

# Clean air – within seconds...



## Adaptive control system for sensitive operating ranges.

The digital VRP-M controller forms the core of the ready-to-plug-in Universal Control System for VAV units and for duct pressure control. Depending on the application, a variety of pressure sensors and actuators are available.

The precise pressure sensors and the reliable fast runner actuators enable the extraction of contaminated air and the supplying of fresh air within a few seconds when contaminated exhaust air is involved in the laboratory and production sector.

VAV applications with either standard or spring-return actuators can be integrated in an Optimiser System. This kind of demand-controlled (DCV) ventilation system combines energy efficiency and comfort. Also in combination with the proven VAV-Compact as needed.

Various actuator variants are available for controlling a pressure balance, e.g. duct pressure, including the proven fast runner or with a spring-return with defined emergency position.

The manufacturer of the VAV unit adjusts the VRP-M system individually for the respective application using the Belimo PC-Tool. Commissioning on the system is considerably simplified, thanks to the adaptive control characteristics.

Up to eight MP slaves – VRP-M including actuator and sensor – can be integrated in bundles into higher-level bus systems via the Belimo MP-Bus®. This lowers planning and cabling outlays, increases functionality and reduces costs – exactly the way you are used to with the solutions from Belimo!

**MP-BUS**  
TECHNOLOGY BY BELIMO

## Perfect solutions for volumetric flow and pressure applications.

### Belimo Europe

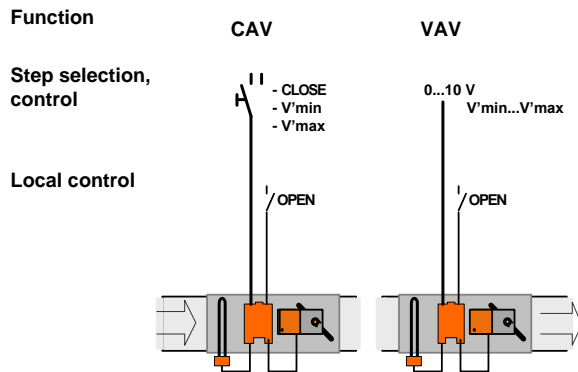
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**BELIMO**<sup>®</sup>

## CAV / VAV system, conventional

Constant and variable volumetric flow applications with standard or fast-running actuator.



### Application

- Standard actuator  
Extraction of contaminated air
- Fast-runner actuator  
Laboratory solutions, production exhaust air

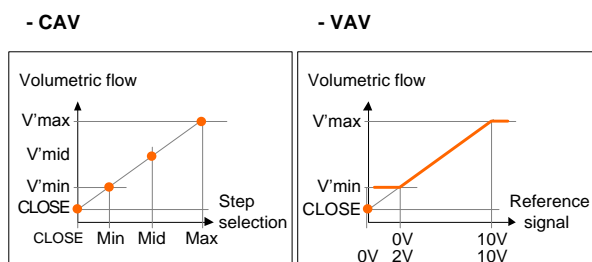
### Control

- CAV: step-control via switch, contacts
- VAV: control signal 0...10 / 2...10 V  
e.g. room temperature control CR24

### Local control

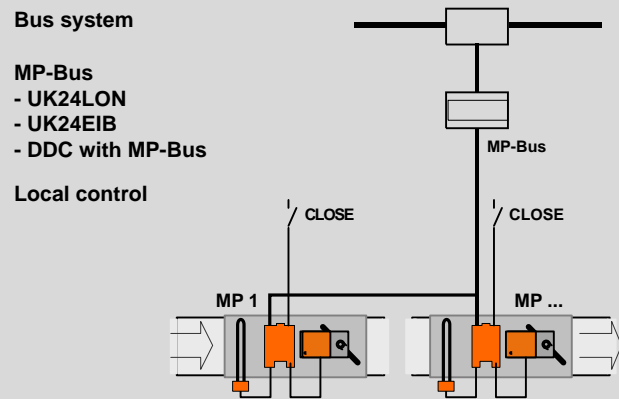
via switch, contacts  
Available steps: CLOSE / OPEN / V'mid / V'max

### Control diagram



## VAV system, bus operation

VAV system solution for bus integration with standard or fast-running actuator.



### Application

- Standard actuator  
Extraction of contaminated air  
Combined systems with VAV-Compact
- Fast-runner actuator  
Laboratory solutions, production exhaust air

### Control, sensor integration

- MP-Bus
- Additional 0...10 V sensor

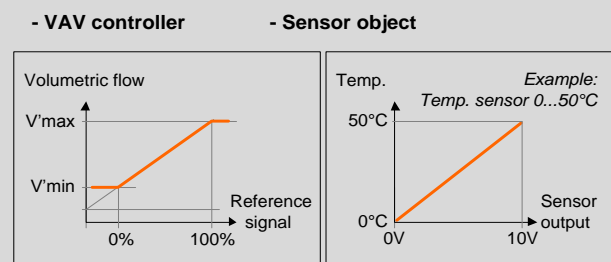
### Local control

via switch, contacts  
available steps: CLOSE / OPEN / V'mid / V'max

### Integration in

- Modbus, BACnet, LONWORKS®, KNX
- DDC system with MP-Interface

### Control diagram



For detailed information for planning, application and operation, see [www.belimo.eu](http://www.belimo.eu).

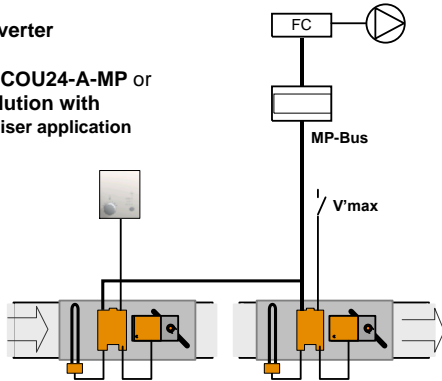
## DCV Demand Controlled Ventilation

DCV System solution – Optimiser function for energy-efficient fan control via damper positions of the integrated VAV units.

Fan, frequency converter

Fan Optimiser COU24-A-MP or MP-Partner Solution with integrated Optimiser application

Control, local control



### Application

- Standard actuator
- Energy-efficient fan control
- Extraction of contaminated air
- Combined systems with VAV-Compact

### Control

- CAV: step-control via switch, contacts
- VAV: reference signal 0...10 / 2...10 V, e.g. room temperature control CR24

### Local control

via switch, contact  
Available steps: CLOSE / OPEN / V'mid / V'max

### Fan optimiser

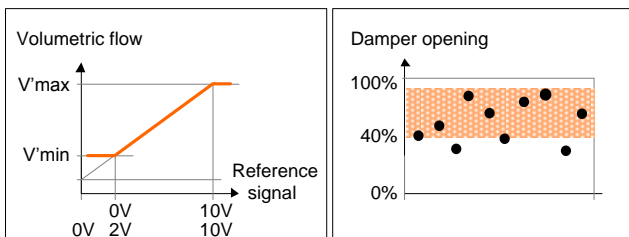
- Belimo Fan Optimiser COU24-A-MP
- DDC with integrated MP-Interface and Optimiser application

### Frequency converter control

Analogue signal 0...10 V

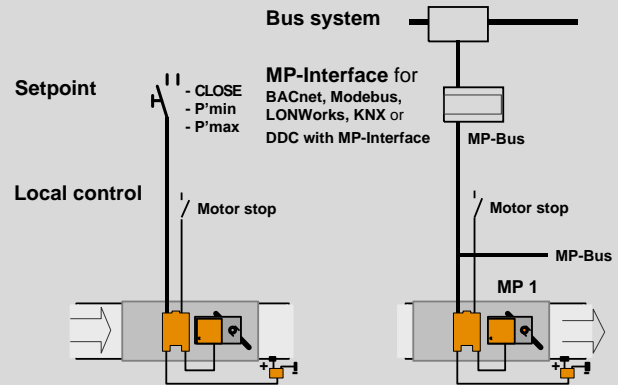
#### Control diagram

- VAV controller
- Damper behaviour optimiser



## STP – conventional & bus operation

System solution with standard or fast-running actuator for room and duct pressure control.



### Application

- Standard actuator
- Duct pressure control circuit
- Fast-running actuator
- Duct pressure control circuit

### Control, sensor integration

- MP-Bus
- integration of additional 0...10 V sensor

### Local control

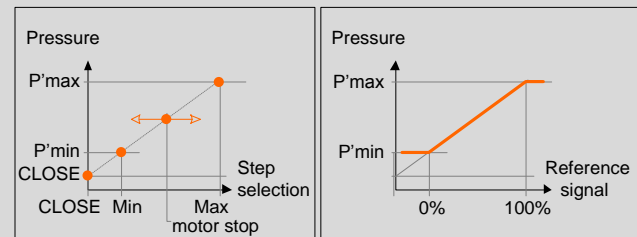
via switch, contact  
Available steps: CLOSE / OPEN / Motor stop / P'mid / P'max

### Integration in

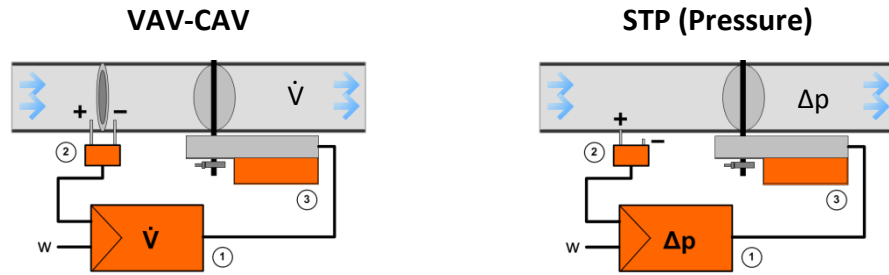
- Modbus, BACnet, LONWORKS®, KNX
- DDC system with MP-Interface

#### Control diagram

- STP step mode
- STP modulating – Bus mode



## Application



	VAV-CAV	STP (Pressure)
Control mode	Flow	$\Delta p$
Supply / exhaust air systems	■	■
Extraction system	■	■
Duct pressure system		■
Actuator variants	According to application: standard or fast runner, see ③ section Actuator Spring-return actuator with emergency position open or close	
Sensor variants	According to application: static / dynamic, see ② section $\Delta p$ -Sensor	
Optimiser function for energy efficient fan control	■ a)	-
Step control	■	■
Modulating control	■	■
Local override steps	Close, V'mid, V'max, Open	Close, V'max, Motor stop, Open
Bus integration	MP-Bus (MP-Partner systems), LonWorks, KNX, Modbus, BACnet, COU24-A-MP	

## ① Controller platform

	VAV / CAV	VRP-M	STP
Application			
Power supply	AC / DC 24 V		
Control signal	0/2...10 V, 0/4...20 mA		
Feedback, actual value	Flow 0/2...10 V		$\Delta p$ 0/2...10 V
Tools	PC-Tool VRP-M Modul, Service-Tool ZTH-GEN		
Optimiser compatible	■		-
Gateways	UK24LON, UK24EIB, UK24MOD, UK24BAC		
MP-Master	DDC systems from Belimo MP-Partner, COU24-A-MP		

## ② $\Delta p$ -Sensor

Type	VFP-100	VFP-300	VFP-600	VFD3
Measuring principle	static	Static	Static	Dynamic
Pressure range	0...100 Pa	0...300 Pa	0...600 Pa	selectable: 0...100/300/600 Pa
Comfort zone	■	■	■	■
Dust-laden air		Dusty to heavily dust-laden air <sup>b)</sup>		Dusty air <sup>b)</sup>
Corrosive media		Corrosive air <sup>c)</sup>		<sup>d)</sup>
Connection	integrated cable-/plug-in unit corresponding to VRP-M			

## ③ Actuator

Type	LM24A-V-ST	LMQ24A-SRV-ST	NMQ24A-SRV-ST	SF24A-V-ST
Function	Standard	Fast runner	Fast runner	Spring-return
Emergency function	-	-	-	open or close
Running time	110...150 s	2,5 s	4 s	110...150 s
Connection	integrated cable-/plug-in unit corresponding to VRP-M			

- a) Restriction: Optimiser requires actuators with standard running time (fast runners are not allowed).
- b) Independent from the sensor type, the pick-up device (part of VAV-unit) must be checked periodically and cleaned if necessary.
- c) The VAV unit (pick-up, etc.) must be selected according to the media. The compatibility of the sensor materials must be examined, see VFP-xxx Technical Data
- d) Air-duct cleaning agent and disinfectant compatible