



VRP-M Tool - Version 2.x

User Manual

English

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Introduction

The VRP-M Tool User Manual describes handling and use of VRP-M Tool Version 2 - the parameterising and operating program for the VRP-M system solution.

The VRP-M Tool's functions are arranged on two task-oriented tabs called 'Service' and 'Expert', which also provide the structure for this document.

The VRP-M V3.x system solution supports:

- Air volume applications in VAV mode
- Duct and room pressure applications in STP mode

The VRP-M system solution is adjusted and parameterised by the manufacturer of the VAV or pressure control system.

Note

For technical data, a description of functions and details of connections and wiring, refer to the following Product Information:

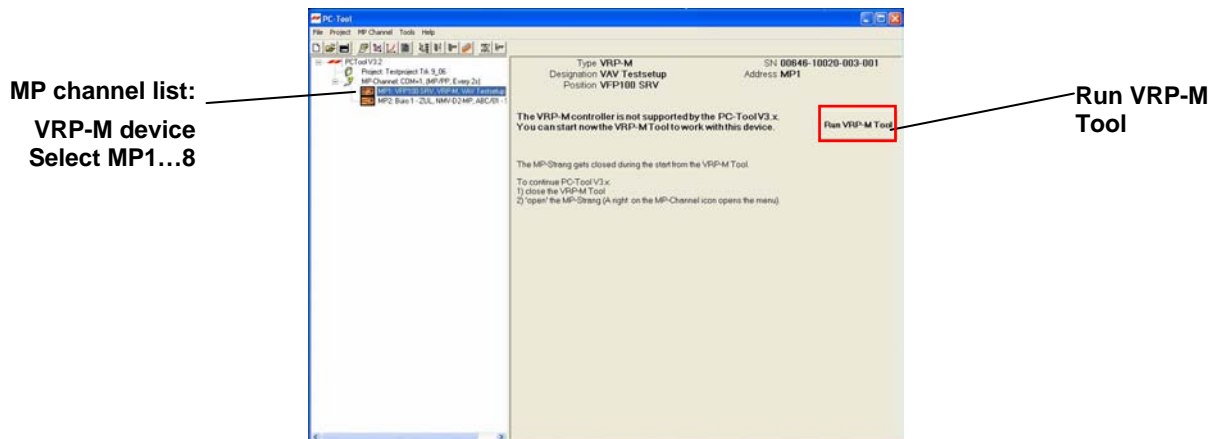
VRP-M V3.x system solution - VAV and STP applications

Use and restrictions

The VRP-M Tool can only be used for Belimo VRP-M controllers.

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

VRP-M Tool V2.x can be integrated as a module in Belimo PC-Tool V3.x. By clicking the VRP-M icon in the PC-Tool's *MP channel* list, you select the required VRP-M.



When you exit the VRP-M Tool, you return to PC-Tool V3.x.

Safety notes

- 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 compatibility of the VFP-.. sensor with the medium to be controlled must be verified.
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.
- Applications with an NMQB24-SRV-ST fast-running actuator: The actuator moves into the 'CLOSED' position when the supply voltage is switched on, in the event of a power failure >5 s or if the manual disengagement pushbutton is pressed. The VRP-M control function is deactivated for the duration of this movement.
When the synchronisation process has finished, the actuator moves into the position defined by the VRP-M controller.
- 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

This document is based on the following versions:

- VRP-M controller V3.05
- VRP-M Tool V2.00.03

Up-to-date information about compatibility, versions and functions can be found on the Internet at www.belimo.eu

Note

VRP-M documentation

For technical data, a description of functions and details of connections and wiring, refer to the following Product Information:

VRP-M V3.x system solution - VAV and STP applications

Getting started

Please carry out the following steps the first time you start the VRP-M Tool.

By selecting 'Extras!Options', you open the Options dialog box in which you can set the following options:

- Language

Available languages: German / English / French

- COM port

COM port number (COM1 .. COM9) for connecting the ZIP adapter.

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

- Unit

Possible units for indicating the volumetric flow / pressure

- m³/h / Pa

- l/s / Pa

- cfm / uPSI

Note

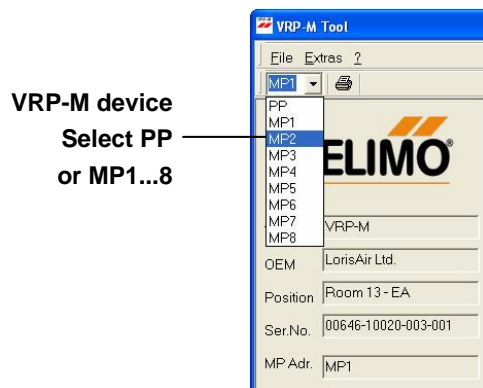
The OEM field can only be activated by VAV unit manufacturers.

VRP-M: selecting the MP address

Set the required address (PP or MP1...MP8) in the address list box.

PP: Conventional control (0...10 / 2...10 V)

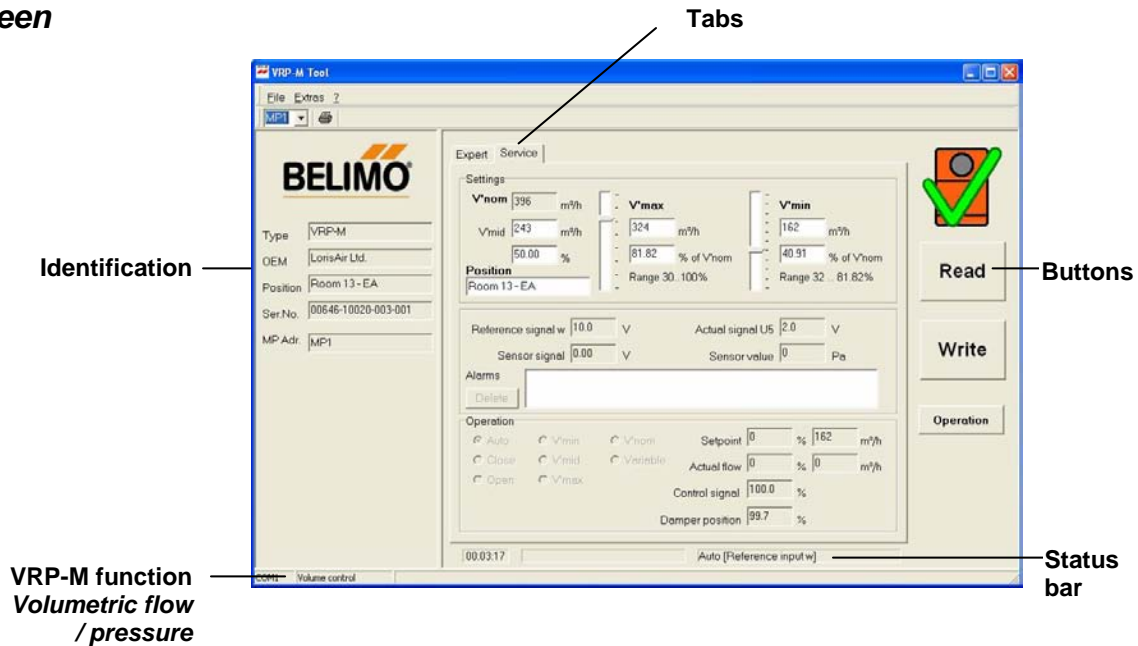
MP1...MP8: MP-Bus operation



PC-Tool V3.2: When you specify the MP address, the data of the corresponding VRP-M (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-Tool

Screen



- Menu bar Main menu: File; Extras; ?.
- Toolbar VRP-M address list box: File | Print.
- Identification The identification data of the connected VRP-M is read in and displayed as soon as you start the program.
- 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 Click the 'Read' button to read the configuration values from the VRP-M and display them.

- Write Click the 'Write' button to write the configuration values in the VRP-M.

- Operation Activates the operating functions.
Only visible if the 'Service' tab is active, see pages 10-11.

File menu

The 'File' menu contains the following functions:

- Print Prints the currently active VRP-M data.

- Print to file Saves the currently active VRP-M configuration data in a text file.

- Exit Exits the VRP-M-Tool. If you started the VRP-M Tool from PC-Tool V3.x, you return to the PC-Tool.

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 'Serial number')
for setting the address of the connected VRP-M to PP or MP1...MP8, see page 21.

- Options Activates the Options dialog box containing the following settings: - Language (German/English, etc.),
- COM port (COM1 .. COM9),
- Unit (m³/h / Pa; l/s / Pa; cfm / uPSI),
- Directory for the log file.

? menu

By selecting the ? menu, you access the following submenus:

Help	Opens the Help dialog box (only available in German).
Help – PDF	Help information about the VRP-M Tool (in PDF format).
About	Shows VRP-M-Tool version information.

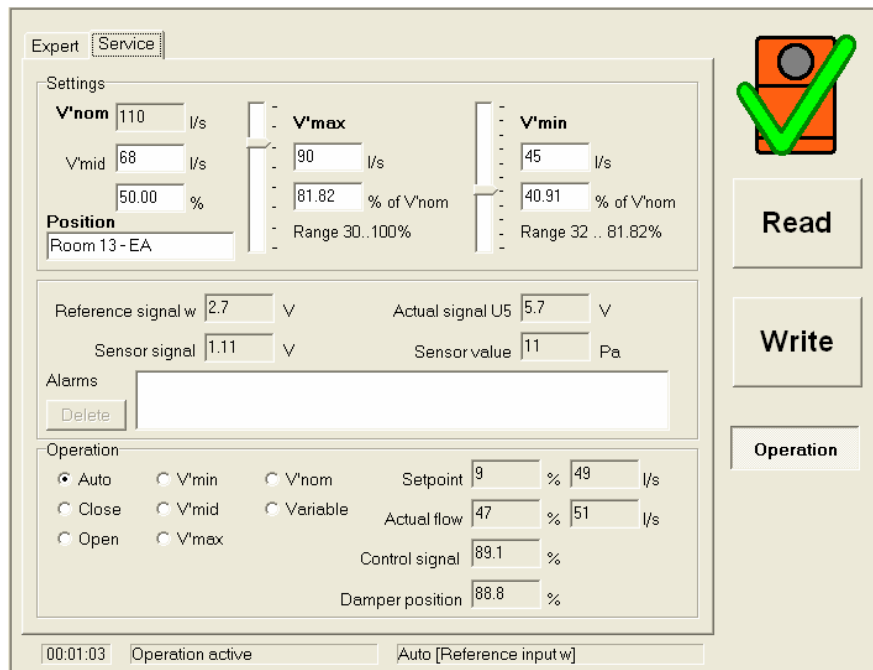
'Service' tab

Screen

Purpose: Commissioning and testing

Note:

The data and units are indicated as volume or pressure, depending on the preset controller function [VAV or STP] of the VRP-M.



- Read* – Reads the data from the connected VRP-M
- Write* – Writes the changed settings in the VRP-M
- Operation* – Activates the operating functions

Settings

Note on V'min
With VRP-M V2.16, V'min is indicated as a percentage of V'max

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 [V'min..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 V'nom setting	Pa / uPSI
Position	VAV / STP	Input field for specific system designations	16-character text field

Signal values

Name	Control type	Function	Range / unit
Reference signal w	VAV / STP	Input signal at 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 at 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 in Pa
Alarms	VAV / STP	Alarm signals appear in this field (no alarm signals are generated at present)	

Operation

Setpoint indication if operating mode is activated from VRP-M Tool
The value indicated for the CLOSE-OPEN-V'min-V'mid-V'max-V'nom or P'min-P'max-P'nom modes is '- -'

	Name	Control type	Function
Operating mode	AUTO	VAV / STP	VRP-M operates in automatic mode, i.e. it adjusts to the applied reference signal
	Close	VAV / STP	Damper closed, control deactivated!
	Open	VAV / STP	Damper open, control deactivated!
	V'min	VAV	VRP-M adjusts to the specified V'min value
	V'mid	VAV	VRP-M adjusts to the specified V'mid value
	V'max	VAV	VRP-M adjusts to the specified V'max value
	V'nom	VAV	VRP-M adjusts to the specified V'nom value
	P'min	STP	VRP-M adjusts to the specified 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	VRP-M adjusts to the specified V'nom value
	Variable	VAV / STP	VRP-M adjusts to the specified 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 %

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.

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.

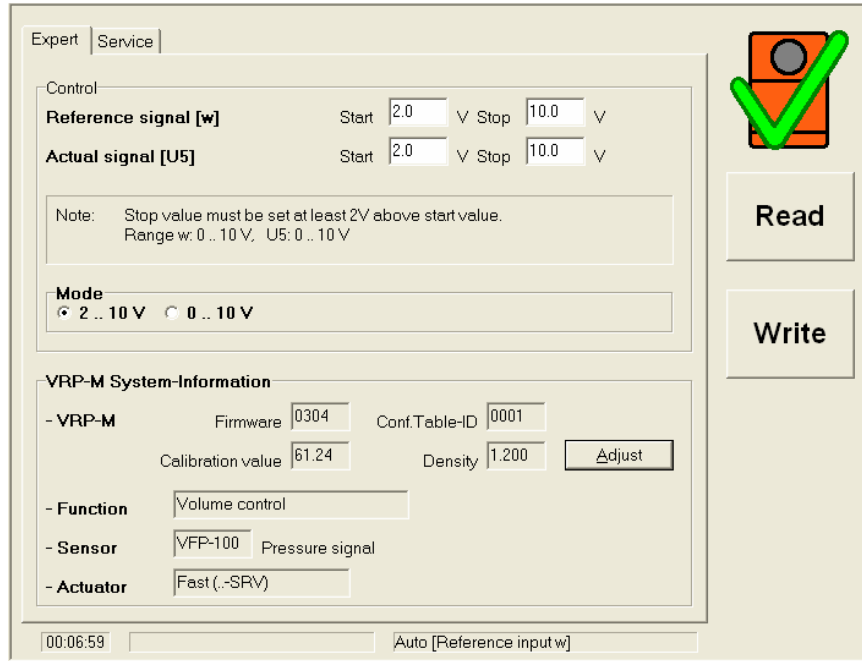
Adaption / synchronisation

The damper position is indicated as 0% for the duration of the adaption / synchronisation.

'Expert' tab

Screen

Purpose: Showing the configuration and setting the mode



- Read* – Reads the data from the connected VRP-M
- Write* – Writes the changed settings in the VRP-M

Control

Note:

The mode setting [options: 2...10 V / 0...10 V] causes the reference and actual signals to be synchronised at the appropriate levels.

The control function enables these two signals to be set individually, e.g. w 5...10 V / U5 0...10 V.

	Range	Function
Reference signal [w]		Defines the start and stop points of 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 points of 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 points of the operating range V/min...max / P/min...max
	0...10 V	0...10 V = start and stop points of the operating range V/min...max / P/min...max

VRP-M System-Information

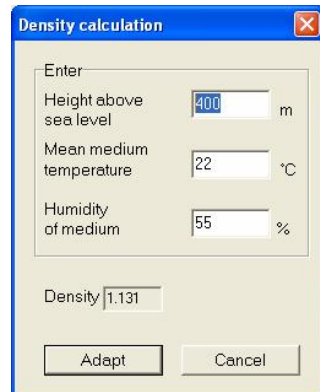
Note:

This information shows the settings of the VRP-M. The settings can be printed using the *Print / Print to file* functions. This data is required by the system supplier in case of replacement orders.

	Field	Function
VRP-M	Firmware	Version number of the VRP-M firmware
	Conf.Table-ID	Configuration table version
	Calibration value	Device-specific VAV parameter
	Density	Density of the medium [kg/m ³] - VAV only
	Function	Volumetric flow / pressure [VRP-M STP]
	Sensor	Sensor type
	Actuator	Actuator type

Density calculation (VAV applications)

By clicking the 'Adjust' button, you can calculate the density of the medium after specifying the 'Height above sea level', 'Mean medium temperature' and 'Humidity of medium' parameters.



The density is re-calculated each time one of these input parameters is changed. By clicking *Adapt*, you write the calculated density value in the VRP-M as an individual parameter.

Note:

It is not normally necessary to adapt the density during operation. It is therefore advisable to set a meaningful mean temperature when the system is commissioned.

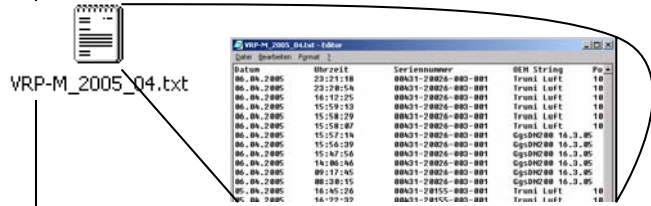
Log data

All read and write operations executed by the VRP-M Tool are 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
- Write Ctrl+S (writes a single value)
- 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_2006_06.txt

- VRP-M log file
- Year 2006
- Month June

Directory

User-defined path: You can specify a target directory by selecting 'General' in the 'Extras / Options...' menu. 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. If you change the language setting, in other words, the language of the displayed log data is not changed until the next monthly file.

Read / print log file

You can select the log file in Explorer, then display it or print it out using third-party software (text editor, MS Excel, etc.).

Datum	Uhrzeit	Seriennummer	OEM String	Position	Aktion	Volumenstrom [m³/h]	Leitwert k
06.04.2005	23:21:18	00431-20026-003-001	Troni Luft	100P5s-185/100m3	Setzen	0	28
06.04.2006	23:20:54	00431-20026-003-001	Troni Luft	100P5s-185/100m3	Lesen	0	24.15

VRP-M_2005_04

Datum: 06.04.2005 9 von 37

Uhrzeit: 3:47:56 PM

Seriennummer: 00431-20026-003-001

OEM String: GgsDN200 16.3.05

Position: Room 12: Exh b

Aktion: Lesen

Volumenstrom [m³/h]: 0

Leitwert: 28

Klappenstellung [%]: 0

Dichte: 1.2

V_{nom} [m³/h]: 1250

V_{max} [m³/h]: 1100

V_{min} [m³/h]: 400

V_{mid} [m³/h]: 750

MP-Adresse: PP

Mode [V]: 0 .. 10 V

Eührungssignal w [V]: 0

Volumenstromsignal U5 [V]: 0

Aktive Alarme: 0

Controller Type: VRP-M

Firmware: 214

Config. Table ID: 1

Druckühler: VFP-300

Antrieb: .. - SRV-ST (<5s)

Setzen	0	24.15
Setzen	0	24.15
Setzen	0	24.15
Setzen	0	466.44
Setzen	0	466.44
Lesen	0	28
Lesen	0	28
Lesen	0	28
Lesen	0	28
Lesen	0	24.15
Setzen	60	24.15
Lesen	60	24.15
Lesen	0	24.15
Setzen	171	24.15
Setzen	52	48.99
Lesen	0	36.8

Screen layout
 e.g. in MS Excel
 Function: Data ! Screen...

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      10.11.2006 / 15:44:17

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

Setup
- BELIMO Type      VRP-M
- OEM LorisAir Ltd.
- Position Room 13 - EA
- Serial number    00646-10020-003-001
- MP addressMP1
- Firmware 0304
- Conf.Table-ID 0001
- Sensor (Pressure signal)  VFP-100
- Actuator Fast (...SRV)

Controller settings
- Function Volume control
- Calibration value 61.24
- Density 1.200
- Mode2 .. 10 V
- Settings
  - V'nom396 m³/h
  - V'max324 m³/h
  - V'mid243 m³/h
  - V'min162 m³/h

VRP-M information
- Alarms -

VRP-M Tool Release V02 00 02
    
```

Data record for VAV application

Data record for STP application

```

Belimo VAV      10.11.2006 / 15:23:33

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

Setup
- BELIMO Type      VRP-M [STP Mode]
- OEM LorisAir Ltd.
- Position Branch L12
- Serial number    00646-10020-003-001
- MP addressPP
- Firmware 0304
- Conf.Table-ID 0001
- Sensor (Pressure signal)  VFP-100
- Actuator Fast (...SRV)

Controller settings
- Function Pressure control [VRP-M STP]
- Calibration value --
- Density --
- Mode2 .. 10 V
- Settings
  - P'nom100 Pa
  - P'max 90 Pa
  - P'min 15 Pa

VRP-M information
- Alarms -

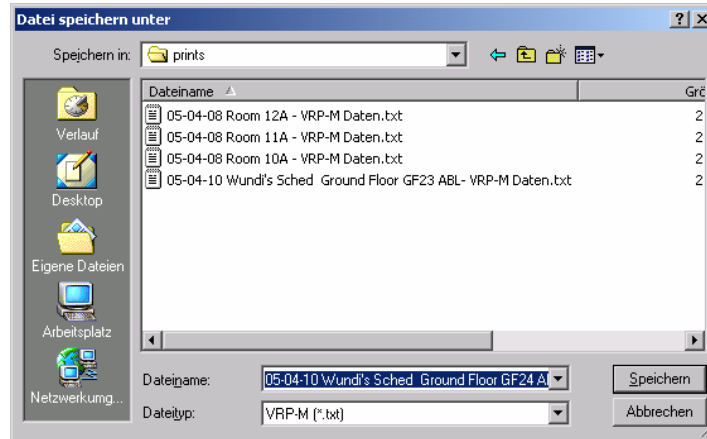
VRP-M Tool Release V02.00.02
    
```

Print to file

Function keys <Ctrl> <Alt> <P>

If a printer is not installed or if the data is exported to a word-processing program, for example, it is saved in a text file.

'Save as' dialog



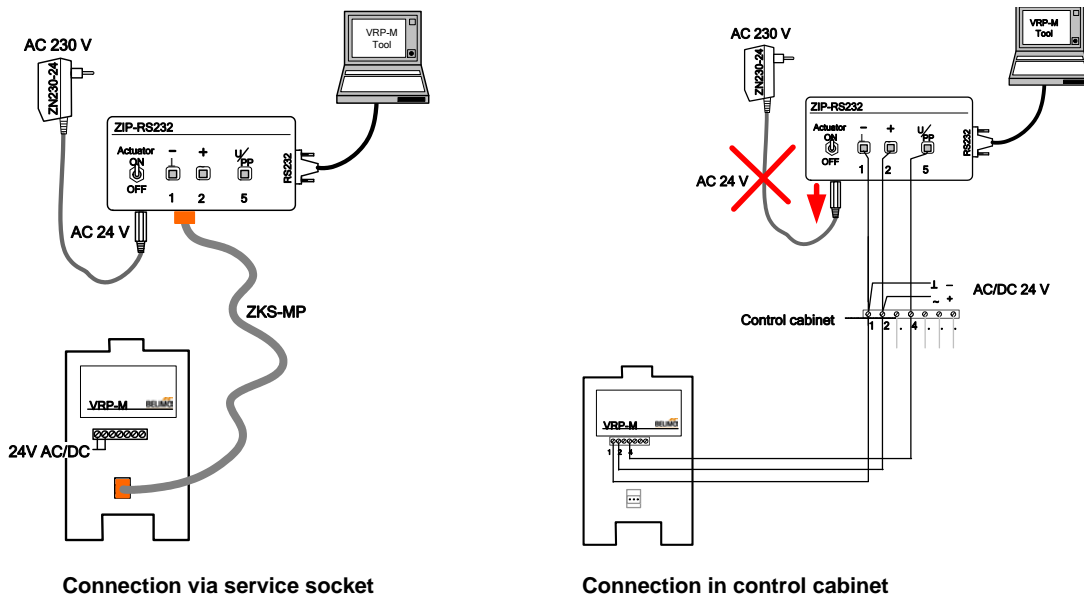
Connection of the VRP-M-Tool

The VRP-M-Tool can be connected either directly to the 3-pole service socket on the VRP-M controller or via the PP connection (terminal 4). Several different level converters can be used for communication, e.g. a ZIP-RS232.

Conventional operation (PP)

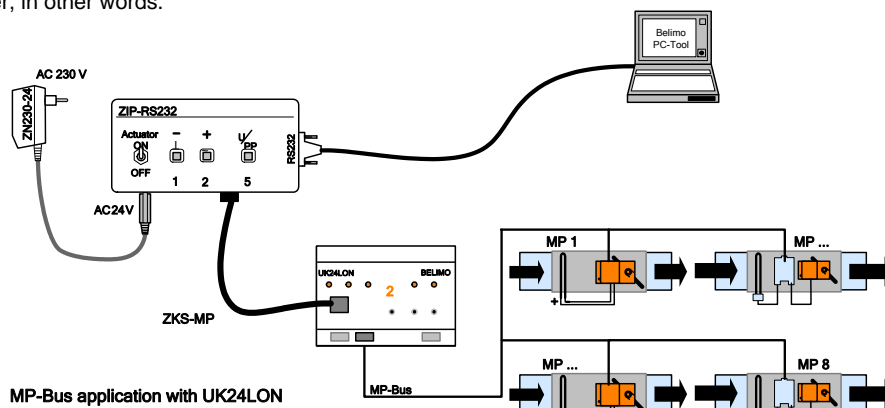
The VRP-M operates with a locally connected reference signal (0 ... 10 V applied to terminal 3).

The VRP-M detects that no Tool is connected and automatically switches back to the analogue reference signal after 120 s.



MP-Bus operation (MP)

The VRP-M operates in the MP system, i.e. it receives its reference signal via the connected MP master, such as a UK24LON. The VRP-M Tool can only be connected via the bus master in MP mode because otherwise two MP masters will be connected on the same MP-Bus. The local connection on the VRP-M cannot simultaneously communicate with the MP master, in other words.



For more information, see www.belimo.eu

- System documentation VRP-M V3.x - VAV / STP applications
- Product information UK24LON and UK24EIB
- Tool connections

Commissioning

VFP... sensor: zero offset

VFP-100



VFP-300

VFP-600



VRP-M

- Disconnect both (!) hose connections from the sensor
- Remove the cover of the VFP-... sensor housing
- Turn the zero potentiometer a) inside the VFP-... sensor until the LED b) inside the VRP-M [p>0] lights up
- Turn the zero potentiometer back until the LED b) goes out again

The sensor output signal (sensor voltage) is indicated as 'Sensor signal 0...10 V' on the 'Service' tab in the VRP-M Tool.

Note:

All potentiometers or other elements of the VFP-... sensor which are coated with protective lacquer must not be adjusted.

Commissioning (continued)

NMQB24-SRV-ST actuator

Damper setting range adaption

The angle of rotation must be adapted whenever the angle of rotation limiting of the NMQB24-SRV-ST damper actuator is adjusted.

Procedure:

- Switch the 24 V supply voltage off and back on, or
- Press the manual override pushbutton twice
- The actuator moves into the CLOSED...OPEN... set position.

The control function is deactivated for the duration of this movement.

Damper position synchronisation

The NMQB24-SRV-ST is automatically synchronised when the 24 V supply voltage is switched on or the manual override pushbutton is actuated.

Function:

- Synchronisation triggered
 - Switch on the 24 V supply, or
 - Press the manual override pushbutton
- The actuator moves into the CLOSED...set position.

The control function is deactivated for the duration of this movement.

Note:

The VRP-M control function is deactivated for the duration of an adaption or synchronisation process and the damper position is indicated as 0% in the VRP-M Tool.

This must be taken into account during the planning phase and when the VRP-M application is commissioned or operated.

Commissioning (continued)

MP-Bus address

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

Address range: MP1...MP8

Addressing on the VRP-M Tool

Start the addressing procedure on the VRP-M-Tool.

Select 'Extras | VRP-M address...' or press function key <F2>:

There are two possible addressing methods:

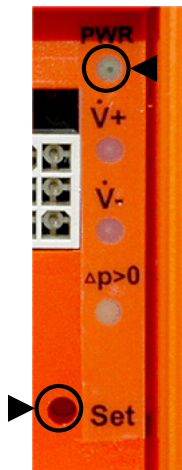
- 1) Addressing with serial number

Enter or confirm the serial number of the VRP-M (sticker on VRP-M, displayed in VRP-M-Tool).

- 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.



De-addressing on the VRP-M Tool

De-addressing resets a VRP-M from MP-Bus to conventional operation.

The VRP-M is assigned the address **PP** for this purpose as described above.

For more information, see www.belimo.eu