



The VAV-Compact product range.

Ready for the volumetric flow systems of tomorrow.

**BELIMO**<sup>®</sup>



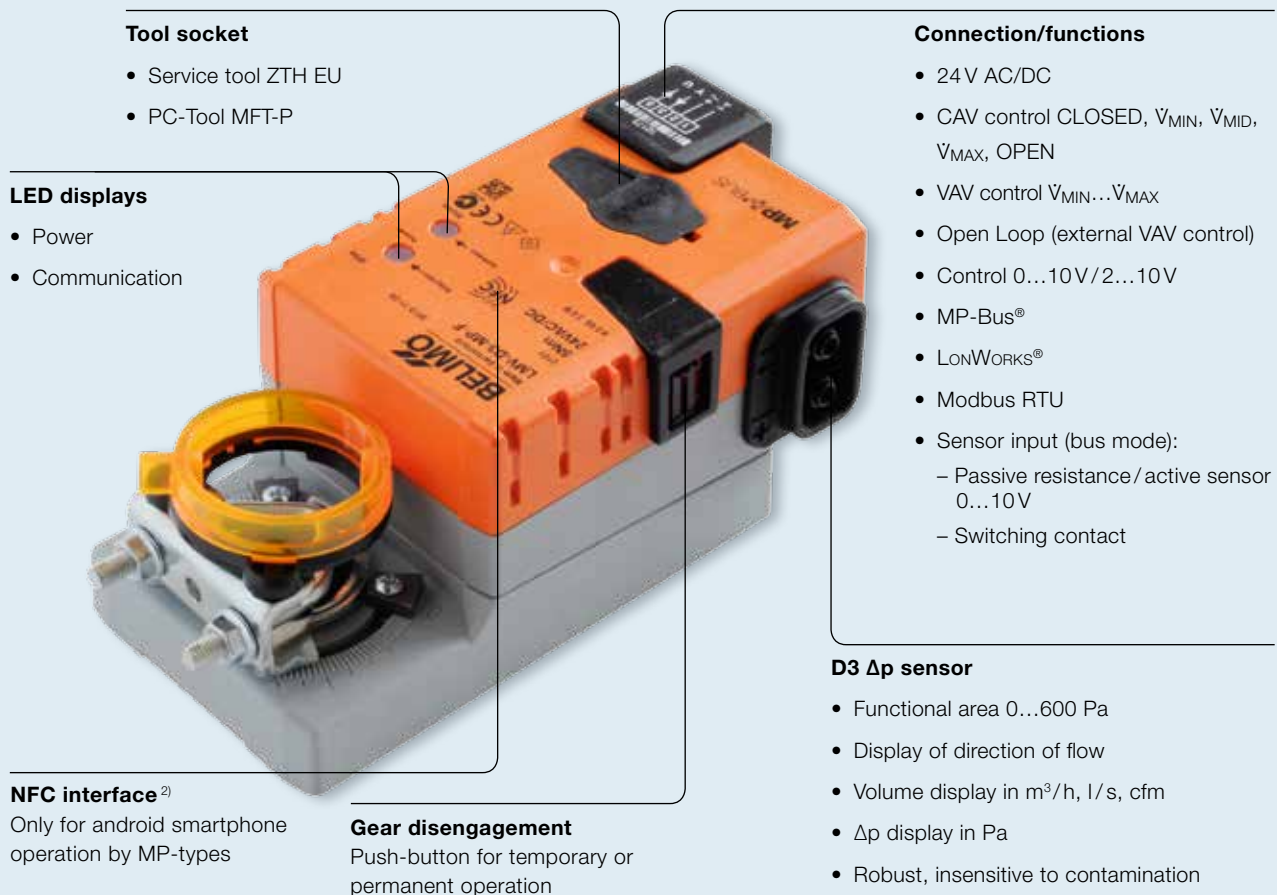
## Current technology, modern sensors, convincing operation concept.

### **EXPERIENCE** **EFFICIENCY**

Belimo launched the first VAV-Compact <sup>1)</sup> on to the market back in 1990 – as a cost-optimised unit consisting of an integrated differential pressure sensor, controller and actuator. The concept of the trendsetter product is convincing and has shaped the market. As of today, more than 3 million units of these have been installed in variable volumetric flow systems. Around 90% of all VAV units in Europe are being fitted with VAV-Compact controllers.

The system solution for volumetric flow systems – the VAV-Compact with the further-developed D3 sensor generation – is ready for the requirements of tomorrow. The result: Balanced room comfort with the lowest energy consumption. Another highlight is the three-part interaction concept with local operation using a smartphone, the self-explanatory service tool ZTH EU and the comprehensive PC-Tool with graphical trend display. Please ask for the original from the market leader when you are equipping your VAV units.

## VAV-Compact – the better original.



### Tool socket

- Service tool ZTH EU
- PC-Tool MFT-P

### LED displays

- Power
- Communication

### NFC interface<sup>2)</sup>

Only for android smartphone operation by MP-types

### Gear disengagement

Push-button for temporary or permanent operation

### Connection/functions

- 24 V AC/DC
- CAV control CLOSED,  $V_{MIN}$ ,  $V_{MID}$ ,  $V_{MAX}$ , OPEN
- VAV control  $V_{MIN}...V_{MAX}$
- Open Loop (external VAV control)
- Control 0...10V/2...10V
- MP-Bus®
- LonWORKS®
- Modbus RTU
- Sensor input (bus mode):
  - Passive resistance/active sensor 0...10V
  - Switching contact

### D3 Δp sensor

- Functional area 0...600 Pa
- Display of direction of flow
- Volume display in m<sup>3</sup>/h, l/s, cfm
- Δp display in Pa
- Robust, insensitive to contamination

## Energy-efficient volumetric flow systems in accordance with DIN EN 15232

The law demands highly-insulated and sealed building shells. Any emissions that may arise must be evacuated and corresponding amounts of fresh air must be supplied. Demand controlled ventilation – known as DCV<sup>3)</sup> – fulfils this and the specifications of energy efficiency class A (DIN EN 15232). Modern VAV systems, integrated in DCV systems, control the operation of the air conditioning all the way to the room in accordance with requirements – not as much as possible, but exactly as much as necessary. The VAV-Compact series has highly sensitive sensors for precise Δp recording. This allows the smallest of volumetric flows to be controlled. The simple integration in DCV systems (Fan Optimiser) plays an important role in meeting SFP requirements<sup>4)</sup>.

## Simple monitoring and system integration

All relevant data of the VAV-Compact units can be called up at any time with the proven ZTH EU service tool or with the user-friendly PC-Tool – as a simple display or as a graphic trend assessment:  $V_{MIN}/V_{MAX}$  setting, flow direction, set point/actual values, Δp and volumetric flow (in m<sup>3</sup>/h, l/s, Pa), damper position, etc. The standard controllers are actuated using a 0/2...10V signal or via MP-Bus®.

New: The operating volumetric flow parameters  $V_{MIN}/V_{MAX}$  or the MP address can now be adapted extremely easily using the intelligent Belimo Assistant app on your android smartphone.

Appropriate VAV-Compact models are available for direct connection in LonWORKS® and Modbus RTU networks.

## The most comprehensive product range for new systems and renovations

Belimo VAV-Compact controllers are distributed through all well-known manufacturers (OEM). They supply the complete VAV unit, completely attached and set. Depending on the unit version, rotary actuators with 5/10/20 Nm or actuators with linear movement are available.

## Modernising with the VAV-Compact Retrofit kit

The VAV-Compact Retrofit kit is available for modernising old VAV units. The controller has an internal database (TypeList) for the usual round nominal diameters. All relevant retrofit data, including  $V_{NOM}$  value, are stored and can be called up with the service tool ZTH EU or the PC-Tool: Select respective nominal diameter, set  $V_{MIN}/V_{MAX}$  – and the VAV unit is ready for operation.

<sup>1)</sup> VAV – Variable Air Volume: variable volumetric flow system

<sup>2)</sup> NFC – Near Field Communication: wireless transmission standard

<sup>3)</sup> DCV – Demand Controlled Ventilation: demand-based ventilation system with Fan Optimiser system using pressure feedback

<sup>4)</sup> SFP – Specific Fan Power

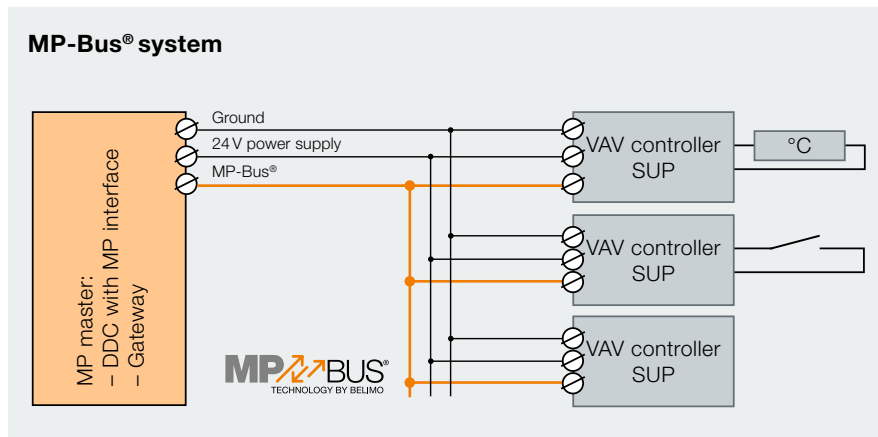
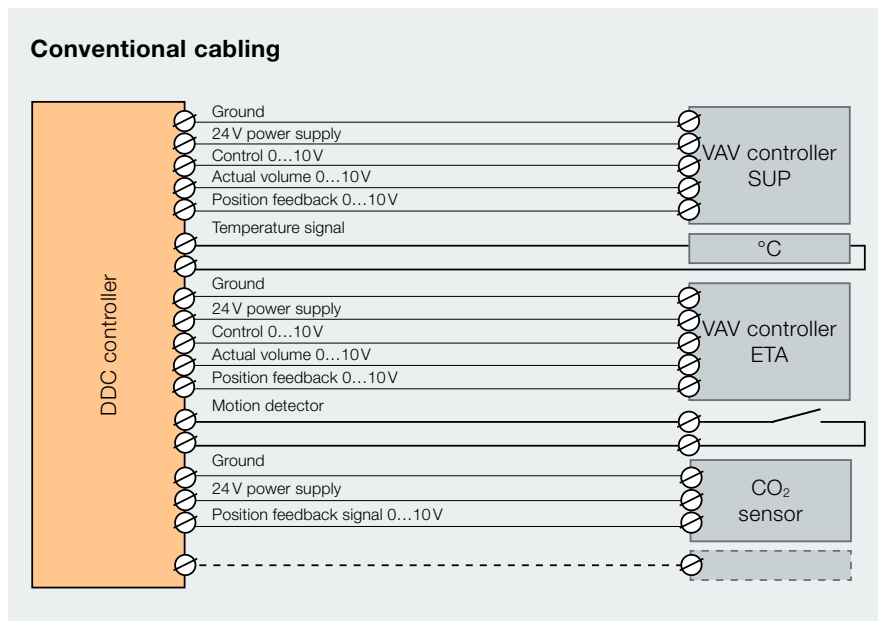
# Integrated bus solutions.

## The key to an energy-efficient system.

### Open system solution

In addition to the conventional 0...10V/2...10V control via local room or DDC controllers, more and more VAV systems are being implemented with bus connection. Standard VAV-Compact devices are bus-capable and can be extended at any time from analog control to the MP-Bus® system, in many cases with the existing cabling. Bus systems allow massive savings to be made in installation and operation:

- Less cable means smaller fire loads and smaller control cabinets – that brings high added value in operation and in monitoring.
- Central access to all relevant data of the VAV controller.
- Easy implementation of energy-efficient DCV systems. For example with the Fan Optimiser function for lasting ventilator control via the demand of the switched-in VAV units.



### MP-Bus® Partner solutions

The MP-Bus® technology from Belimo is equipped with an open protocol for the direct integration of the VAV-Compact in MP Partner solutions with integrated MP interface. A corresponding list of manufacturers can be found at: [www.belimo.eu](http://www.belimo.eu)

### MP Gateways

Various Belimo Gateways are available for integrating all Belimo MP actuators (dampers, valves, VAV controllers) in LON-WORKS®, KNX, BACnet, Modbus or Profibus systems. 1...8 MP devices and one additional sensor or switch can be bundled in one channel and connected together and inexpensively to the desired field bus system.

### Integration in LonWorks®

In addition to the Gateway solution, the VAV-Compact LON with installed LONMARK®-certified interface is available from Belimo for integration in LonWorks®. Thanks to the integrated control and sensor object, a complete VAV room solution is obtained.

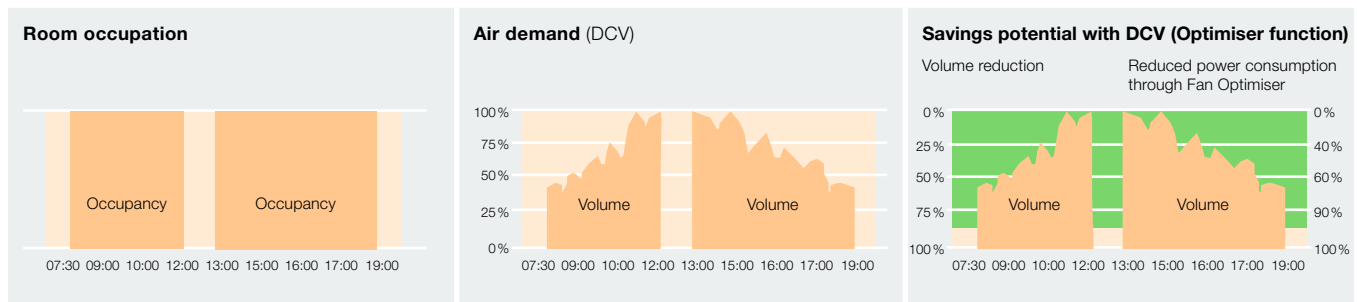
### Integration in Modbus RTU

The VAV-Compact MOD with integrated Modbus RTU interface can be supplied for Modbus systems. One sensor or one switch can also be integrated for each actuator.

# DCV – Demand Controlled Ventilation. Needs-controlled operation throughout.

## Optimum air volume

Demand-based operation of a room air system is known as Demand Controlled Ventilation (DCV). In this system, the air exchange rate is based on the current air demand. The air quality and the temperature act as controlled variables. The zone is not run with the calculated full load, but instead the quantity of air is reduced according to the current requirements in accordance with changing volumes.



## Fan Optimiser

**Constant primary pressure system:** In a VAV system with conventional primary pressure-regulated fans, the  $\Delta p$  set point corresponds to the full load level (Point K = 100%), independent of the air exchange rate currently required by the DCV system. The excessive system pressure is eliminated by the downstream VAV units by means of the closing of the dampers.

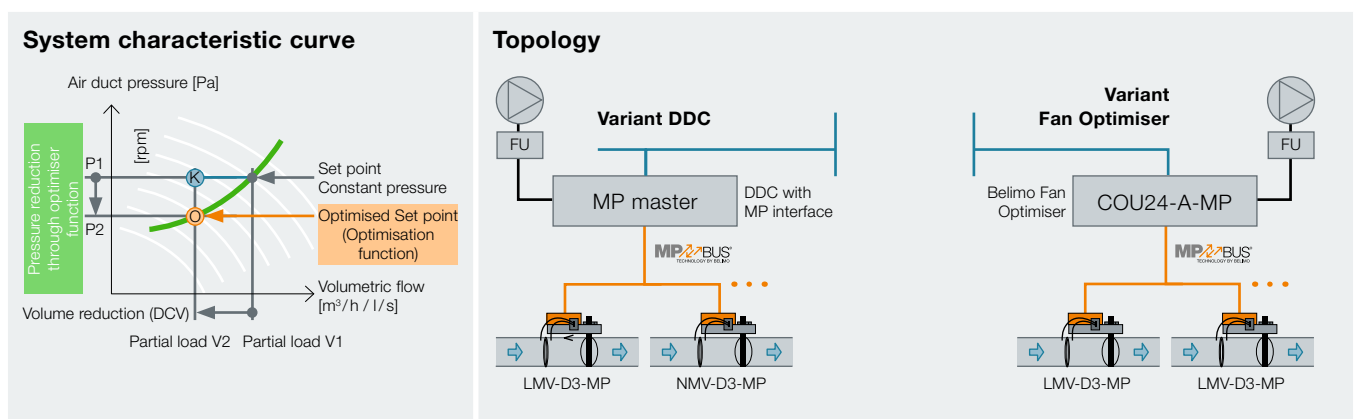
**Variable primary pressure – Fan Optimiser system:** With this system, the primary pressure of the system is continuously aligned with the necessary room air requirement during operation. The goal is to keep the duct pressure as low as necessary. To this end, the damper positions of the VAV units are evaluated via the bus master and the primary pressure is lowered approximately to the system characteristic curve (Point O). With energy optimisation, precisely as much pressure is generated as the transport of the currently required volume through the air duct system requires.

### Conventional solution:

- Unnecessary energy consumption
- Irritating sounds of flow
- Excessive system pressure

### The Belimo solution:

- Markedly lower energy consumption and operating costs through rpm reduction in the fans (SFP)
- Convenience enhancement through the considerably reduced sounds of flow and air movements



In addition to the proven COU24-A-MP Fan Optimiser solution, optimiser systems can also be implemented through the MP-Bus® with DDC solutions from Belimo MP partners or via Gateways in all conventional bus systems.



# Transparency and information. At all times, everywhere.

## Belimo Assistant app for android smartphones

Do you want to use your smartphone to operate the VAV-Compact? No problem! Adjusting the  $V_{MIN}/V_{MID}/V_{MAX}$  operating volumetric flow parameters is child's play with the intelligent assistant app from Belimo. Set points/actual values and damper position are displayed for instant assessment of system efficiency. Thanks to the new NFC interface, no cable connections are required. A clever idea – brilliantly implemented.



## Service tool ZTH EU

VAV units have concealed installation at many locations and are therefore difficult to access. The ZTH EU service tool provides the practical solution for the easiest of operation, tests and troubleshooting.

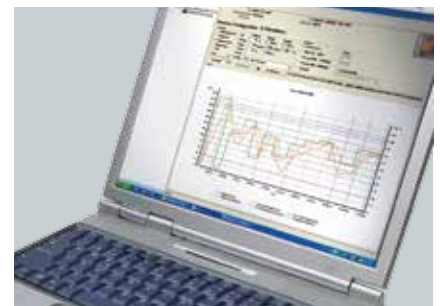
Capable of central operation – directly at the control cabinet, at the floor distributor or at the CR24 room regulator – all efforts and costs for opening ceilings, etc. are dispensed with, and setting or tests are carried out under menu guidance. Display and entry take place with real values – no conversion required. The  $\Delta p$  and position indicator enables rapid diagnostics – from the VAV unit to the behaviour of the system – even without direct visual contact. This means that VAV units can be adjusted to changing operating conditions on site.



## PC-Tool MFT-P

The proven PC-Tool from Belimo is available for operating and setting the VAV-Compact. It provides everything that the ZTH EU service tool has to offer, and much more. The connection is established locally or centrally in the control cabinet or on the MP master, respectively.

- **Checking the VAV unit:** Trend function for graphic depiction, saving or printing of all current and/or recorded data.
- **Functional check:** Set point profiles can be specified for monitoring purposes and the resulting volume,  $\Delta p$  actual values and damper position can be graphically displayed and logged.
- **Save, release data print:** All parameter and actual values can be saved and printed out as needed, either offline or online – and also in the form of freely definable labels.



For **VAV manufacturers (OEMs)** Belimo offers a special VAV manufacturer module for adaptation of the VAV controller to the VAV unit. Several workflows are supported by the means of powerful programming features. The setting data can be acquired manually, stored in a database on the PC or imported as a file into the PC-Tool. Calibration can be carried out passively, with pre-defined values, or actively on the test bench by means of a reference volumetric flow. All sequences and setting data are logged for documentation purposes. Customer-specific labels can be created automatically with the print module.

As an alternative to the mentioned calibration methods, the setting data can be stored in the VAV-Compact in the factory and called up with either the manufacturer version of the ZTH EU or by using the respective PC-Tool.

# Belimo VAV-Compact solutions. Proven in day-to-day practice.

## Statoil's Fornebu building – Fornebu/Norway



Modbus system: 6500 LMV-D3-MP, 84 UK24MOD plus 800 zone dampers

## Nuovo Teatro dell'Opera di Firenze – Florence/Italy



LON system: 320 LMV-D3LON with Fan Optimiser function, 300 fire protection actuators, valves: 12 EPIV, 270 PICCV

## ETEHCENTER – Linz/Austria



Beckhoff MP system: 400 LMV-D3-MP with Fan Optimiser function, 1330 valve and 100 fire protection actuators

## PRIME TOWER – Zurich/Switzerland



Wago MP system: 800 LMV-D2-MP with Fan Optimiser function, 800 fire protection actuators

## Complementary Belimo VAV product ranges

### VAV-Universal

- Static or dynamic sensors
- Volume or pressure controllers
- Standard or fast runner actuator (2.5/4 s running time)
- Spring-return actuator with open-close emergency control function
- Rotary, linear, 360° rotating actuators

### Electrical accessories

- Gateways UK24LON/EIB/BAC/MOD
- Fan Optimiser COU24-A-MP
- Room temperature controller CR24-B1/2/3
- Apartment air controller CRA24-B3
- 3-contactor step control CRA24-B1P
- Positioner CRP24-B1, SGF24



5-year  
warranty



On site around  
the globe



A complete  
range of products  
from one source



Tested quality



Short delivery  
times



Comprehensive  
support

#### Head office

BELIMO Automation AG  
Brunnenbachstrasse 1  
CH-8340 Hinwil, Switzerland  
Tel. +41 43 843 61 11  
Fax +41 43 843 62 68  
info@belimo.ch

Belimo worldwide: [www.belimo.com](http://www.belimo.com)

**BELIMO**<sup>®</sup>