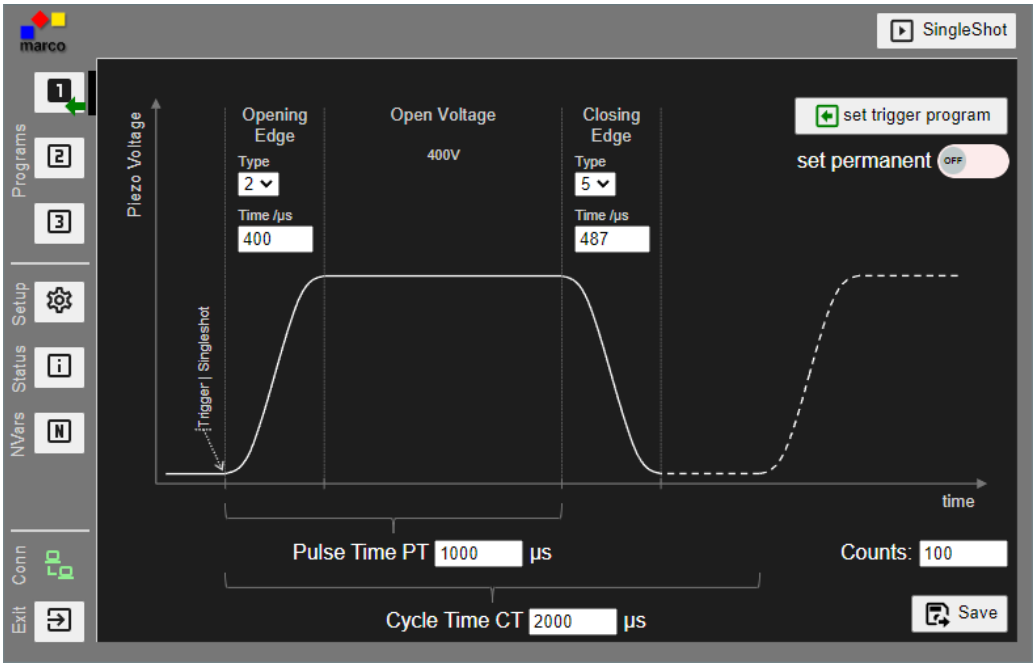

marco
SingleShot
Programs
Setup
Status
NVars
Conn
Exit
Piezo Voltage
Opening Edge
Type
2
Time /µs
400
Open Voltage
400V
Closing Edge
Type
5
Time /µs
487
set trigger program
set permanent
OFF
Trigger I Singleshot
time
Pulse Time PT 1000 µs
Counts: 100
Cycle Time CT 2000 µs
Save

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1 Scope

The marco BasiControl software is used to set up the BasicValve driver *mtv/ehm/e*. It allows configuration of three independent dispensing programs (1 2 3). For the latest version of the BasiControl software please refer to marco-systems.com.

2 Home screen

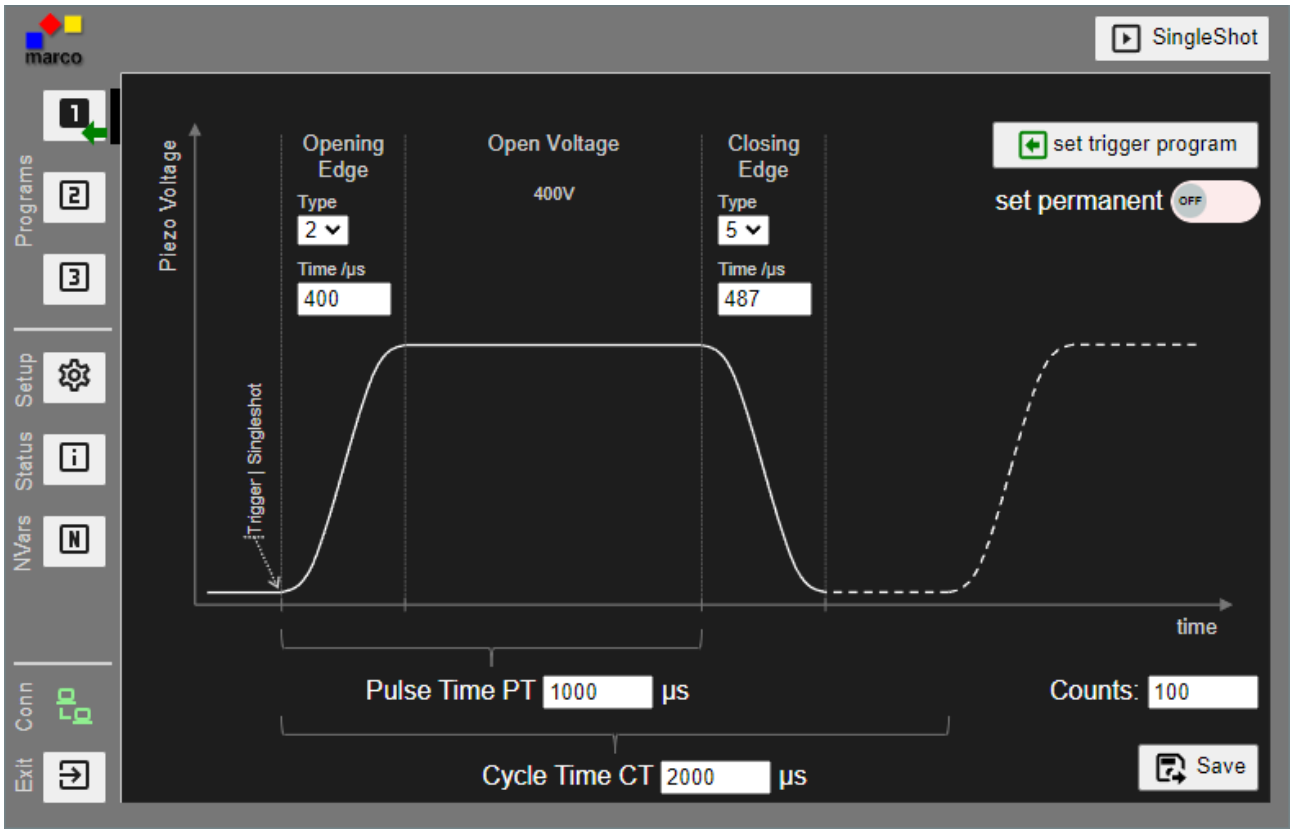


Figure 1: Home screen

2.1 Dispensing programs

Each dispensing program consists of the following parameters:

- **Opening and closing edges**

  The *mtv/ehm/e* is configured with three default opening edges suitable for a wide variety of different dispensing liquids.

  Edge shape and resulting velocity affect dispensing behaviour. Select an edge type that yields the best results with the particular dispensing liquid being used.

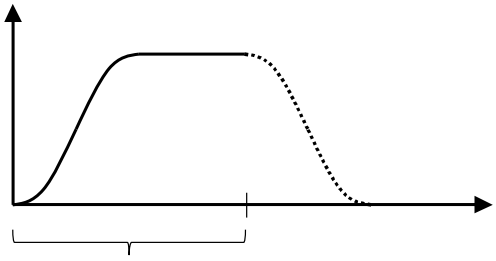
  In particular the shape of the closing edge has a great influence on droplet formation and should be tested for satellite formation or residue build-up.

  Please refer to Section 4 in this document for details on the available edge shapes. If in-depth tuning of the edge shapes proves to be necessary, please refer to the marco *mtv/ehm/b* and *vis/vt108* product lines.

- **Pulse time (PT)**

  This is the time the BasicValve valve seat is open and liquid is allowed to flow into and through the valve seat.

  PT includes the opening edge time.



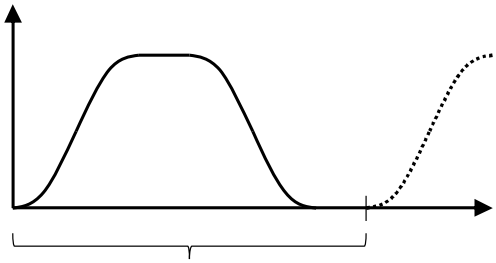
Pulse Time (PT)

- **Cycle time (CT)**

  This is the time it takes to complete a whole cycle in a single dispensing sequence. CT is composed of pulse time (PT), closing edge time and pause time.

  CT is the inverse of dispensing frequency – i.e. 2000 µs cycle time corresponds to 500 Hz dispensing frequency.

  Note: The BasicValve has a lower boundary of 2 ms CT or 500 Hz dispensing frequency. For more advanced operation please refer to the *mtv/ehm/b* and *mtv/dsm/a* product lines.



Cycle Time (CT)

- **Counts**

  This is the number of times a dispensing sequence is repeated in a dispensing program once triggered. I.e. a dispensing program with a count of 1000 in a dispensing sequence with a CT of 2000 µs will run for 2 seconds. Not usable when "set permanent" is activated.

- **Save**

  This saves the current dispensing program settings to the non-volatile memory on the *mtv/ehm/e* and activates the high voltage driver using these settings.

- **Set trigger program**

  This sets the current dispensing program to be executed from the INP trigger input line.

- **Set permanent**

  The current dispensing sequence will be executed as long as there is an active signal at the INP trigger input line. Regardless of the previous "Counts" setting.

2.2 Configuration check

Should the settings made for a dispensing program be invalid, e.g. pulse time greater than cycle time, then the status icon appears in red to alert the user and the 'ConfChk' error code on the Status tile is activated.
Note: the dispensing program concerned will not be triggered.



Please refer to the Troubleshooting table in Section 6 for information on all error codes.

2.3 NVars parameters

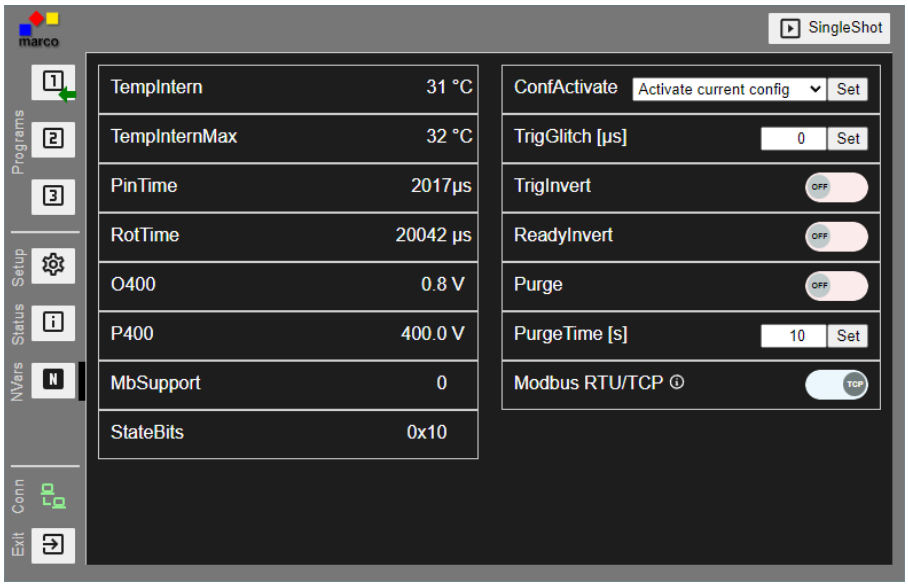


Figure 2: NVar parameters

- **TempIntern**
  Current temperature of the internal electronics
- **TempInternMax**
  Maximum temperature of the internal electronics since power on
- **PinTime**
  Measured on-time of the last trigger on the INP input line
- **RotTime**
  Measured time between the last two rising edges of triggers on the INP input line.
- **O400**
  Current Torque block drive voltage
- **P400**
  Current Torque block supply voltage
- **MbSuport** (software licence required)
  ModBus interface active
- **StateBits**
  State of the I/O lines (logic OR)

0x01	INP active
0x02	INP2 active
0x04	INP3 active
0x08	INP4 active
0x10	OUT1 active
0x20	OUT2 active
0x40	Button T1 active
0x80	Button T2 active

- **ConfActivate**
  - **Activate current config**: activate HV driver with the current settings.
  - **Activate config and save to flash**: activate HV driver with the current settings and save current settings to persistent memory. Same functionality as the 'Save' button on the 'Programs' tile.
  - **Load default config**: reset all dispensing program and NVar settings back to factory default.

  Note: all settings made by the user since delivery revert to the factory settings - this cannot be revoked!

- **TrigGlitch** (user defined time in micro-seconds)

  Controller hardware unit de-bounces trigger signals on the INP input line. All triggers with a shorter on-time than TrigGlitch time will be discarded.
  Attention: this will delay execution of the dispensing program for the TrigGlitch time!

  Setting only active after save and power cycle!

- **TrigInvert**

  Invert the INP trigger input line sensitivity. Default sensitivity is on rising edge.

- **ReadyInvert**

  Invert the ready signal polarity (default on OUT1). Default polarity is active high.

- **Flush** and **FlushTime**

  Drive mTV BasicValve open for the user defined time either to flush out liquid or to change valve seat

- **Modbus RTU/TCP** (software licence required)

  Toggles between Modbus RTU (serial RS485) and Modbus TCP (Port 5020).
  Setting only active after save and power cycle!

2.4 Dispensing program trigger

Each trigger will start the number of counts set for the dispensing program.
The dispensing programs can be triggered in two ways:

- manually, by using the 'SingleShot' button

  This is useful when tuning or testing the dispensing program parameters

  or

- externally, by a rising edge on the INP pin of the *BasicValve* driver *mtv/ehm/e*.

  Please refer to the *mtv/ehm/e* data sheet

  doc:P/mtv/ehm/doc/017 for the detailed electrical characteristics.

  The program to be triggered can be selected using the 'set trigger program' button.

Figure 3: Documentation download

3 Set-up

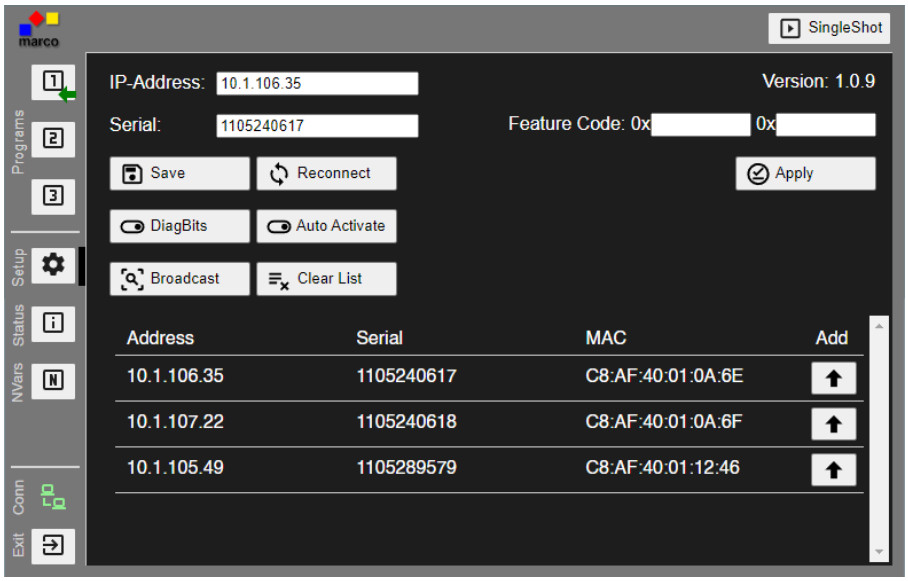


Figure 4: Set-up screen

- **IP address**

  Normally, the *mtv/ehm/e* is allocated an IP address via DHCP. If this is not the case, the *mtv/ehm/e* IP is set per default to 192.168.0.123. Use the broadcast feature to search for the allocated IP address or refer to Section 5.2.1 for details on how to obtain the IP address.

- **Serial**

  The *mtv/ehm/e* serial number is printed on the device label: S followed by 10 numerical digits.

- **Save**

  'Save' stores the current set-up entries to the local hard disc drive (this will not affect the dispensing program settings!).

- **Reconnect**

  With this function, you can close and re-open the network connection to the *mtv/ehm/e*. This is necessary when entering a new IP address.

- **DiagBits**

  When enabled, all status DiagBits are monitored continuously. This function can be disabled to reduce network traffic slightly.

- **Auto activate**

  When enabled, the ConfActivate on the *mtv/ehm/e* is set automatically when a connection has been established. This automatically activates the high voltage driver.

- **Broadcast/Clear list**

  The broadcast function sends out a broadcast network search on all available network interfaces and lists all *mtv/ehm/e* devices which were able to respond to the broadcast.

  Once the relevant *mtv/ehm/e* is shown in the list, click on the 'Add' icon to select its IP address and serial number.

  'Clear list' removes all entries in the list.

- **Feature Code**

  Used to enable licensed software features in the mtv/ehm/e BasicValve driver.

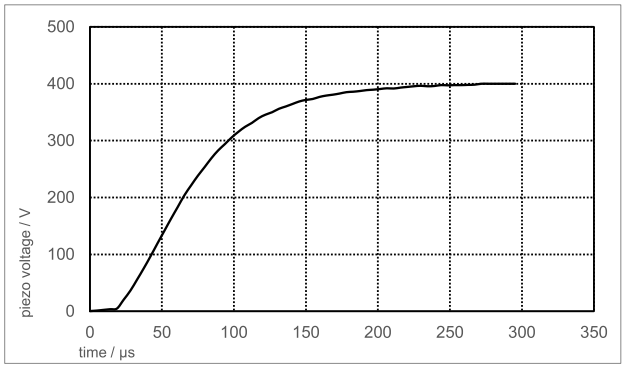
  The software feature license is issued to the user as a PDF document containing two 8-digit hex codes. The Code are unique per device and not interchangeable between drivers.

  After entering the two codes in the order provided and clicking the Apply button, the driver resets and the licensed feature becomes available.

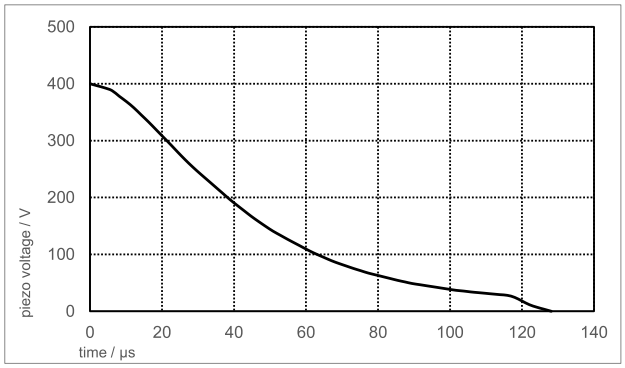
4 Opening and closing edges

There are three opening and three closing edges available to choose from in the mTV BasicValve system.
If in-depth tuning of the edges proves to be necessary, please refer to the marco *mtv/ehm/b* and *vis/vt108* product lines.

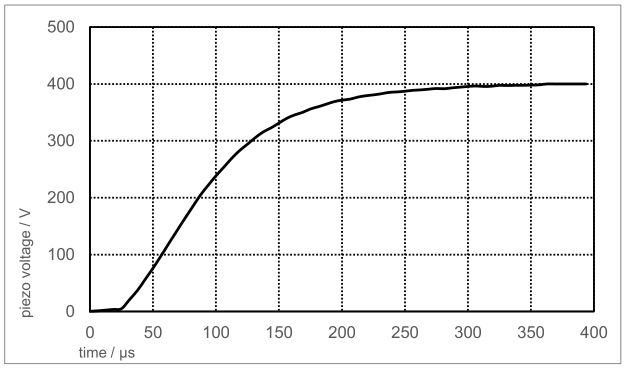
4.1 Reference voltage/time graphs



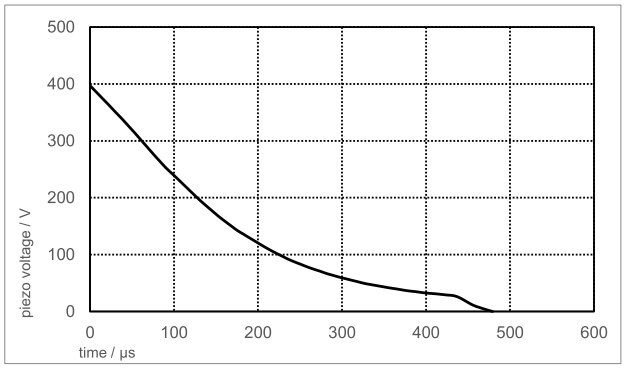
Opening edge 1 - fast



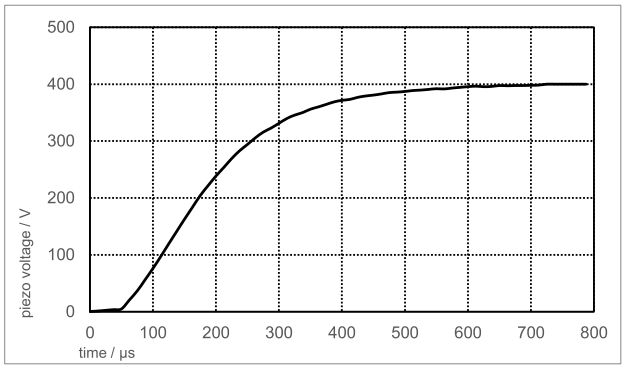
Closing edge 4 - fast



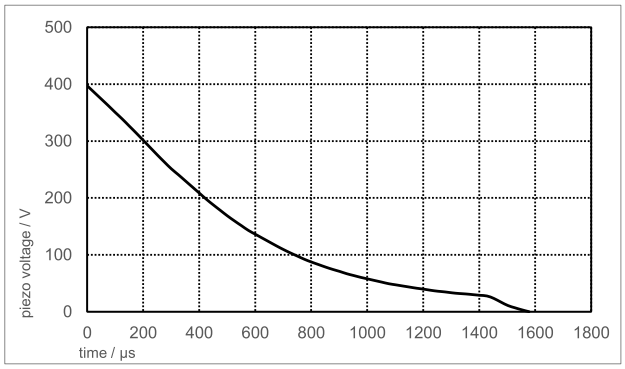
Opening edge 2 - medium



Closing edge 5 - medium



Opening edge 3 - slow



Closing edge 6 - slow

Figure 4: Reference graphs

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5 Installation

5.1 Note

Normally, the *mtv/ehm/e* is allocated an IP address via DHCP. If this is not the case, the *mtv/ehm/e* is set per default to the following settings:
IP address: 192.168.0.123
(Network Mask: 255.255.255.0)
(Gateway: none)

5.2 Configuration without a router

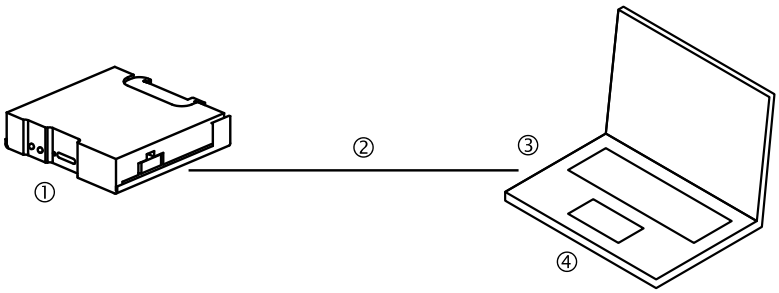


Figure 8: Connecting the BasicValve driver to a laptop/PC without a router (direct connection) using a dedicated network interface card (NIC)

① BasicValve driver *mtv/ehm/e*

② Network cable

Cat5e UTP or better – ensure the cabling is appropriate for your electrical environment

③ Network interface (NIC) of the laptop/PC.

Either integrated NIC or dedicated NIC i.e. using an USB Ethernet adapter.
A dedicated NIC is to be recommended if a fixed IP configuration is used in order to avoid incompatibility with other existing network connections on your laptop/PC.

④ Laptop/PC

5.2.1 Procedure

1 Prepare your equipment:

Ensure you have a USB-to-Ethernet adapter and an Ethernet cable

2 Install the USB-to-Ethernet adapter

Plug the adapter into a USB port on your laptop. Windows should automatically recognise the adapter and install the drivers required. If not, you may need to download the drivers from the manufacturer's website and install them manually.

3 Connect the BasicValve driver *mtv/ehm/e*:

Plug one end of the Ethernet cable into the Ethernet port on the adapter and the other end into the *mtv/ehm/e*.

4 Set fixed IP addresses:

- Go to Control Panel -> Network and Sharing Centre -> Change Adapter Settings
- Right click on the new Ethernet connection (representing your USB-to-Ethernet adapter) and select Properties
- Select Internet Protocol Version 4 (TCP/IPv4) and click on Properties
- Select Use the following IP address.
  Enter an IP address in the 192.168.0.xxx range (e.g. 192.168.0.100) and set the Subnet mask to 255.255.255.0. Leave the Default gateway and DNS server fields blank.
  Do not enter 192.168.0.123 as the address!
- Click on OK to save the settings

5 Verify connection:

- Open command prompt and type in
  ping 192.168.0.123
  If the system responds, the connection has been successfully established. If it times out, double check the IP settings and physical connections.

5.3 Configuration with a router

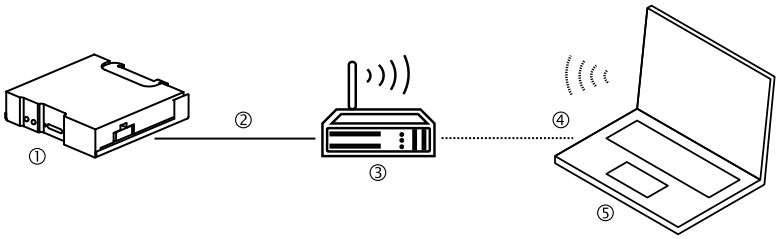


Figure 9: Connecting the BasicValve driver to a laptop/PC with a router

① BasicValve driver *mtv/ehm/e*

② Network cable
Cat5e UTP or better – ensure the cabling is appropriate for your electrical environment

③ Company or private office network router

④ Laptop or PC Network interface (NIC)
Wired or wireless. This connection must provide a valid route to the BasicValve driver *mtv/ehm/e*.

⑤ Laptop/PC

5.3.1 Procedure

1 Check IP address

Your router should automatically assign an IP address to the *mtv/ehm/e*.

Check the DHCP server log entries (usually via the web interface of your router) for the IP address using the MAC address of the *mtv/ehm/e*. The MAC address is printed on the device label.

If you do not have access to the log or router, provide your system administrator with the MAC address and request the allocated IP address.

2 Verify connection:

– Open command prompt and type in
ping <device IP address>
replacing <device IP address> with the actual IP of the *mtv/ehm/e*.
If the system responds, the connection has been successfully established. If it times out, ensure that the device is correctly connected to the router and switched on and that DHCP has been enabled on the router.

6 Troubleshooting

This table lists and describes error codes of the *mtv* BasicValve driver and the corresponding corrective actions.

Error code	Description	Corrective action
Run	No error, operational	None
ConfChk	No valid dispensing program settings	Identify the erroneous setting in the dispensing programs or carry out a factory reset.
NoEna	'Enable loop' open	Check to see whether valve is connected or cable damaged.
P4off	Valve power not on	activate HV driver (ConfActivate)
ErrConf	Config checksum error	Switch power off and on again. If the error persists, return the BasicValve driver to the manufacturer.
NoActivate	Valve not connected	Cable or devices are damaged.
PowFail	HV Power failure	BasicValve driver must be replaced.
ShortLow	Piezo actuator inside the valve or the cable is damaged	Check valve and cable and replace if necessary
ShortHigh	Piezo actuator inside the valve or the cable is damaged	Check valve and cable and replace if necessary
NoDos	Minimum stroke not reached	
LvlFail	Piezo actuator inside the valve or the cable is damaged	Check valve and cable and replace if necessary
HvOver	Piezo actuator inside the valve or the cable is damaged	Check valve and cable and replace if necessary
OverTemp	Maximum permissible BasicValve driver temperature reached - driver has shut down to prevent damage	Improve heat management of BasicValve driver.
OverPulse	Dispensing frequency too high	Adapt dispensing frequency to valve specification.
ToutFail	High voltage level required not reached	Check valve and cable and replace if necessary
CrcConf	Flash checksum error	Switch power off and on again. If the error persists, return the BasicValve driver to the manufacturer.
OutErr	Dispensing frequency too high	Adapt dispensing frequency to valve specification.
OutFail	Piezo actuator inside the valve or the cable is damaged	Check valve and cable and replace if necessary