VRP-M Module V2.11

User Guide

English

Table of Contents

Introduction

The Manual describes handling and use of the VRP-M Module V2.11 the parameterising and operating tool for the VRP-M system solution.

The VRP-M Module functions are split into two task-oriented tabs, called '*Service*' and '*Expert*', which also provide the structure for this document.

The VRP-M V3.x system solution supports two main applications:

- VAV mode - for air flow control
- STP mode – for duct pressure control

The VRP-M system solution is normally delivered mounted, pre-adjusted and parameterised by the manufacturer (OEM) of the VAV or pressure control system.

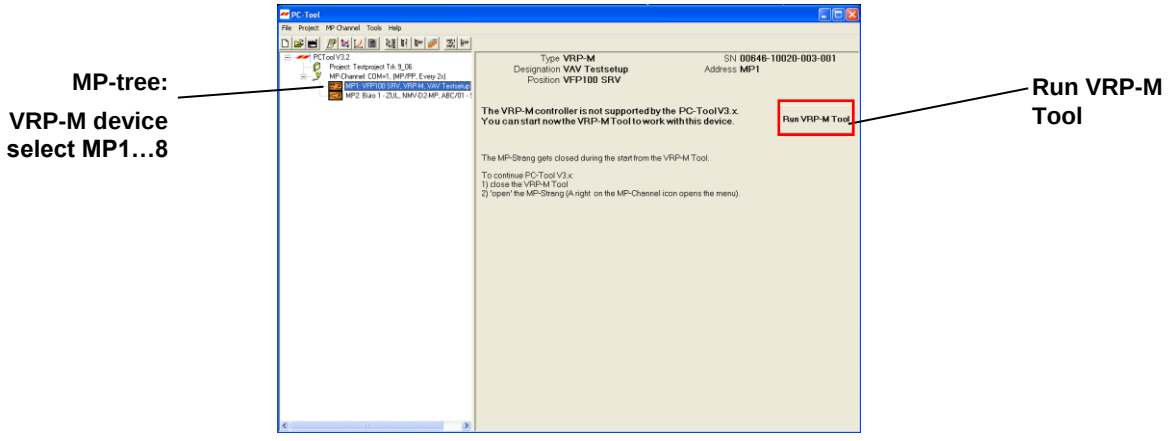
Note
For technical data, a description of functions and details of connections and wiring, refer to the Product-Information documents:
❶ *VRP-M VAV - Adaptive VAV control system for sensitive working areas*
❷ *VRP-M STP - Adaptive control system for duct pressure applications*

Use and restrictions

The VRP-M Module can exclusively be used in combination with the Belimo VRP-M controller.

The Belimo PC-Tool Suite V3.x is required to operate and parameterise Belimo MFT / MP devices such as NMV-D2M, L/NMV-D2-MP, L/NMV-D3-MP, etc.

The VRP-M Module V2.11 can be integrated as a module in the Belimo PC-Tool Suite V3.x. By clicking at the VRP-M icon in the PC-Tool's *MP-tree*, the required VRP-M controller is loaded into the VRP-M Modul.



Exiting the VRP-M Module will return to PC-Tool Suite.

Safety notes, provisions

- The VRP-M system solution is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Only components explicitly approved for this purpose by Belimo are allowed to be used for the VRP-M system solution.
- The equipment configuration and settings form part of the unit or damper manufacturer's system solution (OEM) and are not allowed to be modified without prior authorisation. All changes are liable to disrupt operation and cause damage to the system or injury to persons!
- Attention must be paid to the following during the planning phase and before the VRP-M system solution is operated:

  The VFP-... / VFD3 sensor compatibility with the medium to be controlled must be verified in advance.

  The specifications supplied by the VAV unit or damper manufacturer (design, installation site) must be consulted. All local regulations must be observed.
- If the VRP-M solution is operated in a bus system, the cycle times of the MP-Bus and the higher-level system must be taken into account.
- The VRP-M solution is Fan Optimiser compatible, either with other VRP-Ms or in combination with VAV-Compacts.

  Exception: the use of VRP-M equipped with fast-running actuators can *NOT* be integrated into an Optimiser system!
- The manufacturer of the VAV or damper (OEM) is responsible for ensuring that the VRP-M system solution is installed and set correctly as well as for the overall precision of the control system. If replacement devices are ordered, they are configured by the OEM at the factory according to the installed system.

  The VRP-M system solution is sold exclusively via the OEM channel for this reason.

Version overview, release note for VRP-M system solution

The VRP-M Module V2.0.11 supports all VRP-M versions found in the field. This means the MMI adapts automatically to the functions of the connected VRP-M controller.

This document is based on the following versions:

- VRP-M controller V3.08
- VRP-M Module V2.00.11

VRP-M Version Overview

Version	*Released*	
VRP-M V2.16	2005	Market introduction Europe, VAV-Application
VRP-M V3.06	2007	plus Integration STP-Function
VRP-M V3.08	2012	plus Integration VFD3-Sensor

VRP-M documentation

Technical data, scope of functions, details about wiring and connections, etc., refer to the following Product Information:

*System-Overview '**Pure air – within seconds'***

Product-Information VRP-M System

- ***Adaptive VAV control system for sensitive working areas***
- ***Adaptive control system for pressure applications***

Getting started

At the very first use of the VRP-M Module please carry out the following configuration steps:

Open *'Extras ¦ Options'* and set-up the following options:

- **Language** German / English / French

- **COM port** COM port number (COM1 -...) connection for the MP-Interface (ZIP-USB-MP, ZIP-RS232).

The current active COM port is shown in the bottom left-hand corner of the main screen.

- **Units** Possible units for volumetric flow / pressure
  - m^3/h / Pa
  - l/s / Pa
  - cfm / uPSI

Note

The OEM field can only be activated by VAV-unit manufacturers (OEM).

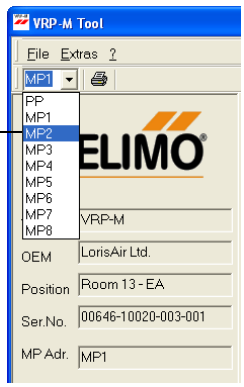
VRP-M selecting the MP address

Select the required address (PP / MP1...MP8) from the address list.

PP: unaddressed (default setting)
for conventional (step or 0…10 / 2…10 V) control

MP1...MP8: for MP-Bus operation

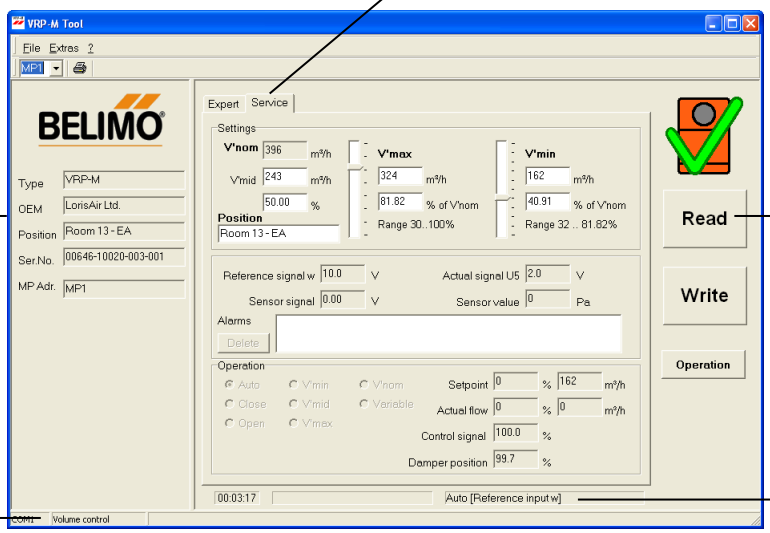
VRP-M device - Select address



After selecting the MP address, the data of the corresponding VRP-M controller (type, OEM, position, serial number, etc.) is read in and displayed on the screen. If the selected address does not exist on the MP-Bus, the display fields are left empty.

Structure of the VRP-M Module

Screen



Menu bar	Main menu: File; Extras; ?.
Tool bar	VRP-M address list box: File | Print.
Identification	The identification data of the connected VRP-M is read-in and displayed as soon as the program is connected to the VRP-M unit.
Status bar	Shows the program runtime, operating status and operating mode.
Footer	Active COM interface; VRP-M function: *Volumetric flow / pressure*
Buttons	Read, Write, Operation
Tabs	Service, Expert
Consistency	This icon indicates whether the data of the connected VRP-M matches the data displayed on the screen

- Data consistent

- Data not consistent

Buttons

- Read	read the configuration values from the VRP-M.
- Write	write the configuration values into the VRP-M.
- Operation	activates the operating functions. Active only in the '*Service*' tab, see pages 10-11.

File menu

The 'File' menu contains the following functions:

Print	Print the VRP-M data.
Print to file	Store VRP-M configuration data into a text file.
Exit	Exit the VRP-M Module.

Extras menu

The 'Extras' menu contains two functions – MP address and options:

MP address	Activates the MP address dialog box. There are two possible methods ('*Pushbutton*' or via '*Serial number*')
Options	Activates the Options dialog box containing the following settings: - Language - COM port - Unit - Log file directory - OEM release, for authorised VAV-manufacturer only

? menu

The ? menu option contains the following submenus:

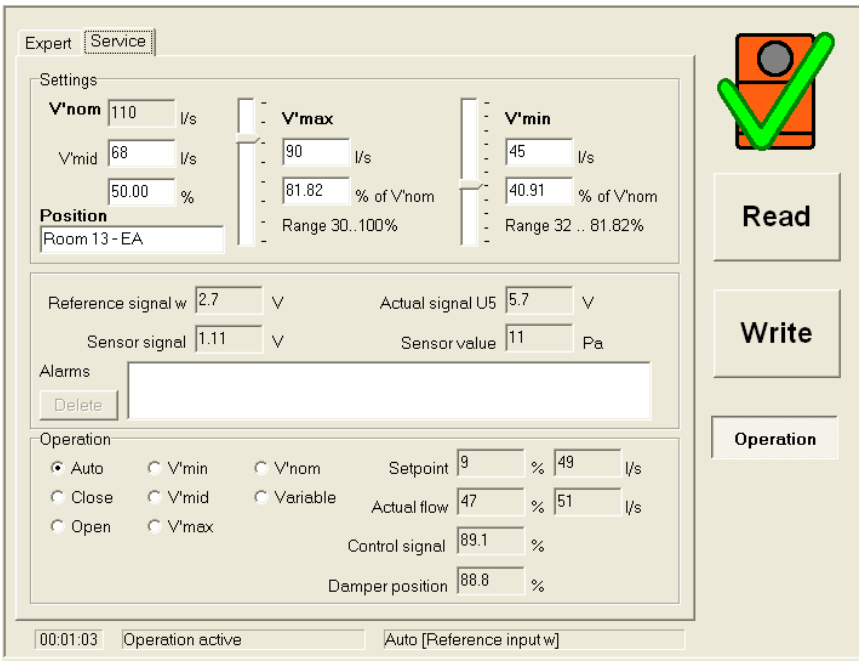
Help – PDF	Help information in PDF format.
About	Version information.

'Service' tab

Screen

Purpose: Commissioning and testing

Note:
The data and units are indicated as volume or pressure value, depending on the pre-set controller function [VAV or STP].



Read – Reads the data from the connected VRP-M

Write – Writes the changed settings in the VRP-M

Operation – Activates the operating functions

Settings

Name	Control type	Function	Range / unit
V'nom	VAV	Nominal volumetric flow, specified and set by the unit manufacturer [read only]	m^3/h / l/s / cfm
V'max	VAV	Maximum setting limit as a function of the V'nom setting	m^3/h / l/s / cfm
V'min	VAV	Minimum setting limit as a function of the V'nom setting	m^3/h / l/s / cfm
V'mid	VAV	Intermediate position [Vmin..V'max] for CAV applications	m^3/h / l/s / cfm
P'nom	STP	Nominal volumetric flow, specified and set by the unit manufacturer [read only]	Pa / uPSI
P'max	STP	Maximum setting limit as a function of the V'nom setting	Pa / uPSI
P'min	STP	Minimum setting limit as a function of the P'nom setting	Pa / uPSI
Position	VAV / STP	Input field for specific system designations	16-character text field

Note on V'min

With VRP-M V2.16, V'min is indicated in percentage [5] of V'max

Signal values

Name	Control type	Function	Range / unit
Reference signal w	VAV / STP	Input signal w [terminal 3], corresponds to V'min..max / P'min..max	0…10 / 2…10 V
Actual signal	VAV / STP	U5 - Actual volumetric flow signal or pressure output signal [terminal 5]	0…10 / 2…10 V
Sensor signal	VAV / STP	Input signal from pressure sensor	0…10 V
Sensor value	VAV / STP	Input signal from pressure sensor	Sensor range [Pa]
Alarms	VAV / STP	Alarm signals appear in this field (alarm signals are currently not implemented)	

Operation

	Name	Control type	Function
Operating mode	AUTO	VAV / STP	VRP-M operates in automatic mode, which means it follows the reference signal w
	Close	VAV / STP	Damper closed, control deactivated!
	Open	VAV / STP	Damper open, control deactivated!
	V'min	VAV	VRP-M adjusts to the V'min value
	V'mid	VAV	" " " " V'mid value
	V'max	VAV	" " " " V'max value
	V'nom	VAV	" " " " V'nom value
	P'min	STP	" " " " P'min value
	Motor stop	STP	Motor stops in current position, control deactivated!
	P'max	STP	VRP-M adjusts to the specified P'max value
	P'nom	STP	" " " " P'nom value
	Variable	VAV / STP	" " " " setpoint, range 0…100% = V'min…max / P'min…max
Display	Setpoint	VAV	Set volumetric flow 0…100 % = V'min…V'max [m^3/h / l/s]
	Actual flow	VAV	Actual volumetric flow 0…100 % V'nom [m^3/h / l/s]
	Setpoint	STP	Set pressure 0…100 % = P'min…P'max [Pa]
	Actual pressure	STP	Actual pressure 0…100 % P'nom [Pa]
	Control signal	VAV / STP	Control signal applied to the motor
	Damper position	VAV / STP	Position feedback 0…100 %

Setpoint indication
while the VRP-M Module '*Operating mode*' is active the setpoint value is indicated as '--'

Note on indicated damper position

If actuators without a feedback signal are used (e.g. NM24-V-ST with a 3-wire cable), the damper position is indicated as 0% over the complete setting range for technical reasons. These actuator types cannot be used for applications in which the position is evaluated, e.g. the COU24-A-MP Optimiser.

Adaption / synchronisation
The damper position is indicated as 0% for the duration of the adaption / synchronisation.
It is recommended to adapt the actuator, at the commissioning state, to the dampers angle of rotation.

Note on indicated control signal

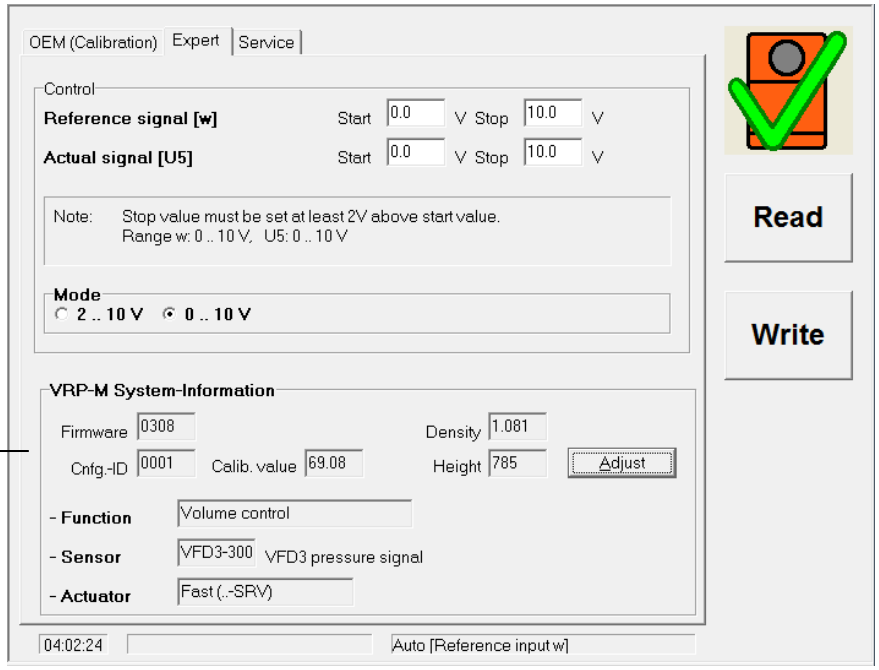
The control signal is indicated as
a) 0…100% for modulating actuators
b) -100 / 0 / 100 modulating 3-point for VAV actuators

Pressure applications: The motor stop command either freezes the current control signal or sets it to 0 if b) applies.

'Expert' tab

Screen

Purpose: Showing the configuration and setting the mode



Note
The displayed items might differ from this picture, depending on the active application, configuration.

Read – Reads the data from the connected VRP-M

Write – Writes the changed settings in the VRP-M

Control

Note:
The setting Mode adapts the reference and actual signals to the appropriate levels [options: 2…10 V / 0…10 V].
The Control function allows to set the signals individually, e.g.
w 5…10 V / U5 0…10 V.

	Range	Function
Reference signal [w]		Defines the start and stop point for the operating range V'min…max / P'min…max
	Start	Start point: DC 0…8 V
	Stop	Stop point: DC 2…10 V
Actual signal [U5]		Defines the start and stop point for the actual signal 0…100% V'nom / P'nom
	Start	Start point: DC 0…8 V
	Stop	Stop point: DC 2…10 V

	Settings	Function
Mode	2…10 V	2…10 V = start and stop point for the operating range V'min…max / P'min…max
	0…10 V	0…10 V = start and stop point for the operating range V'min…max / P'min…max

VRP-M System-Information

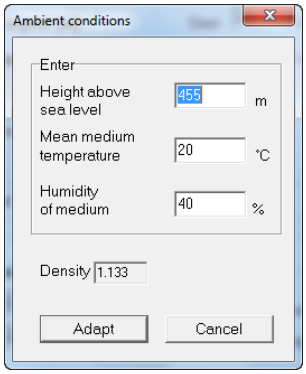
Note:

This feature shows the actual settings of the VRP-M controller. The settings can be printed using the '*Print*' / '*Print to file*' functions. E.g. for replacement orders.

Refer to page 16 - Print data

	Field	Function
VRP-M	Firmware	Version number of the VRP-M firmware
	Cnf.Table	Configuration table version
	Calibration value	Device-specific VAV parameter
	Density	Density of the medium [kg/m^3] - VAV only
	Hight [m]	Project data: height above sea level [m] [VAV application] and [VFD3 sensor (VAV & STP application)]
	Function	Volumetric flow / pressure [VRP-M STP]
	Sensor	Sensor type
	Actuator	Actuator type

Ambient conditions adjustment



The VRP-M controller can be adjusted with the parameters '*Density*' and '*Height above sea level'* to the application or system environment.

- Density (VAV Application)

By clicking at the 'Adjust' button, the density of the medium will be calculated according to the entered parameters '*Height above sea level*', *'Mean medium temperature*' and *'Humidity of medium*'.

Note:
Normally it is not necessary to adapt the density during operation. It is therefore advisable to set a meaningful mean temperature during the system commissioning.

Height above sea level [m] (VFD3 Sensor)

VRP-M Parameter for the VFD3 sensor adjustment to the local altitude - *height above sea level*.

Note, VRP-M applications (VAV- and STP) using the VFD3 sensor type must be adjusted to the local altitude by the use of the parameter '*height above sea level*'.

Log data

All the VRP-M Module read and write operations get recorded in a monthly log file.

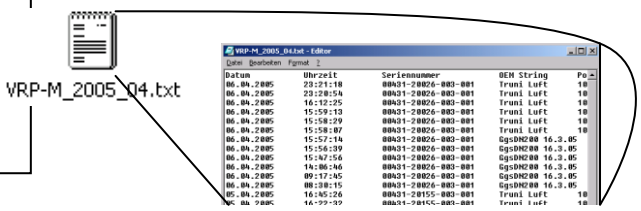
All user actions and controller settings that have been executed on the connected PC can be displayed, and if necessary printed out, using a standard program such as MS Excel.

Log actions (events)

- Write (writes a complete data record)

- Write Density

- Read



Log file

The log data is saved in a monthly log file in text format. The file is given a unique name.

Syntax: VRP-M_YYYY_MM.txt

Example: *VRP-M_2012_06.txt*
_Month June
_Year 2012
VRP-M Log file

Directory

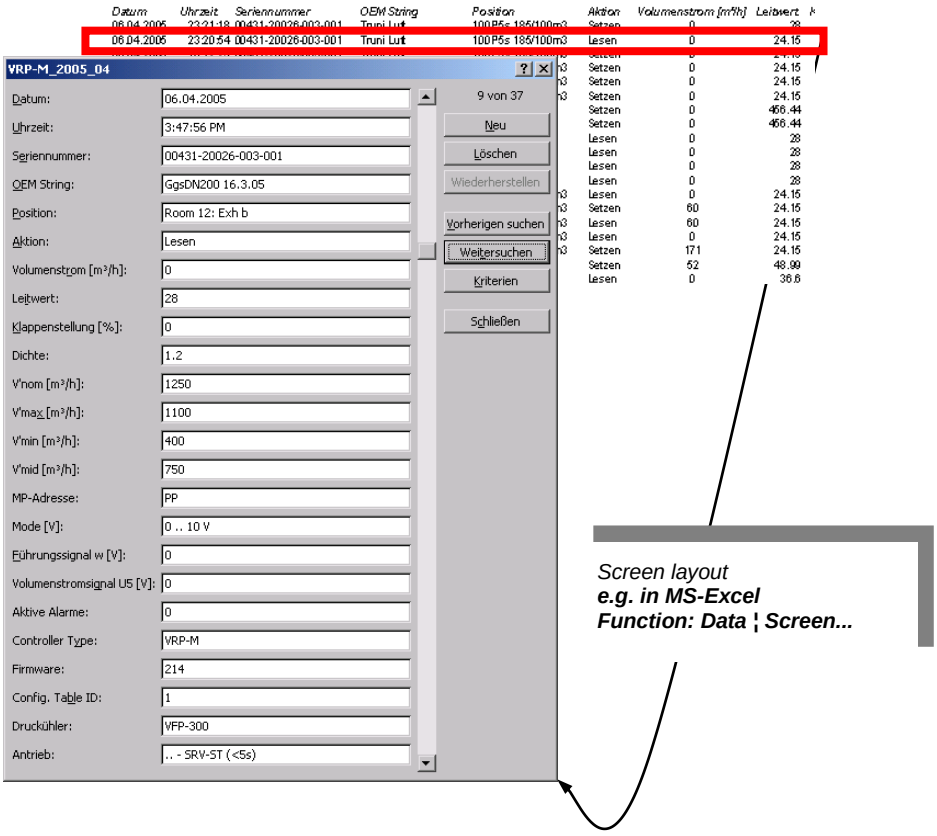
User-defined path: the target directory can be specified in the option '*General*' found under '*Extras ¦ Options...*'. All log files are saved in this directory. See page 9 for settings.

Column title

The language of the column titles depends on the selected program language, at the time of first Log entry.

Read / print log file

The required log file can be selected in the Explorer, then displayed or printed using a third-party software (text editor, MS Excel, etc.).



Print data, print to file

Print data

Function keys <*Ctrl*> <*P*>

The data of the connected VRP-M can be printed out or exported to a text file on the hard disk for inclusion in production or system documentation, etc.

The following data and settings of the connected VRP-M are printed out:

```
Belimo VAV     10. 1.2012 / 15:44:17

VRP-M System Solution: SETTINGS
      --------------------------------

Setup
- BELIMO Type                 VRP-M
- OEM                         loritrol Ltd.
- Position                    Grädi2.OG12 AL
- Serial number               01145-60003-003-001
- MP address                  PP
- Firmware                    0308
- Cnfg.-ID                    0001
- Sensor (VFD3 pressure signal)VFD3-300
- Actuator                    Fast (..-SRV)

Controller settings
- Function                    Volume control
- Calib. value                69.14
- Density                     1.133
- Height                      455
- Mode                        0 .. 10 V
- Settings
  - V'nom                  1000 m³/h
  - V'max                   850 m³/h
  - V'mid                   553 m³/h
  - V'min                   490 m³/h

VRP-M information
  - Alarms                      -

VRP-M Tool Release Version 2.11
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Data record for *VAV* application

```
Belimo VAV     10. 1.2012 / 15:23:33

VRP-M System Solution: SETTINGS
--------------------------------
Setup
- BELIMO Type                 VRP-M [STP Mode]
- OEM                         loritrol Ltd.
- Position                    OG12 RFT5
- Serial number               01145-60003-003-001
- MP address                  PP
- Firmware                    0308
- Cnfg.-ID                    0001
- Sensor (VFP pressure signal)VFP-600
- Actuator                    Fast (..-SRV)

Controller settings
- Function              Pressure control [VRP-M STP]
- Calib. value                --
- Density                     --
- Height                      --
- Mode                        0 .. 10 V
- Settings
  - P'nom                  350 Pa
  - P'max                  300 Pa
  - P'min                  175 Pa

VRP-M information
- Alarms    -

VRP-M Tool Release V02.11
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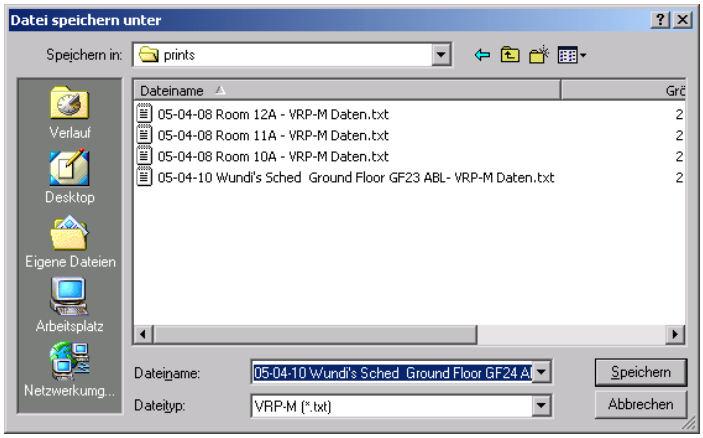
Data record for *STP* application

Print to file

Function keys <*Ctrl*> <*Alt*> <*P*>

If no printer is available or if the data is exported e.g. to a word-processing program, the data can be saved into a text file.

'*Save as*' dialog

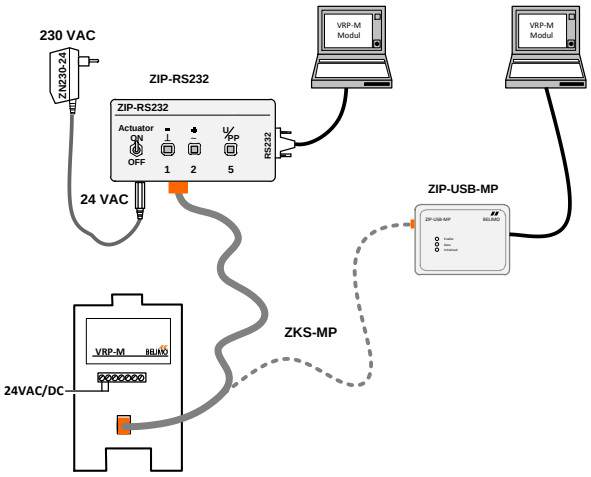


How to connect the PC-Tool Suite

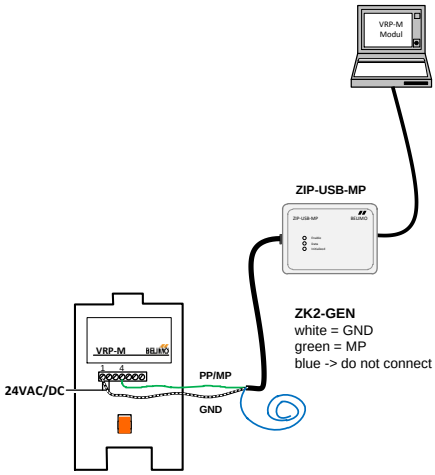
The PC-Tool can be connected via a ZIP-Interface either directly to the 3-pole service socket on the VRP-M controller or via the PP/MP connection (terminal 4). Two types of ZIP-Interfaces are available, for RS232 and for USB.

Conventional Operation (PP)

The VRP-M operates with a 0 … 10 V control signal (terminal 3) or as CAV controller. About 120 s after termination of the VRP-M Module the VRP-M resets all possible 'Operating steps' previously commanded by the Tool.



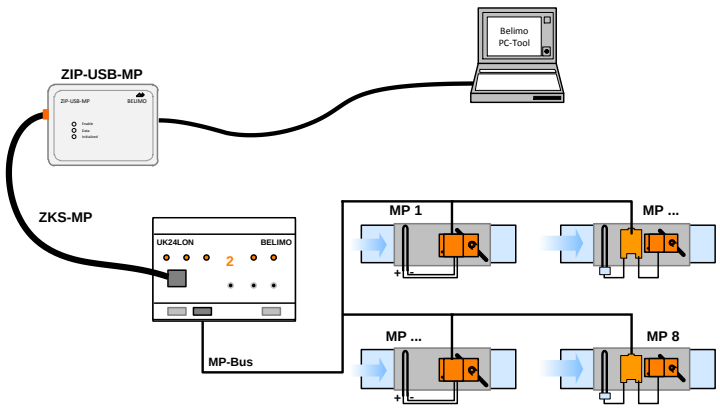
Connection: via service socket



Connection: via VRP-M terminals or control cabinet

MP-Bus Operation (MP)

In a MP-Bus system the VRP-M receives its control signal from the MP-Bus master, e.g. UK24LON by bus. In such a system the PC-Tool can only be connected via the MP-Bus master. Otherwise two MP-Bus master will be connected on the same MP-Bus which is not allowed. Alternative: disconnect the VRP-M temporary from the MP-Bus.

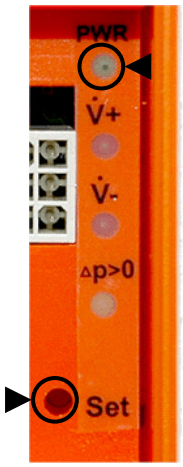


For more information, refer to www.belimo.eu
- System documentation VRP-M V3.x - VAV / STP applications
- Product information UK24LON, UK24EIB, UK24MOD, UK24BAC
- Tool Connection Guide

How to set a MP-Bus address

If the VRP-M system solution is integrated in an MP-Bus system, each MP-slave must be MP-addressed.

Address range: MP1...MP8



VRP-M Module – Address procedure

Start the addressing procedure:

Select 'Extras ¦ VRP-M address…' or press function key <F2>:

Two addressing methods can be used:

1) Addressing with serial number

   Enter or confirm the serial number of the VRP-M

   (sticker on VRP-M, displayed in VRP-M Module).

2) Addressing with acknowledgement on VRP-M

   Acknowledge the selected address by pressing the '*Set*' pushbutton on the corresponding VRP-M.

   The power LED (green) blinks when the '*Set*' pushbutton is pressed.

VRP-M Module - De-addressing option

The '*De-addressing*' option resets the VRP-M from MP-Bus mode to conventional operation.

The VRP-M gets set back to address **PP** for this purpose.

For more information: www.belimo.eu