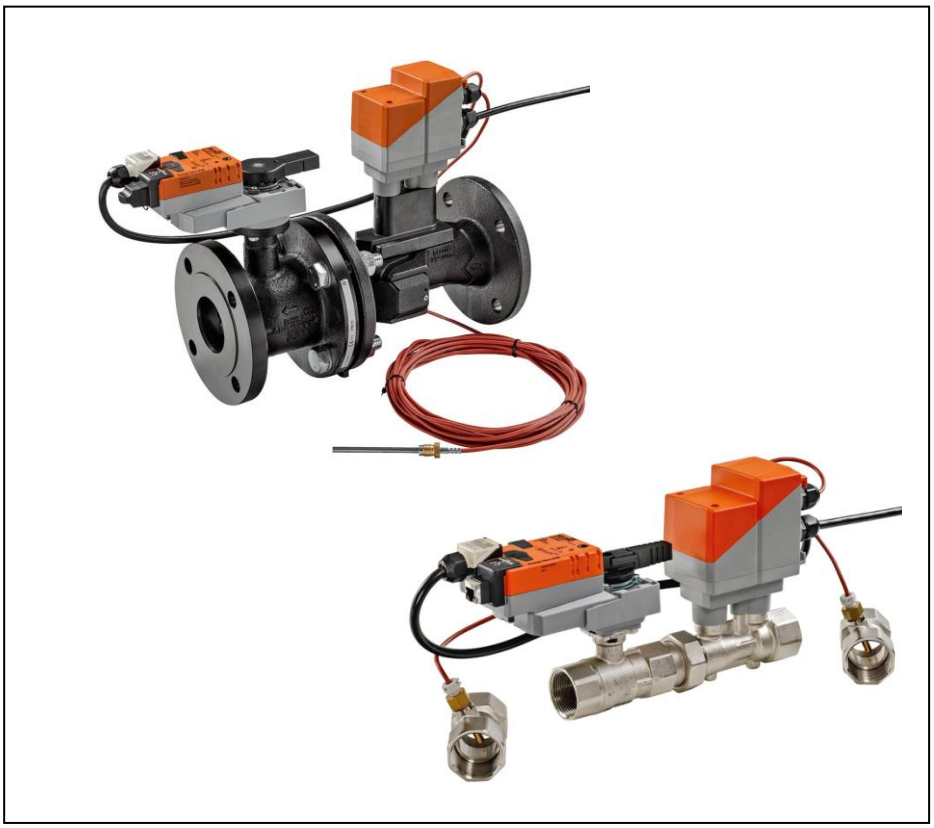


Characterised control valve (CCV) with adjustable flow rate and sensor-operated flow control, power control, and power and energy-monitoring function

Contents

General

Versions Information

- This manual relates to the following listed products with a production date from 31st March 2017.
  - Belimo Energy Valve™ DN15 to DN50
    - EV0..R+(K)BAC(1)
  - Belimo Energy Valve™ DN65 to DN150
    - P..W..EV-(K)BAC
- Earlier versions might have different views and functions. In case of doubt, please contact your Belimo Representative.

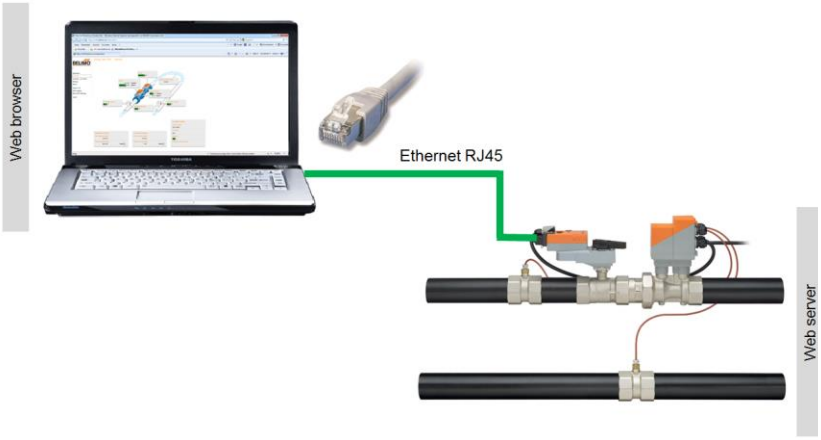
Requirements

- For a direct-access a PC with an installed web browser and a network cable (RJ45) is needed.
- The following web browsers are supported:
  - Microsoft Internet Explorer
  - Mozilla Firefox
  - Safari on platform iOS
  - Standard web browser on platform Android:
    - Gingerbread
    - Honeycomb
    - Ice Cream Sandwich
    - Jelly Bean
- The current version of Java has to be installed. Download: http://www.java.com/de/download/.

Access to the Energy Valve

Connection

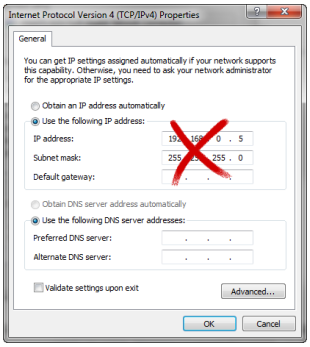
- Connect the PC/Laptop to the Energy Valve with the RJ45 cable

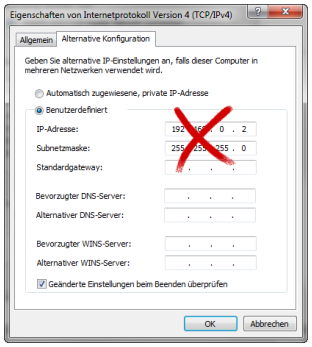


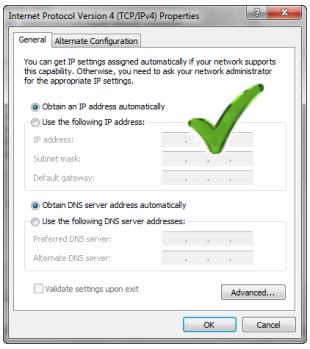
- Note: The Energy Valve must be supplied with voltage.

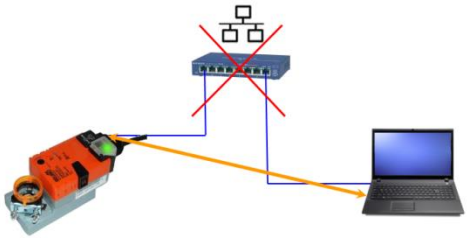
Access to the Energy Valve by means of a "Peer to Peer" connection

- Easy access to the valve possible.
- The IP address has not to be known.
- The following conditions have to be considered:
  - Direct connection valve – PC. This access method cannot be used in a network with other devices.
  - No static IP address is configured
  - No alternative IP address is configured
  - DHCP mode is set







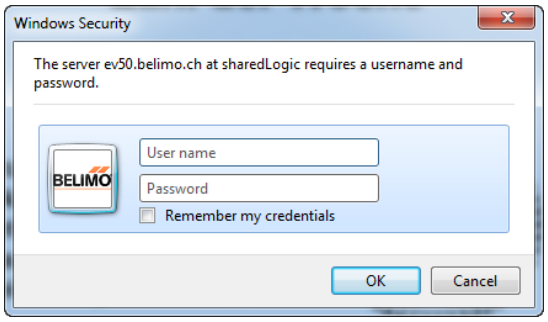


- Open Internet Explorer and enter the following address: **http://belimo.local:8080**

Access to the Energy Valve by means of the IP address

- As an alternative to the "Peer to Peer" connection an access by using the IP address is also possible.
- This type of connection can be used in a network with several devices.
- In case of several Energy Valves in the network different IP addresses must be assigned first.
- 192.168.0.10 is the IP address assigned at the time of delivery
- Open Internet Explorer and enter the following address: **http://192.168.0.10:8080**

User name and password



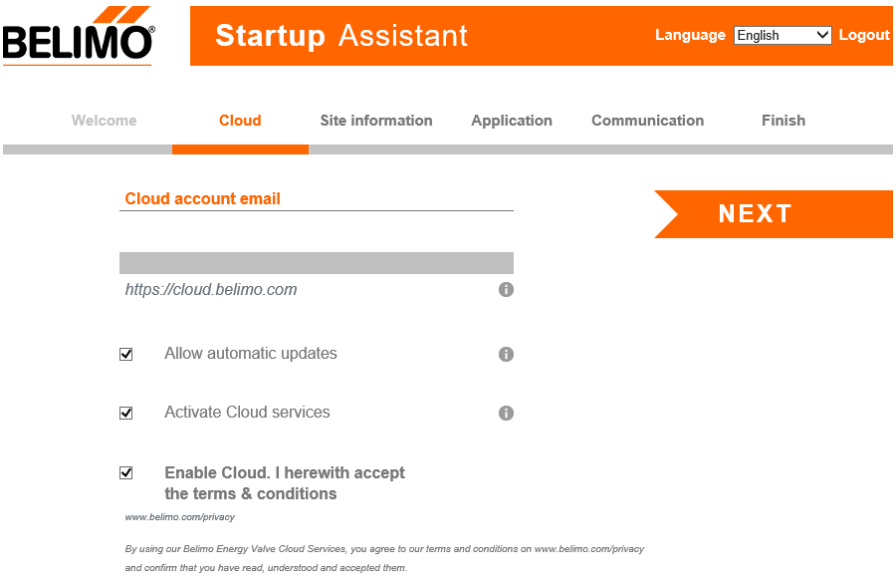
- Access to the Energy Valve is password-protected
- 3 users have different reading and writing access

User name: Password:	guest guest	maintenance belimo	admin [1]
Overview	R	R	R
Live Trend&KPI	R / W	R / W	R / W
Data logging	R	R	R / W
Health state	R	R/W	R / W
Version information	-	R	R
Application	R[2	R[2	R / W
Date & Time	-	R	R / W
Users	R	R/W	R / W
IP	-	R	R / W
BACnet/MP/Modbus	R	R	R/W
Cloud Settings	-	-	R/W
Maintenance	-	-	R/W

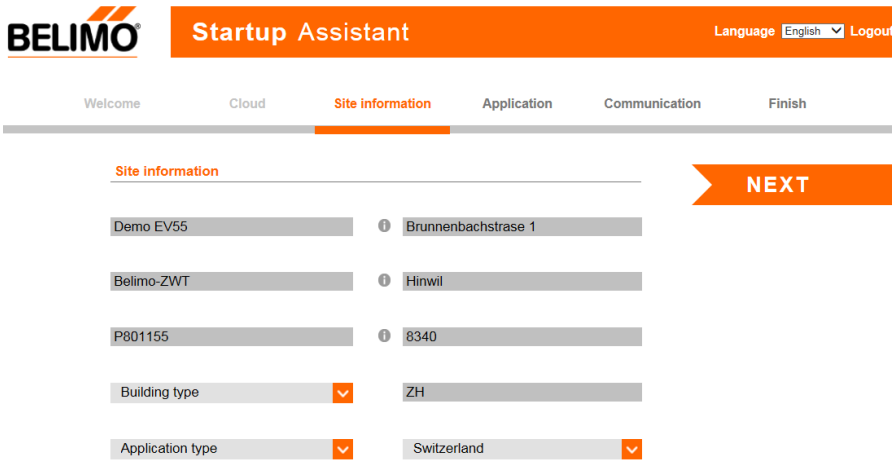
- Legend:
  L = Read access
  S = Write access
  - = Page is not displayed
  [1] = Please contact your Belimo Representative
  [2] = Units can be written

Startup Assistant

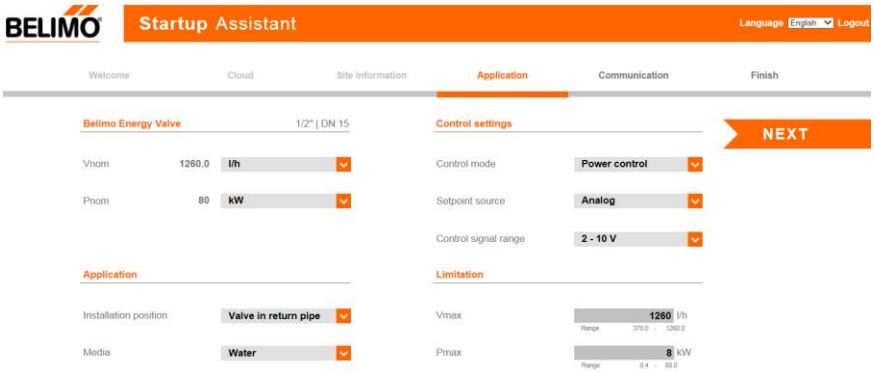
- The startup assistant is opened right after the start. The Startup-Assistant helps to do the main settings of the Belimo Energy Valve™ right at the beginning. The following steps appear:



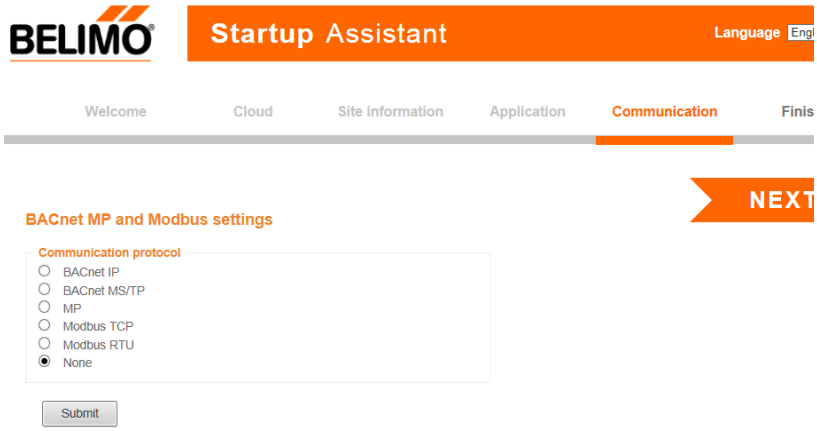
- First step: If a usage is desired for the Belimo Cloud, the details can be specified in the first step. If the operator of the Energy Valve decides to use the Belimo Cloud, he agrees to the General Terms and Conditions. For further details see: www.belimo.com/privacy
- Cloud account e-mail: If the user already has a Belimo Cloud account, he can enter the e-mail address here.
- Allow automatic updates: Receive software updates and allow Belimo to install them on the device. After updating, the device is automatically restarted and all settings are retained.
- Activate Cloud Services: Here you can activate the cloud services, Delta-T optimization and support via Cloud.
- Cloud services: After deactivating the cloud services, the following is no longer available: Delta-T optimization via the cloud, online support and remote configuration.



- Second step: The details for the valve can be filled in here, e.g. location of the installation, application details or the building address



- Third step: Enter the settings for the installation, control settings and flow rate



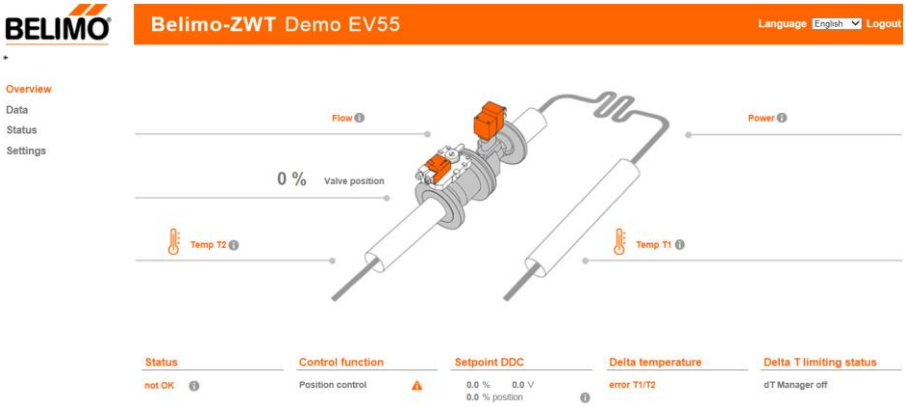
- Step Four: Setting the respective bus protocols

Language selection

- The language displayed on the web server is selected automatically according to the current PC settings
- Available languages
  - Deutsch
  - Englisch
  - Spanisch
  - Französisch
  - Kroatisch
  - Magyar-Englisch (Ungarn)
  - Italienisch
  - Japanisch
  - Koreanisch
  - Mazedonisch
  - Holländisch
  - Polnisch
  - Portugiesisch
  - Russisch
  - Slowakisch
  - Slowenisch
  - Serbisch
  - Schwedisch
  - Chinesisch (Mandarin)
- If the language is not available, English is selected as the display language
- If necessary, the display language can be selected manually

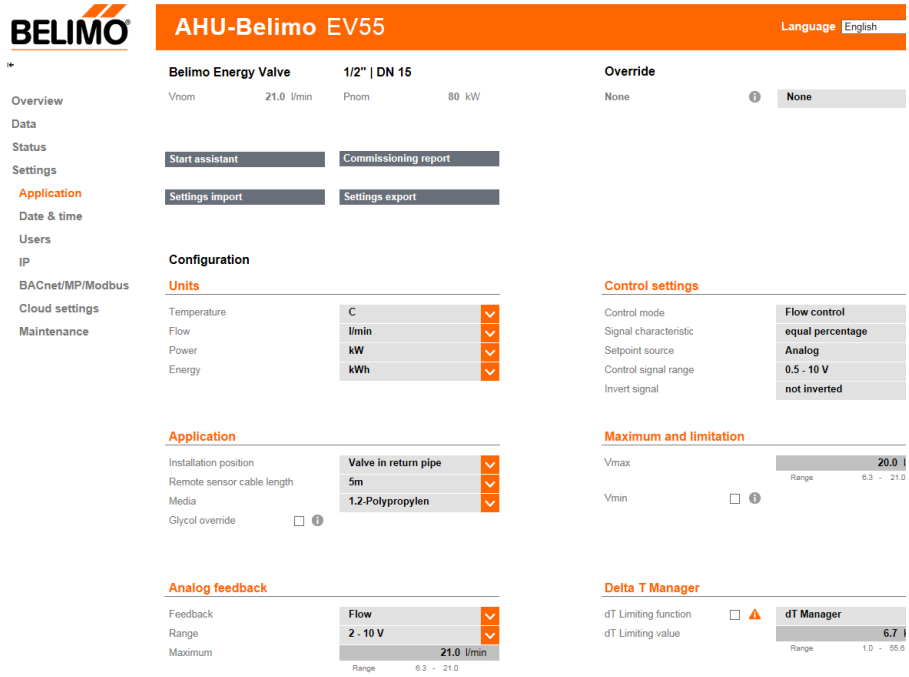
Overview

- In addition to the most important values of the valve, this page shows the following additional values:
  - Status
  - Control function
  - Setpoint DDC
  - Delta temperature
  - Delta-T Limiting status



Settings - Application

- All settings can be made on this page.

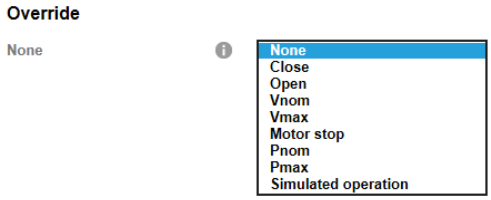


Note

The various setting options are explained in detail below.

Settings Override

- The current control signal can be overridden with the help of the Override function.



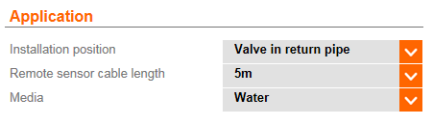
> Note
>
> The definition of the values Vnom, Vmax, Pnom and Pmax is provided in the Appendix to this document.

- The following options are available:
  - **Auto:** No manual override
  - **Close:** Valve is closed
  - **Open:** Valve is opened completely
  - **Vnom:** The nominal flow rate of the valve (catalogue value) is controlled [1)]
  - **Vmax:** The set maximum volumetric flow (100% requirement) is controlled
  - **Motor stop:** The actuator remains at its current position
  - **Pnom**: The nominal power Q'nom of the valve is controlled [1)]
  - **Pmax**: The set maximum power Q'max (100% requirement) is controlled
  - **Simulated operation**: In simulated operation, the energy valve is loaded with non-real input data. For example, it is possible to display all functions during a customer visit.

1) As Vnom/Pnom may be greater than the maximum required (set) Vmax/Pmax of the installation, achieving the nominal value is dependent on the output of the pump.

- The override function is deactivated automatically after 2 hours.
  The time remaining before deactivation is displayed

Settings - Application



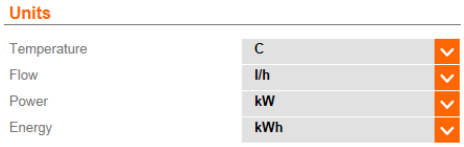
- Installation position
  The correct setting is important for the allocation of the consumed energy as cooling or heating energy
  - Valve in return pipe
  - Valve in supply pipe
- Media
  Selection of the medium used:
  - Water
  - Monoethylenglycol
  - 1.2 Polypropylenglycol
- Concentration
  - Percentage concentration of the glycol
  - The selection is only displayed when 'Monoethylenglycol' or '1.2 Polypropylenglycol' has been selected
- Cable length
  - The cable length of the sensor which is away from the valve is setted to the correct value of 3 meters (DN15…DN50) or 10 meters (DN65…150) ex works.

> **The setting of the cable length may not be changed!**

> **The cables between valve unit and temperature sensors may not be either shortened or lengthened.**

Settings - units

- Setting of the value units



Temperature
- °C (*)
- °F
- K

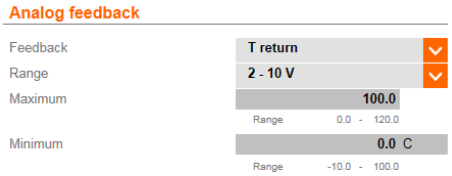
Flow rate
- m^3/h
- m^3/s
- l/s
- l/min (*)
- l/h
- gpm
- cfm

Power
- W
- kW (*)
- BTU/h
- kBTU/h
- Ton

Energy
- J
- kWh(*)
- MWh
- kBTU
- TonH
- MJ
- GJ

(*) = presetting ex-works

Settings – analog feedback



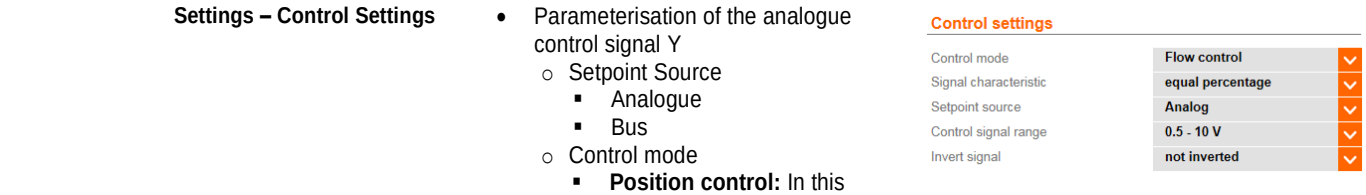
- Feedback Information: U5 corresponds to one of the following values. The units correspond to the units set in the 'User' range.
  - **Flow:** Flow rate
  - **Power:** Current consumer power
  - **T supply:** Supply temperature
  - **T return:** Return temperature
  - **Delta T:** Differential temperature, supply and return
  - **Valve Position:** Valve opening angle [°]
- Feedback signal range:
  - 0 – 10 VDC
  - 0.5 – 10 VDC
  - 2 – 10 VDC
- Maximum: Setting the maximum value for the feedback signal
  - 10 V = set value
- Minimum: Setting the minimum value for the feedback signal
  - 0 V = set value
  - Only displayed when 'T supply' or 'T return' has been selected
  - 0 V corresponds to the value 0 with all other selections

Note

These settings configure the analog feedback signal U5

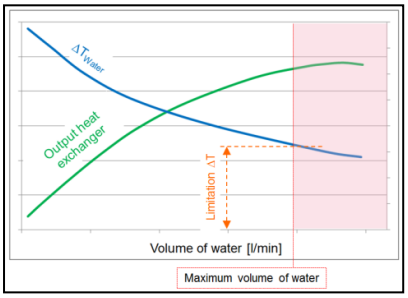
Settings – Control Settings

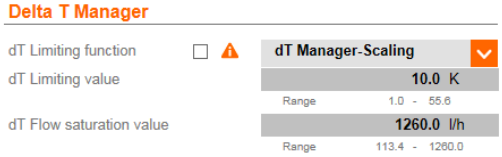
- Parameterisation of the analogue control signal Y
  - Setpoint Source
    - Analogue
    - Bus
  - Control mode
    - **Position control:** In this setting, the valve functions as a pressure-dependent valve, e.g. like a conventional characterized control valve
    - **Flow control:** Operation as a pressure-independent valve analogous to an EPIV
    - **Power control:** The control signal requests directly a certain power output at the exchanger. The valve works temperature- and pressure - independent
  - Control signal range
    - **0.5 – 10 VDC**
    - **2 – 10 VDC**
  - Invert control signal
    - **no:** no inversion → 0V = valve closed / 10V = valve open
    - **yes**: inversion → 10V = valve closed / 0V = valve open
  - Control signal characteristics
    - **equal percentage:** equal-percentage characteristic curve
    - **linear:** linear characteristic curve
    - This selection is not available when 'Power control' is selected. For power control the characteristic is always linear



Settings – Delta-T- Manager

- This function can be used in order to prevent an increase in the volumetric flow when levels fail to reach a set supply/return differential temperature.
- The valve will not be opened further in such cases, even with an increasing control signal
- Limitation function
  - **-:** Delta-T limitation switched off
  - **Delta-T- Manager:** Simple Delta-T limitation switched on
    - **dT Limiting value:** No increase in the volumetric flow when levels fall below this setting value
  - **Delta-T-Manager-Scaling:** Advanced Delta-T limitation switched on
    - **dT Limiting value:** No increase in the volumetric flow when levels fall below a (dynamic) setting value
    - **dT Flow saturation value:** Corresponding flow rate when achieving Delta-T





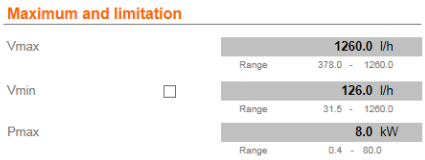
The limitation function monitors the differential temperature only when the flow rate is ≥ 30% of Vmax
- In the range below 30% Vmax too low differential temperatures are not corrected
- This operating behavior ensures the correct start-up of the system after a downtime

Settings – Maximum and limitation

Note

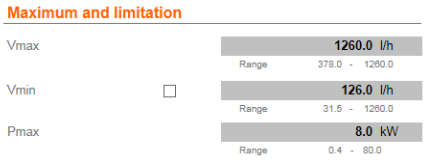
The definition of the values Vnom and Vmax is provided in the Appendix to this document.

- Maximum flow rate Vmax
  - This value is to be set on the basis of the design data of the consumer
  - Input as absolute value in the selected unit
- Minimum flow Vmin
  - In order to ensure a minimum flow at a request of 0V, it is possible to enter a Vmin
  - The input is made as an absolute value in the selected unit
  - The box must be selected actively
  - This minimum flow becomes effective with a minimum demand of the control signal. This is depending on the analogue setting 0V, 0.5V, 2V or via Bus 0%



Settings – Configuration power

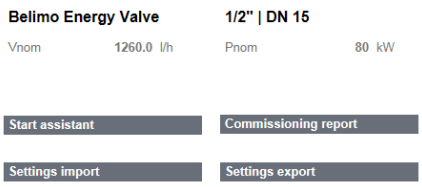
- Maximum power Pmax
  - Is shown when control function 'Power' is selected
  - This value is to be set on the basis of the design data of the consumer
  - Input as absolute value in the selected unit



Settings - settings Import/Export

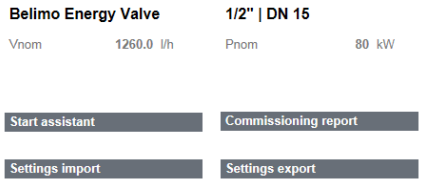
This function can only be used with the same nominal size

- Import and export the settings, in case several Energy Valves are operated with the same configuration settings
- It is only possible to adopt all settings of an Energy Valve of the same nominal size.



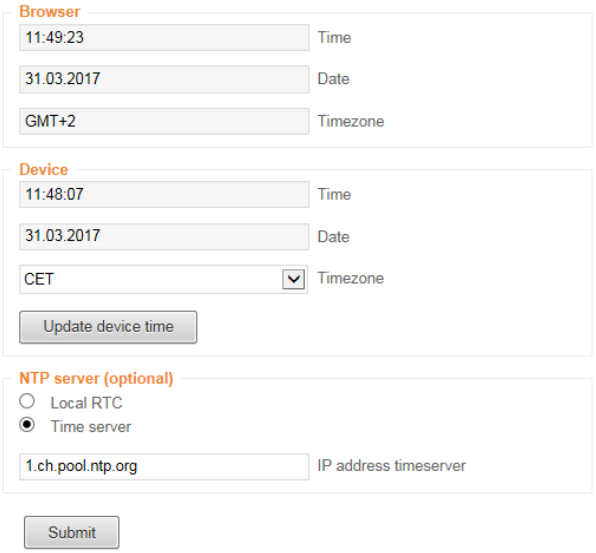
Settings - commissioning report

- In a commissioning report, all settings and basic data of the Energy valve are shown clearly and structured.
- It can be saved as a pdf file



Settings - Date & Time

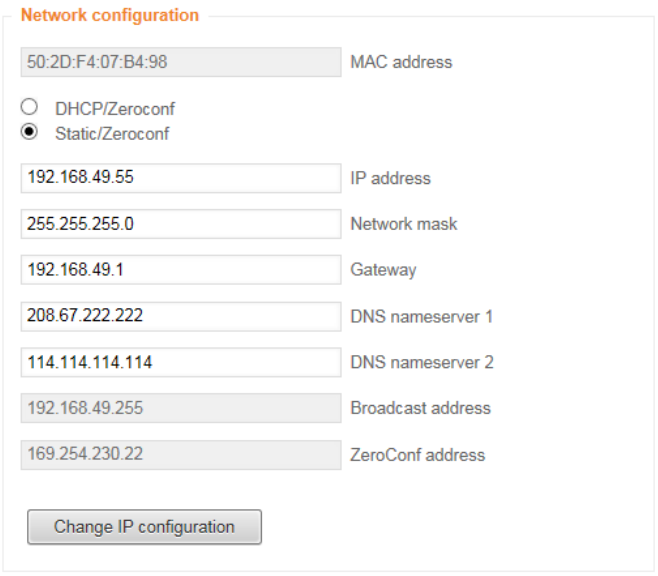
- Possible settings: Date, Time and Time Zone



- Browser: Date and time of the connected PC-Browser
- Device: Date and time which is set on the Energy Valve
- Update device time: Clicking on "Update device time" causes the Date and Time settings of the attached PC to be adopted on the Energy Valve.
- NTP Server: As an option, time and date can be obtained from a Time Server.
- When using several Energy Valve it is possible to define one Energy Valve as the Time-Master. For this purpose, the IP address of the Time-Master must be entered at all other Energy Valves.

Settings - IP

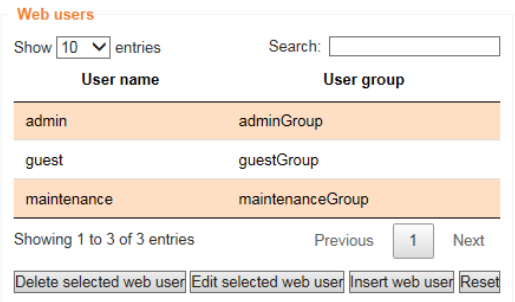
- IP settings
- This settings are to be set on the basis of the instruction of the network administrator



- **Static IP/Zeroconf:** With this setting, the possibility is given to assign a pre-defined IP-address to the Energy Valve, as well to assign the subnet mask and gateway to it. This method can be used, if the network administrator is managing the network addresses without a DHCP server.
- **DHCP/Zeroconf:** With this setting it is possible, to assign automatically an IP-address to the Energy Valve. If a DHCP Server is available in the network, the Energy Valve is able to receive an IP-address from it.
  If there is no DHCP Server in the network, the Energy Valve is able, via Zeroconfig, to calculate an IP-address based on the ZeroConfig specification.

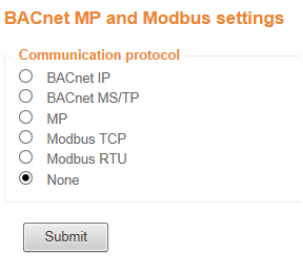
Settings - User

- Settings for the user management
  - Users can be added, modified, or deleted..
  - Under "Edit selected web user" the respective password can be changed
  - Note: Only users with a lower or equivalent authorization can be edited



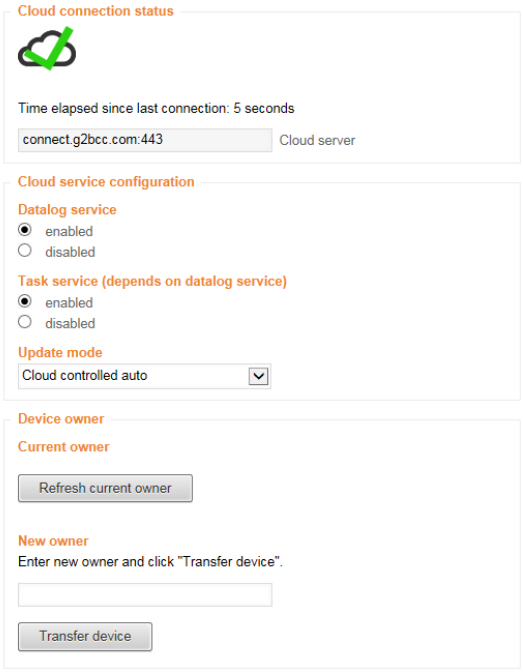
Settings - BACnet/MP/Modbus

- Selection of the communication protocol
  - BACnet IP
  - BACnet MS/TP
  - MP
  - Modbus TCP
  - Modbus RTU
  - None (only conventional control)
- Perform all relevant settings in accordance with the specifications of the onsite equipment.



Settings – Cloud

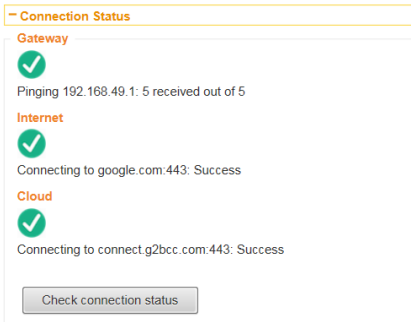
- Settings for the Belimo Cloud access



Cloud connection status: Here you can see whether the connection to the Belimo Cloud is established or not.
Cloud Server: The address of the connected host server
Datalog Service: Enables data transfer between the Energy Valve and the Belimo Cloud
Task service: Enables automatic updating of the flow of the Energy Valve and Delta-T values through the Belimo Cloud.
Update mode: Allows the software to be updated by the Belimo Cloud

- **Disabled**: No updates
- **Device controlled:** Updates are displayed on the web server, no installation.
- **Cloud controlled manual**: Updates are displayed on the Belimo Cloud, no installation required
- **Cloud controlled auto**: Updates are installed automatically

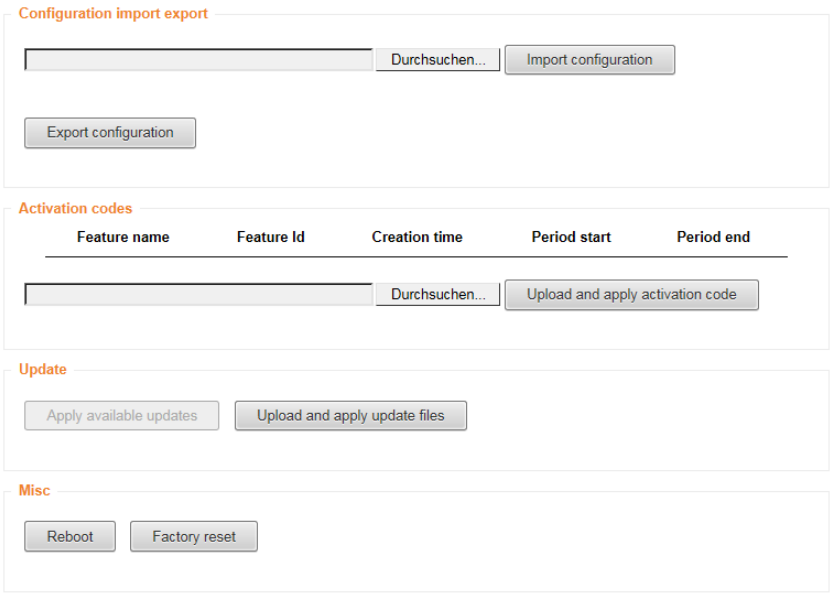
Current owner: The person who owns the device. This is typically the name of the user who has configured the Belimo Cloud settings and matches the email address specified during initial installation.
Refresh current owner: Simple refresh button to explicitly request the Belimo Cloud to inform Belimo of the current owner.
New owner: Used when a transfer is started from a current owner (or no owner) to a new owner. To do this, press the "Transfer device" button after entering a new owner.Cloud connection status: It is shown here whether the connection to the Belimo Cloud is established or not.



Connection status: Executes a routine that helps troubleshoot the connection to the Belimo cloud.
The following three steps are performed.

- Checking the connection to the next gateway
- Checking the Internet connection
- Checking the connection to the Belimo Cloud

Settings - Maintenance



Configuration Import Export

> **This function can only be used with the same nominal size**

- The settings which are selected during commissioning can be saved here as a file on the computer (Export configuration)
- If a larger number of Belimo Energy Valve™ need to be installed with the same settings, these settings can be exported once to be imported and applied to the other valve (Browse / Import Configuration). Only be used with the same nominal size.

Update

- It is possible to upload a software update directly and apply it on the Belimo Energy Valve™

Misc

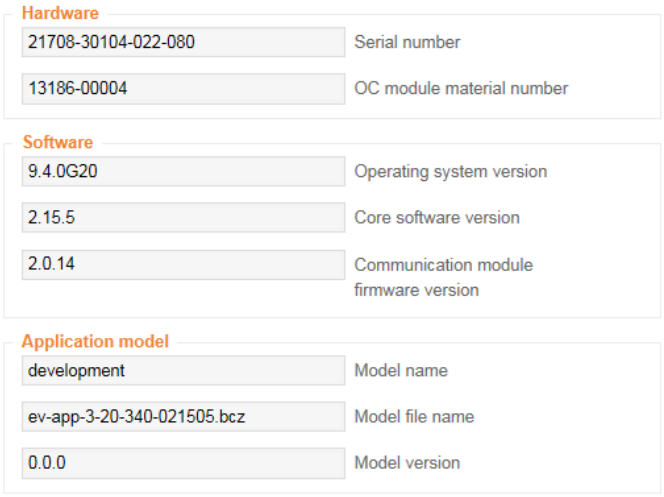
- Reboot: After pressing this field, the device restarts. The previously made settings will be maintained
- Factory reset: The device can be reset to the factory default settings. The steps are as follows: 1. Press the "Factory reset" button and confirm with "ok". Press the gear disengagement button on the actuator. After that the actuator starts to set all settings back to default condition. All stored data will be lost.

Status – Health state

- Displays the current error messages and the error history
- Current status messages are displayed
- The error history can be reset with the appropriate authorization

Status - Versions Information

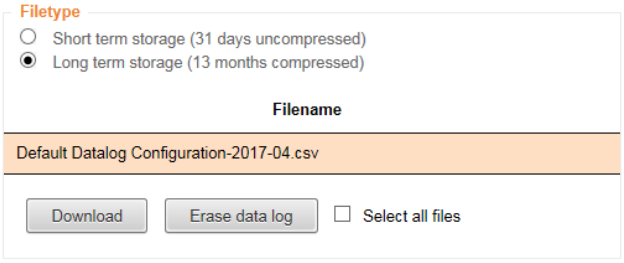
- Display of the current software and hardware version



> Note
>
> Please communicate the information on this page to your local Belimo representative in the event of malfunction.

Data - Data logging

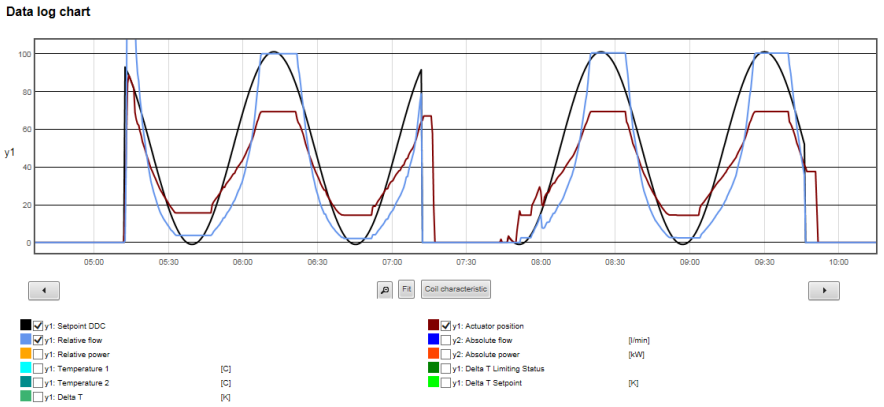
- Download of the csv files stored in the Energy Valve



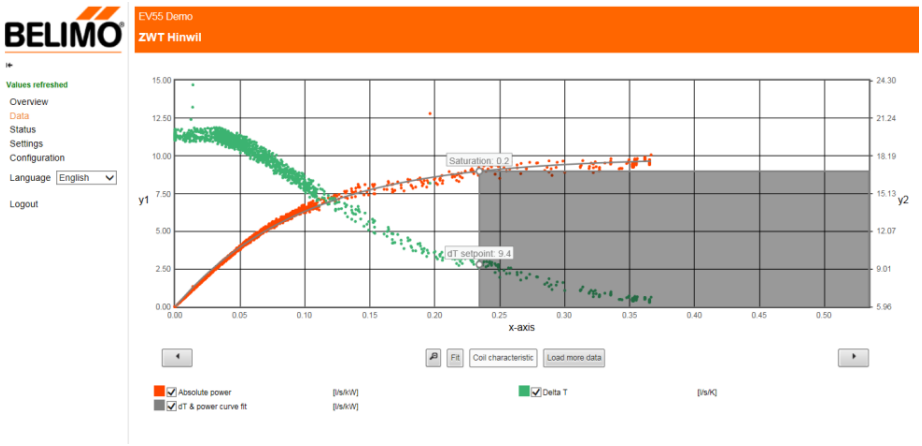
- Short Term Storage: One file is available per day for the last 31 days. A measurement series is stored every 30 seconds.
- Long Term Storage: One file is available per month for the last 13 months. A measurement series is stored every 2 hours.
- The files on the actuator can be deleted by users with the respective authorisation.

Data – Live Trend & KPI

- The LiveTrend function visualizes the system values.
- The displayed values can be selected in the lower area
- The zooming function can be used to limit the time period



- The visualization of the plant data allows a simple and fast overview of the system
- In this view the stored data of the last 8 days are automatically read in for the display
- The 'Read more data' button reads in all the data stored in the actuator
- The Delta-T values can be determined using the "coil characteristic" button



Display of recorded energy consumption as well as cumulative water flow:

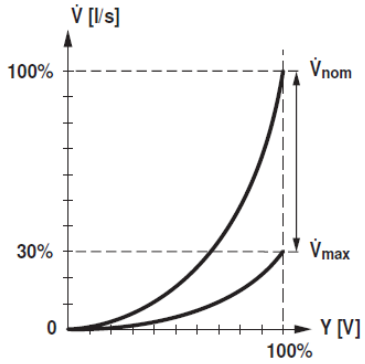
Attachment

Definition of Vnom

- Is the maximum possible flow rate. Vnom represents the as-delivered condition.

Definition of Vmax

- Is the maximum flow rate which has been set with the greatest control signal, e.g. 10V /100%



Definition of Pnom

- Pnom is the maximum controllable power output Qnom at the heat exchanger.

Definition of Pmax

- Pmax ist the maximum power output Qmax which has been set with the greatest control signal, e.g. 10V / 100%
- For control mode 'Power'.