Operating Instructions

Turbo-Wasser®

Kolloid-Generator Comfort

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1. Foreword and notes

Congratulations on purchasing this special device. The present colloid generator is a completely new development to generate almost all colloids that can be produced using the electrolysis process.

The logical and practical operation will delight you. It helps you produce the dispersion you want in the simplest way. In the practical case you have everything you need to produce silver colloid at hand. You only need to purchase additional distilled water.

Electrodes for other materials are commercially available. Please pay attention to the highest possible purity, for most materials at least 99.99% pure material of the electrodes. However, some materials are not offered in this purity at an affordable price. The user is responsible for deciding how to deal with it.

The included electrode holders can hold electrodes with a diameter of 2 to 3 mm without tools. Additional electrode holders for using electrodes with 0.5 mm to 8 mm are also available as accessories if required.

Notes:

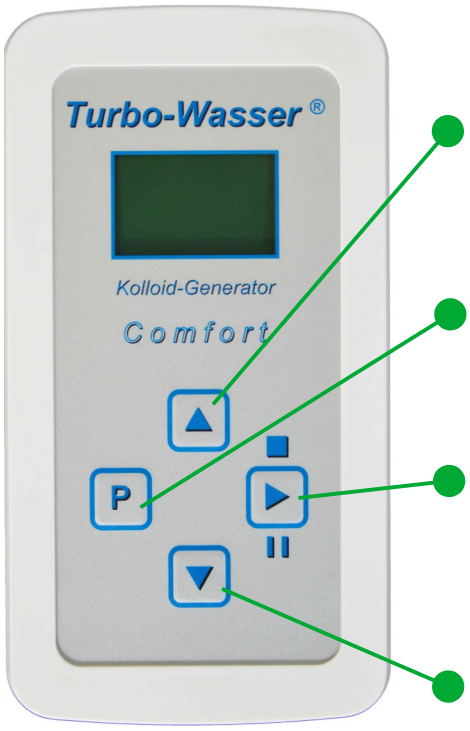
The device works with an electrode voltage of up to 60 volts. This voltage is also permissible in the medical sector even without contact protection. This does not pose a danger to the human body. However, touching it with wet hands or even the tongue should be avoided, as this could cause an unpleasant feeling. Children should not use the device or only use it under the supervision of an adult!

The device is quite insensitive, but under no circumstances should it be operated with steam. (If necessary, use the “hot plate”, which you can purchase as an accessory.) Also make sure that it is not submerged in water. Any traces of this kind will void the guarantee!

The beaker is included for standard use. This is well suited to producing normal household quantities quickly and safely. However, larger vessels can also be used for production without any problem, e.g. B. a preserving jar or a carafe. Glass vessels with a sufficiently large opening are preferable so that they can be cleaned easily. Under no circumstances should metal containers be used.

As a rule, distilled or double-distilled water should be used as water for the production of the colloids. For some materials it may be advantageous to use water with a slightly higher conductivity; under no circumstances should salts or any chemicals be added! The user is responsible for providing suitable material. The colloid generator only provides the technical possibility for electrolysis. The device manufacturer is not responsible for the result of the dispersion!

2. Controls and connections

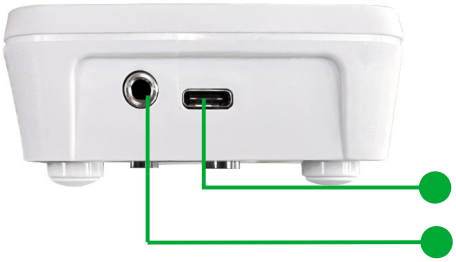


UP button
Scrolls upwards in the Parameter menu or increases the parameter value when the parameter is open.
If the button remains pressed, the parameter continues to run up, if this is provided for the parameter.

P button (parameter)
Opens Parameter level
Opens Parameter – for changing the parameters
Closes parameter – after change

START button (+ Pause + OFF)
Jump to the display of the most important production parameters, start production
Pause or restart (also after errors)
when pressed for longer than 2 seconds → **OFF**

DOWN button
Scrolls down or down in the Parameters menu, reduces the parameter value when the parameter is open.
If the button remains pressed, the parameter continues to run downwards, as long as this is intended for the parameter.



Top face

Power supply, USB-C connection

Connection for external electrode holder,
e.g. “Hot plate” - 3.5 mm jack socket

When connected here, the electrode connections on the underside are switched off!

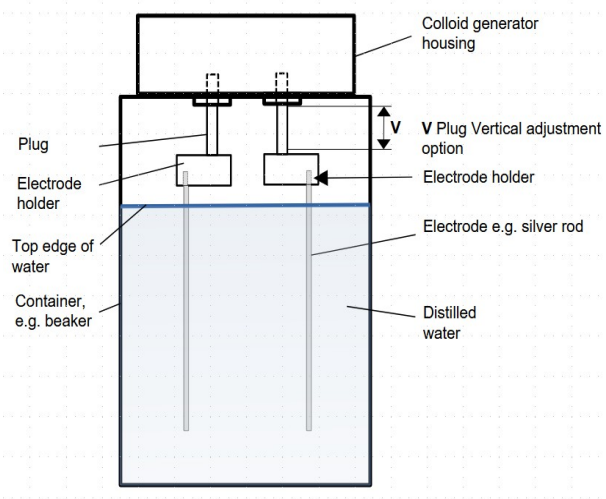
Underside

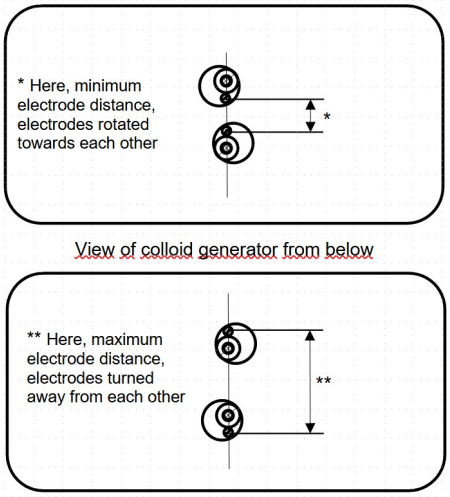
Electrode connection A
(if polarity reversal OFF = anode)

Electrode connection B
(if polarity reversal OFF = cathode)

3. Preparations, connections, fastening the electrode holders

Always work with clean containers. This is the only way to achieve optimum results. Normally use distilled or double distilled water, especially for colloidal silver production. For other materials, it may be necessary to use water with a slightly higher conductivity. Insert the electrode holders into the sockets on the underside of the generator. Remove the electrodes from the glass tube with a paper towel or cosmetic tissue and insert them into the electrode holder with a slight twisting motion. Please ensure that you always insert the electrodes with the same side into the electrode holder! Use a medium distance for your first attempts. Depending on the application, you can select narrower or wider spacings by rotating the electrode holders. You can also adjust the height of the electrode holders so that they are optimally adapted to the height of the water level or the container used.





Please ensure that the electrode holders themselves never touch the water, but are positioned approx. 5 mm above the water surface!

Note: Some users prefer to do this with warm or hot water. In principle, there is nothing to be said against this. Production tends to be somewhat accelerated, as warm water has better conductivity. We advise against using the generator over steaming water. If this is required for certain applications, we recommend the use of external electrode holders, e.g. the “hot plate” (available as an accessory).

Power is supplied via the enclosed connection cable with the USB-C side at the top of the device. Plug the other USB side into the USB power supply unit and plug this into a socket with 100 to 240 volts AC. As an
alternative to the mains adapter, any other USB port, e.g. on a PC or a power bank, can also be used. When using a power bank, please ensure that you use a model that does not switch off automatically even under low loads.

4. Switch on

When the colloid generator is connected to the power supply via the USB-C port, it is switched on. If the appliance is to be switched off, this can be done at any time by pressing the Start button (Pause and OFF) for longer than two seconds. Switch on again by briefly pressing the Start button.

5. Settings

An important component of this generator is the simple user interface, with a few logically arranged buttons with which all settings can be made quickly.

The default setting on delivery is for the material silver, with a volume of 250 ml and a concentration of 25 ppm. After switching on and the welcome message, the question appears:

Start last Setting or setting select with P ▷	After pressing the **START button**, the last settings are displayed ...
Mat: Ag Silver Vol: 250 ml Conc: 25 ppm Start ? ▷	… and **Start** with these parameters is possible immediately. → „Quick **start**“ If you want to change the settings instead, press the **P** button to call up the parameters:
Material Ag Silver	The first parameter, “Material”, then appears. This can now be changed if required. To change, see **5.1 - Principles of operation**

5.1 Principles of operation

Whenever we are at Parameter level, we can “scroll” through the parameters using the **Up** or **Down** buttons. This allows the parameter required for the change to be selected.

The following parameters are available:
- **Material**
- **Volume**
- **Concentration**
- **Time** (instead of “Material” and “Volume”) only for “Customised” materials
- **Current**
- **Polarity reversal time** (Pole rev. time)
- **Polarity reversal logic** (Pole rev. logic)

Once you have selected the desired parameter, you can “open” this parameter for modification by pressing the **P** button again - the parameter now flashes to indicate that it can be modified.

This parameter can now be changed or selected under “Material” using the **UP** or **DOWN** button. The smallest individual steps of this parameter are executed by briefly pressing in the corresponding direction. If the button is held down for longer, the parameter runs in the selected direction. For numerical parameters, the system switches to the next higher step size at the next decade. Once the desired setting has been reached, press the **P** button again, the set value is saved and the parameter is “closed”. Proceed in the same way for each parameter that is to be changed. Start continue under **7. Start**

5.2 Material

If the Material parameter is “opened” by pressing the **P** button, the currently set material flashes. As described under 4.1, this can now be changed. Starting from the material “Ag-silver”, pressing the **UP** button displays the other materials in the following (alphabetical formula letters) order:

... Ag-Silver, Au-Gold, Cr-Chrome, Cu-Copper, Fe-Iron, Ge-Germanium, Mg-Magnesium, Si-Silicon, Zn-Zinc, Z1-Individual 1, Z2-Individual 2, Z3- Individual 3, Z4- Individual 4, ...

Press the **DOWN** button to reverse the order. After reaching the desired material, this is saved with the **P** button. For better orientation, a short beep is signalled when “Silver” is reached if the Up or Down button is held down.

A very important feature of the ***Colloid Generator CC*** is that the parameters associated with the material remain stored with the respective material. This means that when you return to a previously used material, the parameters used with it are retained. This makes operation considerably easier, as it can normally be assumed that the material in question is predominantly used with the same settings.

Using the “Individual 1 - 4” materials, it is also possible to use all materials not listed here with your own tests and specifications. In order to optimise the specifications for this purpose, the “Time” parameter is used instead of the two parameters, “Volume” and “Concentration”, for the customised materials. This parameter is used with these materials together with the “Current” parameter, which is of particular importance here, in order to generate the desired concentration. **See Section 5.4** where this is described in more detail.

5.3 Further parameters

As all parameters can be changed identically, as described above, the areas and special features are only briefly described here.

- Volume — 50 ml to 10,000 ml – realistic range of use is normally 100 ml to 2,000 ml. The range was only defined to be large enough to allow special applications.

- Concentration — range 1 ppm to 100 ppm
  If this is not sufficient, a new start with the missing concentration would be possible (or correction via Volume).

- Time — 1 minute to 99 hours **only for the "Individual" materials**, instead of the "Volume" and "Concentration" parameters **cf. Section 5.4**

- Current — 3 mA to 20 mA – this limits the respective maximum current to the set value. Depending on many flexible factors, this value may not be reached (e.g. because the conductance is too low).

- Polarity reversal time
  5 seconds to 600 seconds + OFF

- Polarity reversal logic
  Selection **1 = t**, polarity reversal time corresponds to the set polarity reversal time. (Important e.g. for magnesium – and work with short times for this)

  Selection **2 = I**, intelligent / current-dependent polarity reversal logic.
  The time is related to the maximum current (20 mA). If, for example, the actual current is only half of the maximum current, the polarity reversal time is doubled. This function is very helpful for most materials where frequent polarity reversal slows down the process, as the polarity is reversed much less frequently in the start phase at low current.
  The polarity reversal time approaches the programmed value as the current increases.

5.4 Use of the “Individual” materials

As it has been found in practice that at least a significant number of users also want to use materials other than those provided in the material list, the “Customised” materials have been added to this generator. In contrast to the named materials, for which the associated material parameters are stored in the calculation formula for the concentration, it would not be practical to enter these material parameters, partly because they are often not available. In most cases, there are specifications or recommendations as to which quantity should be used for which time. These recommendations often refer to some device for which the operating current is known or a direct indication of the current to be used.

This information can now be used to program the corresponding settings via the “Time” parameter in conjunction with the “Current” parameter. It should be noted, however, that the time specification during production calculates the time in relation to the set current (maximum current).

Example: If the average working current were only a quarter of the current entered, the time required would quadruple compared to the specified time. This is also reflected in a correspondingly higher “remaining time”.

Note: Unfortunately, many recommendations and timetables do not take into account the fact that the full working current is often only reached after a considerable time or even never at all!

It is up to the user to adjust the parameters so that the desired result is achieved. This principle often applies here too: The proof of the pudding is in the eating. At least with this generator, you have the possibility to adjust all parameters in the desired or required way.

Example of the specification:
If a production time of one hour is recommended for a certain material, e.g. at 5 mA for 1 litre, then one hour and 5 mA could be programmed, **or** 30 minutes and 10 mA, **or** 15 minutes with 20 mA. If, as is often the case, the set current is not reached, the program automatically increases the time accordingly.

5.5 Language selection (optional)

For devices that allow language selection, this is called up as a “hidden” parameter, as this is usually only required once by the user. To access the “Language” parameter, go to the parameter level using the **P** button (or you are already there). The parameter you are on is irrelevant. Then press the **DOWN** button for at least two seconds. The set language now appears. If you want to change this, press the **P** button. The current language flashes. A different language can now be selected using the **UP** (or DOWN) button. If the **P** button is pressed again, the selected language is saved. If you then press either the **UP** or **DOWN** button, the next (and all other) parameters and texts are displayed in the selected language.

6. Start

Once the desired parameters have been set and the generator with the electrodes (as described under 3.) has been placed on the filled container, production can be started. If the **START** button is pressed, the most important parameters are displayed again. Press the **START** button again to start production. The display normally shows “Water ok”, then after one second:

Runs 0 ppm Of XX ppm Remaining time Y Hr ZZ Min

… or here, time display for the “Customised” materials

… see further under **7. Production process**

Should the display instead show:

Water unfav. Regardless start? ▷ Back with **P**

This is displayed if water with a higher conductivity is used. Depending on the desired production, this may even be necessary for various materials.
It is only an indication and can be continued independently with the Start button if desired.

7. Production process

If production was started as described under 6. Start, the estimated remaining time in hours and minutes appears after a short time in the “Running” display in the bottom line. This display is an estimate of the production time based on the current process data. This time should only serve as a rough guide to the expected production time. Due to the many variables in the process, it is not possible to give an exact figure here. If very long times are expected, this is indicated by the “> 24 hrs” display.
The display of the present current is much more accurate. This can be called up as an alternative to the remaining time with the **DOWN** button and is then displayed with

Runs	X ppm
Of	XX ppm
Current	
xx,x mA	

… or here, time display for the “Customised” materials.

If you want the remaining time to be displayed again, press **DOWN** again.

Another indicator of progress is the display of the achieved concentration in relation to the desired concentration. (... or here, time display, achieved time in relation to the programmed time for the “Customised” materials)

When the desired concentration is reached, the current at the electrodes is switched off and the following is displayed:

Finished	XX ppm
Of	XX ppm
Switch off with ▷	
(min. 2 sec.)	

… or here, time display for the “Customised” materials

If not switched off or unplugged manually, the display goes out after three minutes. The display can be reactivated by pressing the **START** button.

Note: If the generator with the electrodes is removed from the water, either remove the electrodes immediately or switch off the device so that the water flows away from the electrode holders. Never place them on the operating side while the electrodes are still plugged in and wet!

8. Operational messages, error messages

If irregularities or errors occur in the process, these are signalled by a long beep. At the same time, causes and suggestions for action are offered on the display. Possible messages:

- Water unfavourable - described under point **6. Start**!
- No water - in exceptional cases, this display may indicate that water with a very low conductivity and / or poorly conducting electrodes are being used. Check conductivity, especially electrodes / electrode holders, increase water conductivity if necessary!
- Dendrites - Increase the distance between electrodes, wipe off electrodes if necessary.
- Short circuit - eliminate short circuit, increase electrode gap if necessary.
  - can also be displayed if the concentration is very / too high or if the water is extremely conductive (unfavourable).

9. Further notes and recommendations, optimisation of electrode arrangement

As the processes involved in electrolysis are dependent on a wide range of variables, our aim was to develop a colloid generator that can be adapted as variably as possible to the user's requirements. We also realise that many users are put off by too many setting options. For them in particular, we have created the option of using the **“quick start function”** to restart the last process immediately and without any detours by pressing just two buttons. See also **5. Settings**.

For other users, we provide a device with which not only the electrical but also the mechanical variables can be adjusted in a variety of ways, allowing everyone to find and use their optimum setting.

It should also be mentioned here that the **concentration figures in ppm are merely based on the usual representation in order to be able to provide a quantitative order of magnitude**. This information is only intended as a general guide and does not claim to be an exact metrologically verified concentration. The formula according to Faraday's 1st law in conjunction with some empirical values is stored in the programming. This ensures reliable reproduction of the results.

We are also happy to receive tips and suggestions for further optimisation.

10. Scope of delivery

1 storage case
1 USB plug power supply unit for connection to 100 – 240 volt mains voltage
1 USB connection cable (power supply side) to USB-C (device side)
1 “Turbo-Wasser Comfort” colloid generator
2 electrode holders, universally adjustable, for tool-free mounting of electrodes from 2 to 3 mm
1 glass tube for storing the silver rods
2 silver bars 3 x 82 mm, purity min. 99.99 %
1 spray bottle 30 ml amber glass
1 pipette bottle 20 ml amber glass
1 storage bottle 250 ml amber glass
1 beaker 250 ml
1 funnel
1 glass stirring rod
1 Operating Instructions (German)

Current operating instructions:

EC Declaration of Conformity

CE

Hersteller:

Turbo-Wasser®
Helmut Dick

Robert-Bosch-Straße 11
D-73079 Süßen

declares that the products:

Colloid generator with the type designations:

Turbo-Wasser Kolloid-Generator Comfort

to which this declaration refers complies with the following standards and directives in accordance with

EMC Directive 2014/30/EU	EN 61010-1 EN 55014-2 EN 61000-6-1

Süßen, 22.10.2024

Helmut Dick

Managing Director

Notes on the operating environment

The standards used to assess the products specify limit values for use in the home and in small businesses, which means that the products are intended for use in this operating environment.

Utility model protection

The electrode holders used with this device are protected as a utility model at the German Patent and Trade Mark Office.
The utility models bear the numbers 20 2022 002 460 and 20 2023 000 579 and may not be copied without the owner's authorisation.

Notes