



Dispenser / Dispensers

genius² / simplex²

Gebrauchsanleitung

Operating manual

Vor dem ersten Gebrauch das Gerät gründlich spülen oder die ersten Dosierungen verwerfen.

Before using the instrument for the first time, ensure it is rinsed carefully or discard the first few samples dispensed.

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1 Introduction

1.1 Scope of delivery

The packaging contains:

Bottle-top dispenser VITLAB® simplex² with dispensing tube or VITLAB® genius² with dispensing tube and integrated recirculation valve, telescopic filling tube, recirculation tube (genius²), installation tool, various bottle adapters, a quality certificate and this operating manual.

Nominal volume, ml	Adapter for bottle thread, PP	Filling tube Length, mm
1, 2, 5, 10	GL 25, GL 28/S 28, GL 32, GL 38, S 40	125–240
25, 50, 100	GL 32, GL 38, S 40	170–330

1.2 Use operating manual

- Please carefully read the operating manual before using the device for the first time.
- Keep the operating manual in an easily accessible place. It is part of the instrument.
- Be sure to include the operating manual if you transfer possession of this device to a third party.
- You can find updated versions of the instruction manual at <https://www.vitlab.com/manuals>.

1.2.1 Signal words and their meaning

Signal word	Meaning
 WARNING or WARNING! ...	WARNING indicates a dangerous situation that, if not avoided, could result in death or serious injury.
 CAUTION or CAUTION! ...	CAUTION indicates a hazardous situation that, if not avoided, could result in moderate or minor injury.
NOTICE or NOTICE! ...	NOTE is used to address actions that are not related to physical injury. Example: Possible property damage.

1.2.2 Symbols used in the instructions

- | | |
|--|---|
|  The sign warns of a possible hazard. |  The sign suggests that eye protection be worn. |
|  The sign warns of hazardous media and the dangers that can arise from liquid splashes. |  The sign suggests that you to wear protective clothing. |
|  The symbol indicates that the instruction manual and safety information must be observed. |  The sign suggests that protective gloves be worn. |



The sign suggests that a face shield be worn during work. — —

1.2.3 Presentation of descriptions of actions

Format	Meaning
1. Task	Indicates a task.
a., b., c.	Indicates the individual steps of a task.
>	Indicates a prerequisite for a task.
⇒	Indicates a result of a completed task.

2 Safety regulations

2.1 General safety regulations

Please read carefully!

The can be used in combination with hazardous materials, work processes and equipment. However, the operating manual cannot cover all of the safety issues that may occur in doing so. It is the user's responsibility to ensure compliance with the safety and health regulations and to specify the corresponding restrictions before use.

- Every user must read and observe the user manual enclosed with this laboratory device before and during use. The device may only be used by trained and qualified personnel.
- Follow the general hazard instructions and safety regulations, e.g. wear protective clothing, eye protection and protective gloves.
- When working with infectious or hazardous samples/media (e.g. hazardous substances), the general safety rules in the laboratory must be observed and regulations for handling the samples/media must be followed. The information provided by the media manufacturer (e.g. safety data sheets) must be observed.
- Use the laboratory device only for pipetting or dispensing media within the defined limitations and restrictions of use. Comply with the operating exclusions.
- If working with inflammable media, make sure to take the necessary precautions to avoid the buildup of static electricity (e.g., do not dispense into plastic vessels and do not wipe instruments with a dry cloth). Do not use the device in potentially explosive atmospheres. If in doubt, contact the manufacturer or supplier.
- Always check that the instrument is in proper working condition before use. If device malfunctions are indicated (e.g. sluggish pistons, leaks or power supply faults), stop working with the device immediately and refer to the "Troubleshooting" section in the user manual. Contact the manufacturer, if necessary.

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- Always perform work in a manner that does not endanger users or other people. Avoid splashes. Only use suitable vessels. Never use unnecessary force when operating, cleaning or servicing the laboratory device.
 - If the laboratory device is supplied with power through a power adapter, batteries or accumulators, the components and connections on the device must be regularly checked for proper working condition. Do not operate the laboratory device and its accessories in an unprotected, humid or wet environment.
 - Do not make any technical modifications. Use only original replacement parts of the manufacturer; even power adapters or accumulators of identical size and specification from other manufacturers are not permitted. Do not disassemble the laboratory device and its accessories (e.g., power adapters, cables, racks, accumulators or batteries) any further than described in the user manual!
 - Only autoclave the laboratory device when this is permissible according to the user manual.
 - Never press down the piston when the dispensing cannula is sealed with the screw cap.
 - Never remove the dispensing cannula while the dispensing cylinder is filled.
 - Reagents can accumulate in the screw cap of the dispensing cannula. Therefore, clean the screw cap regularly.
 - For small bottles, and when using the flexible discharge tube, use a bottle stand to prevent tipping over.
 - Never carry the mounted instrument by the cylinder sleeve or the valve block. Breakage and detachment of the cylinder can lead to injuries caused by chemicals (First Steps, p. 45, Fig. 3).
 - Never use force. Always pull the piston up and press down gently when dispensing.

2.2 Target group

The operating manual is intended for users who use the laboratory instrument in the course of their professional activities. Users are familiar with the typical safety regulations and working methods in laboratories and have been trained accordingly. They can recognize potential hazards and protect themselves from them. The operating manual assumes this expertise and does not replace basic laboratory training or specific safety training.

2.3 Improper use

Various risks may arise if the laboratory instrument is used improperly. These risks include: inaccurate liquid delivery, damage to the laboratory instrument, and the risk of contamination, infection, and injury from contact with the dispensed media.

Any use of the laboratory instrument other than for dispensing liquids within the defined operating limits is considered improper use.

2.4 Foreseeable misuse

A typical misuse is the incomplete dispensing of liquids, i.e. residual liquid remains in the instrument if the piston is not pressed down completely. If this is the case, liquid will escape from the upper edge of the dispensing cylinder over time due to the design.

Another typical misuse is inadequate cleaning of crystallizing or hygroscopic liquids. This leads to blocked pistons or valves. In the case of hygroscopic liquids, this leads to an accumulation of liquid at the recirculation valve and in the dispensing cylinder.

2.5 Function

The VITLAB® simplex² and genius² bottle-top dispensers are used to dispense liquids directly from the storage bottle. They are available in variable and fixed versions.

For dispensing hydrofluoric acid, we recommend the bottle-top dispenser VITLAB® Dispenser TA² with platinum-iridium valve spring (see separate instruction manual).

2.5.1 Handling

If handled properly, the dispensed liquid comes into contact with the following chemical-resistant materials only:

Borosilicate glass, Al₂O₃-ceramic, ETFE, FEP, PFA, PTFE, platinum-iridium, PP (closure cap). If higher chemical resistance is required, use ETFE/PTFE bottle adapters ('Accessories', page 23).

2.6 Limitations of Use

This instrument is designed for dispensing liquids, observing the following physical limits:

- operating temperature from +15°C to +40°C (from 59°F to 104°F) of instrument and reagent
- vapor pressure up to 600 mbar. Absorb slowly above 300 mbar in order to prevent the liquid from boiling
- Kinematic viscosity up to 500 mm²/s (dynamic viscosity [mPas] = kinematic viscosity [mm²/s] x density [g/cm³])

2.7 Operating Limitations

- Liquids that form deposits (e.g., crystallizing solutions or concentrated alkaline solutions) may make the piston difficult to move or may cause jamming. If the piston movement becomes sluggish or stiff, the instrument should be cleaned immediately. See also Cleaning, p. 54.
- When dispensing inflammable media, make sure to avoid to buildup of static charge (e.g., do not dispense into plastic vessels; do not wipe instruments with a dry cloth).

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- The instrument is designed for general laboratory applications and complies with the requirements of the relevant standards, e.g. DIN EN ISO 8655. The use of the instrument for special applications (e.g. in trace analysis, in the food sector, etc.) must be carefully checked by the user. Approvals for specific applications (e.g., for the production and administration of food, pharmaceuticals, or cosmetics) have not been given.

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- vapor pressure up to 600 mbar. Absorb slowly above 300 mbar in order to prevent the liquid from boiling
- Kinematic viscosity up to 500 mm²/s (dynamic viscosity [mPas] = kinematic viscosity [mm²/s] x density [g/cm³])

2.9 Operating exclusions

Never use the dispenser for:

- Liquids that attack Al₂O₃-ceramic, ETFE, FEP, PFA, and PTFE (e.g., dissolved sodium azide*)
- Liquids that attack borosilicate glass (e.g., hydrofluoric acid)
- Liquids that are decomposed catalytically by platinum-iridium (e.g., H₂O₂)
- Nitric acid > 60%
- Tetrahydrofuran
- Trifluoroacetic acid
- Explosive liquids (e.g., carbon disulfide)
- Suspensions (e.g., activated charcoal) because solid particles may clog or damage the instrument
- Liquids that tend to polymerize spontaneously (e.g., adhesives and their components)
- Liquids that attack PP (screw cap and bottle adapter)**.

* Dissolved sodium azide is permitted up to a concentration of 0.1%.

** Alternatively, ETFE/PTFE bottle adapters and ETFE/PTFE screw caps can be used (accessories from Accessories/spare parts). The user must review carefully to ensure the suitability of ETFE/PTFE bottle adapters and ETFE/PTFE screw caps.

2.10 Storage conditions

Store the unit and accessories in a cool and dry place in cleaned condition only.

Storage temperature from -20 to 50°C (-4 to 122°F).

2.11 Recommended application range

The VITLAB® genius² and simplex² dispensers offer a very wide range of applications for dispensing aggressive reagents, e.g. concentrated acids such as H³PO₄, alkalis such as NaOH, KOH, salt solutions and a variety of organic solvents. Please note the exclusions of use and the recommended area of application.

Medium	Medium	Medium
O Acetaldehyde	O Chloronaphtalene	O Mineral oil (engine oil)
O Acetone	I Chromic acid, ≤ 50%	O Monochloroacetic acid, 50%
O Acetonitrile	I Chromosulfuric acid	O Sodium acetate
O Acetylacetone	O Cumene (isopropylbenzene)	I Sodium chloride
O Acrylonitrile	O Cyclohexanone	I Sodium dichromate
O Acrylic acid	O Decane	I Sodium fluoride
O Adipic acid	O 1-decanol	I Sodium hypochlorite
O Allyl alcohol	O Dibenzyl ether	I Sodium hydroxide, ≤ 30%**
I Aluminum chloride	O Dichlorobenzene	O Nitrobenzene
O Formic acid, ≤ 100%	O Dichloroethane	O Octane
O Amino acids	O Dichloromethane	O Oleic acid
I Ammonia solution, ≤ 20%	O Diethanolamine	O Oxalic acid
I Ammonium chloride	O Diethylamine	I Perchloric acid
I Ammonium fluoride	O 1,2 Diethylbenzene	O Petroleum
I Ammonium hydroxide, ≤ 20%	O Diethylene glycol	O Phenol
I Ammonium sulfate	O Diethyl ether	O Phenylethanol
O Amyl acetate	O Dimethylaniline	O Phenylhydrazine
O Amyl alcohol (pentanol)	O Dimethylformamide (DMF)	I Phosphoric acid, 85
O Amyl chloride (chloropentane)	O Dimethyl sulfoxide (DMSO)	I Phosphoric acid, 85% + Sulfuric acid, 98%, 1:1
O Aniline	O 1,4 Dioxane	O Piperidine
I Barium chloride	O Diphenyl ether	O Propanol
O Benzaldehyde	O Glacial acetic acid (= acetic acid 100%)	O Propionic acid
O Benzoic acid methyl ester	O Acetic acid, ≤ 96%	O Propylene glycol (propanediol)
O Gasoline	O Ethanol	O Propylene oxide
O Benzene	O Ethanolamine	O Pyridine
O Benzoyl chloride	O Ethyl acetate	I Mercuric chloride
O Benzyl alcohol	O Ethyl methyl ketone	O Salicylaldehyde
O Benzylamine	O Formaldehyde, ≤ 40%	O Salicylic acid
O Benzyl chloride	O Formamide	I Nitric acid, ≤ 60%*/**
I Boric acid, ≤ 10%	O Glycol (ethylene glycol)	I Hydrochloric acid, ≤ 37%**
O Pyruvic acid	O Glyceric acid, ≤ 50%	I Sulfuric acid, ≤ 98%**
O Bromobenzene	O Glycerin	O Silver acetate
O Bromonaphthalene	O Urea	I Silver nitrate
O Butanediol	O Heating oil (diesel oil)	O Turpentine
O 1-butanol	O Hexane	O Tetramethylammonium hydroxide
O Butyric acid	O Hexanol	O Toluene
O n-Butyl acetate	O Hexanoic acid	O Tartaric acid
O Butylamine	I Iodine-iodine-potassium solution	O Xylene
O Butyl methyl ether	I Hydroiodic acid, ≤ 57%**	I Zinc chloride, ≤ 10%
I Calcium carbonate	O Isoamyl alcohol	I Zinc sulfate, ≤ 10%
I Calcium chloride	O Isobutanol	
I Calcium hydroxide	O Isopropanol (2-propanol)	
I Calcium hypochlorite	O Isopropyl ether	
O Chloroacetaldehyde, ≤ 45%	I Potassium chloride	
O Chloroacetone	I Potassium dichromate	
O Chlorobenzene	I Potassium hydroxide**	
O Chlorobutane	I Potassium permanganate	
O Chloroacetic acid	O m-Cresol	
	I Copper sulfate	
	I Magnesium chloride	
	O Methanol	
	O Methoxybenzene	
	O Methyl tert-butyl ether (MTBE)	
	O Methyl formate	
	O Methyl propyl ketone	
	O Lactic acid	

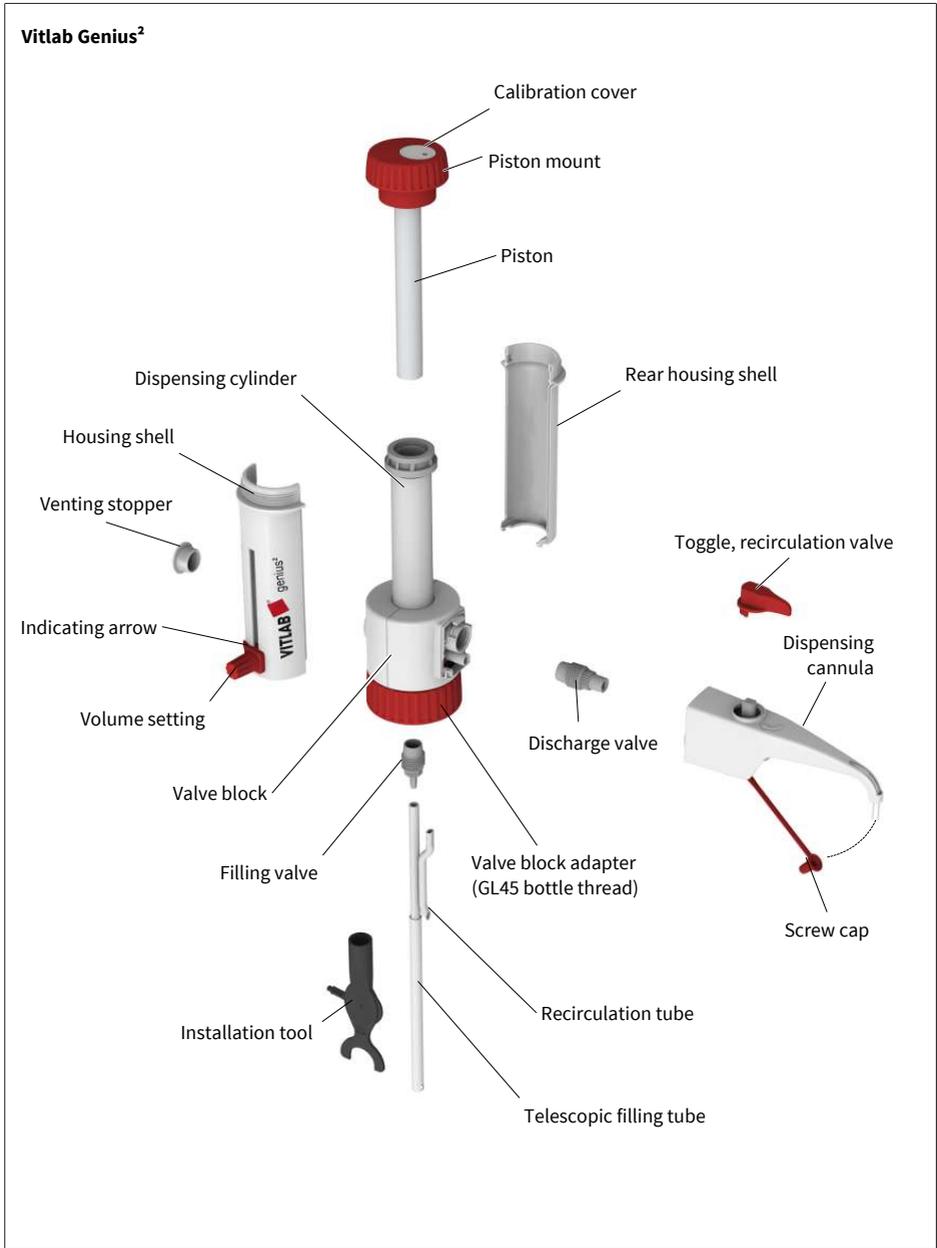
* Use ETFE/PTFE bottle adapter

** Use dry tube

Legend: I Inorganic media | O Organic media

All information has been carefully tested and is based on the most current information available. Always observe the operating manual of the instrument and the specifications provided by the reagent manufacturer. In addition to the chemicals listed above, a number of organic or inorganic saline solutions (e.g. biological buffers), biological detergents as well as media for cell cultures can be dispensed. Please call us if you need information on chemicals that are not on the list. Last updated: 07/25

3 Functional and operational components



4 Assembly

⚠ WARNING



Risk of injury from hazardous media

- > Wear your personal protective equipment, in particular protective clothing suitable for the medium to be used, eye protection and protective gloves!
- > Before use, find out how to use the medium safely and whether the laboratory instrument is suitable for this purpose.
- > Observe the chemical-specific safety data sheets and follow the operating instructions for the medium at the workplace!

4.1 First Steps

1. Installing the filling tube/recirculation tube

- Adjust the length of the telescopic filling tube to the bottle height and attach it.

NOTICE! Set the filling tube to approx. 2 cm above the bottom of the bottle so that no crystallized substances or solids are sucked into the instrument.



- Center the filling tube (side with smaller diameter) and attach it carefully to avoid damaging the olive-shaped nozzle.

⇒ If a dispensing cannula with recirculation valve is used, the recirculation tube must also be fitted.

- Insert the recirculation tube with the opening pointing outward.

2. Mounting and aligning the instrument on a bottle

- Screw the instrument (GL 45 threads) onto the reagent bottle and then align the dispensing cannula with the bottle label. This is done by rotating the valve block with the dispensing cannula.

NOTICE! Do not tip

To prevent tipping, use a bottle stand – particularly with small bottles and when using the flexible discharge tube.



3. Transporting the instrument



⚠ WARNING! Hazardous media:

If hazardous media are used, handle the instrument and bottle only with protective gloves.

- a. For bottles with other thread sizes, select a suitable bottle adapter.
- b. Always wear protective gloves when touching the instrument or the bottle, especially when using dangerous liquids.
- c. When mounted to a reagent bottle, always carry the instrument as shown in the figure.

4.2 Priming

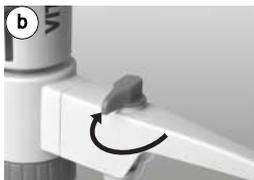
NOTICE! Rinse instrument thoroughly:

Before using the instrument for the first time, ensure it is rinsed carefully and discard the first few samples dispensed. Avoid splashes, as there may be ethanol and glycerine residues in the instrument.

Instruments with recirculation valve

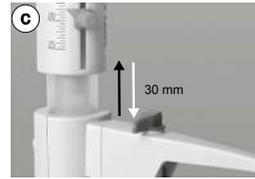


- a. Turn the sealing cap and pull it downwards at the same time. Open the dispensing cannula (Fig. a).

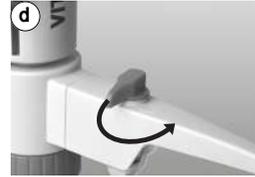


- b. Turn the valve to 'Re-dose'.

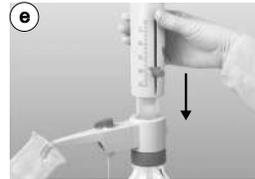
- c. For priming, pull the piston up approx. 30 mm and push it down until the lower stop. Repeat this procedure at least 5 times.



- d. Turn the valve to 'Dispense'.



- e. To avoid splashing, hold the opening of the dispensing cannula against the inside of a suitable collection container and dispense until the air has been removed from the dispensing cannula and no bubbles remain. Wipe away any remaining drops from the cannula.



Instruments without recirculation valve

- a. Open the screw cap of the dispensing cannula (see 'Instruments with recirculation valve', Fig. a). To avoid splashes, hold dispensing cannula orifice on the inner wall of a suitable receiving vessel.
- b. For priming pull the piston up approx. 30 mm and push it down until the lower stop. Repeat this process about 5 times until the air has been removed from the dispensing cannula and no bubbles remain.

5 Operation

⚠ WARNING

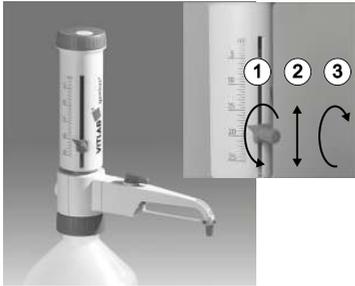


To be observed for every application, especially with hazardous media

- > Wear your personal protective equipment, in particular protective clothing, eye protection and protective gloves!
- > Before use, find out how to use the medium safely and whether the laboratory instrument is suitable for this purpose. Observe the safety data sheets and follow the operating instructions for the medium!
- > Never press down the piston when the dispensing cannula is sealed with the screw cap. Dispense slowly to avoid splashing.
- > Open the screw cap slowly to avoid splashing. Media residue can accumulate in the screw cap.

5.1 Dispensing

1. Select volume



Variable: Loosen the volume selector thumb screw by one turn (1), slide the pointer vertically to the desired volume (2) and re-tighten the volume thumb screw (3).



Fixed: The volume is fixed and cannot be changed.

2. Dispensing



- Unscrew the screw cap of the dispensing cannula.
- For instruments with a recirculation valve, turn the valve to dispensing.
- Hold the dispensing cannula orifice on the inner wall of a suitable receiving vessel.



- Gently pull the piston up to the stop and then push it back down to the lower stop evenly and without applying too much force.



- Wipe off the dispensing cannula against the inner wall of the receiving vessel.
- Seal the dispensing tube with the screw cap.

NOTICE! Park position:

After use, always press the plunger down to the bottom stop (**park position**). If the piston is not pressed down to the bottom stop, media may escape unintentionally.

5.2 Accessories

5.2.1 Flexible discharge tube with recirculation valve

⚠ WARNING



Risk of media contact if the hose is damaged

If the hose is damaged, media contact may occur. Check the hose for damage (e.g. kinks and the like) before each use and replace it if necessary.

- Use a face shield and personal protective equipment.
- Secure the bottle with a bottle stand.
- In order to avoid splashing reagent, hold the dispensing tube firmly, and insert it into the holder provided after use.
- Rinse the tubing to clean it.
- Do not disassemble.

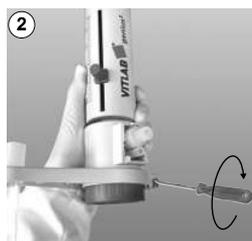
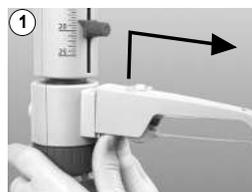


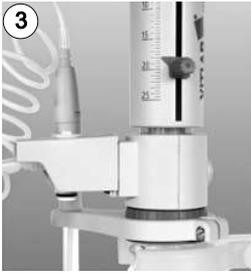
The flexible discharge tube for the VITLAB® simplex² and genius² bottle-top dispensers can be used for serial dispensing (Accessories/spare parts, p. 61).

The specified accuracy and coefficient of variation of the instrument are only obtained for volumes > 2 ml and by gently approaching the upper and lower stops. The coil of the tubing can be stretched to a maximum length of 800 mm. Before use, make sure that the hose is properly looped and not twisted. The operating exclusions for the respective instrument in use apply.

Prerequisite:

- If the instrument was in use, it must be cleaned before installing the flexible discharge tube (Cleaning, p. 54).
- a. For instruments with a recirculation valve, set the valve to 'Recirculation' and pull the valve toggle upwards.
- b. Slide the discharge tube housing all the way up, then pull it forward with gentle up and down motions.
- c. Push the flexible discharge tube holder from the bottom of the valve block and tighten it. The Instrument must not be mounted on a bottle for this purpose. Fit the collecting tube.
- d. Press down the plug of the recirculation valve.





- e. Slide the flexible discharge tube housing into the valve block up to the stop.



- f. Push the housing all the way down.
- g. Place valve lever in position “Re-dose” and press in firmly.

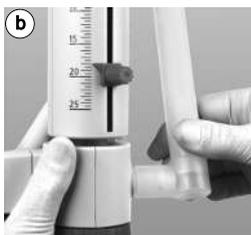
NOTICE! Use bottle stand, see accessories/spare parts, p. 61.

5.2.2 Drying tube



For moisture- or CO₂-sensitive media, it may be necessary to use a drying tube filled with suitable absorbent (not included in the scope of delivery).

See also Accessories/spare parts.



- a. Unscrew the venting stopper using the installation tool.
- b. Screw in the filled drying tube.
- c. Place the PTFE sealing ring on the bottle thread or place the screwed-on bottle adapter and screw the Instrument onto the bottle.

NOTICE! If necessary, seal the threads of the drying tube, the bottle and/or the bottle adapter with PTFE tape.

5.2.3 Sealing ring for valve block

For highly volatile or outgassing media, we recommend sealing the connection from the valve block to the bottle with the PTFE sealing ring and PTFE tape (Accessories/spare parts).



5.2.4 Venting stopper for microfilter with Luer cone

For sterile media, we recommend the venting stopper with Luer cone for connecting a microfilter. This offers increased protection against contamination from the drawn-in air (Accessories/spare parts).

- Unscrew the venting stopper (see 'Fitting the drying tube', Fig. a).
- Screw in the venting stopper with Luer cone.
- Place the PTFE sealing ring on the bottle thread or place the screwed-on bottle adapter and screw the Instrument onto the bottle.
- Insert a commercially available sterile filter into the Luer cone.



6 Error limits

Error limits in relation to the nominal capacity (= maximum volume) indicated on the instrument at equal temperature (20 °C/68 °F) of instrument, ambient environment and distilled water. The test was carried out in accordance with DIN EN ISO 8655-6 with a completely filled instrument and uniform and jerk-free dispensing.



Error limits

Nominal volume ml	A* $\leq \pm$ %	μ l	CV* \leq %	μ l
1	0.5	5	0.1	1
2	0.5	10	0.1	2
5	0.5	25	0.1	5
10	0.5	50	0.1	10
25	0.5	125	0.1	25
50	0.5	250	0.1	50
100	0.5	500	0.1	100

$$A_T = \frac{V_N}{V_T} \cdot A_N$$

Partial volumes

The percentage values for A and CV are relative to the nominal volume (V_N) and must be converted for partial volumes (V_p).

e.g.	Volume	A* ≤ ± %	µl	CV* ≤ %	µl
V_N	25.0	0.5	125	0.1	25
$V_T = 50\% N$	12.5	1.0	125	0.2	25
$V_T = 10\% N$	2.5	5.0	125	1.0	25

*A = Accuracy, CV = Coefficient of Variation

NOTICE! The error limits of DIN EN ISO 8655-5 are clearly undershot. The maximum total error for a single measurement can be calculated approximately from the sum of the error limits $FG = R + 2 VK$ (for the 25 ml size: $125 \mu\text{l} + 2 \times 25 \mu\text{l} = 175 \mu\text{l}$).

7 Checking the Volume (Calibration)

Depending on use, we recommend that gravimetric testing of the instrument be carried out every 3–12 months. This time frame should be adjusted to correspond with individual requirements.

Gravimetric volume testing according to DIN EN ISO 8655- 6 (for measurement conditions, see Error limits, p. 51) is performed as follows:

1. Prepare instrument

Clean the instrument (Cleaning, p. 54), fill it with test liquid (distilled water) and then prime it carefully.

2. Check volume

- Carry out 10 doses with test liquid in 3 volume ranges (100 %, 50 %, 10 %).
- For discharge, depress the piston slowly and steadily without force until the lower stop
- Wipe off the tip of the dispensing tube.
- Weigh the dispensed quantity on an analytical balance. Refer to the operating manual of the balance manufacturer.
- Calculate the dispensed volume. The Z factor takes account of the temperature and air buoyancy.

Calculation (for nominal volume)

x_i = weighing results

n = number of weighings

V_0 = nominal volume

Z = Correction factor (e.g. $1.0029 \mu\text{l}/\text{mg}$ at 20°C , 1013 hPa)

Mean:

$$\bar{x} = \frac{\sum x_i}{n}$$

Mean volume:

$$\bar{V} = \bar{x} * Z$$

Accuracy*:

$$A\% = \frac{\bar{V} - V_0}{V_0} * 100$$

Standard deviation*:

$$s = Z * \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$$

Coefficient of variation*:

$$CV\% = \frac{100 s}{\bar{V}}$$

*) Accuracy and coefficient of variation are calculated according to the formulas of statistical quality control.

NOTICE! Test instructions (SOPs) are available for download at www.vitlab.de.

8 Adjustment

Calibration may be necessary after prolonged use.

- Perform calibration, e.g. at nominal volume (Checking the Volume (Calibration)).
- Calculate average volume (actual value) (Checking the Volume (Calibration)).
- Adjust the instrument (set current value).
- Calibrate again after adjustment to check.

Example

The gravimetric control of a 10 ml instrument results in a current value of 9.90 ml with a set nominal volume of 10.00 ml.

- Insert the pin of the installation tool into the calibration cover (item b) and break it off by turning it. Dispose of the calibration cover.



b



b. Insert the pin of the installation tool into the calibration screw and turn to the left to increase the dispensing volume or turn to the right to decrease the dispensing volume (e.g. current value 9.97 ml approx. 1/2 turn to the left).

c



c. The calibration is complete.

⇒ The change in calibration is indicated by a red disk (circle in illustration).

Calibration range

Nominal volume	Analog/Fixed max. +/- [μl]	One rotation corresponds to [μl]
1 ml	6	~ 8
2 ml	12	~ 16
5 ml	30	~ 40
10 ml	60	~ 80
25 ml	150	~ 130
50 ml	300	~ 265
100 ml	600	~ 400

9 Cleaning

⚠ WARNING



There is a risk of exposure to liquids during cleaning.

- The components cylinder, valves, suction pipe and dosing cannula are filled with liquid!
- > Wear protective clothing, eye protection and protective gloves to protect yourself from hazards caused by the liquid during cleaning.
 - > Never point the openings of the suction tube, dosing cannula and valves towards the body in order to avoid hazards from escaping liquid.
 - > Never remove the dosing cannula when the dosing cylinder is full, as liquid will then escape.



The instrument must be cleaned in the following situations to assure correct operation:

- Before using the instrument for the first time.
- Immediately if the piston becomes stiff.
- Before you change the liquid.
- Before storing the instrument.
- Regularly when using liquids which form deposits (e.g., crystallizing liquids).
- Regularly if liquids accumulate in the screw cap

- After you have stored the instrument.
- Before dismantling the instrument.
- Before autoclaving the instrument.
- Before replacing one or more valves.
- Regularly if you use hygroscopic liquids (e.g. concentrated sulphuric acid).

9.1 Cleaning type Analog, type Fixed

1. Empty the instrument completely

- a. Screw the instrument onto an empty bottle and empty it completely by dispensing. If the instrument is equipped with a recirculation valve, it must be emptied in the dosing and recirculation position.



2. Rinse instrument

- a. Screw the instrument onto a bottle filled with a suitable cleaning agent (e.g. deionized water) and fill and empty completely several times to rinse.



3. Dismantling the piston

- a. Hold the housing shells firmly and unscrew the piston mount completely by turning it to the left.

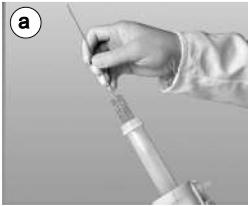
NOTICE! Do not interchange pistons

The pistons of the instruments are individually fitted and must not be interchanged with pistons from other instruments!

- b. Carefully pull out the piston.



4. Clean the piston and cylinder, and refit the instrument



- a. Clean the piston and cylinder. Carefully remove any deposits from the upper edge of the dosing cylinder (e.g., with a bottle brush and thin soapy water).
- b. Rinse the piston and cylinder with deionized water, and dry carefully.
- c. Attach the dosing cannula to open the discharge valve.



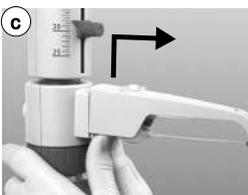
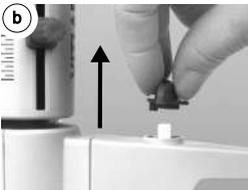
- d. Grasp the piston at the tip and carefully push it fully into the cylinder **vertically while rotating it** and reassemble the instrument.

9.2 Replacing the dosing cannula/valves

NOTICE! A functional test must always be carried out after replacing components.

9.2.1 Replacing the dosing cannula

- a. For instruments with a recirculation valve, set the valve to 'Recirculation'.
- b. Pull the valve toggle upwards.

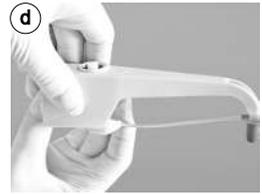


- c. Slide the dispensing cannula housing all the way up, then pull it forward with gentle up and down motions.

- d. Slightly push the dosing cannula onto the valve.

Then pull the dosing cannula slightly upwards.
The coupling piece slides downwards

Push the dosing cannula onto the valve as far as it will go.
Press the dosing cannula down to lock it.

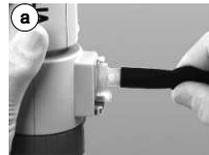


- e. Push the housing all the the discharge tube way down.
- f. For units with a redosing valve, place the valve knob in the 'redosing' position and push it downwards.
- g. Carry out a functional test after replacement.

9.2.2 Replacing the valves

9.2.2.1 Replacing the discharge valve

- a. After disassembling the dispensing cannula (see Replacing the dosing cannula, p. 56), use the assembly tool to unscrew the discharge valve.



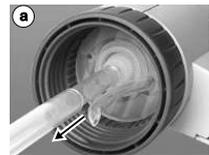
- b. Firmly screw in the new discharge valve first by hand and then tighten it with the assembly tool. The thread should not be visible.



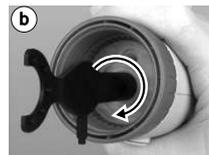
NOTICE! Always install the valve intended for the particular instrument model and size. See also the Accessories/spare parts, p. 61.

9.2.2.2 Replacing the filling valve

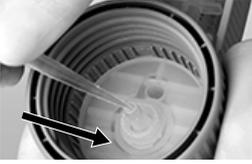
- a. Pull out the recirculation tube and the telescopic filling tube.



- b. Use the assembly tool to unscrew the filling valve.
- c. Screw in the new filling valve first by hand and then tighten it with the assembly tool.



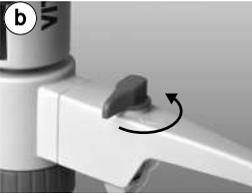
9.2.2.3 Loosen stuck filling valve



If the instrument does not fill up, and if some elastic resistance is evident when the piston is pulled upward, then it is possible that the valve ball is stuck.

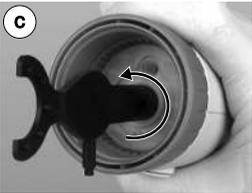
In this case, dislodge the valve ball using light pressure; for example, with a 200 µl plastic pipette tip (see the figure at the side).

10 Autoclaving



The device can be autoclaved at 121°C (250°F), 2 bar, and a holding time of at least 15 minutes according to DIN EN 285.

- a. The instrument must be carefully cleaned prior to autoclaving (Cleaning, p. 54).
- b. Open the closure cap on the dispensing cannula, and for instruments with a recirculation valve, set the valve to 'Dispense'.
- c. Check that the filling valve is firmly seated.



- d. To ensure unhindered access for the steam and to prevent the valve ball in the filling valve from possibly becoming stuck, hold the instrument with the discharge piston pressed vertically downward, and gently tap against the casing with your hand. Then lay it horizontally in the autoclave.

Be sure to avoid the instrument coming into contact with metal surfaces in the autoclave!

NOTICE! Do not reassemble the instrument until it has cooled down to room temperature (Cooling time approx. 2 hours). After every autoclaving, inspect all parts for deformities or damage. If necessary, replace them. It is the user's responsibility to ensure effective autoclaving.

11 Troubleshooting

Problem	Possible cause	Corrective action
Piston sluggish or stuck	Crystal deposits Contaminants	Stop dispensing immediately. Loosen piston with circular motion, but do not disassemble. Perform cleaning (Cleaning, p. 54).
	The dispensing cylinder or the piston is broken.	If the dispensing cylinder or piston is broken, replace the instrument. Repair is not possible in this case.
Filling not possible	Volume adjusted to minimum setting	Set the desired volume (Dispensing, p. 48).
	Filling valve stuck	Unscrew the filling valve from the valve block and clean it. If the valve ball is stuck, use a 200 µl plastic tip to dislodge it (Loosen stuck filling valve, p. 58). If necessary, replace the filling valve.
Dispensing not possible	Discharge valve stuck	Unscrew the discharge valve from the valve block, clean it and replace if necessary. If the valve ball is stuck, use a 200 µl plastic tip to dislodge it.
Discharge tube (with or without recirculation valve) cannot be mounted sufficiently	Discharge valve is not screwed in deeply enough	Tighten the discharge valve with the assembly tool until it meets the stop so that the threads are no longer visible.
Air bubbles in the instrument	Reagent with high vapor pressure has been drawn in too quickly	Slowly draw in reagent.
	Valve screw connections loose	Tighten the valves firmly with the assembly tool.
	The instrument has not been primed	Prime the instrument (Priming, p. 46).
	Filling tube is loose or damaged	Push the filling tube on firmly. If necessary cut off approx. 1 cm of tube at the upper end and re-connect it or replace filling tube.
	Valves not firmly connected or damaged	Perform cleaning (Cleaning, p. 54). Tighten the valves using the assembly tool.
Dispensed volume too low	Filling tube is loose or damaged	Perform cleaning (Cleaning, p. 54). Push the filling tube on firmly. If necessary cut off approx. 1 cm of tube at the upper end and re-connect it or replace filling tube (Replacing the dosing cannula, p. 56).
	Filling valve is loose or damaged	Perform cleaning (Cleaning, p. 54). Tighten the valves using the assembly tool.

Problem	Possible cause	Corrective action
		bly tool. If necessary, replace filling valves.
Leaking liquid between instrument and bottle	Recirculation tube not connected	Connect recirculation tube (First Steps, p. 45, Fig. 3).
	Volatile reagent dispensed without sealing ring	Install sealing ring for valve block (First Steps, p. 45).
Liquid discharge at the upper edge of the dispensing cylinder	Piston not in lowest position after dispensing	After use, always depress the piston to the lower stop (put it in the "parking position"). (see Dispensing, p. 48)
	Hygroscopic dispensing medium leads to a leakage of medium	Regularly wipe off any accumulation of liquid on the upper edge of the dispensing cylinder

12 Product markings

Symbol or number	Meaning
	General warning symbol
	Follow the operating instructions
	Use eye protection
	Use hand protection
	Wear protective clothing
www.vitlab.com/ip	Patent information

13 Ordering Information

Variable dispenser

Volume ml	Graduation ml	A* ≥ %	CV* ≥ %	VITLAB® genius ² Order No.	VITLAB® simplex ² Order No.
0.2 - 2.0	0.05	0.5	0.1	1625503	1621503
0.5 - 5.0	0.10	0.5	0.1	1625504	1621504
1.0 - 10.0	0.20	0.5	0.1	1625505	1621505
2.5 - 25.0	0.50	0.5	0.1	1625506	1621506
5.0 - 50.0	1.00	0.5	0.1	1625507	1621507
10.0 - 100.0	1.00	0.5	0.1	1625508	1621508



Fixed dispenser

Volume ml	A* ≥ %	CV* ≥ %	VITLAB® simplex ² Order no.
1	0.5	0.1	1622502
5	0.5	0.1	1622504
10	0.5	0.1	1622505



For dispensing hydrofluoric acid, we recommend the bottle-top dispenser VITLAB® Dispenser TA² with platinum-iridium valve (see separate instruction manual).

See also the Scope of delivery, p. 37.

14 Accessories/spare parts

The packaging unit is always 1 unless otherwise indicated!

Bottle adapter

External thread	for bottle thread/ ground joint	Material	Order no.
GL 32	GL 25	PP	1670150
GL 32	GL 28/S 28	PP	1670155
GL 45	GL 32	PP	1670180
GL 45	GL 38	PP	1670110
GL 45	S* 40	PP	1670120



External thread	for bottle thread/ ground joint	Material	Order no.
GL 32	GL 25	ETFE	1670072
GL 32	GL 28/S 28	ETFE	1670080
GL 45	GL 32	ETFE	1670100
GL 45	GL 38	ETFE	1670115
GL 45	S* 40	PTFE	1670125

* buttress thread

Dispensing tube for VITLAB® simplex²



Description	Nominal volume ml	Length	Order no.
Dispensing tube for VITLAB® simplex ²	2/5/10	105	1678002
	25/50/100	135	1678006

Dispensing tube for VITLAB® genius²



Description	Nominal volume ml	Length	Order no.
Dispensing tube for VITLAB® genius ²	2/5/10	105	1678102
	25/50/100	135	1678106

Filling valve



Description	Nominal volume ml	Order No.
Valve:	2/5/10	1676734
PFA/borosilicate glass/ ceramic.	25/50/100	1676735

Discharge valve



Description	Nominal volume ml	Order No.
Valve:	2	1676749
PFA/borosilicate glass/ ceramic/platinum-iridium.	5/10	1676727
	25/50/100	1676728

Telescopic filling tube

Description	Nominal volume ml	Outer Ø mm	Order no.
Telescopic filling tubes, FEP. Individually adjustable lengths.	2/5/10	70–140	1678210
		125–240	1678212
		195–350	1678214
		250–480	1678216
	25/50/100	170–330	1678218
		250–480	1678220



Recirculation tube

Description	Order no.
Recirculation tube. FEP	1676747



Sealing ring for valve block

Description	Order no.
Sealing ring for valve block, PTFE, for highly volatile media.	1671683



Adjustment/installation tool

Description	Order no.
Adjustment/installation tool	1676748



Closure caps

Description	size	Order No.
Closure cap with tab, PP, red.	2/5/10	1676018
	25/50/100	1676019



Flexible discharge tubing



Description	Nominal volume ml	Outer Ø mm	Inside Ø mm	Order no.
Flexible discharge tubing with recirculation valve, PTFE spiraled, approx. 800 mm long with safety handle.	2/5/10	3	2	1678132*
	25/50/100	4.5	3	1678134*

Drying tube (without filling)



Description	Order no.
Drying tube (without filling), including sealing ring (PTFE).	1671090

Plastic stand



Description	Order no.
Plastic stand PP, 325 mm, Base plate 220 x 160 mm.	1671116

Venting stopper for microfilter with Luer cone



Description	Order no.
Venting stopper for microfilters with Luer cone, PP, venting stopper and PTFE sealing ring.	1671682

15 Calibration service

The ISO 9001 and GLP guidelines require regular inspection of your volume measuring instruments. We recommend performing a volume check every 3 to 12 months. The cycle is dependent on the individual requirements of the instrument. Checks should be performed more frequently, in case of high frequency of use or the use of aggressive media.

The detailed testing procedure is available for download at www.vitlab.com.

VITLAB also offers the option to have your instruments calibrated through our calibration service.

Simply send us the instruments to be calibrated, accompanied by details about which type of calibration you would like. The instruments will be returned to you after a few days together with a test report (factory calibration) or a DAkkS calibration certificate. More information can be obtained from your dealer or directly from VITLAB.

16 Warranty

We shall not be liable for the consequences of improper handling, use, servicing, operating or unauthorized repairs of the device or for the consequences of normal wear and tear, especially of wearing parts such as pistons, seals, valves and the breakage of glass. The same applies for failure to follow the instructions of the operating manual. We are not liable for damage resulting from disassembly beyond that described in the operating manual or if non-original spare parts or components have been installed.

17 Repair – calibration service

If any instrument malfunction cannot be remedied in the lab by simply exchanging replacement parts, the instrument must be sent in for repair.

Please note that for safety reasons only clean and decontaminated instruments can be inspected and repaired!

17.1 Sending for repair

NOTICE! Transporting hazardous materials without approval is prohibited by law.

- a. Clean the instrument thoroughly and decontaminate.
- b. Complete the “Declarations of Health Safety Compliance” form (forms can be requested from the dealer or manufacturer or downloaded from www.vitlab.com).
- c. Send the completed form together with the instrument to the manufacturer or dealer. Include an exact description of the malfunction and the media used.

Shipment is at the risk and the cost of the sender.

18 Disposal

Before disposal, observe the relevant national disposal regulations and ensure that the product is disposed of properly.