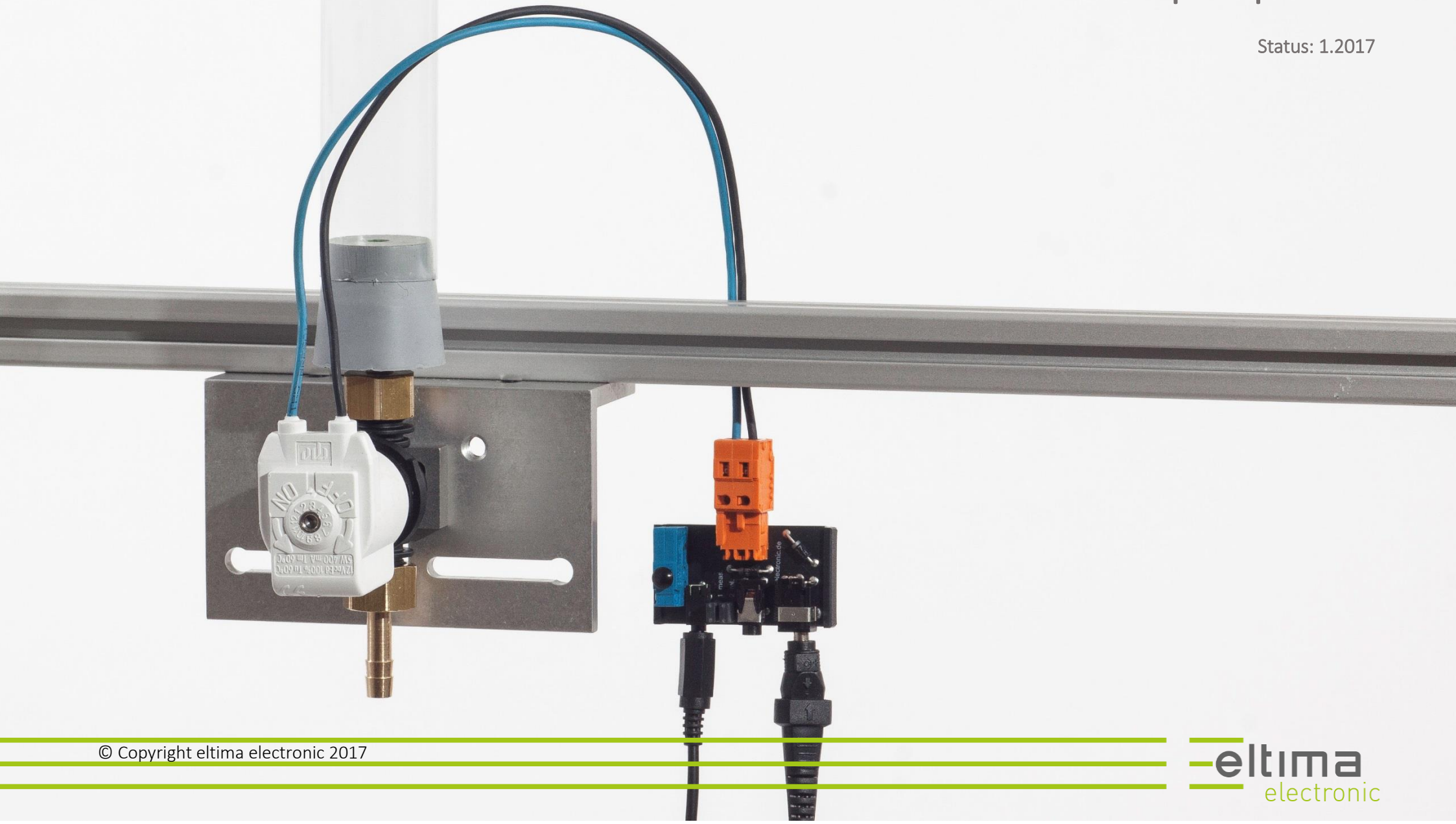
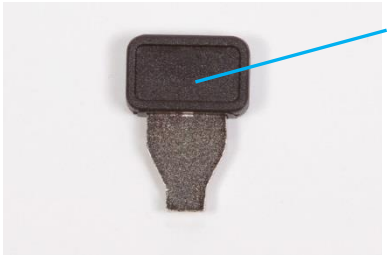
user's manual
drop dispenser

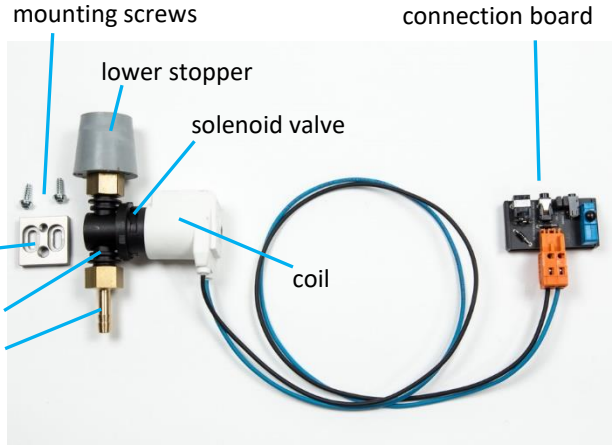
Status: 1.2017

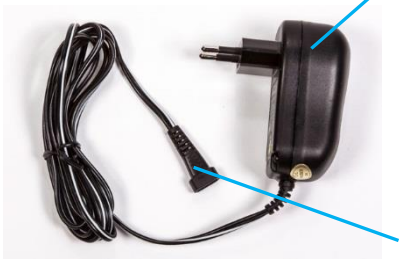


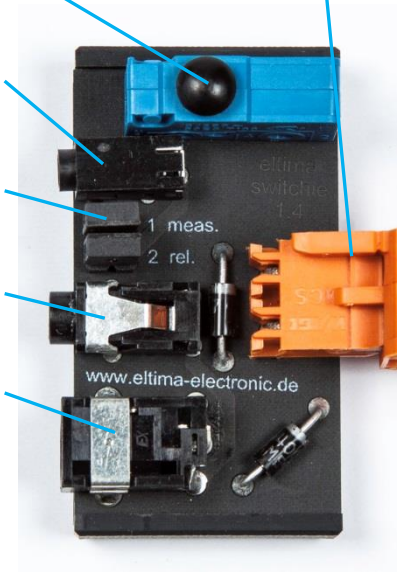
eltima electronic

Description of components









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Introduction

Dear customer,

thank you for purchasing our drop dispenser. Developed and produced with great care, it shall be a reliable tool for you.

Please do not hesitate to contact us if you should miss anything or have further improvement proposals. This way the product will be able to develop to fully meet your requirements.

Please read this manual carefully before using the drop dispenser, to get familiar with the system and its functions.

Intended purpose

The eltima drop dispenser was developed to produce fluid drops or splashes for photographic purposes. Use it only for this purpose!

Symbols


Tips concerning the handling of the device.


Important notices on the function of the device.


Important notices to prevent damage of the device or connected devices.

Maintenance and storage

- The included power supply is not waterproof and is for indoor use only. Keep it away from the drop dispenser or water. Please observe the instructions in the user manual of the power supply.
- Protect the adaptor board from water as well. Should it nevertheless get wet, wipe it dry immediately.
- Never drop the device or its components or expose it to severe impacts.
- Do not attempt to make any technical alterations to the electrical circuitry.

Functional principle

In drop photography it is most important to have constant operating conditions during a certain amount of time. Among others the drop size should stay the same as long as the actuation time of the valve doesn't change. Without special measures this is a quite difficult task, since the water level of the container decreases with every dispensed drop and with it also the pressure on the valve. The latter however, along with the actuation time of the valve, determines the size of the drop.

To guarantee a constant drop size the eltima drop dispenser works on the principle of Mariotte's bottle (named by Edme Mariotte who discovered this principle). It consists of a closed tank in form of a plastic tube having a stopper with a small inner tube at the upper end, see Figure 1. The construction ensures a constant water pressure (water column) on the solenoid valve as long as the water level is above the lower end of the inner tube. Thus the pressure is determined by the position of the lower end of the inner tube.

The slight vacuum in the air cell neutralizes the effect of the water between the lower end of the inner tube and the water level. With every dispensed drop an air bubble will raise from the inner tube.

The pressure on the valve can be changed by moving the inner tube up or down. Moving the tube up will increase the pressure and bigger drops will be dispensed and vice versa.

The Mariotte's bottle only works if it is balanced. Therefore the inner tube must be completely filled with air. From this reason the bottle must be bled after each filling. See also paragraph *Bleeding the drop dispenser*.

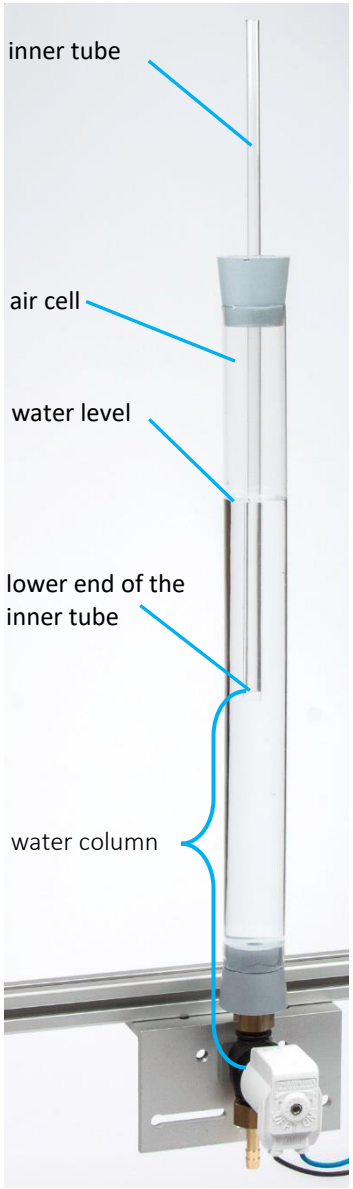

Figure 1: Mariotte's bottle

Putting into operation

Preparations

Power supply

When using the power supply always observe the instructions in the user manual of the power supply!

At first the voltage selector must be set to the operating voltage of the magnetic valve, which is 12 V.

Turn the voltage selector clockwise using the setting key until the arrow points at 12 V and the switch snaps in.

Figure 3: delivery status

Figure 4: using the setting key

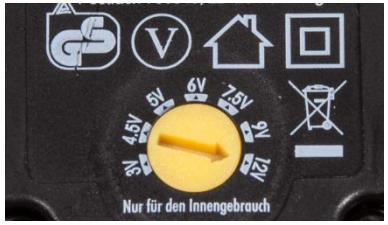

Figure 5:
voltage selector set to 12 V

Take the DC-plug marked with the blue arrow (yellow tip and larger diameter), see *Figure 2,* and plug it into the DC-adaptor.

Observe the right polarity as shown in *Figure 6*. The plus pole must be in the outer ring!

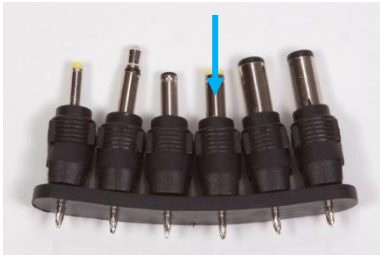

Figure 2: DC-plugs

If you plugged the DC-plug reverse the device would not work. However it will not be damaged. In this case just plug it in the other way.

The power supply is now ready to use.

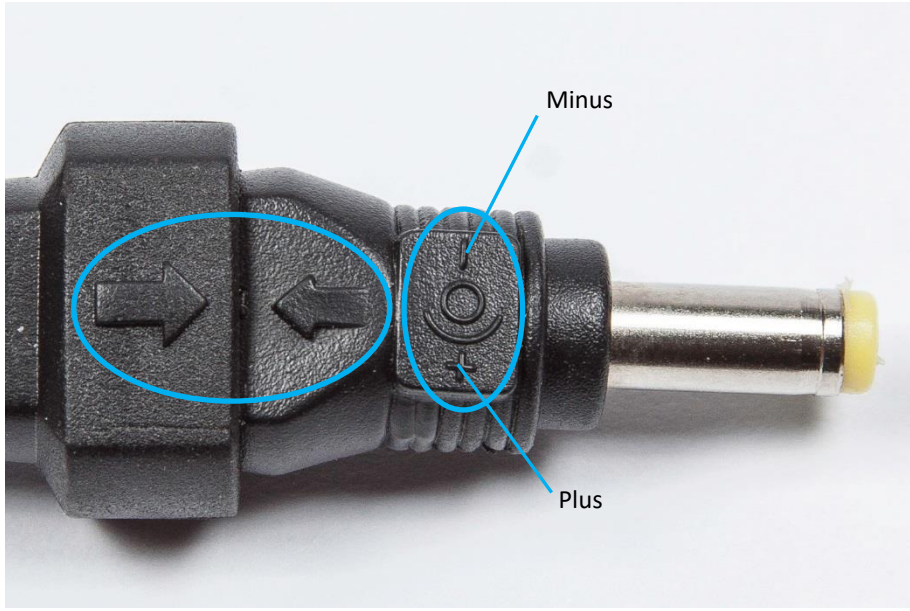

Figure 6: DC-adaptor with DC-plug

Assembling the drop dispenser

Plug the outer tube tight on the stopper of the magnetic valve by twisting it powerful.

The overlap should at least be 1cm.

Figure 9: overlap

Figure 8: outer tube plugged in

Mount the holding blok with the two screws on the valve body, like shown in *Figure 9*. The drop dispenser can now be fixed with a M5 screw on any support or using the ¼" thread on a tripod.

Mount the drop dispenser to a stable holder, like our carrier system item. nr. 50050, a tripod or any construction of your choice.

Figure 10: drop dispenser mounted on the carrier system

Figure 7:
holding block mounted on the valve

The *Figure 10* shows the drop dispenser mounted on the corner plate, item nr. 50059, of the carrier system.

Pour the drop fluid into the tube. It can be filled completely.

Close the tube with the upper stopper while twisting it slightly.

The Marriotte's Bottle is now prepared.

Connect the solenoid valve to the adaptor board.

Connect the adaptor board to the controller used, see the chapter *Controlling the drop dispenser*.

Connect the DC plug to the adaptor board and plug the power supply into the socket.

Bleeding the drop dispenser

Put a cup under the nozzle. Press the manual actuation button several times until the inner tube is completely filled with air, *Figure 11* and bubbles rises after each press of the button. This is most important for getting a constant drop size, see chapter *Functional principle*.

The drop dispenser is now ready for use.

Changing the water pressure

To increase the pressure on the valve pull the inner tube a bit outwards of the stopper. For this, pull out the stopper and pull the inner tube with a slight rotation out of the stopper (not completely of course).

With a slight rotation the inner tube can be moved easily.

To decrease the pressure the inner tube must be moved inwards. For this, pull out the stopper and pull the inner tube with a slight rotation in the opposite direction.

Each time the upper stopper is removed the drop dispenser must be bleeded!

Figure 11: inner tube bleeded

Figure 12: drop dispenser ready to use

Controlling the drop dispenser

Very important: Both plugs, for the Joker² and the drop-timer provide the 12 V DC operating voltage for the valve, see *Figure 13*! Connect only the intended devices to these plugs or controls that can drive the coil of the valve.

Never connect cameras or flashes to these plugs. They may be seriously damaged!

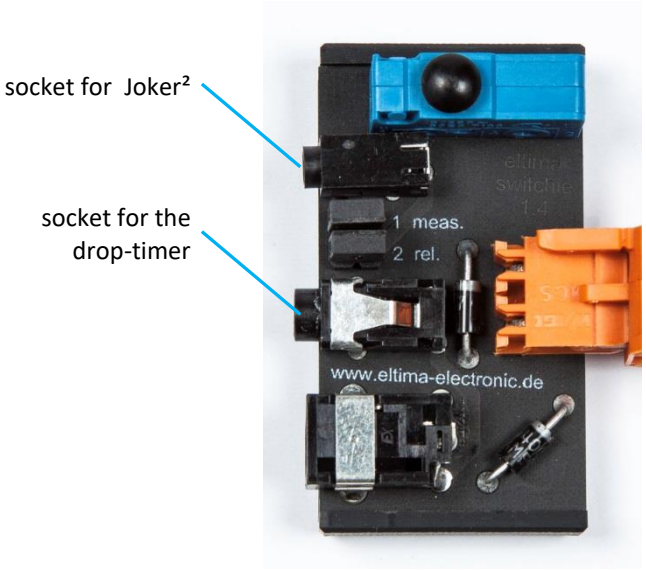

Figure 13: adaptor board

Operation with Joker²

The light barrier system Joker² has four outputs where drop dispensers can be connected. Each output has two solid state switches for controlling a drop dispenser. Since software version 2.0.2.4 of the Joker² controller each of these switches can be individually controlled by software. Hence, up to 8 devices can be controlled by the Joker².

Connecting one drop dispenser to the Joker² controller

The drop dispenser is to be connected with the connection cord included. Plug one end into an output socket of the Joker² and the other into the connector for Joker² of the adaptor board.

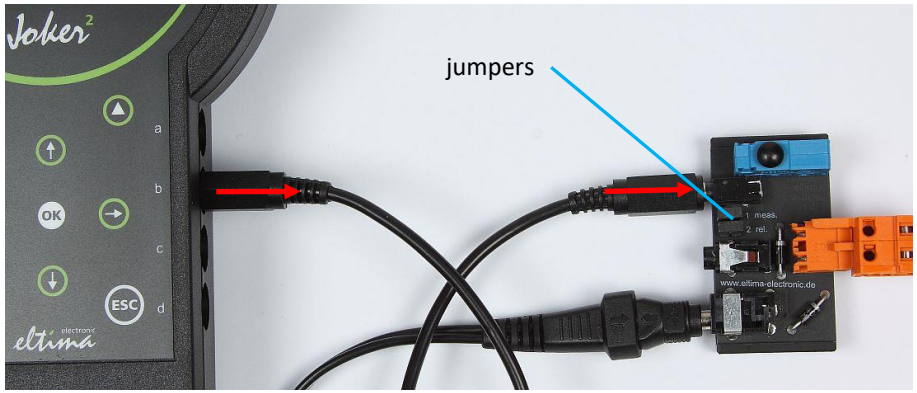

Figure 14: connecting the drop dispenser to output b

Using the two jumpers you can choose the switch for controlling the drop dispenser. Figure 14 shows the dispenser connected to output b. Pull the jumper on 1 (measure) if you want the dispenser to be controlled by the switch b-1. For be controlled by b-2, plug it on 2 (release). If both are plugged, the dispenser is controlled by both switches.

Unused jumpers can be shelved on just one pin of the header.

Connecting two drop dispensers to one output

By using the Y-plug, item nr. 50048, the two control signals of a certain output can be distributed to two drop dispensers. With the two jumpers you can select the switch for each drop dispenser.

Figure 15 shows two drop dispensers controlled by output b.

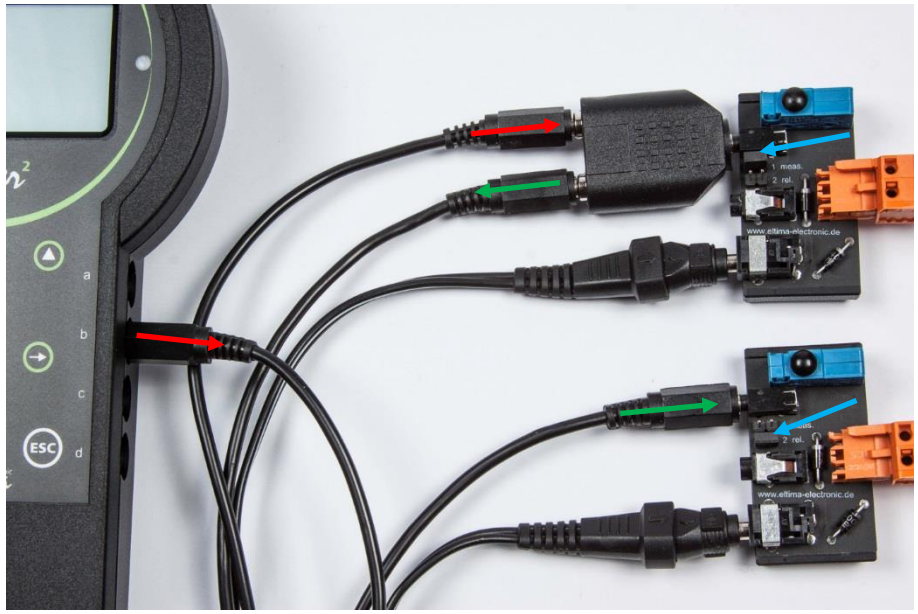

Figure 15: two drop dispensers connected to one output of the Joker²

The cable with the red mark brings both signals b-1 and b-2 to the first drop dispenser (the upper one). The green one routes them to the second dispenser. Since the jumper of the first drop dispenser is plugged on position 1 (blue arrow) it will be controlled by the switch b-1. The second drop dispenser is controlled by b-2 since the jumper is plugged on position 2.

Working with drop-timer

Users of the light barrier Jokie or Jokie² may use the drop-timer for controlling the drop dispenser see *Figure 16*.

Connect the drop dispenser with the 3,5 mm jack cable to the drop timer.

In this use case the position of the two jumpers does not matter

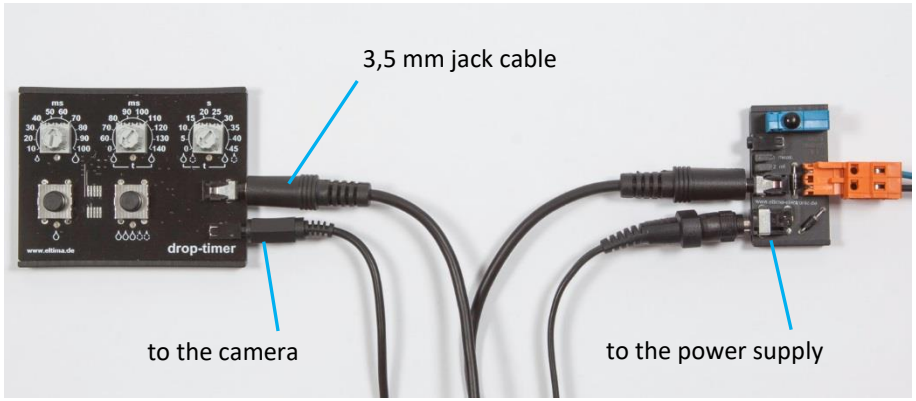

Figure 16: connecting the drop-timer

Cleaning the drop dispenser

To avoid residues from the different fluids you may use, the drop dispenser must be cleaned after each use.

Disassembly of the drop dispenser

Before disassembling empty the drop dispenser. Push the button for manual activation or turn the coil counter clockwise until the dispenser is empty.

Remove the upper stopper first, then the outer tube.

Pull the coil connector out of the adaptor board.

Screw off the valve body from its support.

Turn the coil counter clockwise until the limit stop. Then pull it out of the valve body, see *Figure 18*.

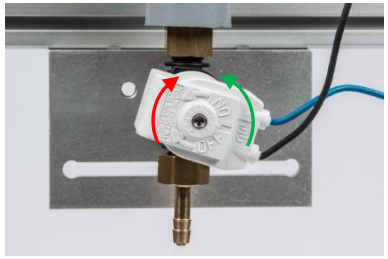

Figure 18: manual open of the valve.

green: open
red: close

Screw off the two nozzles from the valve body. Keep an eye on the o-ring seals to not lose them.

The *Figure 17* shows the disassembled drop dispenser.

Figure 17: solenoid valve disassembled

The o-ring seal of the valve body, see *Figure 17,* can sometimes also be found in the coil. Leave it were it is.

Rinse all the parts with water.

The coil and its connecting leads are waterproof.

Allow the parts to dry.

Assembling of the drop dispenser

First put the o-ring seals back in the nozzles. Then screw them on the valve body.

Please observe the flow direction!

The *Figure 20* shows the flow direction arrow (marked with the blue arrow) which must point to the nozzle without stopper.

If the flow direction arrow is covered, please observe the fluid inlet in the inner of the valve body. Mount the stopper nozzle on the inlet side as shown in *Figure 19*.

Put the coil back on the valve body and turn it clockwise until the limit stop.

When assembling the coil it doesn't matter whether the cables go up or down.

Plug the outer tube tight on the stopper of the magnetic valve by twisting it powerful.

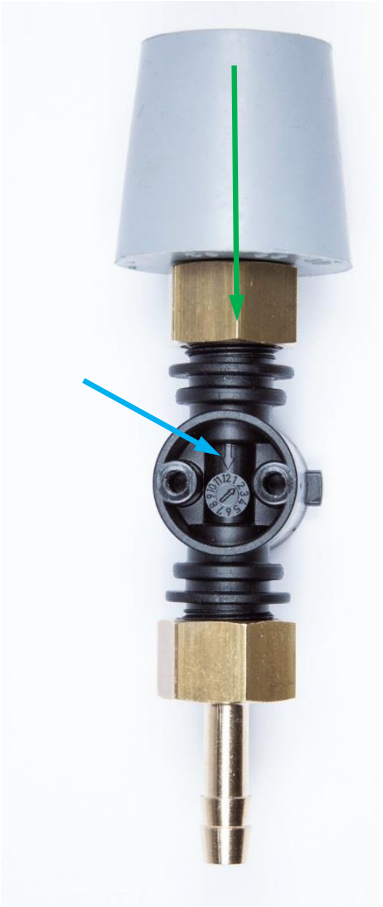

Figure 20: flow direction, valve body view from below

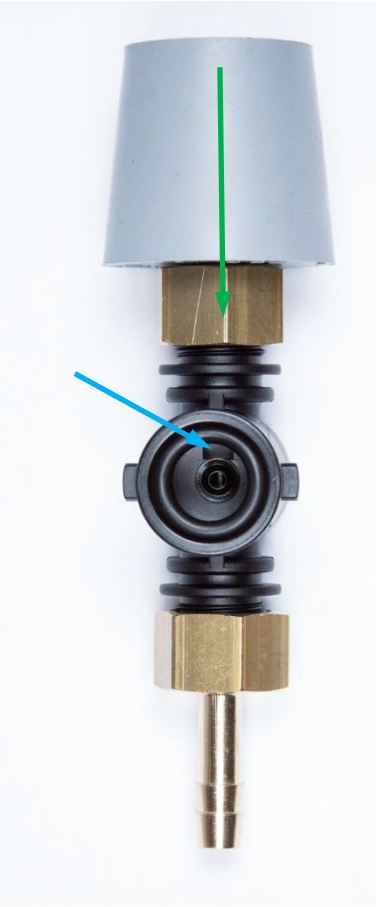

Figure 19: flow direction, valve body view from above

Specifications

Solenoid valve:

- Rated voltage coil: 12V DC
- Rated power coil: 5,5 W
- Valve seat diameter: 2,2 mm
- Screw head: Torx 15
- Nozzle:
  - Material: Messing
  - Internal thread: 1/4“
  - Hose diameter: 6 mm
  - Inner diameter: approx 4,4 mm

Mariotte‘s Bottle:

- Capacity: approx 150 ml
- Max. height of the water column: approx. 200 mm
- Diameter: 28 mm
- Lenght, without inner tube: approx. 300 mm

Notes

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