume flow controller works independently 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
- Flow rate range parameterised in the controller at the factory (q_{vmin}: minimum volume flow rate, q_{vmax}: maximum volume flow rate)
- Operating parameters are specified via the order code and parameterised in the factory

Operating modes

- Modbus RTU: Setpoint value setting via X-AIRCONTROL or external software
- BACnet MS/TP: Setpoint value setting via external software

Interface

Communication interface
- Modbus RTU, RS485 (factory preset)
- BACnet MS/TP (can be activated on site with ZTH-EU)
- Data points see bus lists

Parts and characteristics

- Transducer for dynamic measurement principle
- Overload protection
- Connection socket RJ12
- Service interface for connection of service tools
- Axis clamping device
- Indicator lights for detecting the operating mode
- Addressing key for setting user addresses in bus mode
- Supply and communication not galvanically isolated

Operating parameters

- q_{vmin} = 0 – 100 % of the nominal volume flow rate q_{vnom} adjustable
- q_{vmax} = 20 – 100 % of the nominal volume flow rate q_{vnom} adjustable

Construction

- LMV-D3-M/B-J6 TR with connection socket RJ12
- NMV-D3-M/B-J6 TR with connection socket RJ12

Type LMV-D3-M/B-J6 TR for volume flow controller
- TVR, TZ-Silenzio, TA-Silenzio, TVZ, TVA, TVM

Type NMV-D3-M/B-J6 TR for volume flow controller
- TVJ
- TVT up to 3.94 × 11.81 or 31.5 × 15.75 in.

Commissioning

- Due to the volume flow rates set in the factory, always ensure that the control units are only installed in the specified locations
- Commissioning steps for network integration required
- Operating parameters can be adjusted by others (service tool ZTH-EU)

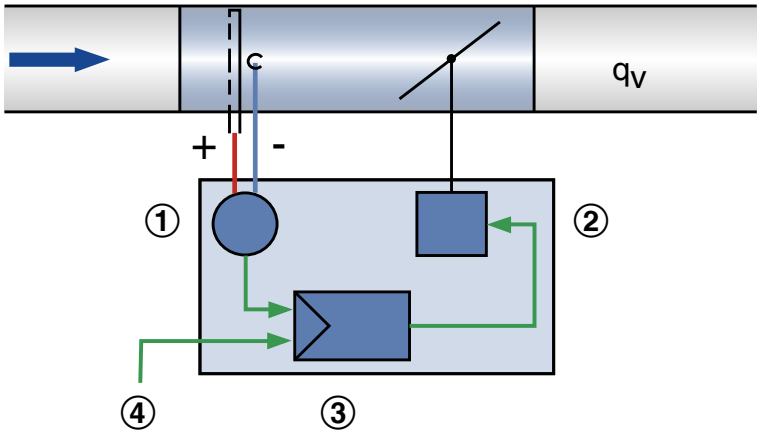
Useful additions

- Adjustment device type ZTH (order code AT-VAV-B)

Function

A closed control circuit for regulation of the volume flow rate, i.e. measuring - comparing - adjusting, is characteristic of air terminal units.
The volume flow rate is measured by measuring a differential pressure (effective pressure). This is done via a differential pressure sensor. An integrated differential pressure transducer converts 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 (q_{vnom}).
The volume flow rate setpoint value is specified by a higher-level controller (e.g. room temperature controller, air quality controller, central BMS). Variable volume flow control results in a value between q_{vmin} and q_{vmax}. 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.

Principle of operation



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

Specification text

This specification text describes the general properties of the product.

Category
- Compact controller for volume flow rate
- Regulation of a constant or variable volume flow rate setpoint value
- Electronic controller for connecting a controlled variable and tapping an actual value for integration in a Modbus RTU or BACnet MS/TP-based central building management system
- The actual value relates to the nominal volume flow rate such that commissioning and subsequent adjustment are simplified

Application
- Dynamic transmitter for clean air in ventilation and air conditioning systems

Supply voltage
- 24 V AC / DC

Actuator
- Integrated; slow running (running time approx. 120 – 150 s for 90°)

Installation orientation
- Either direction

Interface/signalling
- Modbus RTU (RS-485)
- BACnet MS/TP
- Supply and communication not galvanically isolated
- Termination switchable

Connection
- Connection socket RJ12, suitable for TROX X-AIRCONTROL zone module X-AIR-ZMO-MOD

Interface information
- Modbus Register
- BACnet objects
- Volume flow rate setpoint and actual value, damper blade position, error status, etc. read and write

Special functions
- Activation V_{min}, V_{max}, closed, open via Modbus register or BACnet object

Optional activatable operating modes
- Open loop: actuators with air flow measurement

Parameter setting
- Parameters specific to VAV terminal unit parameterised at the factory
- Operating values V_{min} , V_{max} and interface type parameterised in the factory
- Subsequent adjustment via Modbus-BACnet register access or via optional tools: adjustment device, PC software (wired in each case) possible

Factory condition
- Electronic controller factory-mounted on the terminal unit
- Factory parameter settings
- Functional test under air; certified with sticker

Order code

TVR – D / 4 / D2 / BM0-J6 / V / qvmin – qvmax cfm
1 2 5 6 7 8 10 11

1 Type
TVR VAV terminal unit

2 Acoustic cladding
No entry required: None
D With acoustic cladding

3 Material
Galvanised sheet steel (Standard construction)
P1 Powder-coated RAL 7001, silver grey
A2 Stainless steel construction

5 Nominal size [in.]
4, 5, 6, 8, 10

6 Accessories
No entry required: None
D2 Double lip seal both sides
G2 Matching flanges both sides

7 Attachments (control components)
BM0-J6 Compact controller of dynamic transducer, Modbus RTU, BACnet MS/TP, RJ12 connection socket

8 Operating mode
V Variable (setpoint value range)

10 Operating values for factory setting
Volume flow rates in cfm
q_{vconst} (only with operating mode F)
q_{vmin} (only with operating mode V, M)
q_{vmax} (only with operating mode V, M)

11 Volume flow rate unit
cfm

Order example: TVT/8×4/D2/BM0-J6/V/117.72-470.86 cfm

Acoustic cladding	Without
Material	Galvanised sheet steel
Nominal size	8 × 4 in.
Accessories	Double lip seal both sides
Attachment	Compact controller Modbus, dynamic transducer, Modbus RTU, BACnet MS/TP, RJ12 connection socket
Operating mode	V variable operation
Volume flow rate	117.72 – 470.86 cfm

Variants

Compact controller BM0-J6, type LMV-D3-M/B-J6 TR, 5 Nm



① VAV-Compact
② Gear release button
③ Connections for differential pressure sensor
④ Service socket
⑤ Axis clamping device
⑥ Rotation stop
⑦ Indicator light/Addressing key
⑧ Connection socket RJ12

Compact controller BM0-J6, type NMV-D3-M/B-J6 TR, 10 Nm



① VAV-Compact
② Gear release button
③ Connections for differential pressure sensor
④ Service socket
⑤ Axis clamping device
⑥ Rotation stop
⑦ Indicator light/Addressing key
⑧ Connection socket RJ12

Technical data

Compact controllers for VAV terminal units

VAV terminal units	Type of installation component	Part number
TVR, TZ-Silenzio, TA-Silenzio, TVZ, TVA	LMV-D3-M/B-J6 TR	A00000070622
TVJ, TVT	NMV-D3-M/B-J6 TR	A00000070621
TVM	2 x LMV-D3-M/B-J6 TR	A00000070622

Compact controller BM0-J6, LMV-D3-M/B-J6 TR



Compact controller BM0-J6, LMV-D3-M/B-J6 TR

Supply voltage (AC)	24 V AC, 50/60 Hz
Supply voltage (DC)	24 V DC
Power rating (AC)	Max. 4 VA (max. 8 A @ 5 ms)
Power rating (DC)	Max. 2 W
Functional range	AC 19.2 – 28.8 V/DC 21.6 – 28.8 V
Bus connection	**Modbus RTU****, BACnet MS/TP,
Adjustable communication parameters Modbus RTU	Baud rate: 9600, 19200, **38400****, 76800, 115200; Address: **1****,2.3 – 247; Parity: **1-8-N-2****, 1-8-N-1, 1-8-E-1, 1-8-O-1; Number of nodes: max. 32 (without repeater) Terminal resistor: 120 Ω;
Adjustable communication parameters BACnet MS/TP	Baud rate: 9600, 19200, **38400****,**76800, 115200;** **Address: 0,1**,2.3 – 127;** **Number of nodes: max. 32 (without repeater)** **Terminal resistor: 120 Ω;**
Addressing	Required on-site: e.g. adjustment device ZTH-EU or external software
Setpoint value signal input	Via Modbus register access e.g. via X-AIRCONTROL zone module or BACnet objects
IEC protection class	III (protective extra-low voltage)
EC conformity	EMC to 2014/30/EU

**Factory setting

Compact controller BM0-J6, NMV-D3-M/B-J6 TR



Compact controller BM0-J6, NMV-D3-M/B-J6 TR

Supply voltage (AC)	24 V AC, 50/60 Hz
Supply voltage (DC)	24 V DC
Power rating (AC)	Max. 5 VA (max. 8 A @ 5 ms)
Power rating (DC)	Max. 3 W
Functional range	AC 19.2 – 28.8 V/DC 21.6 – 28.8 V
Bus connection	**Modbus RTU****, BACnet MS/TP,
Adjustable communication parameters Modbus RTU	Baud rate: 9600, 19200, **38400****, 76800, 115200; Address: **1****,2.3 – 247; Parity: **1-8-N-2****, 1-8-N-1, 1-8-E-1, 1-8-O-1; Number of nodes: max. 32 (without repeater) Terminal resistor: 120 Ω;
Adjustable communication parameters BACnet MS/TP	Baud rate: 9600, 19200, **38400****, 76800, 115200; Address: 0,**1****,2.3 – 127; Number of nodes: max. 32 (without repeater) Terminal resistor: 120 Ω;
Addressing	Required on-site: e.g. adjustment device ZTH-EU or external software
Setpoint value signal input	Via Modbus register access e.g. via X-AIRCONTROL zone module or BACnet objects
IEC protection class	III (protective extra-low voltage)
EC conformity	EMC to 2014/30/EU

**Factory setting

Communication interface Modbus RTU

Number	Register Address	Description	Range Enumeration	Unit	Scaling	Access
1		Setpoint value Setpoint value between q_{vmin} and q_{vmax}	0 – 10000 Factory setting: 0	%	0.01	[R / W]
2	1	Override control Overwrites the setpoint value with override control	0: None 1: OPEN 2: CLOSED 3: q_{vmin} 4: q_{vmid} 5: q_{vmax} Factory setting: None (0)	-	-	[R / W]
3	2	Command triggering - Release of functions for service and test purposes. Reset resets the controller and clears internal error memory such as register 105.	0: None 1: Adaptation 2: Test 3: Synchronisation 4: Reset Factory setting: None (0)	-	-	[R / W]
4	3	Type of actuator	0: Actuator not connected/not known 1: Actuator air/water with/ without safety function 2: Volume flow controller VAV/ EPIV 3: Fire damper 4: Energy valve 5: Pressure-independent control valve	-	-	[R]
5	4	Current damper blade position (%)	0 – 10000	%	0.01	[R]
6	5	Damper blade angle (°)	0 – max.	°	1	[R]
7	6	Relative volume flow rate related to $q_{vnom;}$	0 – 10000	%	0.01	[R]
8	7	Absolute volume flow rate related to $q_{vnom;}$	0 – $q_{vnom;}$	cfm	0.59	[R]
10	9	-	-	-	-	[–]
11	10	Absolute volume flow rate in selected volume flow unit acc. to register 15 (Lowword)	-	UnitSel	0.0001	[R]
12	11	Absolute volume flow rate in selected volume flow unit acc. to register 15 (Highword)	-	UnitSel	0.0001	[R]
13	12	Analogue setpoint value (%). Shows the setpoint value in % with control input signal.	0 – 10000	%	0.01	[R]
100	99	Bus terminal resistor. Indicates whether the terminating resistor (120 Ω) is active or deactivated.	0: inactive 1: active Factory setting: inactive (0)	-	-	[R / W]
101	100	Serial number, part 1	-	-	-	[R]
102	101	Serial number, part 2	-	-	-	[R]
103	102	Serial number, part 3	-	-	-	[R]
104	103	Firmware version. Example: 302, version 3.02	-	-	-	[R]
105	104	Malfunctions and service information	Bit1: Mechanical travel exceeded Bit2: Actuator cannot be moved (e.g. mechanical overload)	-	-	[R]

Number	Register Address	Description	Range Enumeration	Unit	Scaling	Access
			Bit8: Internal activity (e.g. test run, adaptation) Bit9: Gear release active Bit10: Bus monitoring triggered			
106	105	Setting work areas q_{vmin} Requirements q_{vmin}vmax q_{vmin} in the area 0 – 100 % $q_{vnom;}$	0 – q_{vmax} Standard: 0	%	0.001	[R / W]
107	106	Setting work areas q_{vmax} Requirements q_{vmax}vmin Vmax in the area 20 - 100 % $q_{vnom;}$	q_{vmin} –10000 Standard: 10000	%	0.01	[R / W]
109	108	Bus timeout monitoring	0: Last setpoint value 1: Fast close — CLOSED 2: Quick open — OPEN 3: Center position Factory setting: Last setpoint value (0)	-	-	[R / W]
110	109	Time until release bus timeout monitoring	0 - 3600 seconds Factory setting: 0 (bus timeout monitoring deactivated)	s	1	[R / W]
111	110	Nominal volume flow rate $q_{vnom;}$ (cfm)	-	cfm	0.59	[R]
112	111	-	-	-	-	[–]
113	112	Nominal volume flow rate $q_{vnom;}$ in selected volume flow unit acc. to Reg 118 (LowWord)	-	UnitSel	0.001	[R]
114	113	Nominal volume flow rate $q_{vnom;}$ in selected volume flow unit acc. to 118 (HighWord)	-	UnitSel	0.001	[R]
115	114	-	-	-	-	[–]
116	115	-	-	-	-	[–]
117	116	Control mode	0: Position control (open loop) 1: Volume flow control	-	-	[R / W]
118	117	Unit selection	0: m³/s 1: m³/h 2: l/s 3: l/min 4: l/h 5: gpm 6: cfm Standard m³/h (1)	-	-	[R / W]
119	118	Setpoint value setting	0: Analogue (0 – 10 V, 2 – 10 V) 1: Bus (Modbus, BACnet,) Factory setting: Bus (1)	-	-	[R / W]

Communication interface BACnet MS/TP

Object Name	Object Type	Description	Values	COV Increment	Access
Device	Device [Inst.No]		0 – 4194302 Default: 1	-	W
RelPos	AI[1]	Damper blade position in % Overridden = 1 (gear latch pressed)	0 – 100	0.01 – 100 Standard: 1	R
AbsPos	AI[2]	Absolute position in ° Overridden = 1 (gear latch pressed)	0 - max. rotation angle	0.01 – 65353 Factory setting: 1	R
SpAnalogue	AI[6]	Analogue setpoint value in % Shows the analogue setpoint value in %, if setpoint value setting is in (SpSource[122]) Analogue (1) If setpoint value setting (SpSource[122]) Bus (2) = then Out_Of_Service is TRUE	0 – 100	0.01 – 100 Standard: 1	R
RelFlow	AI[10]	Relative volume flow rate in %	0 – 100	0.01 – 100 Standard: 1	R
AbsFlow_UnitSel	AI[19]	Absolute volume flow rate of selected unit acc. to [121]	0 – $q_{vnom;}$	0.01 – 1000 Standard: 1	R
SpRel	AO[1]	Relative setpoint value in % Setpoint value between q_{vmin} AV[97] and q_{vmax} [98] (Only with bus control input signal) If SpSource (MV[122]) = 1 (Analogue), then Out_of_Service = TRUE	0 – 100 Factory setting: 0	0.01 – 100 Factory setting: 1	C
Min.	AV[97]	Minimum setpoint value in % (q_{vmin}) Requirement: q_{vmin}vmax q_{vmin} in the area 0 - 100 & $q_{vnom;}$	0 – qv_{max} Factory setting: 0	0.01 – 100 Factory setting: 1	W
Max.	AV[98]	Minimum setpoint value in % (q_{vmax}) Requirement: q_{vmax} > q_{vmin} q_{vmax} in the area 20 - 100 % of $q_{vnom;}$	qv_{min} – 100 Standard: 100	0.01 – 100 Standard: 1	W
Vnom_UnitSel	AV[104]	Current volume flow rate according to selected volume flow unit (UnitSelFlow MV[121])	-	0.01 – 100 Standard: 1	R
Bus Watchdog	AV[130]	Time until the release bus timeout monitoring in s If Present_Value ≠ 0, then write access to Present_Value is monitored by AO[1] and MO[1]. Writing to Present_Value AO[1] MO[1] resets the timer. In hybrid mode, only write accesses to MO[1] are monitored.	0 – 3600 s Factory setting: 0 (bus timeout monitoring deactivated)	0.01 – 1000 Standard: 1	W
BusTermination	BI[99]	Terminal resistor Shows whether the terminal resistor (120 Ω) has been activated via the service tools.	Inactive_Text: Switch not active Active_Text: Switch active	-	R
SummaryStatus	BI[101]	Condensed status	Inactive_Text: no error	-	R

Object Name	Object Type	Description	Values	COV Increment	Access
		Summary status (MI[106], MI[110])	Active_Text: Error		
InternalActivity	MI[100]	Status Activity	1: None 2: Test 3: Adaptation	-	R
StatusActuator	MI[106]	Status of the actuator	1: OK 2: Actuator cannot be moved 3: Gear release active 4: Mechanical travel exceeded	-	R
StatusDevice	MO[110]	Status of the device Shows the general status of the device	1: OK 2: Bus timeout monitoring activated	-	R
Override	MO[1]	Override control Overwrites the setpoint value (SpRel AO[1]) with a forced command.	1: None 2: OPEN 3: CLOSED 4: q_{vmin} 5: q_{vmid} 6: q_{vmax} Factory setting: None (1)	-	C
Command	MV[120]	Release test functions	1: None 2: Adaptation 3: Test 4: Reset Factory setting: None (1)	-	W
UnitSelFlow	MV[121]	Unit selection The selected unit is indicated in AI[19] and AV[104].	1: m³/s 2: m³/h 3: l/s 4: l/min 5: l/h 6: gpm 7: cfm Factory setting: m³/h (2)	-	W
ControlMode	MV[122]	Setpoint value setting	1: Analogue (0 – 10 V, 2 – 10 V) 2: Bus (Modbus, BACnet, MP-Bus) Factory setting: Bus (2)	-	W
ControlMode	MV[223]	ControlMode	1: Position control (OpenLoop) 2: Volume flow control	-	W

Product details

Bus operation

The controller is supplied from the factory with operating mode Modbus-RTU. The operating mode can be switched to BACnet MS/TP at any time using the service tool ZTH-EU. For a smooth exchange of data in the bus network provided by others, the communication parameters and the user address for the bus interface are required. The communication parameters for the bus systems (address, baud rate etc.) can be set using the ZTH-EU. The interface provides standardised bus register/object access to the available data points.

Setpoint value default setting

- In the operating mode Modbus RTU (factory setting), the setpoint value is set by specifying the volume flow rate setpoint value [%] in the Modbus register 0 or by X-AIRCONTROL.
- The transferred percentage value refers to the volume flow rate range specified by q_{vmin} – q_{vmax}
- Volume flow rate range q_{vmin} – q_{vmax} preset at the factory according to the order code
- Subsequent adjustment of q_{vmin} or q_{vmax} possible using service tool ZTH-EU, Modbus/BACnet interface or X-AIRCONTROL

Actual value as feedback for monitoring or tracking control

- The actual values can be read in cfm (factory setting) via service tools, Modbus-BACnet interface or X-AIRCONTROL
- In addition to the volume flow rate actual value, further information on other Modbus registers/BACnet objects or X-AIRCONTROL can be read out
  - Overview of the bus registers/objects in the communication tables

Override control

For special operating situations, the volume flow controller can be put in a special operating mode (override control). The following modes are possible: control P_{vmin}, control q_{vmax}, damper blade in the OPEN position or damper blade CLOSED. This is set via the Modbus register 1 or via BACnet object type MO[1].

Override control via bus timeout monitoring (Modbus)

If the Modbus communication fails for a stipulated time period, a pre-defined operating mode q_{vmin}, q_{vmax}, OPEN or CLOSED can be activated.

- The override control to be activated upon bus timeout is specified via Modbus register 108
- The time period after which override control is activated upon bus timeout is specified via Modbus register 109
- Each Modbus communication resets the timeout of the bus timeout monitoring

Override control via bus timeout monitoring (BACnet)

If the BACnet communication fails for a specified period, a predefined operating state can be activated.

- The setpoint value to be activated upon bus timeout is specified via Relinquish_Default from SpRel (object AO1)
- Bus timeout period is defined via BusWatchdog (object type AV [130])
- Communication on the data points SpRel (Object AO[1] and Override (Object MO[1])

Override controls for diagnostic purposes

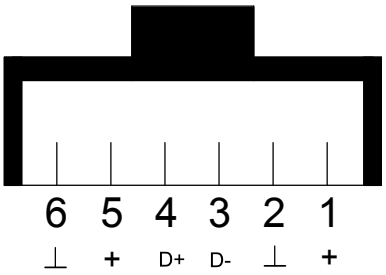
Activation via bus system, external/on-site switch contacts, ZTH-EU or PC software or X-AIRCONTROL.

Prioritisation of various setting options

Settings for service connector via analogue are prioritised over Modbus/BACnet settings.

- High priority: settings via the service connector (adjustment device, PC software) for test purposes
- Lowest priority: setting via Modbus/BACnet/X-AIRCONTROL

BM0-J6, connection socket pin identification RJ12



6 ⊥, - = Ground, neutral
5 ~, + = Supply voltage 24 V
4 D+ = Modbus RTU, BACnet MS/TP
3 D- = Modbus RTU, BACnet MS/TP
2 ⊥, - = Ground, neutral
1 ~, + = Supply voltage 24 V

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 stored in the Easy Product Finder design program. 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]
Technically possible minimum volume flow rate: The value depends on product type, nominal size and control component (attachment). Values are stored in the Easy Product Finder design program. 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]
Upper limit of the operating range for the VAV terminal unit that can be set by customers: q_{vmax} can be set to less than or equal to q_{vnom} For analogue signalling to volume flow controllers (typically used), the maximum value of the setpoint signal (10 V) is assigned the set maximum value (q_{vmax}) (see characteristic).

q_{vmin} [cfm]
Lower limit of the operating range for the VAV terminal unit that can be set by customers: q_{vmin} should be set to less than or equal to q_{vmax} . Do not set 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 signalling to volume flow controllers (which are typically used), the set minimum value (q_{vmin}) is allocated to the minimum setpoint signal (0 or 2 V) (see characteristic).

q_v [cfm]
Volume flow rate

VAV terminal unit
Consists of a basic unit with an attached control component.

Basic unit
Unit for controlling a volume flow without an attached control component. The main components include the casing with sensor(s) to measure the effective 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 types of connection, acoustic characteristics (e.g. acoustic cladding or integral sound attenuator), volume flow rate range.

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 consists basically of a controller with effective pressure transducer (integral or external) and an integral actuator (Easy and Compact controllers) or external actuator (Universal or LABCONTROL controllers). Important distinguishing features: Transducer: dynamic transducer for clean air or static transducer for contaminated air. Actuator: slow-running actuator as standard, spring return actuator for safe position, or fast-running actuator. Interface: analogue interface or digital bus interface for the capturing of signals and data.