Service tool for parameterisable and communicative actuators / VAV controllers and HVAC performance devices from Belimo.

- **Connection via service socket on the device or MP/PP connection**
- **ZIP USB function**

Technical data

Electrical data	Nominal voltage	AC 24 V, 50/60 Hz, DC 24 V (from actuator)
	Operating range	AC 19.2...28.8 V / DC 21.6...28.8 V
	Power consumption Operation	1 W
	Connection	Socket for connecting cable ZK1-GEN (3 m) supplied with connector
	Interface USB 2.0	USB socket type B, connecting cable (1 m) with socket A to B supplied
	Optional cables	ZK2-GEN, ZK6-GEN
Interface	Communication	Point to Point (PP), no bus mode possible (MP)
Operating modes	Parameterisation	Point to Point (PP) Connection using service socket or connecting terminals on the actuator
	MP level converter (ZIP function)	Connection in control cabinet or via service socket on actuator For MP monitor operation, connection on MP-Bus
Operation	LCD display	2 x 16 characters, with background lighting
	Keys	i / esc / ▲ / ▼ / OK
Safety	Protection class	**III** Safety extra-low voltage
	EMC	CE according to 2004/108/EU
	Operating temperature	0...50 °C, non-condensing
	Non-operating temperature	–20...50 °C, non-condensing
Dimensions / weight	Dimensions	L x W x D: 95 x 55 x 25 mm
	Weight	Approx. 135 g

Safety notes

- **The device must not be used outside the specified field of application, especially not in aircraft or in any other airborne means of transport.**
- **Only connection to Belimo devices with 24 V safety extra-low voltage and PP/MP interface permitted.**
- **Changes to parameters etc. may only be performed following consultation with/specification from the OEM, device or mechanical/electrical contractor. Operating and adjustment regulations must be observed.**

Definitions

ZTH AP The ZTH AP is sold worldwide. Therefore the product name for the European region is defined as ZTH AP. In the product information, the term ZTH is used to represent the ZTH AP.

Actuators For simplicity in the product information, the terms actuators, VAV controllers, fire damper actuators and HVAC final controlling elements are summarised using the term actuators.

Supported devices

Damper product range	..-MF / ..-MP / ..-MPL / ..-MFT(2) /..-MOD / ..LON	
Valve product range	..-MF / ..-MP / ..-MPL / ..-MFT(2) /..-MOD / ..LON	
EPIV - pressure-independent characterised control valve	P6..W..-MP	available since 2011
Fire damper actuator	BF-TopLine with BKN230-24MP	
VAV product range	VRD2 / VRD2-L	available 1992-2007
	VRD3	available since 2008
	VRP-M (VAV and STP applications)	available since 2005
	NMV-D2..	available 1992-2000
	LMV-D2M / NMV-D2M..	available 2000-2006
	LMV-D2-MP / NMV-D2-MP / SMV-D2-MP.., LHV-D2-MP..	available 2006-2011
	LMV-D2LON / NMV-D2LON	available 2006- 2011
	LMV-D3-MP / NMV-D3-MP / SMV-D3-MP.., LHV-D3-MP..	available since 2011
	LMV-D3LON / NMV-D3LON	available since 2011
	LMV-D3-MOD / NMV-D3-MOD	available since 2012
HVAC final controlling elements	According to system description (e.g. Energy Valve)	
sharedlogic	According to system description	

Connection

Connection and supply

The ZTH AP is supplied via the actuator. The connection is set up
- either directly on the service socket of the actuator
- or via PP/MP connection (U5), e.g. connection socket, control cabinet and room controller CR24.

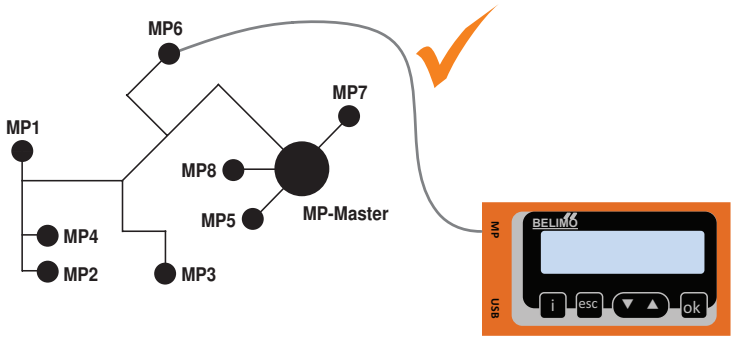
Type of connection and connection cable

	Suitable cable
	ZK1-GEN
	ZK2-GEN
	ZK4-GEN
	ZK6-GEN

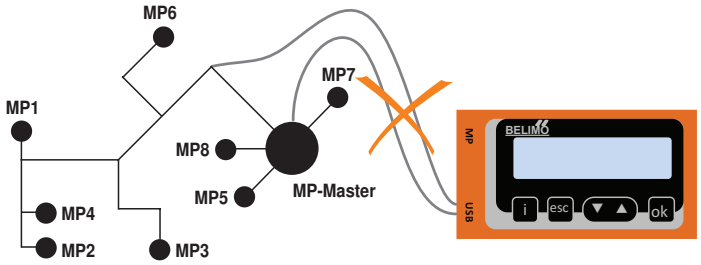
Connection in the MP-Bus system

Direct connection to the MP-Bus or MP master is not possible with the ZTH AP.

Right



Wrong

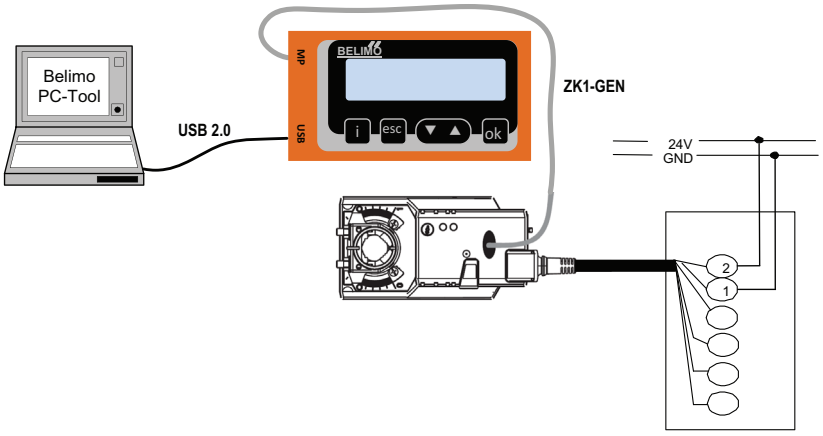


Solution: Use the service socket on the actuator or temporarily disconnect the MP connection of the MP device from the MP-Bus and connect the ZTH AP to the MP connection.

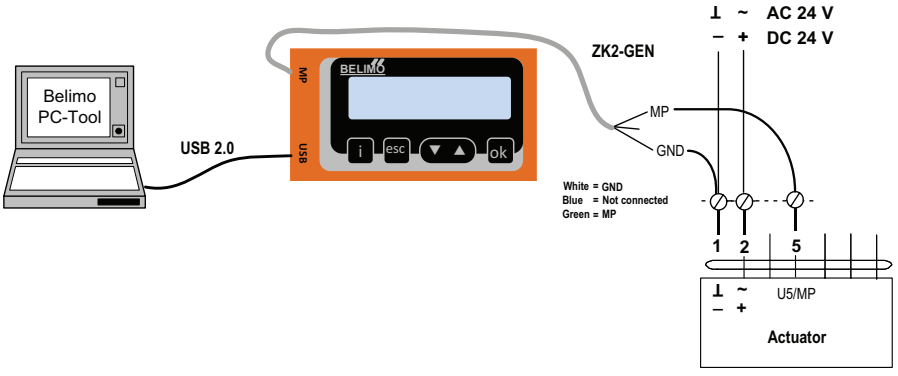
ZIP function connection

Note
The USB driver required will be automatically installed with PC-Tool version 3.9 or higher. For older versions of the PC-Tool, the driver can be downloaded from www.belimo.com and installed separately.

Connection via service socket - local connection with ZK1-GEN cable



Connection via connecting cable - local connection with ZK2-GEN cable



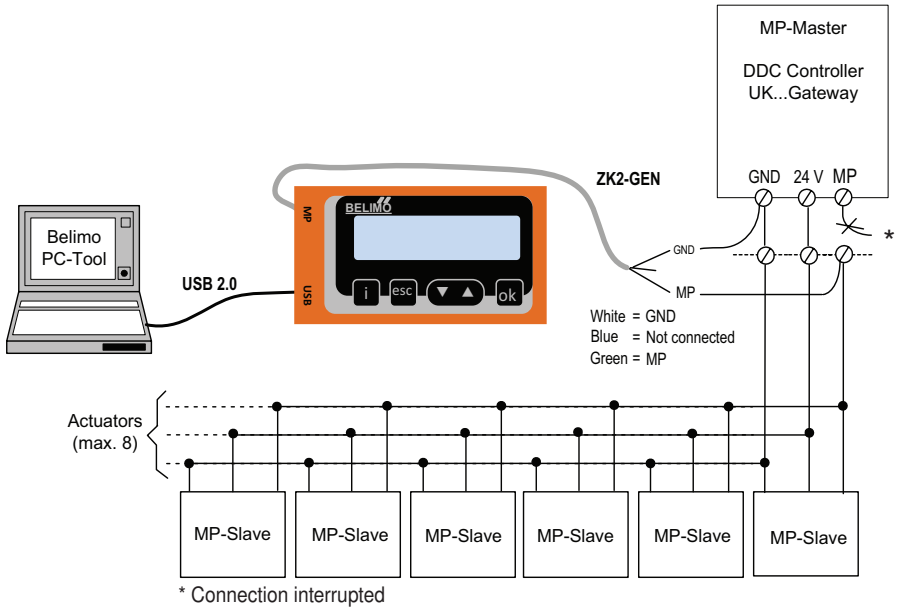
ZIP function connection

PC-Tool as MP master

- Actuator parameterisation via MP-Bus
- Specification of setpoints for simulation of actuators via MP-Bus
- Reading in of sensors that are connected to the MP actuator
- Recording of graphic trends

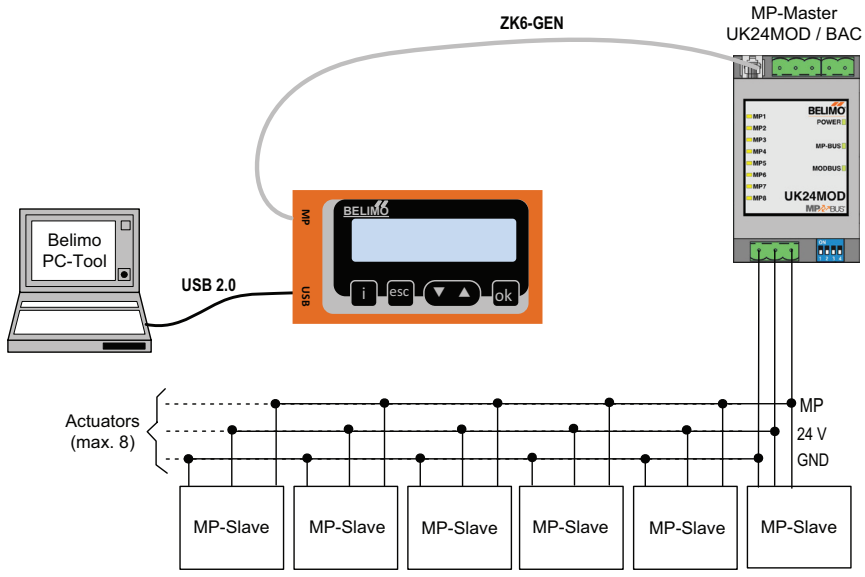
Note

* Interrupt connection between ZTH AP and MP master before using the ZIP function.



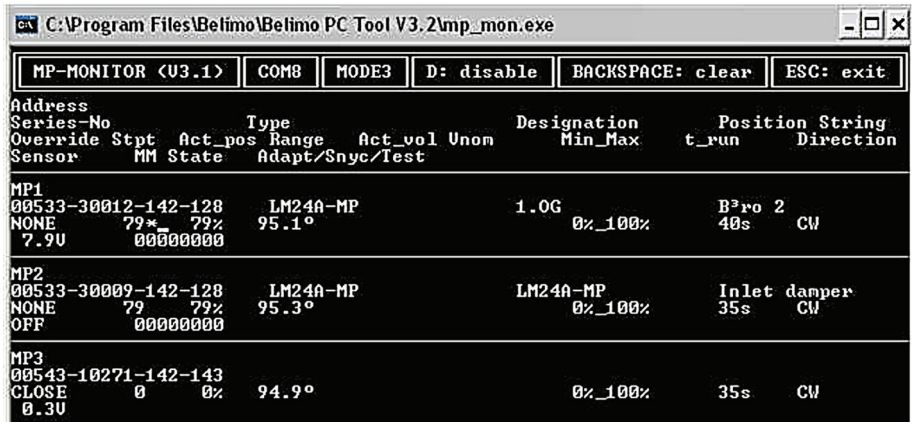
PC-Tool connection with ZK6-GEN, ZK4-GEN on Belimo gateways

- For connection to UK24MOD and UK24BAC, use the ZK6-GEN cable.
- For connection to UK24EIB and UK24LON, use the ZK4-GEN cable.

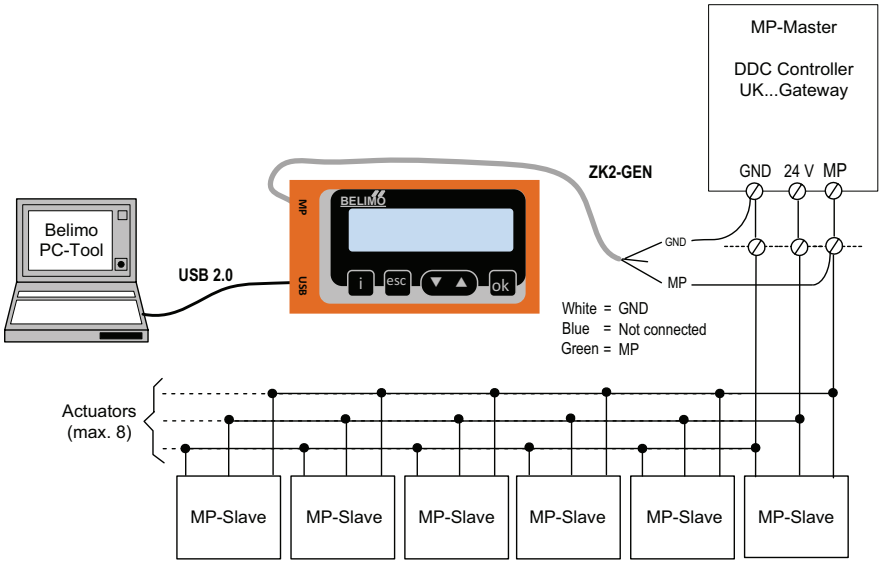


Connection with ZIP function

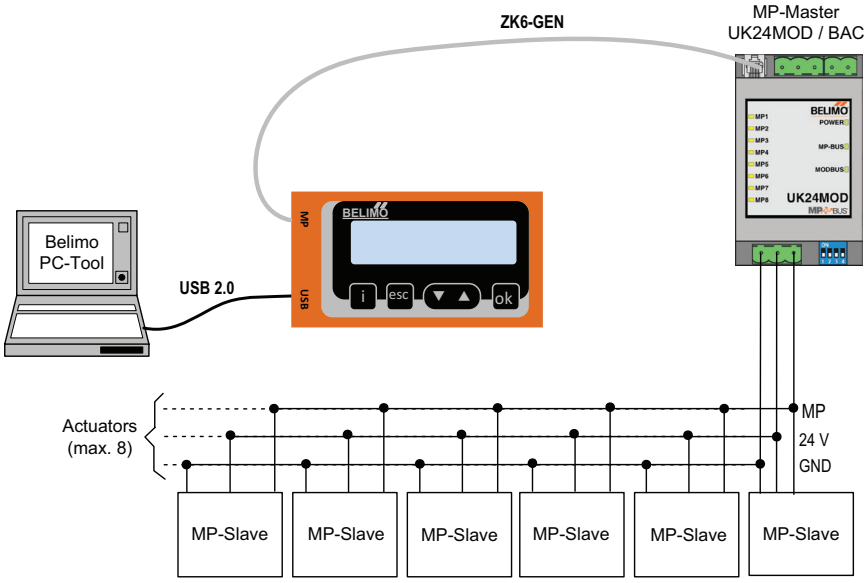
PC-Tool as monitor
Check the MP communication with the MP monitor tool (module of PC-Tool V3.x).



PC-Tool with monitor function / connection: ZK2-GEN to MP master



PC-Tool with monitor function / connection: tool socket with ZK6-GEN, ZK4-GEN



Operation

When the ZTH AP is connected to the Belimo actuator, the operating device starts and data is read from the connected device. The available adjustment and operating options are displayed in accordance with the device type. The available setting parameters are listed in the product documentation for the actuators. See www.belimo.com

Operating elements

LCD display
- Background lighting
- Display with 2 x 16 characters

Key function

▼ and ▲	Forward /backward Change value / status
OK	Confirm entry, go to submenu
ESC	Abort entry, leave submenu, discard change
i	Shows additional information (if available)

- RJ12 connection socket
- USB connection socket for communication with PC

Language setting, unit depiction

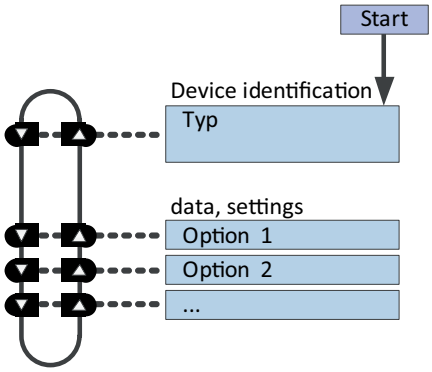
Language and units can be set in the Configuration menu.

Operation

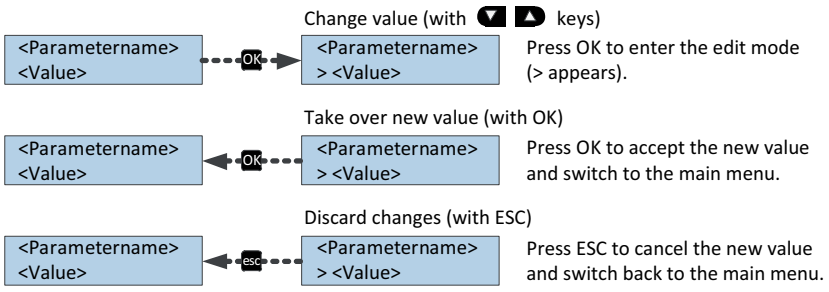
Operating is context-related, i.e. the user sees only the options available for the connected device. The corresponding Configuration table is read from the actuator for this purpose. In addition to the parameter type, this table also contains the corresponding divisions, e.g.: minimum running time which can be set, type etc. Non-relevant options are not displayed.

Menu structure, handling

The operating menu can be scrolled through from both sides using the ▼▲ keys.



Changing values



Starting / ending

The connection to the actuator is started by plugging in the RJ plug and terminated by unplugging it.

Device specifications/Technical data

For a more detailed description, including setting parameters, please refer to the respective separate product information. See www.belimo.com ¦ Documentation.

Configuration

Starting configuration

1. Press the key (OK) while simultaneously plugging in the connecting cable.
2. Configuration menu display appears.

Configuration menu

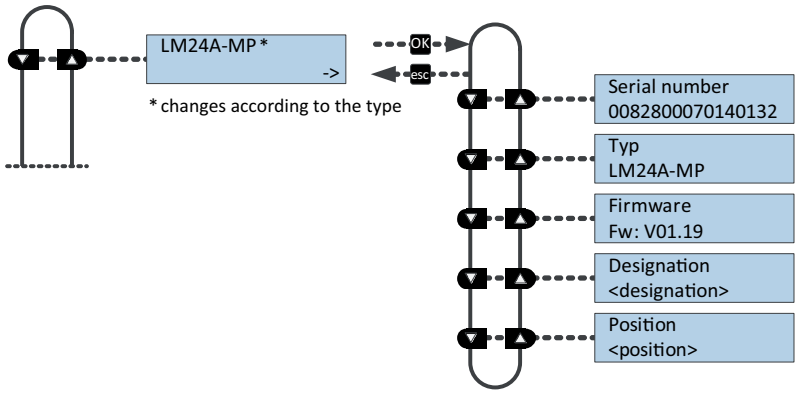
Option / Display	Setting	Product range	Explanation
Empty cache	Yes / No		Function to delete data profiles of HVAC performance devices from the local cache
Backlight	After 0..255 sec off / always active		Setting for duration of backlight in seconds
Show favourites	Disabled/ after 1…65535 s	HVAC performance devices (Energy Valve)	Alternating display of the first 3 values after the set time
OEM number	0…65535	VAV	
Advanced Mode 1)	Yes / No	VAV Fire protection Modbus	Enabled settings: – VAV: direction of rotation – VAV: set Vmin / Vmax to original values (call up OEM setting) – BF-Top: adaption – Modbus: basic address
Expert Mode 1)	Yes / No	VAV Valves	Enabled settings: – VAV: switching mode – VAV: V'mid parameter – VAV: altitude compensation
PICCV function	Yes / No	Valves	Belimo US: Enable PICCV Wizard function
Power supply measurement	Value V (AC)		
Pressure unit	Pa / in WC	VAV	
Flow unit (water)	m3/h / l/min / gpm	Valves	
Flow unit (air)	m3/h / l/s / cfm	VAV	
Exit configuration	ESC		

1) Only activate this option as needed and with the respective know-how. Adjustment of the respective parameters requires special expertise.

Basic functions

Device identification

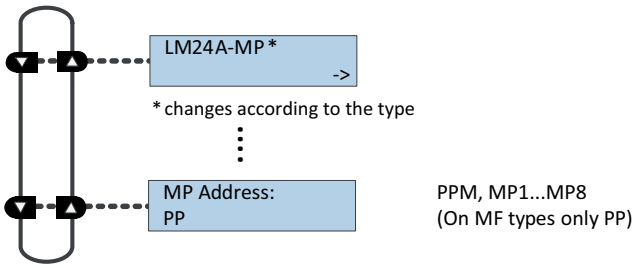
The following menu tree shows the basic functions which are identical for all devices.



Basic functions

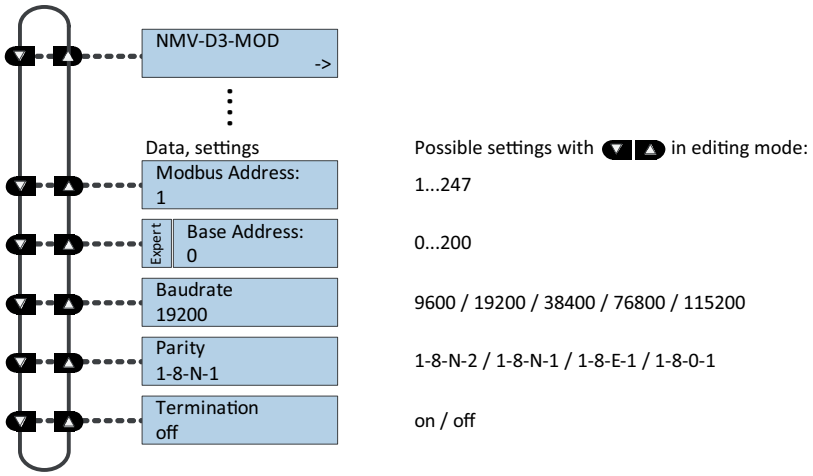
MP address

With MP-capable actuators, the MP address (PP, MP1-MP8) can be set.



Modbus actuators

Modbus-specific communication settings of an actuator with integrated Modbus interface (..-MOD).

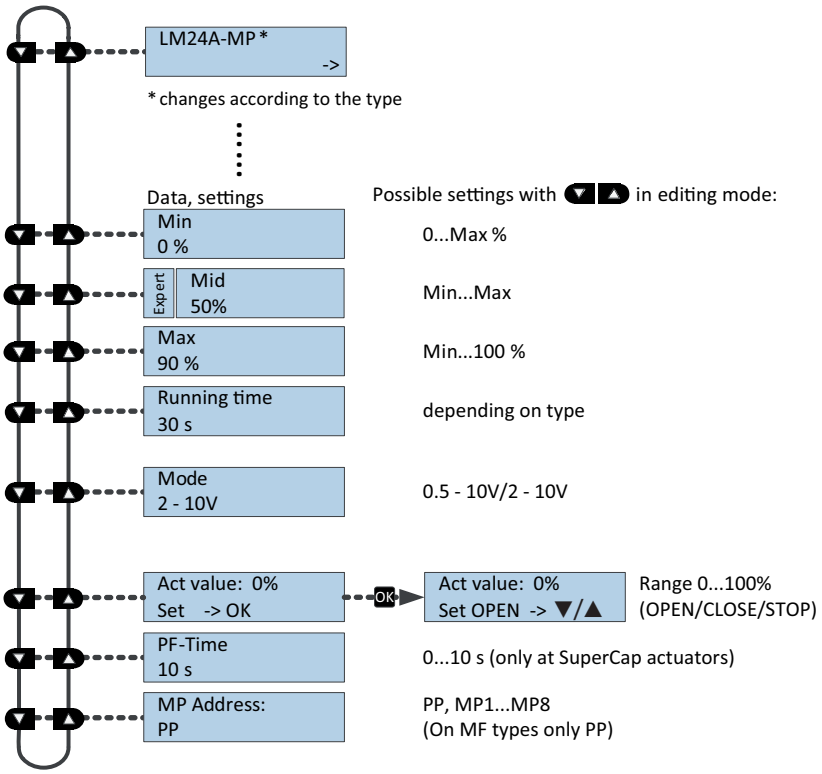


Functions for damper / rotary valve product range

Menu tree

The ZTH AP recognises the device family of the connected device automatically. The menu and the options available are shown related to the connected device.

Adjustment/display options LM24A-MP.

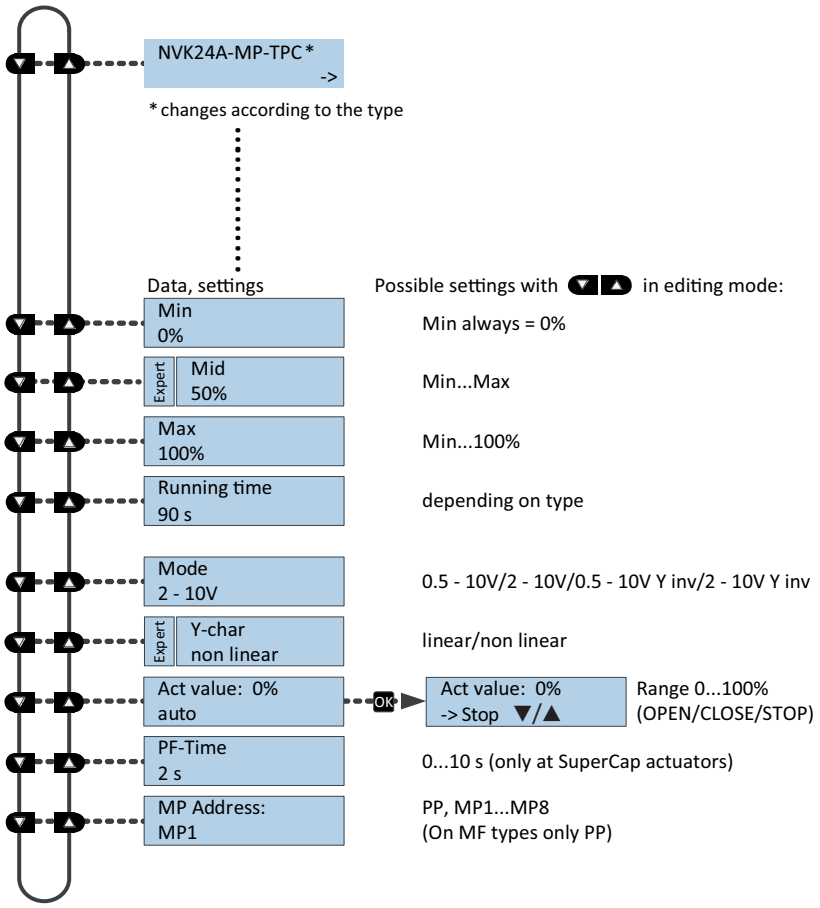


Functions for globe valve product range

Menu tree

The ZTH AP recognises the device family of the connected device automatically.
The menu and the options available are shown related to the connected device.

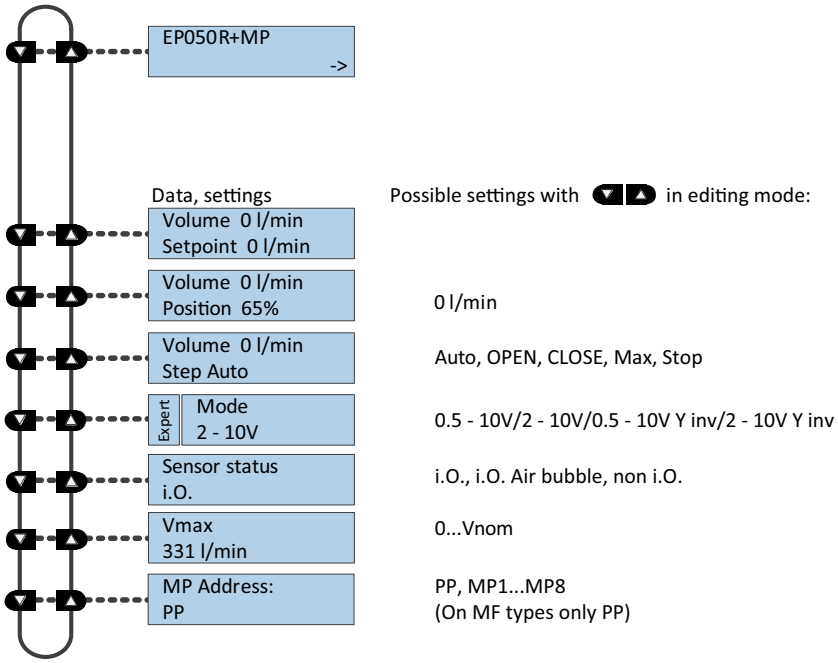
Adjustment/display options NVK24A-MP-TPC.



Functions for EPIV - pressure-independent characterised control valve

Menu tree

Adjustment/display options EPIV.



Functions for VAV product range

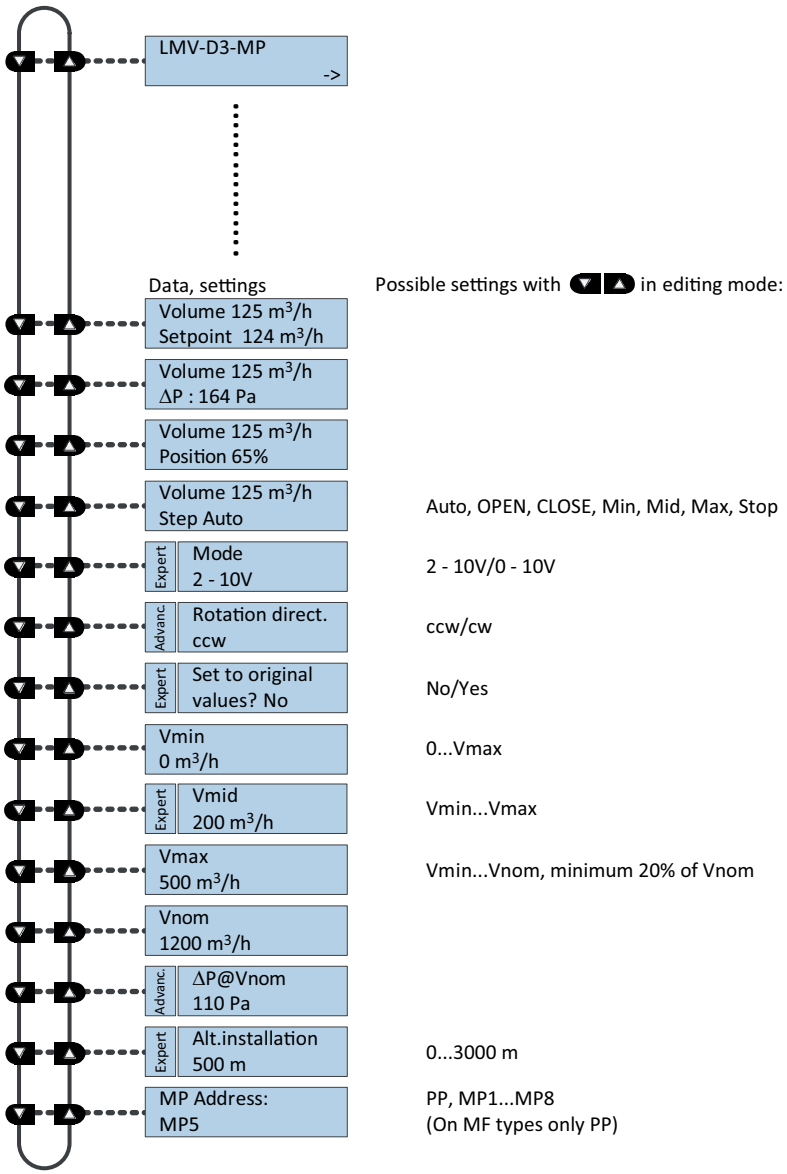
Menu tree

The following menu tree corresponds to the new VAV-Compact D3 generation: L/N/SMV-D3-MP, LHV-D3-MP, L/ NMV-D3LON , L/MNV-D3-MOD[1)]

1) For Modbus settings, see previous description of "Basic functions for Modbus actuators"

Adjustment/display options LMV-D3-MP.

Note: VAV-Universal actuators
The V-actuators L/N/SM24A-V, L/NMQ24A-SRV-ST, which fit the VAV universal controllers VR.., have a tool connection but are nevertheless not tool-capable.



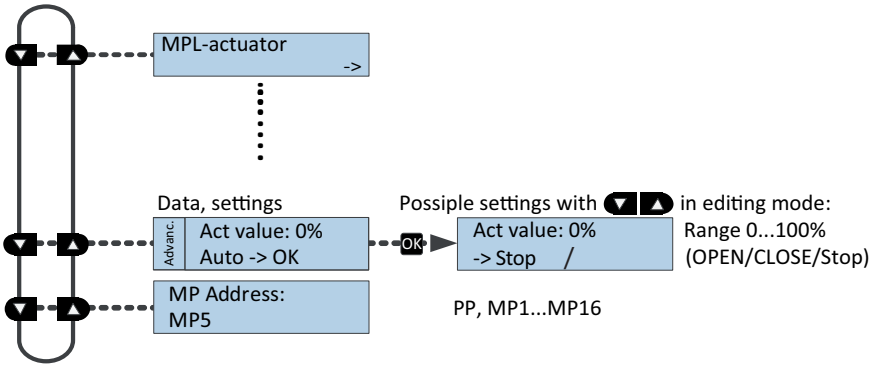
Deviations

VRD2 (1992-2007)	Display showing actual value/setpoint in [% Vnom] Vmin in [% Vmax], Vmax in [% Vnom]	Read only	PP
VRD3 (as of 2008)	Display showing actual value/setpoint in [% Vnom] Vmin in [% Vnom], Vmax in [% Vnom]	HW potentiometer setting «Tool → Read/write, otherwise → Read only	PP
VRP-M VAV	Up to V2.16 Vmin in [% Vmax], Vmax in [% Vnom] As of V3.0 Vmin in [% Vnom], Vmax in [% Vnom]		PP / MP1…8
NMV-D2 (1992 – 2000) **NMV-D2M** (2000 –2006)	Display showing actual value/setpoint in [% Vnom], Vmin in [% Vmax], Vmax in [% Vnom]		PP PP / MP1…8
Altitude compensation	This function requires VAV-Compact D3 with firmware V2.06 (03/2013) or higher and ZTH with firmware V2.01 or higher.		

Functions for MPL actuators

Menu tree

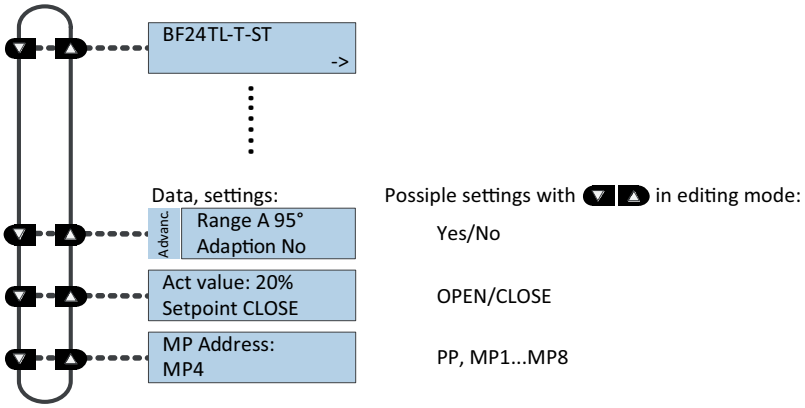
Adjustment/display options MPL actuator.



Functions for BF-TopLine fire damper actuators

Menu tree

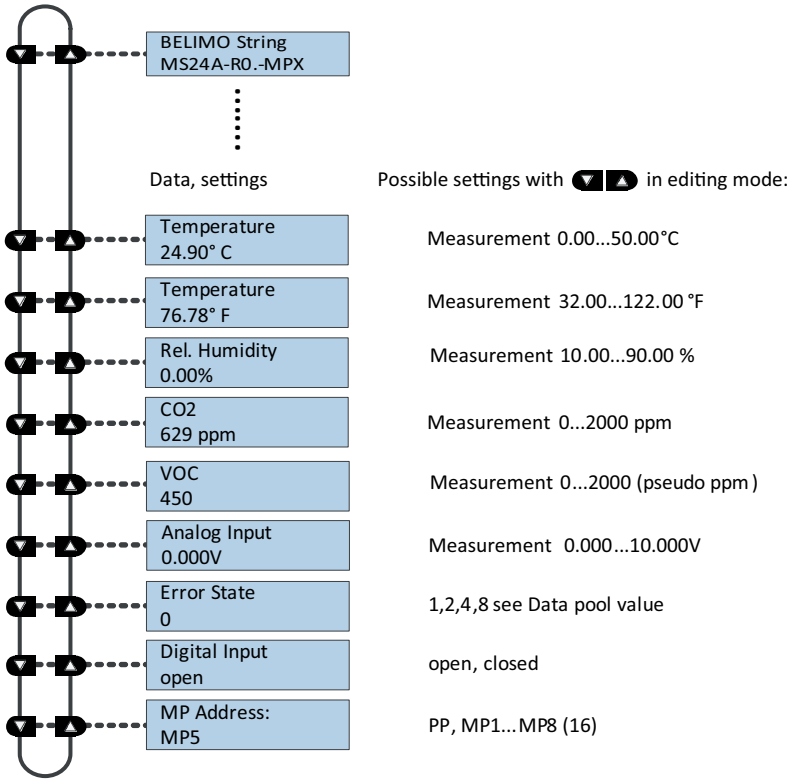
Adjustment/display options BF-TopLine actuator.



Functions for room sensors MS24A-R0x-MPX

Menu tree

Adjustment/display options Room sensor MS24A-R08-MPX (T, rH, CO2, VOC).

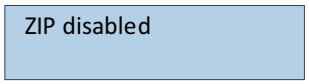


ZIP functions

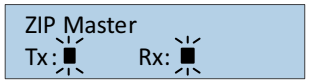
Note
If the ZTH AP is connected to the PC, the display flashes a few times until the driver is installed on the PC.

In this configuration, the ZTH AP works as a level converter between the USB port of a PC and the Belimo MP device. The correct driver will be automatically installed on the PC when the ZTH AP is plugged in. As soon as the USB interface is connected, the ZTH AP switches to ZIP mode.

ZIP disabled

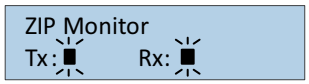


ZIP master



Connection as MP master (e.g. PC-Tool).
If there is bus communication, this is indicated by Tx and Rx flashing.

ZIP monitor



Connection for monitor function with PC-Tool.
If there is bus communication, this is indicated by Tx and Rx flashing.

Power supply

Checking the power supply

The ZTH AP allows the "AC 24 V" power supply (III safety extra-low voltage) of the Belimo devices to be checked. Voltages >30V are not permitted!
Application: e.g. commissioning, troubleshooting in the event of a malfunction.

Measuring process

Note
Only connect RJ12 plug to ZTH AP when starting!

Equipment: ZTH AP, ZK2-GEN
Connect in the following order:
- Connect free wires of the ZK2-GEN to AC 24 V.
- White to GND (connection 1 actuator/VAV controller)
- Blue to ~ (connection 2 actuator/VAV controller)
- Do not connect third wire (turquoise)

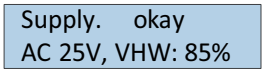
Start:

Press the ZTH AP key (OK) while at the same time connecting the RJ12 plug
Select "AC measurement" function with arrow key (▼)

End:

Disconnect RJ12 plug or end "Configuration" function (ESC)

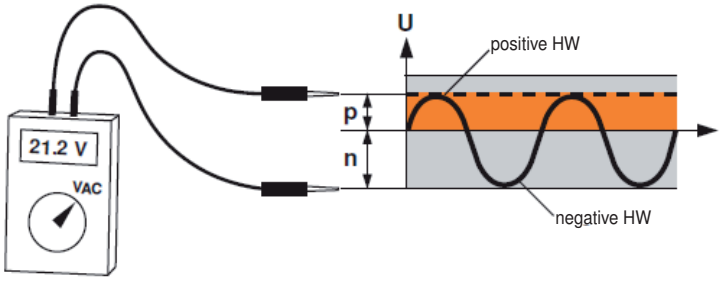
Display



"Supply okay" display: AC supply in the range 19.2 ... 28.8 V
AC value: measured AC voltage (accuracy ±1.0 V provided that VHW >95%)

Explanation of VHW

The VHW unit describes the relationship between the positive and negative half-wave.
The deviation between the positive and negative half-wave value must not be too great. The following formula applies: positive HW / negative HW x 100 should be >80%:



Possible problems

The following factors influence the half-wave load:
- Transformer dimensions too small
- Maximum signal cable length between transformer and actuator exceeded

Firmware upgrade

The ZTH AP can be updated to the latest firmware version using the ZTH AP updater. The required software and the instructions for the upgrade can be downloaded from the download area of the Belimo website www.belimo.com.

Compatibilities

Function and handling

The ZTH AP includes the complete functionality of all previous versions of the ZTH-GEN and ZTH-VAV.

Note
Latest information about firmware upgrades, version overviews, documentation:
See www.belimo.com

The hardware of the ZTH AP is not however compatible with the hardware of the ZTH-GEN. The updates for the ZTH-GEN cannot be loaded to the ZTH AP.

In addition, the new ZTH AP supports the ZIP USB function. This can be used for the ZTH AP updates and also as a level converter USB/MP with the PC-Tool.

ZEV The ZEV adjustment tool (1992 to 2007) is replaced by the ZTH AP.

ZTH-VAV Is replaced by the ZTH AP.

ZTH-GEN V2.xx / V3.xx / V4.xx Is replaced by the ZTH AP.

Version overview

V 2.03
V 2.02
- Device identification for VRD2 / NMV-D2 corrected
- New menu "Sensor monitoring of air bubbles" for the EPIV
- Error correction: impairment of the sensor measurement at Y3
- Error correction: impairment of the analogue setpoint at Y3

V 2.01
- Release of the ZTH and ZIP function