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!

Perfect solutions for volumetric flow and pressure applications.

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VRP-M applications

CAV / VAV system, conventional

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

Function
- 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

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

VAV system, bus operation

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

Bus system
- MP-Bus
  - UK24LON
  - UK24EIB
  - DDC with MP-Bus

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

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

Control, sensor integration
- MP-Bus
  - Additional 0...10 V sensor

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

For detailed information for planning, application and operation, see www.belimo.eu.

www.belimo.eu

Subject to technical modifications
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**

Control diagram - VAV controller

- Volumetric flow
  - V’max
  - V’min

Control diagram - Damper behaviour optimiser

- Damper opening
  - 100%
  - 40%
  - 0%

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

STP – conventional & bus operation

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

**Setpoint**
- CLOSE
- P’min
- P’max

**MP-Interface**
- for BACnet, Modbus, LONWorks, KNX or DDC with MP-Interface

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

- Pressure
  - P’max
  - P’mid
  - CLOSE

Control diagram - STP modulating – Bus mode

- Pressure
  - P’max
  - P’mid
  - Step selection
  - CLOSE Min Motor stop

Subject to technical modifications

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**VRP-M System Overview**

### Application

#### VAV-CAV

- **Control mode**: Flow
- **Supply / exhaust air systems**: 
- **Extraction system**: 
- **Duct pressure system**: 
- **Actuator variants**: According to application: standard or fast runner, see section Actuator
- **Sensor variants**: According to application: static / dynamic, see section \( \Delta p \)-Sensor
- **Optimiser function for energy efficient fan control**: 
- **Step control**: 
- **Modulating control**: 
- **Local override steps**: Close, \( V’ \)-mid, \( V’ \)-max, Open
- **Bus integration**: MP-Bus (MP-Partner systems), LonWorks, KNX, Modbus, BACnet, COU24-A-MP

#### STP (Pressure)

- **Control mode**: \( \Delta p \)
- **Supply / exhaust air systems**: 
- **Extraction system**: 
- **Duct pressure system**: 
- **Actuator variants**: Spring-return actuator with emergency position open or close
- **Sensor variants**: Spring-return actuator with emergency position open or close
- **Optimiser function for energy efficient fan control**: 
- **Step control**: 
- **Modulating control**: 
- **Local override steps**: Close, \( V’ \)-mid, \( V’ \)-max, Open
- **Bus integration**: MP-Bus (MP-Partner systems), LonWorks, KNX, Modbus, BACnet, COU24-A-MP

### Controller platform

- **Application**: VAV / CAV
  - **Power supply**: AC / DC 24 V
  - **Control signal**: 0/2…10 V, 0/4…20 mA
  - **Feedback, actual value**: Flow 0/2…10 V
  - **Tools**: PC-Tool VRP-M, Modul, Service-Tool ZTH-GEN
  - **Optimiser compatible**: 
  - **Gateways**: UK24LOI, UK24EIB, UK24MOD, UK24BAC
  - **MP-Master**: DDC systems from Belimo MP-Partner, COU24-A-MP

- **STP**: 
  - **Power supply**: AC / DC 24 V
  - **Control signal**: 0/2…10 V

### \( \Delta p \)-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**: Dusty to heavily dust-laden air b), Dusty air b), Corrosive air c)
  - **Connection**: integrated cable-/plug-in unit corresponding to VRP-M

### Actuator

  - **Function**: Standard, Fast runner, Fast runner, Spring-return or close
  - **Emergency function**: 
  - **Running time**: 110…150 s, 2,5 s, 4 s, 110…150 s
  - **Connection**: integrated cable-/plug-in unit corresponding to VRP-M

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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

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