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Titrette®

Flaschenaufsatzdispenser | Bottle-top dispenser

Impressum

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Please refer to <http://www.brand.de/om> or use the following
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The original operating manual is written in German. Other languages are translations of the original operating manual.

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1 Introduction

1.1 Scope of delivery

Bottle-top burette Titrette®, for GL 45 threaded bottles, size 10 ml, 25 ml or 50 ml, telescopic filling tube (length 170 - 330 mm), recirculation tube, 2 micro-batteries 1.5 V (AAA/UM4/LR03), 4 PP bottle-top adapters (GL 32-33, GL 38, S 40, NS 29/32), 2 tinted light-protection viewing windows, one performance certificate and this operating manual.

1.2 Terms of use


- Carefully read the operating manual before using the device for the first time.
- The operating manual is part of the device and must be kept in an easily accessible place.
- Be sure to include the operating manual if you transfer possession of this device to a third party.
- You can find up-do-date versions of the operating manual on our website: www.brand.de.

1.2.1 Hazard levels

The following signal words identify possible hazards:

Signal word	Meaning
DANGER	Will lead to serious injury or death.
WARNING	May lead to serious injury or death.
CAUTION	May lead to minor or moderate injuries.
NOTICE	May lead to property damage.

1.2.2 Symbols

Symbol	Meaning
	Hazardous area

1.2.3 Format

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

2 Safety Instructions

2.1 General safety instructions

Please read carefully!

The instrument Titrette® 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.

1. Every user must read and understand this operating manual before operation.
2. Follow the general hazard instructions and safety regulations (e.g., wear protective clothing, eye protection, and protective gloves).
3. Observe all specifications provided by reagent manufacturers.
4. Do not operate the instrument in potentially explosive atmospheres.
5. Use the instrument only for titrating liquids, with strict regard to the defined limitations of use and operating limitations.
Comply with the operating exclusions (see Operating Exclusions, p. 53)!
If in doubt, contact the manufacturer or supplier.
6. Always perform work in a manner that does not endanger yourself or other people. Avoid splattering. Only use suitable vessels.
7. Never turn the hand wheels when the titration tube is sealed with the cap.
8. Never remove the titration tube while the glass cylinder is filled.
9. Reagents can accumulate in the cap of the titration tube. Therefore, clean regularly.
10. To avoid tipping over, use a bottle stand for small bottles.
11. Never carry the instrument by the housing when it is mounted to a reagent bottle. Breakage or loosening of the instrument from the reagent bottle may lead to personal injury.
12. Never use force.
13. Use only original accessories and original replacement parts. Do not make any technical modifications. Do not dismantle the instrument any further than is described in the operating manual!
14. Always check that the instrument is in proper working condition before use. The user can come into contact with media if the instrument has been insufficiently cleaned or inspected. If there is a sign of a potential malfunction (e.g., piston difficult to move, sticking valves or leakage), immediately stop titration and consult Troubleshooting, p. 83. Contact the manufacturer, if necessary.
15. The installed 1.5 V micro-batteries are not rechargeable!

2.2 Function

The Titrette® bottle-top burette with electronic digital display is used to titrate aqueous and non-aqueous titration media (e.g. alcoholic KOH) up to a concentration of max. 1 mol/l. (See Recommended application range, p. 54). Thanks to a high precision measurement system, even the close tolerances of Class A for glass burettes can be adhered to. The instruments are marked DE-M.

2.2.1 Operation

When the instrument is correctly used, the dispensed liquid comes into contact with only the following chemically resistant materials:

Borosilicate glass, Al₂O₃, ETFE, PFA, FEP, PTFE, platinum-iridium, PP (screw cap). The instrument comes equipped with a recirculation valve.

2.3 Limitations of Use

This instrument is intended for titrating liquids within the following physical limitations:

- operating temperature from +15 °C to +40 °C (from 59 °F to 104 °F) of instrument and reagent
- vapor pressure up to 500 mbar
- viscosity up to 500 mm²/s
- altitude: max. 3,000 m above sea level
- relative humidity: 20 % to 90%

2.4 Operating Limitations

- Chlorinated and fluorinated hydrocarbons or chemical combinations which form deposits may make the piston difficult to move or may cause jamming.
- When working with crystallizing media, follow the cleaning instructions (see Cleaning).
- Compatibility of the instrument for the intended application (e.g., trace analysis) must be carefully checked by the user. Contact the manufacturer, if necessary.

2.5 Operating Exclusions

2.5.1 Titrette

Never use the instrument for:

- liquids that attack borosilicate glass, Al₂O₃, ETFE, PFA, FEP, PTFE or platinum-iridium (e.g., hydrofluoric acid).
- suspensions (e.g., of charcoal), as solid particles may clog or damage the instrument.
- concentrated acids and bases as well as nonpolar solvents that have a strong swelling effect on plastics (e.g., toluene, benzene).
- carbon disulfide, as this media is highly flammable.
- Autoclaving the instrument is not permitted!
- The instrument must never be exposed to an aggressive atmosphere (e.g., HCl fumes).

2.6 Battery specifications

2 micro-batteries, 1.5 V (AAA/UM4/LR03), not rechargeable!

2.7 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).

Relative humidity: 5 % to 95 %.

2.8 Recommended application range

The instrument can be used for the following titration media (max. concentration 1 mol/l):

Medium	Medium	Medium
Alcoholic potassium hydroxide solution	Potassium bromate solution	Oxalic acid solution
Ammonium iron (II) sulfate solution	Potassium bromide bromate solution	Perchloric acid
Ammonium thiocyanate solution	Potassium dichromate solution	Perchloric acid in glacial acetic acid
Barium chloride solution	Potassium iodate solution	Nitric acid
Bromide bromate solution	Potassium permanganate solution*	Hydrochloric acid
Cerium (IV) sulfate solution	Potassium thiocyanate solution	Hydrochloric acid in acetone
EDTA solution	Sodium arsenite solution	Sulphuric acid
Iron (II) sulfate solution	Sodium carbonate solution	Silver nitrate solution*
Acetic acid	Sodium chloride solution	Tetra-n-butylammonium hydroxide solution
Iodine solution*	Sodium nitrite solution	Triethanolamine in acetone*
Iodine iodate solution*	Sodium thiosulfate solution	Zinc sulfate solution
Potassium hydroxide solution	Sodium hydroxide solution	

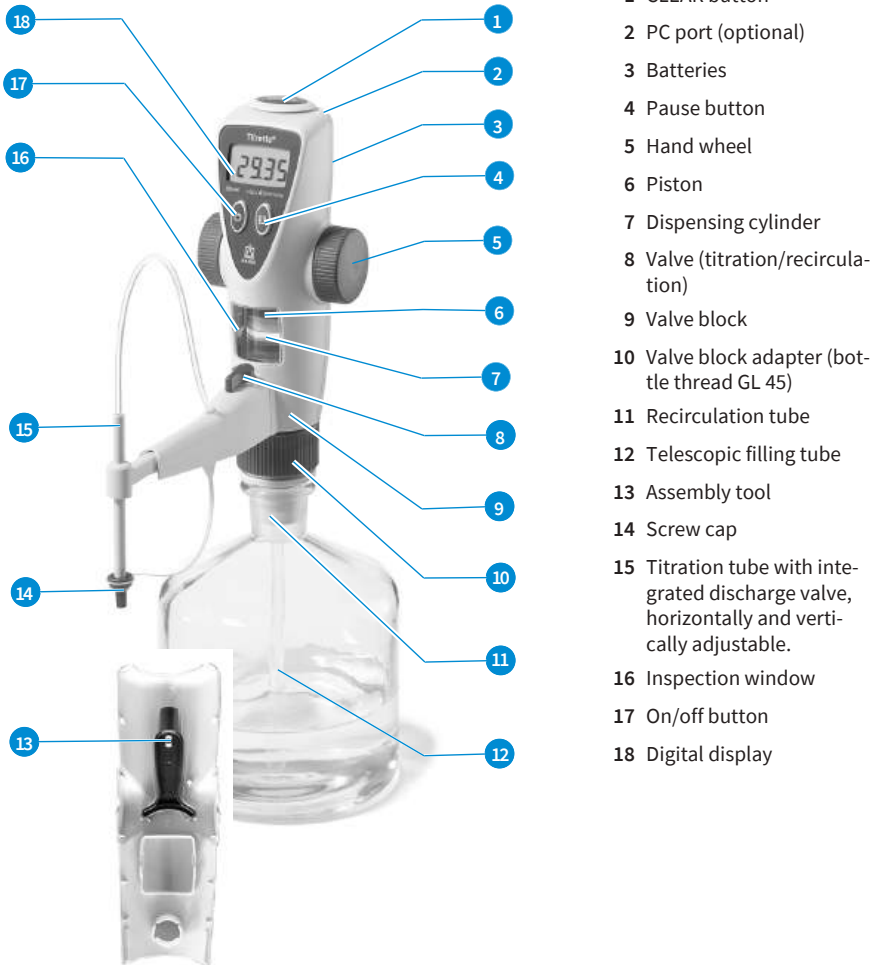
* Use light shield inspection windows (see Sensitive media (replacing the inspection window), p. 63)

This table 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. If you need chemical hazard statements that are not on the list, you are welcome to contact BRAND.

Last updated: 0219/4

3 Functional and operating elements

The operating elements: Separate buttons for on/off, pause and CLEAR for clearing the display. Non-slip hand wheels for fast to drip titration.



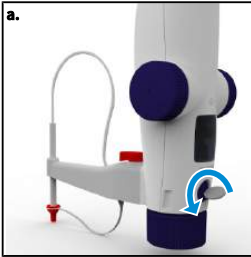
- 1 CLEAR button
- 2 PC port (optional)
- 3 Batteries
- 4 Pause button
- 5 Hand wheel
- 6 Piston
- 7 Dispensing cylinder
- 8 Valve (titration/recirculation)
- 9 Valve block
- 10 Valve block adapter (bottle thread GL 45)
- 11 Recirculation tube
- 12 Telescopic filling tube
- 13 Assembly tool
- 14 Screw cap
- 15 Titration tube with integrated discharge valve, horizontally and vertically adjustable.
- 16 Inspection window
- 17 On/off button
- 18 Digital display

The main features of the Titrette® bottle-top burette have been filed for international patent. The assembly tool is located in the rear housing section.

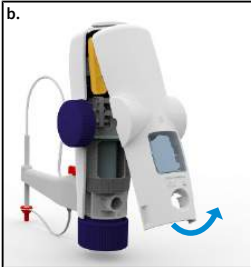
4 Assembly

4.1 First Steps

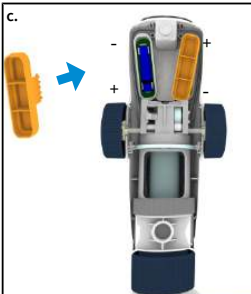
1. Inserting batteries



- a. Unscrew the air vent cap by hand or use a coin.

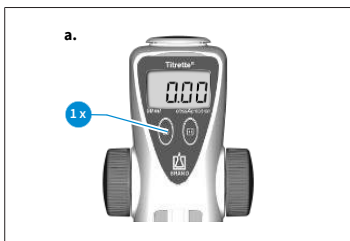


- b. Remove the rear housing shell.
- c. Remove the battery compartment covers and insert the batteries. Ensure that the polarity of the batteries corresponds to the symbols on the battery compartment.



- d. Tightly re-seal the battery compartments with the covers. Carefully press the edges so that each cover fits snugly on all sides without any gaps between it and the battery compartment.
- e. Hang the rear housing shell from the top and then snap it shut.
- f. Screw in the air vent cap.

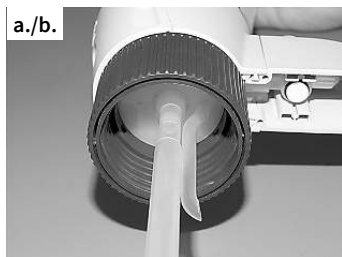
2. Switching the instrument on and off



- a. To switch the instrument on or off, briefly press the ON/ OFF button.

WARNING**Follow the safety instructions**

- > Wear protective clothing, eye protection and protective gloves!
- > Always wear protective gloves when touching the instrument or the bottle, especially when using dangerous liquids.
- > Follow all safety instructions and comply with the limitations of use, see Limitations of use, p. 53.
- > Comply with the operating limitations, see Operating limitations, p. 53.

3. Installing the filling tube/recirculation tube

- a. Adjust the length of the telescopic filling tube to the bottle height and attach it. Center the filling tube (side with smaller diameter) and attach it carefully to avoid damaging the olive-shaped nozzle.
- b. Insert the recirculation tube with the opening pointing outward.

NOTICE

When working with media with a high rate of crystallization, e.g. alcoholic KOH, the length of the telescoping filling tube should be adjusted to a distance of approx. 20 mm from the bottom of the bottle.

4. Mounting and aligning the instrument on a bottle**NOTICE**

The included adapters are made of polypropylene (PP) and may only be used for media that do not attack PP (Accessories/spare parts, p. 86).



- a. Screw the instrument (GL 45 threads) onto the reagent bottle and then align the titrating tube with the bottle label. This is done by rotating the valve block with the titrating tube.
- b. For bottles with other thread sizes, select a suitable adapter.

The titrating tube can be adjusted by 70 mm, both horizontally and vertically.

5. Transporting the instrument



- a.** When mounted to a reagent bottle, always carry the instrument as shown in the figure!

⚠ WARNING



Avoid splashing the reagent

Potential health risk, especially with hazardous media

- > Never turn the hand wheels when the valve is set to 'Titrate' and the titrating tube is closed with the screw cap!
- > Avoid splashing the reagent! The reagent can drip out from the titrating tube and screw cap.

4.2 Priming

NOTICE

Before first use:

After final production inspection, glycerin and ethanol residues may still be present in the instrument. To prevent media from mixing with these residues, rinse the instrument thoroughly before the first use and discard the first dispensed volumes. Avoid splattering.



- a.** Ensure that the screw cap of the titrating tube is screwed on tightly.
- b.** Turn the valve in the direction of the arrow to 'Recirculate'.



- c.** First, turn the hand wheels to move the piston all the way down. To fill, rotate the piston no further than half-way up, and then empty it again.

NOTICE

If filling is not possible, see Troubleshooting, p. 83
Then rotate the hand wheel half way several times to aspirate liquid, each time using a single stroke to the lower position to empty it into the bottle. Repeat the procedure approximately 5 times until there are no more large air bubbles under the piston.

NOTICE

A few bubbles less than 1 mm in size are permitted.



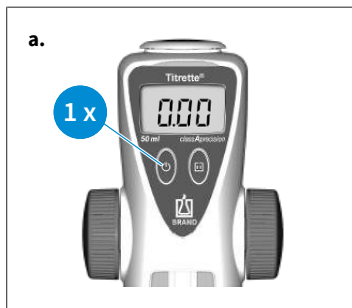
- d.** Unscrew the screw cap of the titrating tube.
e. Turn the valve to 'Titrate'.



- f.** Hold a suitable receiving vessel under the opening of the titrating tube and dispense liquid to deaerate the titrating tube until it is bubble-free. Wipe away any remaining drops from the titrating tube tip.

5 Titrating

1. Switching on the instrument



- a. To switch the instrument on or off, briefly press the ON/OFF button.

2. Filling the instrument



- a. Fill the instrument up to the upper stop position by gently turning the hand wheels.
b. Briefly press the CLEAR button one time to set the display value to zero.

3. Titrating



- a. Hold a suitable receiving vessel under the opening of the titrating tube.
b. Dispense liquid up to the transition point by turning the hand wheels.

NOTICE

If the fill volume is insufficient for the entire titration, gently turn the hand wheels back to the upper stop position to fill (the displayed value remains unchanged during this process). Then continue titration.

4. Filling the instrument after titration

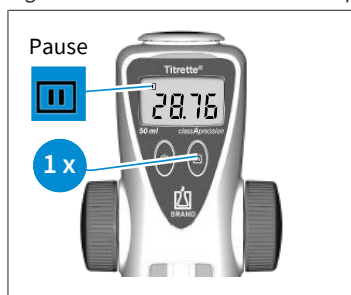
- a. To reduce crystal deposits and evaporation, always fill the instrument all the way up to the upper stop position after titration.

5.1 Energy-saver mode (Auto power off)

If work is interrupted for more than three minutes (factory setting), the instrument automatically switches into standby mode. The display value is saved and reappears in the display after switching back on manually. The user can adjust the amount of idle time before automatically switching off (see Auto power off (APO mode), p. 72).

5.2 Pause function

If the instrument has not been completely primed, air bubbles appear in the titrating tube during titration. To prime the instrument during titration, liquid can be dispensed into a different receptacle using the Pause function without the display value changing.



- a. Press the Pause button one time.
⇒ The Pause signal blinks.
- b. Prime the instrument, dispense liquid, etc. See Priming, p. 58.
- c. To end the Pause function, briefly press the Pause button again.
⇒ The Pause signal disappears.
- d. Continue titration

6 PC interface (optional)

The instrument is available with an optional communication port (RS 232) (see 'Ordering information').

The model with the port provides the following advantages over the standard model:

- Transcription errors are eliminated when copying the primary data because the titration results are automatically transmitted to the PC by double-clicking on the CLEAR button. This fulfills an important GLP requirement.
- All raw data is recorded simultaneously. With each data transfer, the burette sends the titrated volume, the serial number of the instrument, the nominal volume and the adjustment value, as well as the next scheduled calibration date.

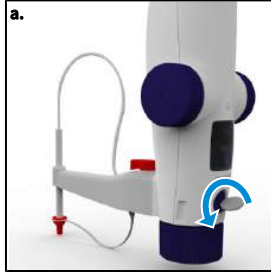
The data transmitted by the instrument is treated as keyboard input from the PC. This universal input format ensures that the instrument is compatible with all PC applications that accept keyboard inputs.

To connect the instrument to a USB port, please use a standard USB/RS 232 adapter.

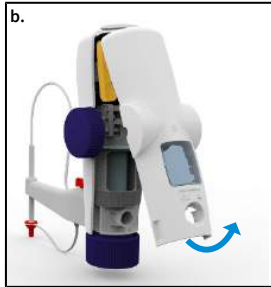
Included in delivery are an interface cable (9-pin D-sub connector) and a CD (German/English, driver software and a public RS 232 communication protocol). All information required for integration into an existing database is available to programmers. In addition, the CD also contains a sample application in XLS format as well as the user manual and the testing instructions.

7 Sensitive media (replacing the inspection window)

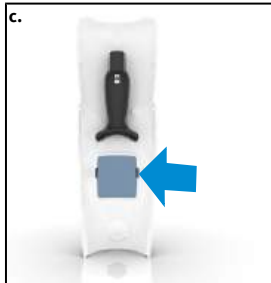
For light-sensitive media (e.g., iodine, potassium permanganate and silver nitrate solutions), we recommend using the colored light shield inspection window.



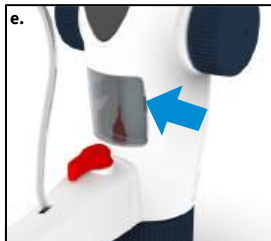
- a. Unscrew the air vent cap by hand or use a coin.



- b. Remove the rear housing shell.



- c. Unclip the rear inspection window on one side and take it out.
d. Insert the colored inspection window with the smaller curvature into the rear housing.



- e. To change the front inspection window, lift up one corner of the window, e.g., with a fingernail, and take it out.
f. Insert the colored inspection window with the larger curvature into the front housing.
g. To secure the rear housing, first hang it from the top, then snap it closed and screw in the air vent cap.

8 Installing a drying tube (optional)



Use of a drying tube, filled with a suitable absorbent (purchased separately), might be necessary for moisture- and CO₂-sensitive media.

(See Accessories/spare parts)

- a. Screw in the filled drying tube in place of the air vent cap.

NOTICE

Seal the threads of the drying tube, the bottle and/or the bottle adapter with PTFE tape.



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. Testing takes place according to DIN EN ISO 8655-6 with a completely filled instrument and with uniform and smooth dispensing.

Error limits

Volume ml	Partial volume ml	Bottle-top burette Titrette®			Bottle-top burettes according to DIN EN ISO 8655-3				Glass burette Class A according to DIN EN ISO 385	
		A* ± %	± μl	CV* %	μl	A* ± %	± μl	CV* %	μl	LoE** ± μl
10'	10	0.10	10	0.05	5	0.3	30	0.1	10	20
	5	0.20	10	0.10	5	0.6	30	0.2	10	20
	1	1.00	10	0.50	5	3	30	1	10	20
25'	25	0.072	18	0.024	6	0.2	50	0.1	25	30
	12.5	0.144	18	0.048	6	0.4	50	0.2	25	30
	2.5	0.72	18	0.24	6	2	50	1	25	30
50'	50	0.06	30	0.02	10	0.2	100	0.1	50	50
	25	0.12	30	0.04	10	0.4	100	0.2	50	50
	5	0.60	30	0.20	10	2	100	1	50	50

* A = Accuracy, CV = Coefficient of variation ** LoE = Limit of error

The titration volume is displayed in 1 μl steps for instrument sizes 10 ml and 25 ml and in 2 μl steps for instrument size 50 ml. From 20 ml titration volume, an automatic switchover to 10 μl steps takes place.

The drop size for the 10 ml device is approx. 20 μl and for the 25 ml and 50 ml device approx. 30 μl.

NOTICE

The maximum total error for a single measurement can be calculated approximately from the sum of the limits of error $LoE = A + 2 CV$. This is a maximum of ± 30 μl for the 25 ml size and ± 50 μl for the 50 ml size.

The limits of error of Class A glass burettes according to DIN EN ISO 385 are thus met.

10 Checking the Volume (Calibration)

Depending on use, we recommend that gravimetric testing of the instrument be carried out every 3-12 months. For calibration, set the 10 ml instrument to 3 decimal places (page 21). This time frame should be adjusted to correspond with individual requirements. The complete testing procedure (SOP) can be downloaded at www.brand.de. You can also carry out a functional test at more frequent intervals, e.g., by titrating against a standard solution. For GLP- and ISO-compliant evaluations and documentation, we recommend the EASYCAL™ calibration software from BRAND. A demo version can be downloaded from www.brand.de.

Gravimetric volume testing according to DIN EN ISO 8655- 6 (for measurement conditions, see Error limits, p. 65) is performed as follows:

1. Prepare the instrument

Clean the instrument (Cleaning), fill it with distilled Water and then prime it carefully.

2. Check the volume

- a. Dispense 5 drops in a separate vessel and wipe off the titration tube tip.
- b. Press the CLEAR button to set the display value to zero.
- c. At 10 pipetting series and weighings in 3 volume ranges (100 %, 50 %, 10 %) are recommended.
- d. Turn the hand wheels with both hands without stopping until the test volume is shown on the display. Wipe off the tip of titration tube.
- e. Weigh the pipetted amount with an analysis scale. (Please refer to the user manual of the scale manufacturer.)
- f. 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 value:

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

Mean volume:

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

Accuracy*:

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

Variation coefficient*:

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

Standard deviation*:

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

*) = Calculation for accuracy (A%) coefficient of variation (CV%): A% and CV% are calculated using the formulas of statistical quality control.

NOTICE

Test Instructions (SOPs) are available for download from www.brand.de.

11 Additional functions

11.1 CAL mode (adjustment)

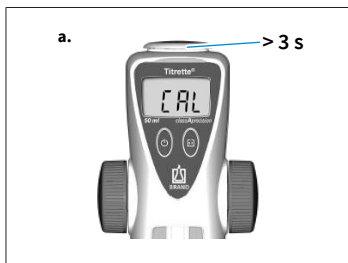
11.1.1 Adjustment

After a long period of usage or following the replacement of the dispensing unit, an adjustment may be necessary to balance out differences in accuracy up to a maximum of ± 0.999 ml. The change from the factory setting is shown in the display.

1. Calculating the adjustment value

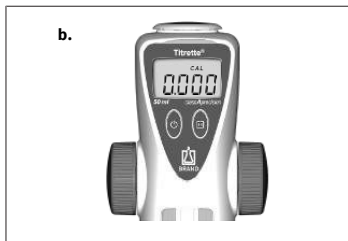
The adjustment value is the deviation of the mean volume from the nominal volume (e.g., mean volume 50.024 ml, nominal volume 50 ml. Adjustment volume = $50.024 \text{ ml} - 50.000 \text{ ml} = 0.024 \text{ ml}$). For information on calculating the mean volume, see Checking the Volume (Calibration), p. 66.

2. Entering CAL mode



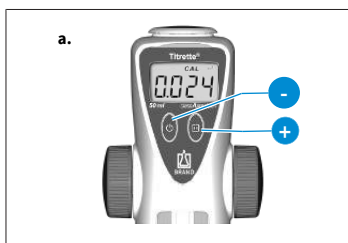
- a. With the instrument powered on, press and hold the CLEAR button for more than 3 seconds until the following modes are repeatedly shown one after another in the display:

CAL — GLP — APO — dP



- b. When CAL appears in the display, release the CLEAR button. CAL blinks and the number field is shown.

3. Entering the adjustment value



- a. The adjustment value is 0.024 ml, for example. Press the Pause or On/Off button until the value has been reached.

4. Confirming input

- a. Press the CLEAR button to confirm the input of the adjustment value.
 - ⇒ The change from the factory setting is indicated by the CAL symbol, which is now continuously shown in the display.

NOTICE

If the CLEAR button is not pressed within approx. 15 seconds, the initial state is preserved.

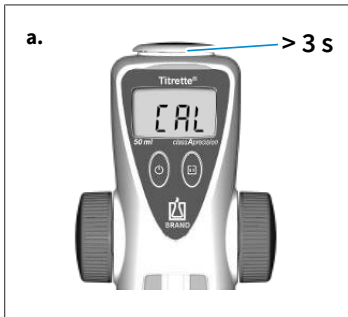
11.1.2 Readjustment

The continuously displayed CAL symbol indicates that an adjustment has already taken place. When a new adjustment value is entered, this is added to the adjustment value already present.

1. Calculating the adjustment value

The already adjusted instrument shows a new deviation of the mean volume from the nominal volume (e.g., 0.017 ml). For information on calculating the mean volume, see Checking the Volume (Calibration), p. 66.

2. Entering CAL mode



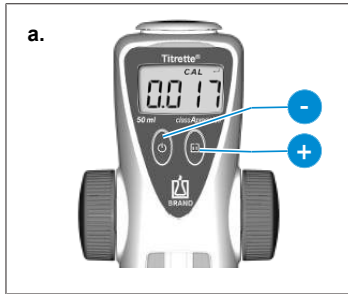
- a. With the instrument powered on, press and hold the CLEAR button for more than 3 seconds until the following modes are repeatedly shown one after another in the display:

CAL — GLP — APO — dP



- b. When CAL appears in the display, release the CLEAR button. CAL blinks and the adjustment value of the previous adjustment appears.

3. Entering the adjustment value



- a. The adjustment value is 0.017 ml, for example. Press the Pause or On/Off button until the value has been reached (the first press of a button sets the display to zero).

4. Confirming input



- a. Press the CLEAR button. The old and new adjustment values are added automatically.
- ⇒ The change in adjustment is indicated by the CAL symbol.

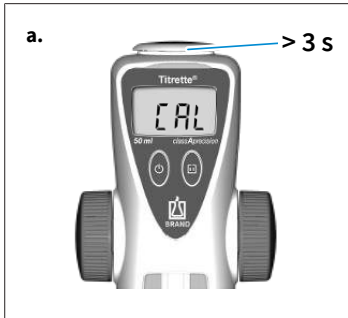
NOTICE

In rare cases, when entering the new adjustment value, the sum of the old and new adjustment values can amount to zero. In this case, the factory setting is restored and CAL disappears from the display.

11.1.3 Factory default setting

The continuously displayed CAL symbol indicates that an adjustment has already taken place. However, the factory default setting should be restored.

1. Entering CAL mode



- a. With the instrument powered on, press and hold the CLEAR button for more than 3 seconds until the following modes are repeatedly shown one after another in the display:

CAL — GLP — APO — dP



- b. When CAL appears in the display, release the CLEAR button. CAL blinks and the adjustment value of the previous adjustment appears.

2. Restoring the factory default setting

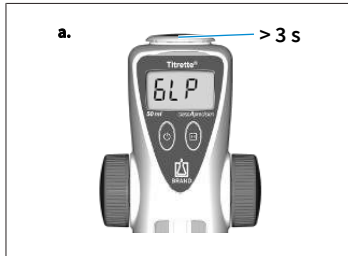


Press the On/Off button and the Pause button at the same time to restore the factory default setting. The CAL symbol disappears.

11.2 Calibration date (GLP mode)

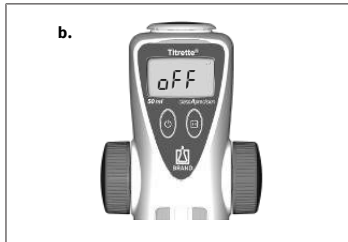
The date for the next calibration can be saved in GLP mode (Good Laboratory Practice).

1. Entering GLP mode



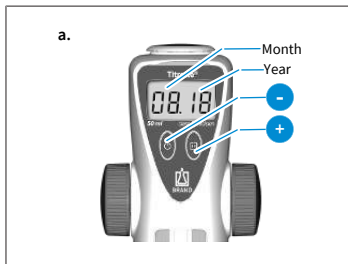
- a. With the instrument powered on, press and hold the CLEAR button for more than 3 seconds until the following modes are repeatedly shown one after another in the display:

CAL — GLP — APO — dP



- b. When GLP appears in the display, release the CLEAR button. The input symbol blinks and 'oFF' appears.

2. Entering the calibration date



Press and hold the Pause button until the desired date is displayed. Pressing briefly gradually extends the time until the calibration date. Pressing the On/Off button reduces the time until the calibration date. (Date input can be from 'oFF' to 12/2099)

3. Confirming input

Press the CLEAR button to confirm the input of the calibration date.

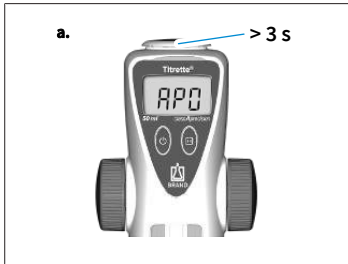
NOTICE

The saved calibration date can be called up any time the instrument is switched on. To do this, simply press and hold the On/Off button. A continuous display of GLP, the year and the month of the desired date appear. Releasing the button ends the continuous display and the instrument is switched on. (If 'oFF' is selected as the calibration date, this function is deactivated.)

11.3 Auto power off (APO mode)

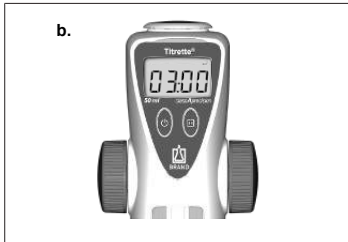
In APO mode, the time for automatic power off can be set from 1 to 30 minutes. The factory default setting for automatic power off is 3 minutes. The shorter the auto power off time setting, the longer the batteries will last.

1. Entering APO mode



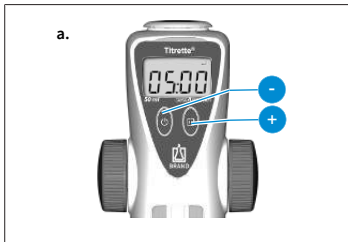
- a. With the instrument powered on, press and hold the CLEAR button for more than 3 seconds until the following modes are repeatedly shown one after another in the display:

CAL — GLP — APO — dP



- b. When APO appears in the display, release the CLEAR button. The input symbol blinks and the factory setting is displayed.

2. Entering the time for automatic power off



- a. Press the Pause or On/Off button until the desired time entry (1 - 30 min) has been reached. 'oFF' deactivates automatic power off.

3. Confirming input

- a. Press the CLEAR button to confirm the input of desired power off time or to confirm 'oFF'.

NOTICE

When the instrument switches itself off, the last displayed value is displayed again after the instrument is switched back on. If the input value 'oFF' is confirmed, the function is deactivated and the instrument will no longer switch itself off.

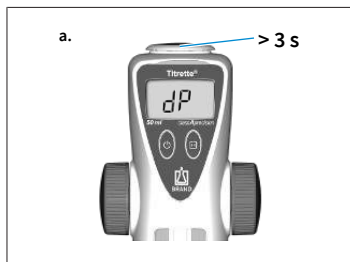
11.4 Decimal places (dP mode)

In dP mode, the display can be set to show 2 or 3 decimal places (factory default setting is 2 decimal places).

NOTICE

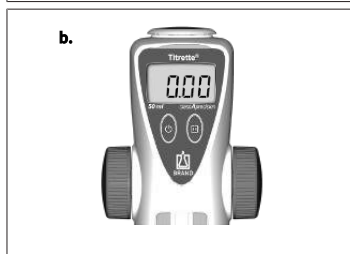
For technical reasons, titration volumes over 20.00 ml can only be displayed with 2 decimal places.

1. Entering dP mode



- a. With the instrument powered on, press and hold the CLEAR button for more than 3 seconds until the following modes are repeatedly shown one after another in the display:

CAL — GLP — APO — dP



- b. When dP appears in the display, release the CLEAR button. The input symbol blinks and the factory setting appears.

2. Changing decimal places



- a. Press the Pause button to select a display with 3 decimal places. (Pressing the button again converts the display back to 2 decimal places.)

3. Confirming input

- a. Press the CLEAR button to confirm the input of the desired decimal place format.

12 Cleaning

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

- Immediately when the hand wheels are more difficult to turn than usual
- prior to a reagent change
- prior to long term storage
- prior to dismantling the instrument
- regularly when using crystallizing solutions
- when liquids accumulate in the screw cap of the titrating tube

⚠ WARNING

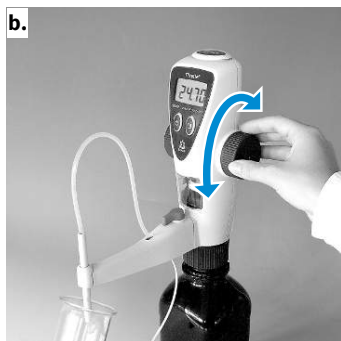


The glass cylinder, valves, telescopic filling tube and titrating tube contain reagent! Follow the safety instructions (see Safety Instructions, p. 52)!

12.1 Standard cleaning



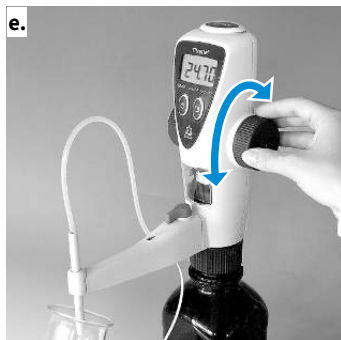
- a.** Set the valve to 'Recirculation' and empty the instrument completely by turning the hand wheels.



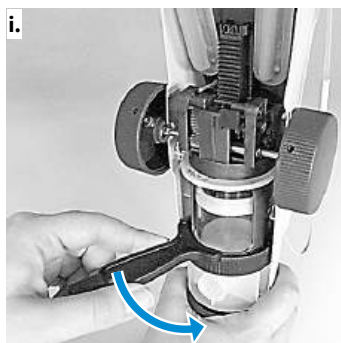
- b.** Screw the instrument onto a bottle filled with deionized water and rinse the instrument several times by completely filling and emptying it.



- c.** Set the valve to 'Titrate', unscrew the screw cap from the titration tube and place a suitable receiving vessel under the titrating tube. To clean the titrating tube, rinse the instrument several times by completely filling and emptying it.
- d.** If deposits appear in the dispensing cylinder, repeat this process with a suitable cleaning agent and then rinse again with deionized water.



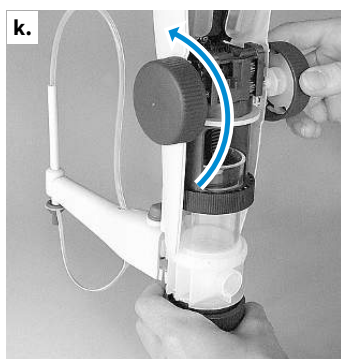
- e. Screw the instrument onto an empty bottle and empty the piston completely by executing several up and down piston movements in the 'Recirculation' and 'Titration' valve setting.
- f. First move the piston all the way up and then down by a half-rotation of the hand wheel.
- g. Unscrew the air vent cap by hand or use a coin.
- h. Remove the rear housing shell and take out the assembly tool.



- i. Loosen the safety ring of the dispensing unit with the assembly tool and unscrew it completely by hand.



- j. Pull the piston rod locking mechanism out to the stop.



- k. Move the top part of the instrument all the way to the top by turning the hand wheels and remove it.



- l. Remove any crystal deposits at the upper edge of the dispensing cylinder, e.g. with water and a soft bottle-brush. Then, dry it off with cellulose paper
- m. Reassemble the top part of the instrument or, if necessary, further dismantle the instrument for intensive cleaning.

NOTICE

Crystallizing media, e.g., alcoholic KOH

Depending on the frequency of use, we recommend that any crystal deposits above the piston be removed at regular intervals of approx. 8 weeks. To do this, carry out steps f-m of the standard cleaning procedure. To do this, carry out steps f-m of the standard cleaning procedure.

To reduce crystal deposits, always fill the instrument all the way up to the upper stop position after titration.

12.2 Intensive cleaning

To avoid mixing up components, do not dismantle several instruments at the same time. Calibration and, if applicable, an adjustment must always be carried out after dismantling or replacing a dispensing unit.

1. Preparing for intensive cleaning

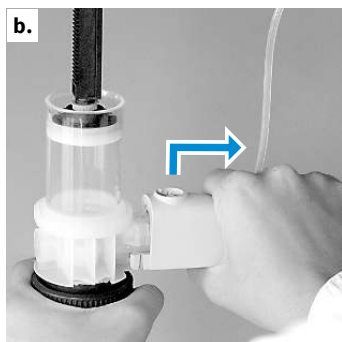
- a. Always perform a complete standard cleaning before further dismantling the instrument.
- b. Pull out the recirculation tube and the telescopic filling tube.

2 Removing and cleaning/replacing the titration tube



(Note the design changes from 2012 and from serial number 01K, see Intensive cleaning, p. 78)

- a. Set the valve to 'Recirculate' and pull the valve lever upwards to remove it (Fig. a).



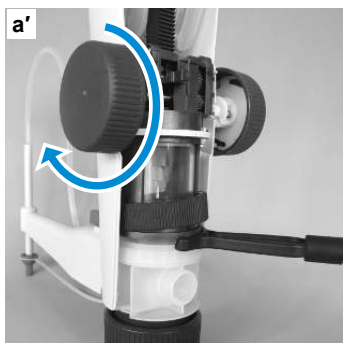
- b. Hold the titrating tube as shown in the figure. To disconnect, push the discharge tube housing all the way up, then pull it forward with gentle up and down motions (Fig. b).
- c. Clean the titration tube with the integrated discharge valve (ultrasonic bath) or replace it.

3. Cleaning/replacing the dispensing unit

(Note the design changes from 2012 and from serial number 01K, see Intensive cleaning, p. 78). The dispensing unit consists of a piston and a dispensing cylinder with a valve block. If liquid is found above the piston, the piston must be replaced. We always recommend replacing the complete dispensing unit.



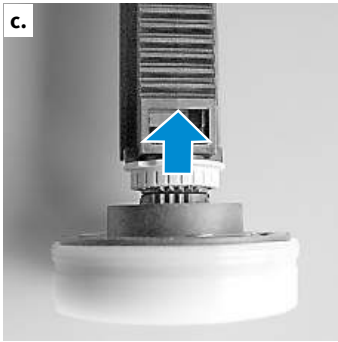
- a. Hold the piston rod and slowly pull the piston out of the dispensing cylinder (Fig. a).



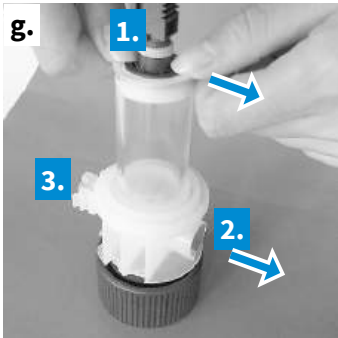
NOTICE

If it is difficult to move the piston, open the top of the instrument, clamp the assembly tool (teeth pointing downward) between the dispensing cylinder and the top and turn the hand wheel to move the piston completely out of the dispensing cylinder (Fig. a').

- b. Use a soft cloth to clean the dispensing cylinder and the piston, or replace them.



- c. To replace the piston, first slide the light gray safety ring of the piston rod **upwards** (Fig. c) and then unscrew the piston (Fig. c').
- d. Screw a new piston onto the piston rod and tighten it securely.
- e. Line up the gears of the piston and the piston rod by turning the piston back by no more than half a gear tooth.
- f. Slide the safety ring of the piston rod back **down**.

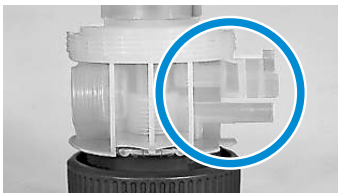


- g. Align the toothed strip (1) of the piston rod in the direction of the air vent opening (2) of the valve block. This is located opposite the titrating tube connection (3). Carefully (!) insert the piston vertically into the cleaned or new dispensing cylinder and push it about half-way in (Fig. g).

NOTICE

The sealing lip of the piston must not be damaged. Avoid contact with hard objects!

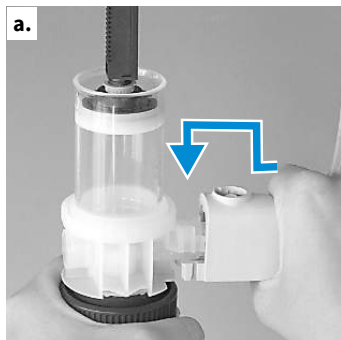
Design change from January 2012



The connection between the titrating tube and the valve block was changed as of January 2012.

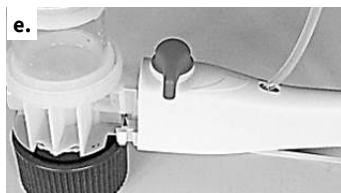
Therefore, when ordering these replacement parts, note the distance between the dispensing duct and recirculation duct on the valve block. If there is no gap between the two ducts, always replace the titrating tube at the same time the dispensing cylinder with valve block is replaced (Accessories/ spare parts, p. 86).

4. Installing the titrating tube



(Note the design changes from 2012, see Intensive cleaning, p. 78). Installing the cleaned or new titrating tube:

- a. Slide the titrating tube on approx. 5 mm.
- b. Push the titrating tube housing all the way up.
- c. Then slide the titrating tube all the way in.
- d. Slide the titrating tube housing down to lock it into place.

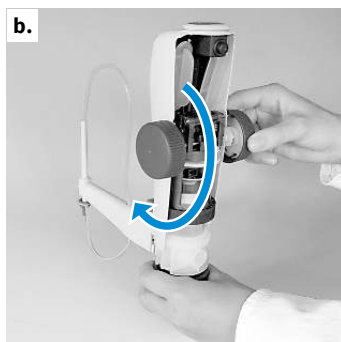


- e. Pull up the valve lever to the 'Recirculate' position and press it in firmly.

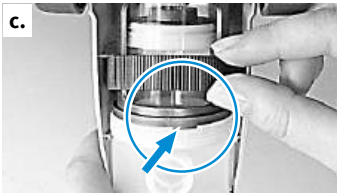
5. Installing the top part of the housing



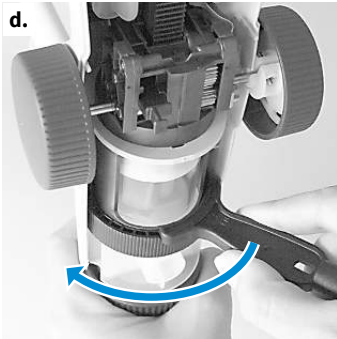
- a. Check that the piston rod locking mechanism has been pulled out.



- b. Attach the top part of the instrument and rotate the hand wheels to move it down while being careful that the recess of the front housing shell slides snugly over the titrating tube. Slightly rotate the top part, if necessary.

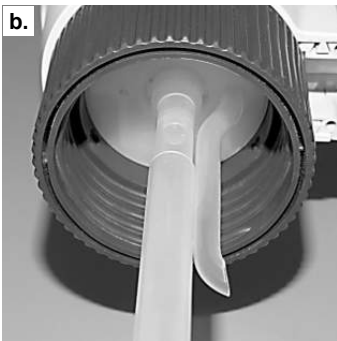


- c. Lift the safety ring of the dispensing unit and check that the tongue and groove interlock. Then, tightly screw in the safety ring by hand.

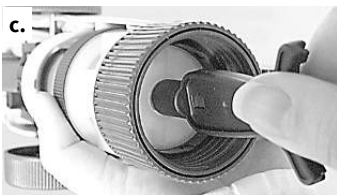


- d. Set the assembly tool on the right-hand edge of the housing and tighten it towards the left-hand edge. Then, re-insert the assembly tool into the rear housing shell.
- e. Slide the piston rod locking mechanism in all the way.
- f. First hang the rear housing shell from the top, then snap it closed and screw in the air vent cap.
- g. Carry out a function check and calibration, and make any necessary adjustments.

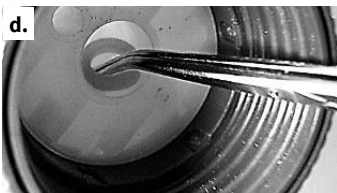
6. Cleaning/replacing the filling valve



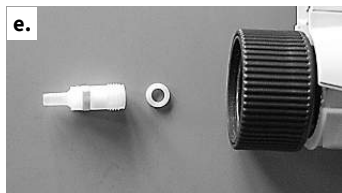
- a. Remove the rear housing shell and take out the assembly tool.
- b. Pull out the telescopic filling tube and the recirculation tube.



- c. Use the assembly tool to unscrew the filling valve.



- d. If the sealing ring is contaminated or damaged, carefully remove it using a pair of angled tweezers.



- e. Clean the filling valve and sealing ring (ultrasonic bath) or replace them.
- f. Insert the cleaned or new sealing ring, if necessary.
- g. Screw in the filling valve first by hand and then tighten it with the assembly tool (1/4 turn is sufficient!).

12.3 Dislodging a stick valve ball



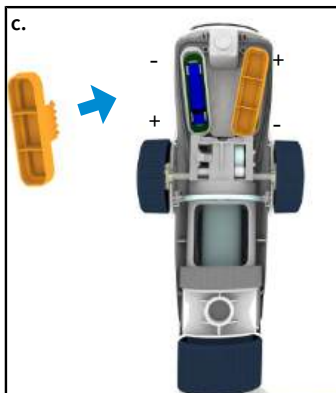
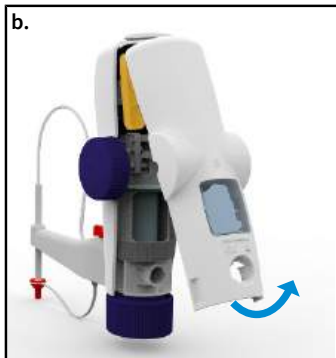
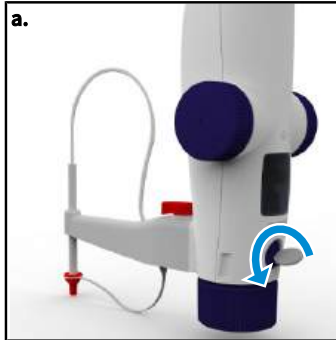
If the instrument does not fill up, and if some elastic resistance is evident when the piston is pulled upward, then it is possible that the valve ball is stuck.

In this case, dislodge the valve ball using light pressure; for example, with a 200 µl plastic pipette tip.

12.4 Replacing the batteries

If the battery symbol in the display is blinking, the battery capacity is depleted. The batteries must then be replaced.

Use only the specified battery type 1.5 V (AAA/UM4/LR03) micro batteries: The batteries are not rechargeable!



NOTICE

Always replace the battery compartment covers when replacing the batteries. These are included with the replacement batteries.

⚠ WARNING













Dispose of fully discharged batteries only in compliance with the Battery Directive. Do not discharge the battery by short-circuiting – explosion hazard!

- a. Unscrew the air vent cap by hand or use a coin.
- b. Remove the rear housing shell.
- c. Remove the battery compartment covers
- d. Remove the dead batteries using a screwdriver.
- e. Insert the new batteries and press them firmly into the sockets. Ensure that the polarity of the batteries corresponds to the symbols on the battery compartment.
- f. Tightly re-seal the battery compartments with the covers. Carefully press the edges so that each cover fits snugly on all sides without any gaps between it and the battery compartment.
- g. Hang the rear housing shell from the top and then snap it shut.
- h. Screw in the air vent cap.

13 Troubleshooting

Fault	Possible causes	Corrective action
Liquid is above the piston	Piston leaky	Perform cleaning, replace dispensing cartridge (see Cleaning, p. 74).
Piston sluggish	Dispensing cartridge contaminated or damaged by crystal deposits	Perform cleaning, replace dispensing cartridge (see Cleaning, p. 74).
Filling not possible	Filling valve stuck	Clean filling valve, possibly dislodge valve ball with a 200 µl plastic pipette tip (see Dislodging a stick valve ball, p. 81).
Filling not possible / liquid moves back when filling in the titration tube	Discharge valve contaminated or titration tube damaged	Clean discharge valve, or replace titration tube (see Cleaning, p. 74).
Air bubbles in the instrument	Instrument filled too quickly	Fill instrument slowly
	Filling tube is loose or damaged	Firmly attach telescopic filling tube, possibly cut the tube off approx. 1 cm from top, or replace tube.
	Filling valve loose or seal possibly not inserted	Check if the seal is inserted and tighten valve with assembly tool.
	Filling tube does not immerse into liquid	Fill bottle, or correct the length of the telescopic filling tube.
	Recirculation tube not installed or installed incorrectly	Install the recirculation tube. The opening must face away from the bottle wall.
Titration not possible	Discharge valve stuck	Clean titration tube with integrated discharge valve, or replace titration tube (see Cleaning, p. 74).
Dispensed volume less than indicated	The instrument has not been fully primed	Prime instrument again (see Priming, p. 58).
	Seal possibly not inserted or filling valve loose	Check if the seal is inserted and tighten valve with assembly tool.
	Filling valve is stuck or damaged	Clean filling valve. If necessary, replace it (see Intensive cleaning, p. 76).
The instrument does not show any function	Internal error	Restart the instrument: Remove battery, wait 1 minute and reinsert battery (see Replacing the batteries, p. 82).

14 Product markings

Symbol or number	Meaning
	General warning sign
	Note user manual
	Note eye protection
	Use hand protection
	Use protective clothing
XXXXXXXX	Serial number
	With this mark, we confirm that the product complies with the requirements set out in the EC Directives and has been subjected to the specified testing procedures.
	UKCA: United Kingdom Conformity Assessed With this mark we confirm that the product complies with the requirements specified in the UK Designated Standards.
	The device is marked in accordance with the German Weights and Measures Act and the Weights and Measures Ordinance. Character sequence DE-M (DE for Germany), framed by a rectangle, as well as the two last digits of the year the marking was added.
www.brand.de/ip	Patent information
 (here: 40 years)	China RoHS (EFUP) EFUP defines the period in years during which the hazardous substances contained in electrical and electronic equipment do not leak or change under normal operating conditions. Under normal use by the user, such electrical and electronic products do not cause severe environmental pollution, serious personal injury or damage to the user's property.
	The electrical device must not be disposed of with the household waste.

15 Ordering Information

Titrette®



	Standard	with RS 232 port
Volume	Order no.	Order no.
10 ml	4760141	4760241
25 ml	4760151	4760251
50 ml	4760161	4760261

16 Accessories/spare parts

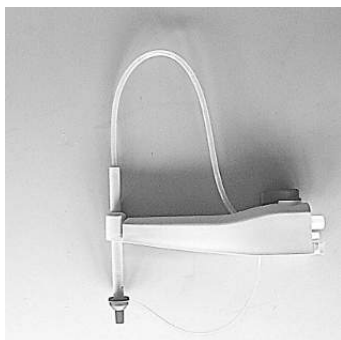
Bottle adapter



PP, pkg unit Pack of 1

External thread	for bottle thread/ground joint	Order no.
GL 45	GL 32-33	704396
GL 45	GL 38	704397
GL 45	S* 40	704343
GL 45	S* 42	704349
GL 45	S* 50	704350
GL 32	NS 24/29	704424
GL 32	NS 29/32	704429

Titration tubes



With screw cap and integrated discharge and recirculation valve. (Note the design changes from 2012, see Intensive cleaning, p. 78)

Pkg unit Pack of 1.

For volumes	From Jan 2012 (with gap) Order no.
10 ml	707525
25 + 50 ml	707529

Screw cap



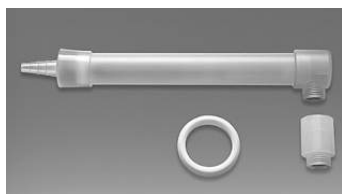
Description	Pkg unit	Order No.
Screw cap with fastener.	Pack of 1	707528

Bottle stand



Description	Pkg unit	Order No.
Bottle stand PP. Support rod 325 mm. Base plate 220 x 160 mm	Pack of 1	704275

Drying tube



Description	Pkg unit	Order No.
Drying tube Incl. PTFE seal- ing ring (with- out drying agent).	Pack of 1	707930

Filling valve



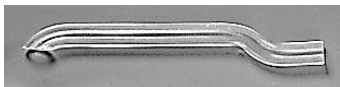
Description	Pkg unit	Order No.
Filling valve with olive- shaped nozzle and sealing ring.	Pack of 1	6636

Telescopic filling tube



Description	Pkg unit	Length	Order no.
Telescopic filling tube. FEP. Indi- vidually ad- justable lengths.	Pack of 1	170-330 mm	708218
	Pack of 1	250 - 480 mm	708220

Recirculation tube



Description	Pkg unit	Order No.
Recirculation tube	Pack of 1	8317

Piston



For volumes	Pkg unit	Order no.
10 ml	Pack of 1	707531
25 ml	Pack of 1	707530
50 ml	Pack of 1	707532

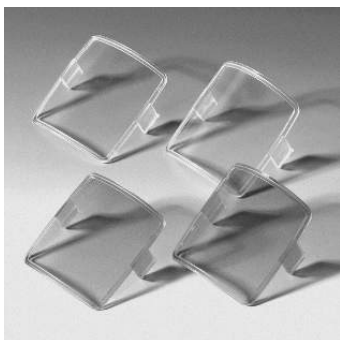
Dispensing cylinder with valve block



(Note the design changes from 2012, see Intensive cleaning, p. 78)

For volumes	Pkg unit	Order no.
10 ml	Pack of 1	707533
25 ml	Pack of 1	707535
50 ml	Pack of 1	707537

Inspection window



Description	Pkg unit	Order No.
Inspection windows, 1 set colorless and 1 set amber-colored (light shield).	Pack of 1	6783

Micro-batteries, 1.5 V



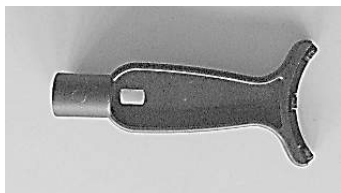
Description	Pkg unit	Order No.
Micro-batteries, 1.5 V. Not rechargeable (AAA/UM4/LR03). Incl. battery compartment covers	Pack of 2 each.	7260

Venting stopper



Description	Pkg unit	Order No.
Venting stopper	Pack of 1.	6659

Assembly tool



Description	Pkg unit	Order No.
Assembly tool	Pack of 1.	6784

Battery compartment covers



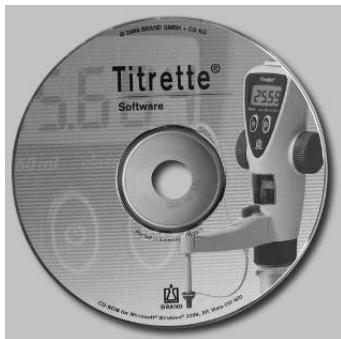
Description	Pkg unit	Order No.
Battery compartment covers	Pack of 2.	8857

RS 232 interface cable



Description	Pkg unit	Order No.
RS 232 interface cable. Length 2 m.	Pack of 1.	8850

Titrette software



Description	Pkg unit	Order No.
Titrette software. CD-ROM. German/English	Pack of 1.	707538

Titrette® extraction system for Bag-in-Box container

Description	Pkg unit	Order No.
Titrette® extraction system for Bag-in-Box container (basic equipment)	Pack of 1	707550

Adapter set interface RS232 to USB for Titrette®

Description	Pkg unit	Order No.
Adapter set interface RS232 to USB for Titrette®	Pack of 1.	707539

17 Repairs

18 Calibration service

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

The complete SOP for testing can be downloaded from www.brand.de or www.brandtech.com.

BRAND also offers you the option of having your devices calibrated through our factory calibration service or through our accredited calibration laboratory. Just send us the devices to be calibrated, indicating the type of calibration you would like. You will get your devices back in a few days. A detailed calibration report (factory calibration) or an accredited calibration certificate in accordance with DIN EN ISO/IEC 17025 is enclosed with each device. More information can be obtained from your retailer or directly from BRAND. The order document is available for download at www.brand.de (Service & Support).

For customers outside Germany

If you would like to use our calibration service, please contact one of our service partners in your region. Our service partners can forward your devices to BRAND for factory calibration, if required.

19 Information about your laboratory instrument

The online service MyProduct (<https://www.brand.de/myproduct>) offers quality certificates, equipment and technical documentation for your instrument Titrette®. When entering serial or article numbers you attain information to your individual instrument.

Furthermore you will find a data matrix code on some devices (Transferpette® S, HandyStep® touch as well as HandyStep touch® S). Scan the data matrix code with an usual reading app to call up the information via URL <https://www.brand.de/myproduct>.

20 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.

USA and Canada:

Find more warranty information on www.brandtech.com.

21 Disposal



This symbol means that at the end of their service life, batteries/accumulators and electronic devices must be disposed of separately from household waste (unsorted municipal waste).

Electronic devices must be disposed of in accordance with Directive 2012/19/ EU of the European Parliament and of the Council from July 04, 2012 on waste from electrical and electronic equipment and in compliance with national disposal regulations.

Both batteries and accumulators (rechargeable batteries) contain materials that can be damaging to the environment and human health. Therefore, they must be properly disposed of in accordance with Directive 2006/66/EC of the European Parliament and of the Council from September 06, 2006 on batteries and accumulators and in compliance with national disposal regulations. Only dispose of fully discharged batteries and accumulators.