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1 Scope

This manual applies to the following products:

marco BasicValve kit for non-contact jet dispensing	**marco BasicValve kit for contact/needle dispensing**
mtv/ba/kit-100/a	mtv/ba/kit-ll/a

Main components of the kits:

Valve drive type **BasicValve**	**Valve driver type** **BasicValve driver**
mtv/dsm/e	mtv/ehm/e

2 Terms and definitions

marco	**marco** Systemanalyse und Entwicklung GmbH
BasicValve	**marco** Torque-Block valve, basic design
BasicValve driver	**marco** Torque-Block valve driver electronics for BasicValve operation
BasicValve seat (VS)	valve insert for **marco** BasicValve
Cartridge (CR)	BasicValve seat insert (see Section 14)
Fluid Body (FB)	Fluid Body (fluid channel connecting media syringe to valve)
piezo actuator	piezo stack with Torque-Block technology engineered and manufactured by **marco** Germany
mtv/	**m**arco**T**orque**V**alve
mtv/ehm/e	Valve driver and control electronics, type: e
mtv/cab/250c	cable, 2.5 metres, type: c
mtv/vss/ba/100	valve seat, Ø100 µm orifice
mtv/cr/ba/d	cartridge, type: ba/d
mtv/fbs/llaa	Fluid Body LuerLock

3 Warning notices

Danger indicates an **imminently hazardous situation**. Disregarding this warning will result in serious injury or health problems.

Warning indicates a **potentially hazardous situation**. Disregarding this warning could result in serious injury or health problems.

Caution indicates a **potentially hazardous situation**. Failure to observe this warning may result in minor or moderate injury to people or damage to property.

4 General safety instructions

To prevent damage to the unit
Only authorised and trained personnel as defined in VDE 0105-100 und IEC 60364 should carry out work on the unit. Equipment must be de-energized before any maintenance or repair work is performed. This particularly applies to connecting and disconnecting cables between the BasicValve driver and BasicValve when carrying out maintenance and repair work, or when preparing to do so.

General
The unit should be installed so that the electrical interfaces are easily accessible and the operating elements and status indicators clearly visible. Incorrect handling by insufficiently qualified personnel can be dangerous. It is imperative that operating personnel is authorised and properly trained!

Modifications to hardware
For reasons of safety, repairs and hardware changes to the devices may only be carried out by **marco** or by authorised personnel. The operating conditions, parameters and safety instructions as specified by the manufacturer and detailed in this manual must be complied with. Failure to do so may result in a partial or complete invalidation of the manufacturer's liability. This also applies to equipment and accessories that have been acquired from third parties.

5 mTV safety-related instructions

The electrical devices described in this operating manual have been designed according to the latest engineering standards for use in industrial systems.

Due to the design of the piezo actuator Torque-Block the **marco** BasicValve is not completely closed when power to the piezo actuator or BasicValve driver is switched off. When the supply power to the driver fails, fluid may leak from the BasicValve. To avoid contamination of parts or production machines, the fluid pressure must be immediately relieved when supply power fails. This also applies when shutting down the production system (e.g., overnight or at weekends) or when power is unintentionally lost.

Prior to initial operation, check to see if fluid flows out of the valve when it is turned off even when no fluid pressure is applied. If this is the case, the position of the fluid reservoir may be too high in relation to the valve and hydrostatic pressure causes the fluid to flow out of the valve although it is de-energised. Place the fluid reservoir low enough to avoid fluid leaks when the valve has no power.

If the piezo actuator Torque-Block or the BasicValve driver is damaged, the valve may switch from a closed to open or intermediate condition, which can cause fluid to be released. We recommend continuous monitoring of the status signal from the BasiValve driver so that if an error is indicated the fluid reservoir is bled immediately and automatically.

Only original cables supplied by **marco** should be used to connect the BasicValve and BasicValve driver.

Connect and disconnect devices only after pressure has been released and the BasicValve driver is deactivated or completely switched off. This also applies to maintenance and repair work.

The BasicValve driver has a dedicated terminal block pin for ground connection for connecting protective ground.

The BasicValve driver must be connected to the system ground. Unused fastening threads may be employed for this – provided adequate grounding resistance is monitored.

The exterior of the BasicValve should only be cleaned using a soft, lint-free cotton or cellulose cloth. In the case of more severe contamination, lightly dampen the cloth with alcohol.

The connection and use of self-made or third-party products is done at the user's own risk.

Only **marco** may carry out repairs or modifications to the device.

6 Warranty terms

This manual contains no guarantee promises. The warranty for **marco** products is only that stated in the current version of the general standard terms and conditions. The warranty applies only when the device is used as intended and the specified conditions of use are complied with. No liability is assumed for any type of consequential damage that may occur due to failure or malfunction of the equipment.

7 Intended use

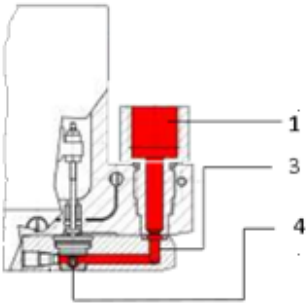
marco BasicValves are used for dispensing various kind of fluids in industrial fully or semi-automated manufacturing machines. They are designed for fixed installation and not for handheld operation.

8 Valid standards and directives

Please refer to the manufacturer's certificate of conformity (COC) mtv/dsm/e:COC (BasicValve) and mtv/ehm/e:COC (BasicValve driver), Section 21 'Related documents'.

9 Theory of operation

The **marco** BasicValve is a uniquely engineered and designed, dispensing valve for both non-contact jet dispensing and contact/needle dispensing. The BasicValve is driven by a patented piezo actuator with **marco** Torque-Block technology. Piezo mechanical movement is conveyed to a rod via a lever connected to the piezo actuator. The movement of this rod is then transferred to a cartridge in the valve seat. The sealing ball is made of wear-resistant ceramics and is attached to the lower end of the rod. In the closed position, the ceramic ball seals the ceramic valve seat, preventing any fluid flow. When the ceramic ball is raised, fluid flows and is dispensed.



1 = fluid body FB (inlet port), **3** = valve seat VS (front), **4** = valve seat VS (orifice)

The entire valve seat of the BasicValve can be removed and disassembled for cleaning purposes. Please refer to Section 18.3.1, 'Removing the valve seat'.

The piezo actuator Torque-Block itself is maintenance-free and allows fluid dispensing frequencies of up to 500 Hz in permanent operation. If higher frequencies are required we recommend using our product mTV modular valve which can operate up to 1,500 Hz **in permanent operation**.
The piezo actuator Torque-Block is driven via a dedicated power amplifier, located in the BasicValve driver. The dispensing process timing sequence of the BasicValve can be started directly using the buttons on the driver or externally i.e. by a PLC (Programmable Logic Controller) using either digital I/O lines or Modbus.

The BasicValve can dispense dots in the nanolitre range (depending on the fluid and nozzle or jet orifice). Pulse times can be adjusted in increments of 0.01 ms which allows a precise dispensing quantity to be set.

The basic design of the piezo actuator Torque-Block and wear-resistant ceramic valve seat keep critical parts separate from each other, resulting in extremely long service life for the piezo actuator and valve seat.

Depending upon the application and length of time in permanent operation, maintenance and inspection of parts subject to wear (e.g. valve seat and cartridge) should be carried out in regular intervals. Maintenance involves preventive cleaning of the wetted valve seat and fluid channel components, particularly in the fluid flow-path areas (red areas in figure above). A visual inspection of all areas of the wetted parts for wear and tear should be conducted and the valve seat, cartridge or other individual parts replaced as required. Please contact **marco** for further information regarding wear and tear or damage.
The expected service life of the piezo actuator Torque-Block is typically >1 billion cycles.

Do not dry cycle the device!

If the BasicValve is operated without any fluid, the ceramic valve seat and ball of the valve seat module can be damaged, causing leakage. If this happens, precise dispensing can no longer be guaranteed. Damaged components can be replaced, however.

The **marco** BasicValve is suitable for precise dispensing of a variety of chemically diverse fluids. These may have different viscosities and may also contain fillers.

To meet dispensing requirements for a broad range of fluids, various types of dispensing accessories are available which allow:

- contact dispensing of a repeatable fluid amount using precise dispensing tips/needles, i.e. continuous line dispensing with uniform shape
- non-contact dispensing (jetting) of individual free-flying droplets onto surfaces/parts
- non-contact dispensing of a fluid string

The BasicValve driver has various threaded mounting boreholes enabling simple integration into automation systems. There are no technical limitations to the installation orientation (vertical, horizontal, angled, upside down, etc.) which would affect the performance of the BasicValve. See the drawing in Section 20 'BasicValve driver reference drawing'.

marco recommends avoiding the use of any dispensing fluids that could damage or are not compatible with the following wetted materials:

- stainless steel 1.4305 (AISI grade 303)
- ceramics
- FFKM
- NBR
- PEEK
- silicone

For applications with anaerobic methacrylate, stainless steel parts can be replaced by synthetic components. If any compatibility issues arise, please contact **marco** at dispensing@marco.de.

When using short pot life adhesives, e.g. cyanoacrylates, wetted parts can be easily replaced if clogging occurs. Please bear in mind that cured material in the valve can lead to malfunctions so cleaning intervals of the valve should be adjusted correspondingly.

10 BasicValve specification

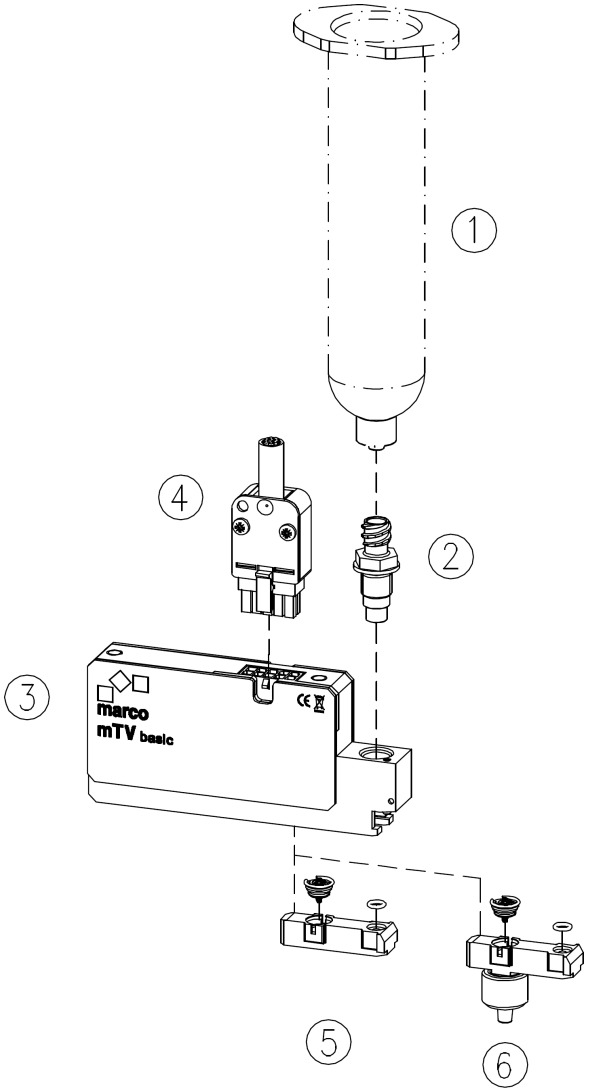
Specification	Application type	
	BasicValve non-contact jet dispensing mtv/ba/kit-100/a	BasicValve needle dispensing mtv/ba/kit-II/a
Dimensions (L x W x H)	85.5 mm x 14.1 mm x 40 mm	85.5 mm x 14.1 mm x 44.9 mm (H: plus needle length)
Dispensable fluids	Lubricants, e.g. oils and grease, paints and dyes, aqueous solutions, organic solvents, adhesives and adhesive components, liquid polymers and polymer solutions and many other liquids	
Dispensable viscosity range	Approx. 1 - 10,000 mPas	
Dispensable fillers in fluid	Examples: quartz powder, iron oxide, aluminium nitrite, nickel, silver, glass and polymeric particles up to a max. fill ratio of 50 % and a max. particle size of 50 µm. These are guidelines only. Please contact **marco** for your specific application.	
Minimum dispensing time for complete stroke	1.0 ms per open and close cycle each (2.0 ms in total)	
Maximum dispensing time	Infinite (permanent dispensing)	
Maximum pause time	Infinite (stop)	
Maximum dispensing frequency in continuous operation	Up to 500 Hz permanently dispensing	
Dispensing accuracy	Max. 5 % (with constant temperature and pressure)	
Maximum operating pressure	75 bar	
Ambient operating temperature range	0 to +45 °C	
Storage temperature range	-10 to +85 °C	
Diameter standard nozzle	100 µm non-contact jet dispensing	600 µm contact/needle dispensing
Valve seat maintenance and inspection interval	>10 000 000 cycles (depending on fluid)	
Piezo actuator service life	>1 000 000 000 cycles	
Wetted materials of BasicValve	Steel grade 1.4305 (AISI 303), ceramics, FFKM, NBR, PEEK, silicone	
Electrical connection	mtv/ca/250c, 2.5 m cable	
Minimum bending radius for electrical connection	Installation: R 35 mm, long term: R 100 mm	
Fluid connection	M10x1, LuerLock, other connections available on request	
Fastening thread on valve drive	2x M4, 5 mm deep on top side 2x M4, 6 mm deep on rear side tightening torque 2.7 Nm	
Degree of protection (valve)	IP54	
Total weight without connecting cable	Approx. 188 g	

The **marco** BasicValve may only be operated with the corresponding BasicValve driver and in compliance with the parameters defined in this operating manual.

Do not open the BasicValve driver!

11 Contents of the BasicValve assembly

1	Syringe/container (provided with dispensing medium)
2	Fluid body LuerLock
3	BasicValve
4	Electrical connection to BasicValve driver
5	Valve seat for jetting (non-contact jet dispensing kit only)
6	Valve seat with LuerLock connector for needle dispensing (needle dispensing kit only)



12 Scope of delivery: marco BasicValve kit for non-contact jet dispensing

1	BasicValve	mtv/dsm/e
2	BasicValve driver	mtv/ehm/e
3	2.5 m cable	mtv/cab/250c
4	Valve seat for jetting	mtv/vss/ba/100
5	Fluid body (LuerLock)	mtv/fbs/llaa
6	Dispensing tool kit	mtv/tk/a
7	Ethernet cable	mtv/ca/e300
Included spares		
8	Cartridge	mtv/cr/ba/b
9	O-ring for valve seat	di:o-3x1ffkm80
10	Snap ring	din:7993.A7va

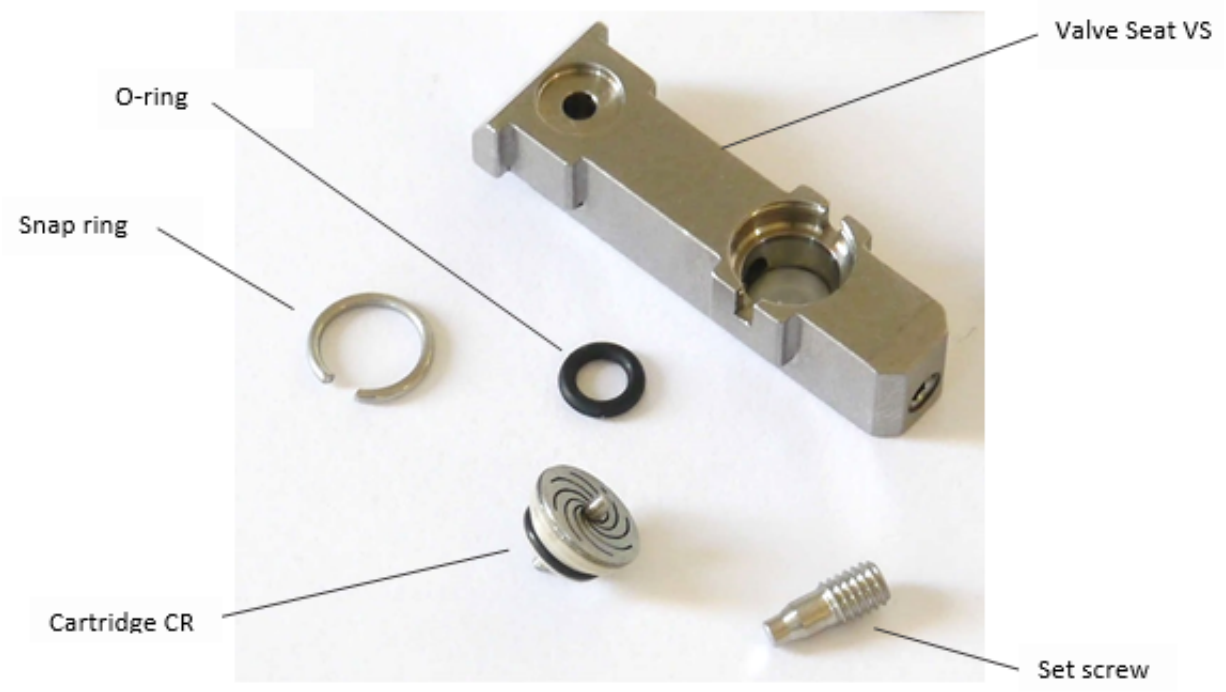
13 Scope of delivery: marco BasicValve kit for contact/needle dispensing

1	BasicValve	mtv/dsm/e
2	BasicValve driver	mtv/ehm/e
3	2.5 m cable	mtv/cab/250c
4	Valve seat for needle dispensing	mtv/vss/ba/lla
5	Dispensing tip kit	mtv/tip/kit/a
6	Fluid body (LuerLock)	mtv/fbs/llaa
7	Dispensing tool kit	mtv/tk/a
8	Ethernet cable	mtv/ca/e300
Included spares		
9	Cartridge	mtv/cr/ba/d
10	O-ring for valve seat	di:o-3x1ffkm80
11	Snap ring	din:7993.A7va

Appearance and minor details may change without prior notice.

The **marco** Cleaning kit *mtv/tk/cla* is available from the **marco** Shop:
https://shop.marco-systems.com/en/produkt/cleaning-kit/

14 BasicValve seat components

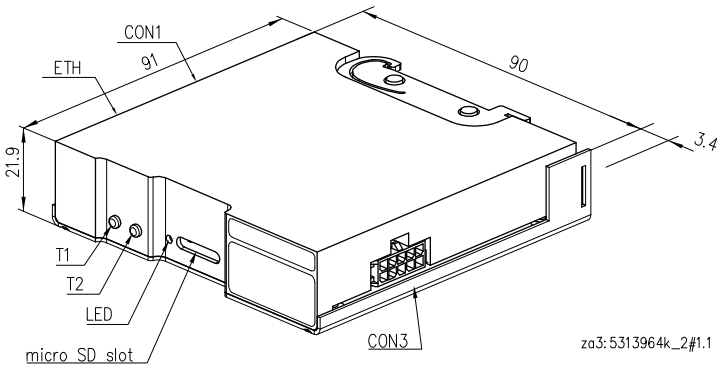


Valve seat assembly with a diameter of 200 µm for jetting operation.

15 BasicValve driver specification

Supply voltage	24 V +/- 10 %
Power consumption	1.8 W idle 31 W full load
Electrical connector	Phoenix Contact 1790344 (DFMC 1,5/7-STF-3,5)
Dimensions (L x W x H)	90 mm x 91 mm x 21.9 mm Mounting: DIN top hat rail
Operating temperature	+5 °C to +50 °C
Storage temperature	+0 °C to +70 °C
Humidity	Dry, non-condensing atmosphere
Degree of protection	IP30

15.1 Control elements

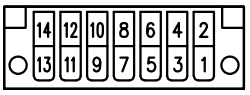


Name	Function
CON1	Supply, control, status
CON3	**marco** BasicValve
ETH	Ethernet
T1	Dispensing trigger
T2	Dispensing purge
µSD slot	Backup/transfer of configuration

15.1.1 Pin assignment

Frontal view of the device connector.

CON1



Pin	Signal	Default function	Comment
1	VCC	supply voltage	24 V nominal
2	GND	reference potential	
3	INP1	input: pulse trigger	rising edge trigger
4	INP2	input: flush	
5	INP3	input: ConfActivate	
6	INP4	input: program select	
7	OUT1	output: ready	
8	OUT2	output: dispense active	
9	n.c.		internally not connected
10	RS485-A (P)	RS485 slave line A	galvanically isolated
11	RS485-B (N)	RS485 slave line B	galvanically isolated
12	RS485-G (P)	RS485 GND	reference potential RS485
13	PE	Protective Earth	housing potential isolated from GND to be connected to facility ground!
14	n.c.		internally not connected

16 Installation and initial operation

- Check the integrity of the outer packaging of the individual components to identify any possible shipping damage
- Check the completeness of the delivery. Contact **marco** or your local sales office immediately if there are any discrepancies.
- Install the BasicValve on an appropriate mounting plate.

Avoid pinching or pulling on the valve's electrical connection cable and observe the minimum permitted bending radius.

- Connect the BasicValve driver to the BasicValve
- Connect the BasicValve driver to the power supply

Before applying the supply voltage, ensure that there is a valid electrical connection between PE and facility ground.

- When the BasicValve is ready for use, connect a suitable fluid supply (such as a small cartridge, tank or drum pump). Refer to the respective operating manual for the fluid supply

17 Troubleshooting

To avoid any risk of equipment damage or personal injury, depressurise the reservoir before connecting or disconnecting any device or performing any troubleshooting work. Follow the instructions provided in Section 18.3.1 'Removing the valve seat', before detaching the valve seat from the valve drive.
The following table can help to recognise and solve problems:

Problem	Possible cause	Corrective action
No fluid flow from dispensing valve	No power to system	Ensure that power is supplied to system. Verify that the BasicValve driver is on and the power LED is lit green.
	Loose, disconnected or faulty cable	Check all cables and electrical connections
	Fluid reservoir empty	Fill reservoir
	No or very low pressure supply to fluid reservoir	Check main air pressure
	Incorrect parameter settings	Check BasicValve driver process parameter set-up. Carry out a factory reset if necessary
	BasicValve driver error	Check BasicValve driver software for an error message and refer to the basiCONTROL software OM
	Dispensing valve failure	Ensure valve operates when activated. Remove valve seat to verify movement of actuator rod.
	Valve opening clogged	Clean valve seat. Refer to cleaning instructions in Section 18.3.4, 'Cleaning the valve seat'
Poor dispensing	Valve seat opening clogged or cartridge flat spring damaged	Clean valve seat. Refer to cleaning instructions in Section 18.3.4
Residual flow after valve closes producing drops or a film on valve seat exterior	Ball rod does not seal valve seat or ceramic parts worn or pitted.	Clean valve seat components. Inspect them for damage or wear and tear. Refer to cleaning instructions in Section 18.3.4
	Drop in voltage on power supply to BasicValve driver	Check BasicValve driver power supply.

To enable dispensing of very small and precise amounts of fluid, the BasicValve has an extremely small orifice. This can become blocked by even the smallest of contaminants which is a very common cause of poor dispensing results. However, there are several other possible causes for a malfunctioning valve that should be investigated first.

18 Cleaning and maintenance

18.1 Cleaning the exterior of the valve

Only clean the valve exterior with a soft, lint-free, cotton or cellulose cloth. In the case of more severe contamination, lightly wet the cloth with a suitable solvent or cleaning agent.

Do not use dripping wet cloths and do not pour solvents, alcohol, water, or other liquids directly onto the valve body. Do not submerge the BasicValve or the cartridge without the protection box in the cleaning agent. Doing so can introduce liquid into the electromechanical drive area and destroy it or negatively affect cartridge performance.
The protection box is part of the **marco** Cleaning kit *mtv/tk/cla*.

18.2 Purging the valve

We recommend first checking to see whether a quick purge would remove the contamination. To do this, press button T2 on the BasicValve driver keeping the valve open until the stream of fluid is clean. Some fluids require a higher applied pressure to improve the flow. Then wipe over the exterior of the valve seat.

If purging does not remove the contamination, carry out the following steps to rinse the valve fluid path with a suitable solvent:

Use the solvent recommended by the fluid manufacturer for the medium dispensed.

1. Depressurise and open the system. Replace the dispensing fluid with a suitable cleaning solution. Use a different syringe or fluid container for the cleaning solution to prevent unnecessary contamination!
2. Apply pressure to the syringe or fluid container.
3. Open the valve until the cleaning fluid flows.

   Do not dry cycle the BasicValve! The ceramic valve seat and cartridge can be damaged if the BasicValve is operated without fluid, causing leakage and a poor seal. Precise dispensing can no longer be guaranteed if this occurs.
   For optimum cleaning, close the valve and allow the cleaning fluid to soak into the closed valve for approximately 5 minutes.
4. Open the valve again and allow the fluid to flow until all the cleaning fluid is purged. When there is no more cleaning fluid in the reservoir, compressed air is released which can contaminate the workstation. To prevent this occurring, ensure that the valve seat orifice is covered by a cloth.

   Repeat this cleaning cycle as often as needed to completely rinse out the cleaning fluid.
5. Depressurise the system.
6. Exchange the cleaning fluid container for a new dispensing fluid reservoir and run the dispensing fluid through the valve until no solvent is present in the dispensing fluid.
7. If performance problems should persist, clean the valve manually.

18.3 Manual cleaning of the valve

Please watch the YouTube video for this procedure:

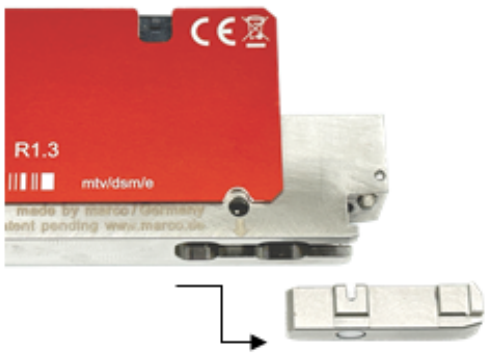
18.3.1 Removing the valve seat

1. Purge the BasicValve with a cleaning fluid (see Section 18.2 'Purging the valve') to remove as much dispensing fluid from the valve as possible. Then blow it through with air.
2. Depressurise the system and remove the reservoir containing the cleaning fluid.
3. Remove the reservoir containing the cleaning fluid. Remove the valve from the mounting bracket.
4. Detach the fluid body from the BasicValve with an SW10 open-end spanner.

CAUTION

To prevent damage to the valve seat or piezo actuator, ensure that the piezo actuator rod is in the upper position to release the spring force of the valve seat by activating the 'purge' function on the BasicValve driver. Follow the recommended steps below for proper valve seat removal/installation.

1. Remove the valve seat carefully from the BasicValve by laterally positioning a screwdriver between BasicValve and valve seat and pushing the valve seat forward. Remove the valve seat from the BasicValve from below.

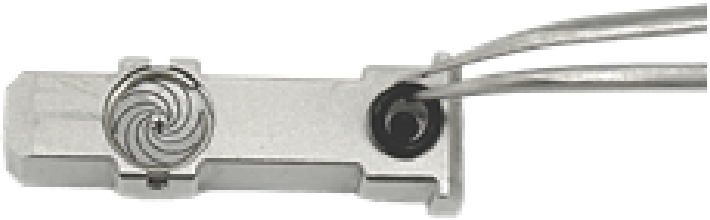


2. Disconnect the BasicValve from the BasicValve driver

18.3.2 Disassembling the valve seat

To prevent damage to the individual valve seat parts, use only the 'BasicValve Dispensing kit' to disassemble and reassemble the valve seat.

- Remove the o-ring using tweezers



- Compress and remove the snap ring with the end of the tool marked with **C**

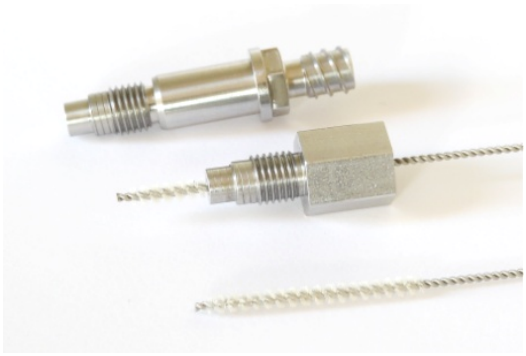
- Lift out the entire cartridge from the valve seat with the other end of the same tool marked with a cartridge icon. To do this, reach in below the collar of the cartridge.

- Unscrew the threaded pin on the back face of the valve seat with an SW1.5 Allen key

Now all the parts of the valve seat and the fluid channel can be cleaned as shown in the next steps. Cleaning tools, such as brushes, cotton swabs, mini-reamers, and a magnifying glass are included in the **marco** 'Cleaning kit' *mtv/tk/cla*

18.3.3 Cleaning the fluid channel

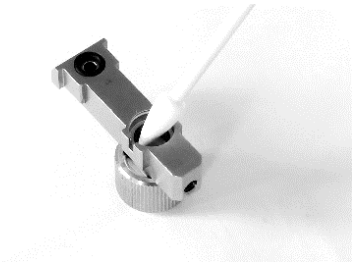
- Blow out the fluid channel with compressed air.



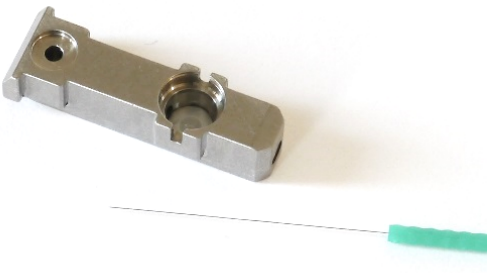
- Check the cleanness with a magnifying glass or, if available, a microscope. The parts can also be cleaned in an ultrasonic bath.

18.3.4 Cleaning the valve seat

- Clean the valve seat with a brush and lint-free cotton swab and, if necessary, with a suitable solvent.



- If the valve seat is clogged, clean it by carefully poking it with a mini-reamer from the **marco** cleaning kit *mtv/tk/cla*



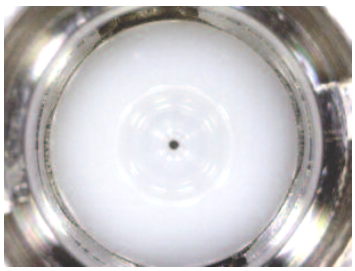
If too much force is applied with the mini-reamer, the ceramic part of the valve seat can be damaged (cracked). The reamer can also break, permanently clogging the valve seat.

- Clean the valve seat with a suitable solvent and blow it dry with compressed air. An ultrasonic bath can be used if the cartridge is in the protective box (available in the **marco** 'Cleaning kit').
- Check the cleanness with a magnifying glass or, if available, with a microscope. No lint, particles, residues from dried fluid, or other contaminants should be left in the valve seat.
- Clean the cartridge and the threaded pin with a lint-free cotton swab or cloth and, if necessary wetted with a suitable solvent.

After using solvents on the cartridge, apply a thin layer of non-resinating oil, e.g. silicone oil to the cartridge spring.

Do not submerge the cartridge in the cleaning agent without the protective box.

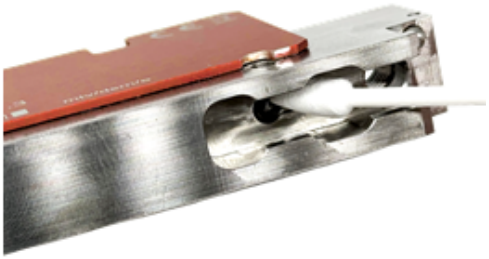
18.3.5 Photographs of a perfectly cleaned valve seat and cartridge as reference



18.3.6 Cleaning the BasicValve

During disassembly of the parts, fluid may have contaminated the BasicValve. Clean with a lint-free cotton swab, a brush, or a cloth, and if necessary, use a small amount of suitable solvent.

Never use dripping wet cloths and do not pour solvents, alcohol, water, or other liquids directly onto the valve. In addition, do not submerge the valve in the cleaning agent, as liquid can get into the piezo electromechanical drive area and permanently damage it.



18.3.7 Reassembly

Reassembly is done following the disassembly steps in reverse.

18.3.7.1 Reassembling the valve seat

- Screw the threaded pin into the valve seat and fasten it with an SW1.5 Allen key.
- Insert the entire cartridge in the proper position in the valve seat using the insertion tool from the 'Dispensing tool kit' and press it in perpendiculy using the tool. Then make sure the cartridge is positioned squarely onto the valve seat.

Place the snap ring in the appropriate position using the tools provided:

- Place the positioning tool on the valve seat and insert the snap ring into the tool.
- Then press the snap ring into the valve seat with the insertion tool and check the position.
  The snap ring must snap all the way around inside the groove designed for this purpose.
- Fit the o-ring and ensure it is not twisted. If it is damaged, please replace with a new one!

18.3.7.2 Reassembling the complete valve

- Screw the fluid body into the BasicValve and fasten it lightly with an SW10 spanner.
- Reconnect the BasicValve to the BasicValve driver.

To prevent damage to the valve seat or piezo actuator, ensure that the piezo actuator rod is in the upper position to release the spring force of the valve seat by activating the 'purge' function on the BasicValve driver. Follow the recommended steps below for proper valve seat removal/installation.

- Insert the valve seat (see note below) in the BasicValve from underneath and push it into place. Make sure the o-ring for the fluid body stays in place.

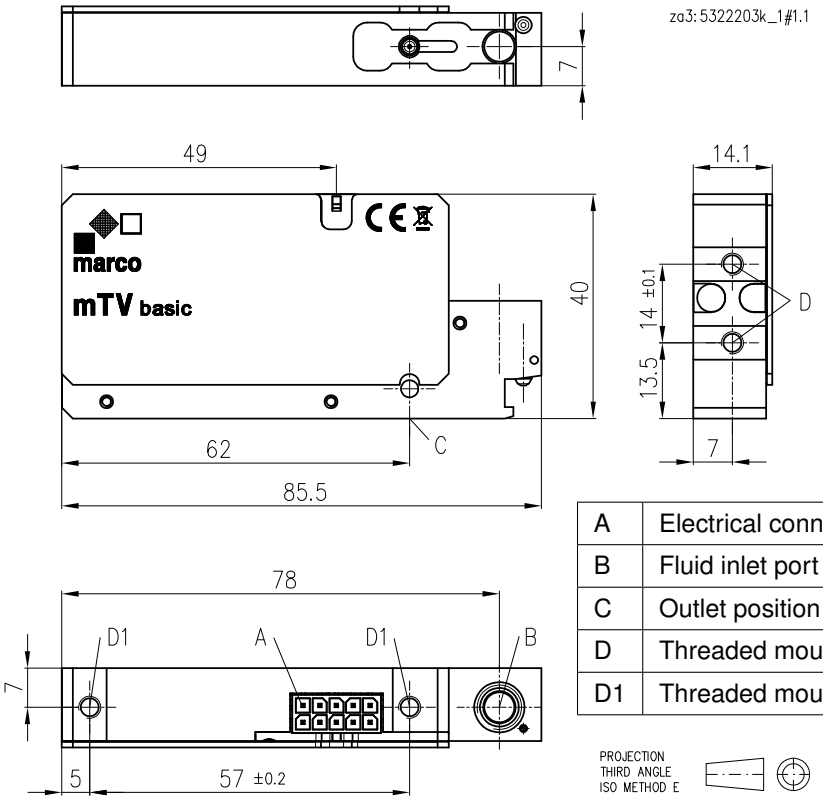
Refer to the valve seat removal instructions for how to mount the valve seat into the BasicValve. Section 18.3.1

18.4 Cleaning the system

To prevent contaminants from entering the valve, the fluid paths, connections, etc. must be thoroughly cleaned. In the case of needle dispensing, the dispensing needle tip must also be cleaned.

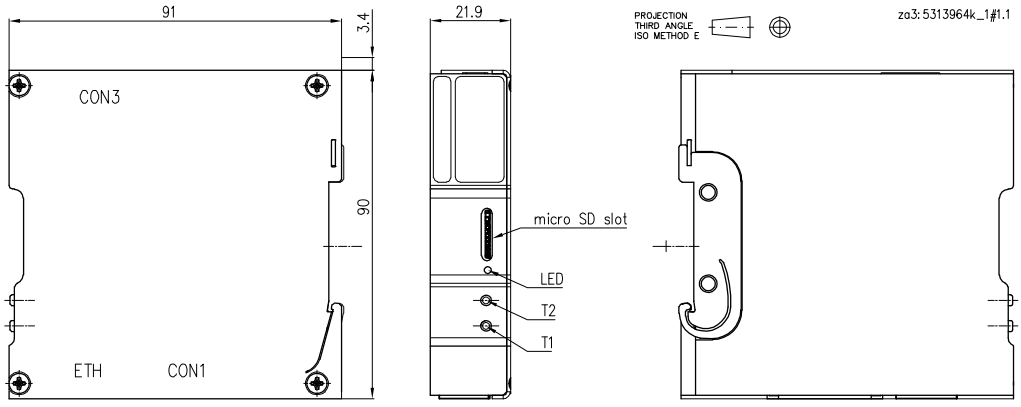
The extent of cleaning required depends upon the type of dispensing fluid. The higher the viscosity and the worse the solubility of the dispensing fluid, the more cleaning fluid and time for cleaning is necessary.

19 BasicValve reference drawing



A	Electrical connection cable
B	Fluid inlet port
C	Outlet position of fluid droplet
D	Threaded mounting holes M4, 6 mm deep
D1	Threaded mounting holes M4, 5 mm deep

20 BasicValve driver reference drawing



21 Related documents

Document name	Description
doc:P/mtv/doc/001	Manufacturer's certificate of conformity for BasicValve
doc:P/tdv/doc/004	Manufacturer's certificate of conformity for BasicValve driver
doc:P/mtv/dsm/doc/004	Data sheet for BasicValve
doc:P/mtv/ehm/doc/017	Data sheet for BasicValve driver
doc:P/mtv/ba/doc/004	Operating manual for BasicValve software

22 Returning goods

In the case of an unexpected valve malfunction which you are unable to correct, please contact marco to request a form for returning goods. Fill out the form describing the problem and the circumstances which led to the malfunction and return it with the valve to the manufacturer.

23 Contact details

Most questions you will have are answered in this guide. However, if you need further assistance, please do not hesitate to contact us directly or your authorized **marco** distributor.

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