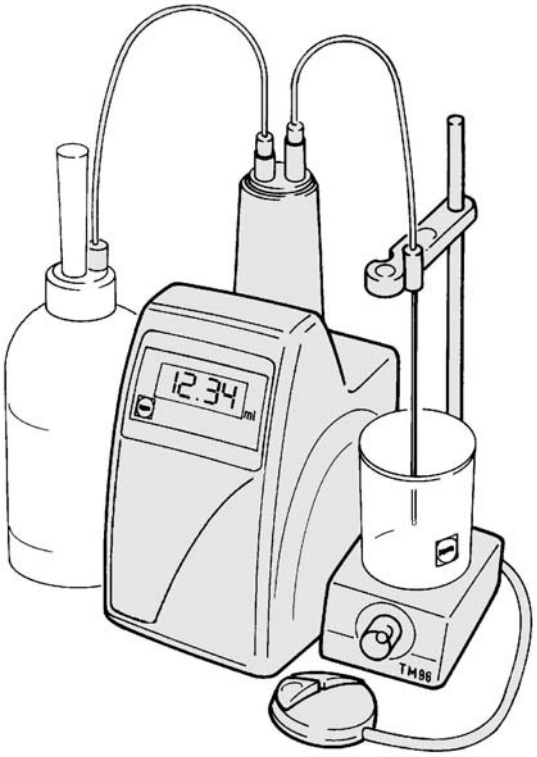
Operating Instructions

Piston Burette TITRONIC® 96

T A B L E O F C O N T E N T S PAGE

Fig. 1 Piston Burette TITRONIC® 96 with Stirrer TM 96 (spare parts), stand, electrode / burette tip holder and manual key button



1 Properties of the Piston Burette TITRONIC® 96

The Piston Burette TITRONIC® 96 which requires just the space of a DIN A4 sheet can be used to carry out all common titrations.

The most important prerequisite for accurate titration is the accurately functioning dosing technology. In addition to the high-precision glass cylinder made of DURAN® borosilicate glass, the virtually play-free spindle ensure correct titration results.

1.1 The solutions to be used are:

- Solutions containing metal ions, ammonium ions, hydrogen ion, tetraalkyl ammonium ion as cation and sulphate, nitrate, halogenide, acetate, hydroxyl, carbonate and hydrocarbonate as anion, **with the exception of hydrofluoric acid**.
- Solutions identified as standard titration solutions in the “Küster-Thiel” reference tables (editors Walter de Gruyter).
- Solutions of carbonic acids and their derivatives.
- Standard solutions for tenside titration and for complexometric metal-ion determination.
- Solvent is: water.
- The solvents ethanol and 2-propyl alcohol have to be verified for each individual case.
  Methanol cannot be used.
- As a principle, the concentrations of the solutions are limited to 1 mol per litre of solution.
  In many cases, however, the solubility of the substances used in the solvent will limit the concentration to a lower level.

1.2 Solutions for conditional use:

All solutions in water as solvent:	Sodium hydroxide	1.0	- 3.6 mol/l
	Hydrochlorid acid	1.0	- 3.6 mol/l

1.3. Unsuitable solutions and reagents:

All solutions in water as solvent:	Iodine	0.01	- 1.0 mol/l
	Iodide/iodate	0.01	- 1.0 mol/l
Solutions in other solvents			
e.g. glacial acetic acid:	Perchloric acid	0.01	- 1.0 mol/l
	Triflouro-methan sulphonic acid	0.01	- 1.0 mol/l
KF reagents:	all concentrations		
Organic reagents:	Phenols, cresols, toluol, xylol, (xylene, ...) acids, trichloric acetic acid, ... and other organic reagents		

Chemicals reacting on Hastelloy, EPDM, PP, PEEK, borosilicate glass DURAN® cannot be used.

1.4. General information to be noted:

Easily inflammable substances (e.g. ether, acetone) must not be used.

All solutions in methanol, ethanol and other low-boiling solvents may cause gas evolution leading to bubbles. This will lead to volume errors.

Note: In these cases volume errors may be avoided by removing the air bubbles by pre-dosing, resetting the display to zero, and then starting titration as such only afterwards.

Oxidising acids will lead to valve disturbances.

All solutions which may develop deposits inside the valves (e.g. by evaporation), which tend to crystallisation or contain solid particles cannot be used. Solutions containing particles will lead to valves which cannot close properly. This can mean return dosing into the reagent bottle, likewise, reverse suction can occur during filling from the dosing hose.

All materials coming in contact with these titration solutions are chemically resistant. The precision cylinder and the spindle for the piston feed ensure measurement accuracy. The automatically switching valves, the clear consumption display with its additional status indications, the stand / stirrer system and the handy manual key button make the Piston Burette TITRONIC® 96 a device with convenient operating properties.

In order to save titration solution and to facilitate the disposal of the chemicals after the analyses as far as possible, we recommend to select between 5 ml and 15 ml for the consumption of titration solution.

The Stirrer TM 96 and the TZ 3665 stand rod attach directly to the Piston Burette TITRONIC® 96. The electrical power for the Stirrer TM 96 is supplied from the Piston Burette TITRONIC® 96. The electrical contacts (15 V =) connect automatically when the stirrer is being installed.

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KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY
DÉCLARATION DE CONFORMITÉ

Wir erklären in alleiniger Verantwortung, daß das Produkt

We declare under our sole responsibility that the products

Nous déclarons sous notre seule responsabilité que le produit

Kolbenbürette

Piston Burette

Burette à piston

TITRONIC® 96

TITRONIC® 96

TITRONIC® 96

auf das sich diese Erklärung bezieht, übereinstimmt mit den Normen

to which this declaration relates is in conformity with the standards

auquel se réfère cette déclaration est conforme aux normes

DIN 12 650, Teil 5
und / and / et
ISO DIS 8655

und mit dem normativen Dokument

and the normative document

et au document normatif

Technische Daten

Kolbenbürette
TITRONIC® 96

25. Juni 1996

SCHOTT-GERÄTE GmbH
Im Langgewann 5
D-65719 Hofheim am Taunus
Deutschland, Germany, Allemagne

11. Oktober, October 11th, 11 Octobre 1996
AGQSF 0000-A044-01/981113

Translation of the legally binding german version

SCHOTT

Technical dates of the Piston Burette TITRONIC® 96

Stand June 25, 1996

Conformity:	DIN 12 650, Part 5, Conformity mark
CE mark: CE	according to the Council Directive 89/336/EMC (electromagnetic compatibility); generic emission according to standard EN 50 081, Part 1 generic immunity according to standard EN 50 082, Part 2 according to the Council Directive 73/23/EMC (low-voltage directive)
Country of origin:	Made in Germany
Propriety rights:	Patent for the valve system is applied for
Cylinder:	20 ml DURAN® borosilicate glass cylinder
UV protection:	Protective coating material: Ultem 1000, amber
Valves:	2 x return valve made of GK 30 polypropylene with PEEK and EPDM (alternating arrangement)
Hoses:	FEP with UV protection

The named parts belong to the dosing unit which must only be replaced as a whole.

Dosing accuracy:	0.15 %, referred to the nominal volume, according to DIN 12 650, Part 5 indicated as a measuring incertainty with a confidence level of 95 %
Volume display:	00.00 ... 20.00 ml with a resolution of 0.01 ml
Display:	4-digit LCD display 20 x 48 mm, digit height 12.7 mm
Connections: Manual key button:	Plug connection: 4-channel mini DIN plug, round
Stirrer:	Plug connection with integrated low-voltage supply (15 V =) in the casing bottom of the Piston Burette TITRONIC® 96 for Stirrer TM 96
RS-232-C interface:	for connecting a printer with a serial RS-232-C interface or a computer (PC) for documenting the consumption in terms of millilitres, Plug connection: 4-channel mini DIN plug, round
Configuration of the RS-232-C interface, fixed settings:	4800 baud, word length 7 bits, 2 stop bits, no parity
Power supply:	corresponds to Protection Class II according to DIN EN 61 010, Part 1, not suitable for use in hazardous environments Mains: 230 V~, 50 / 60 Hz or 115 V~, 50 / 60 Hz; modification inside the device Power draw: 18 VA
Casing material:	Polypropylene and Polyflamm RPP 371 NT, 20 % french chalk
Front foil:	Polyester
Casing dimensions:	135 x 310 x 205 mm (w x h x d), height including dosing unit, without stirrer
Weight:	approx. 1.9 kg
Climate:	Environmental temperature: + 10 ... + 40 °C for operation and storage Humidity according to EN 61 010, Part 1: maximal relative humidity 80 % for temperatures up to 31 °C, linear decrease down to 50 % relative humidity at a temperature of 40 °C

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25. Juni, June 25th, 25 Juin 1996
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2 Setting up and commissioning

2.1 Unpacking and setting up of the Piston Burette TITRONIC® 96

The Piston Burette TITRONIC® 96 and all its accessories are ex-works thoroughly tested for correct functioning and dimensional accuracy and, apart from the Stirrer TM 96 (optional), the stand rod and the manual key button, installed ready for operation.

Please note that also all the small accessories are taken out of the packing.
Set up the Piston Burette TITRONIC® 96 on any flat surface, and connect the mains plug to the mains socket. Prior to plugging in the mains plug it has to be ensured that the operating voltage of the device corresponds to the mains voltage. The operating voltage is indicated on the rating plate on the bottom of the Piston Burette TITRONIC® 96. The piston burette is not suitable for use in hazardous environments.

Please note: The threaded connections on top of the dosing unit are different in height, with the hose **leading to the burette tip** to be connected to the **higher one of the threaded connections.**

2.2 Installation of the stirrer

Insert the stirrer at the lower right side and fasten it by pushing backwards (🕮 Fig. 2). This automatically connects the power supply to the Stirrer TM 96.

Fig. 2: Installing the stirrer:

Insert the stirrer from below into the contact openings of the piston burette, then push the Stirrer TM 96 backwards until it latches.

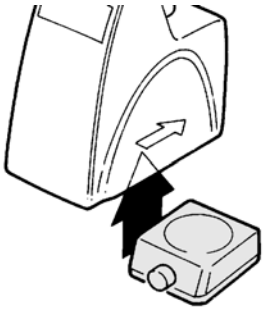
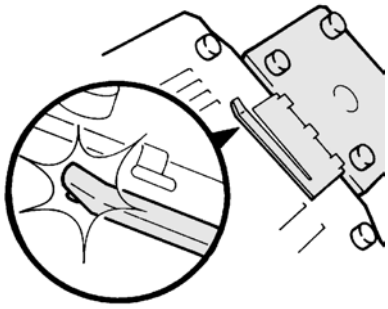
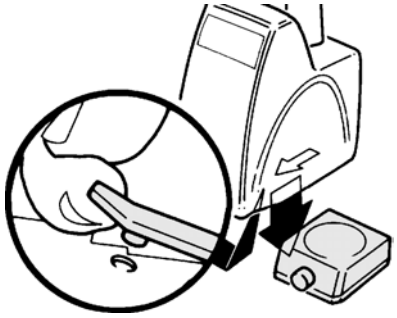


Fig. 3: Removing the stirrer:

Piston Burette TITRONIC® 96
viewed from below:
Lift latch slightly, push the stirrer forwards and remove it downwards.





2.3 Installation of the stand

Insert the TZ 3665 Stand Rod at the right side (🕮 Fig. 4) and fasten it on the back panel of the Piston Burette TITRONIC® 96 using the two included screws (slot-screw driver). Install the electrode / titration-tip holder as shown in Fig. 5.

Fig. 4 Installation of the stand rod

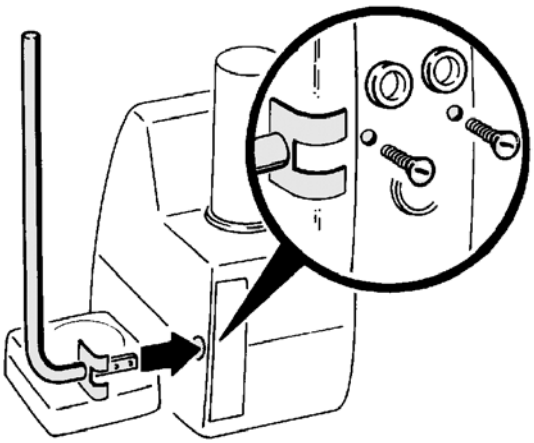
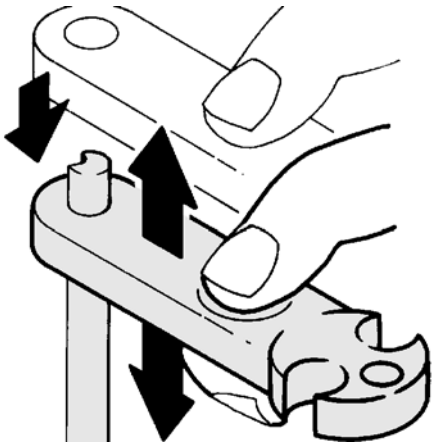


Fig. 5 Installation, lifting and lowering the electrode / titration-tip holder



2.4 Installing the burette tip

Fig. 6 Disassembled burette tip:

Fig. 7 Assembled burette tip:

The burette tip consists of the elements shaft with threaded clamping joint, hose and slip-on tip.

Burette tip - Sequence of assembly:

1. Cut of hose end evenly.
2. Slip parts of the threaded clamping joint on to the hose 🕮 Fig. 6.
3. Guide hose through shaft.
4. Press burette tip onto the free hose end until it reaches the stop.
5. Push burette tip with pressed in hose onto the shaft.
6. Hold tip firmly, and screw threaded clamping joint to the shaft.

2.5 Connecting the manual key button and a printer / computer (PC) (spare parts)

Fig. 8

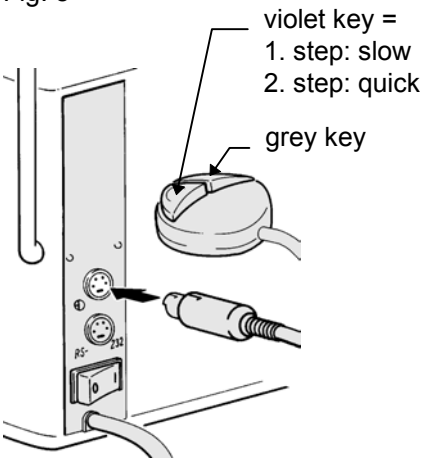
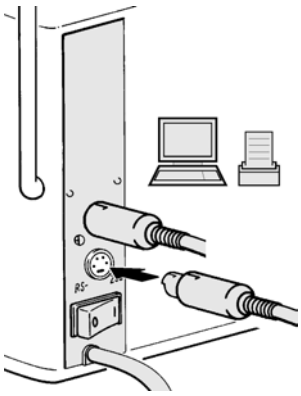


Fig. 9



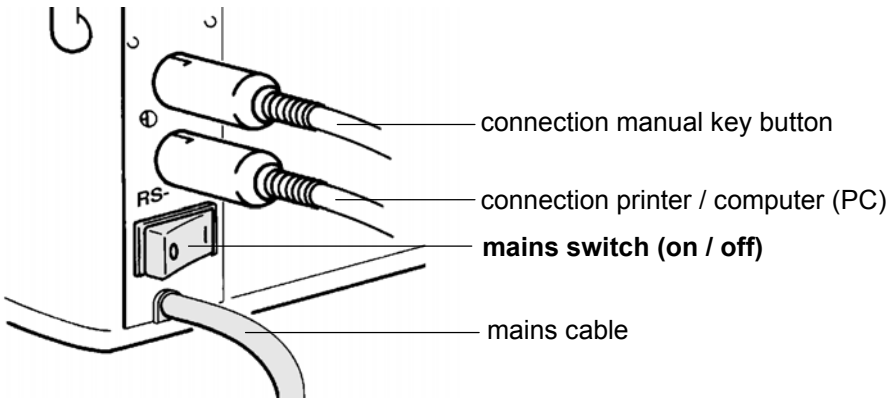
RS-232-C transmission parameters,
fixed settings:
4800 baud, word length 7 bit,
2 stop bits, no parity.

Caution: The two sockets on the side of the unit are identical. If the sockets are mixed up, the electronics of the Piston Burette TITRONIC® 96 may be damaged.
Upper socket: manual key button, lower socket: printer / computer (PC).

2.6 Switching on and off

Connect the mains plug to the mains supply. The mains switch is located on the back panel of the Piston Burette TITRONIC® 96.

Fig. 8



3 Working with the Piston Burette TITRONIC® 96

In any titration process it has to be ensured that the intake hose is immersed into the titration solution in the storage bottle, so that the titration solution can be taken in without air bubbles (🕮 Fig. 13). If the Piston Burette TITRONIC® 96 is already filled with ready-to-use titration solution, titration can be started immediately. Titration solutions to be used: 🕮 chapter 1 „Properties of the Piston Burette TITRONIC® 96“.

If the Piston Burette TITRONIC® 96 has to be filled first, the „Rinsing / Initial filling“ working sequence has to be initiated. The six steps will then run off automatically (🕮 Fig. 13). **A receptacle with a capacity of** at least **100 ml** has to be positioned **under the burette tip**, since titration solution will be ejected during steps no. 2 and no. 4.

⚠ ***Please note*** ⚠**:** Please wear protective glasses and laboratory coat and observe UVV 1 and UVV 113 (V GB) including implementation notes.

3.1 Rinsing and initial filling

Starting the function

Switch off Piston Burette TITRONIC® 96
Press grey key and hold depressed (Fig. 9)
Switch on Piston Burette TITRONIC® 96 (Fig. 10)
Release key; Rinsing / Initial filling are running
To interrupt this function:
Press the grey key again.

Fig. 11

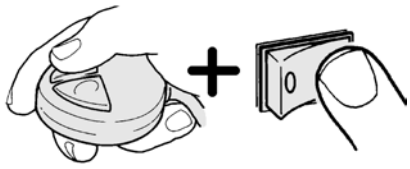
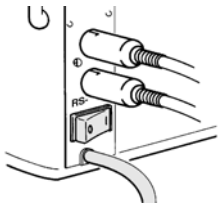


Fig. 12

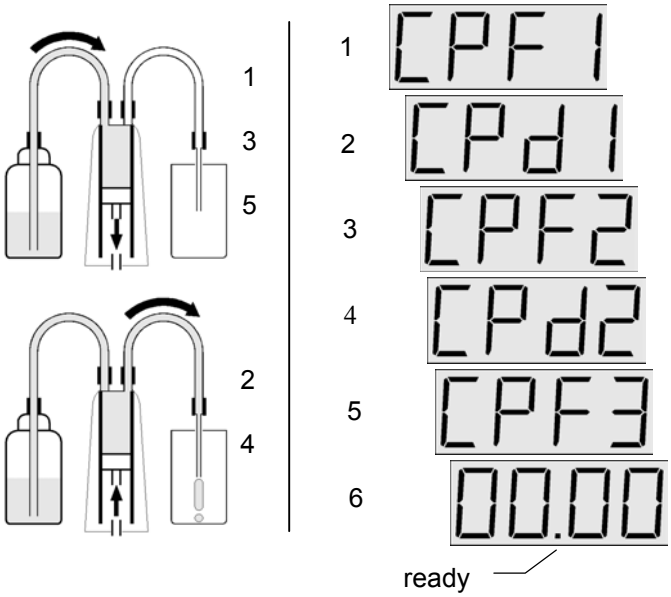


Working steps

Fig. 11 illustrates the functioning of the Piston Burette TITRONIC® 96 during „Rinsing / Initial filling“.

Working steps	Function
1	Taking in the titration solution
2	Dosing of the titration solution including the trapped air
3	Taking in the titration solution
4	Dosing of the titration solution in order to remove even the last air bubbles
5	Filling the piston burette
6	Ready for titration

Fig. 13: Function and display



It should be noted that the titration solution contained in the hoses may vary by diffusion of the components of the air in the case of long standing times. In case of doubt, rinsing of the system should also be started in the „Rinsing / Initial filling“ sequence.

The working-step sequence described above ensures reliable rinsing / initial filling of the Piston Burette TITRONIC® 96. In many cases such a thorough way of proceeding is not necessary.

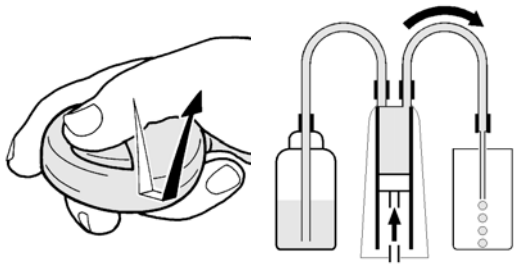
For this reason the process sequence can be interrupted:

Pressing the grey key shortly (🕮 Fig. 11) will cause the program to switch over to working step 5, „Filling“, immediately, the display will show <<CPF3>>. After completion of the filling process the Piston Burette TITRONIC® 96 is ready for titration.

3.2 Titration

⚠ **Please switch stirrer on!** ⚠

Fig. 14



Normal titration

Immerse the titration tip in the sample solution. This will increase accuracy.

Press the violet key to the first stage. The titration solution will be dosed until the key is held depressed.

The display shows the volume, the titration rate is approx. 9 ml per minute.

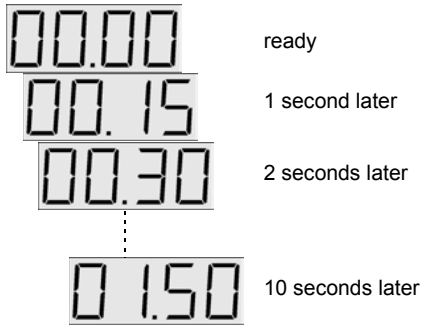
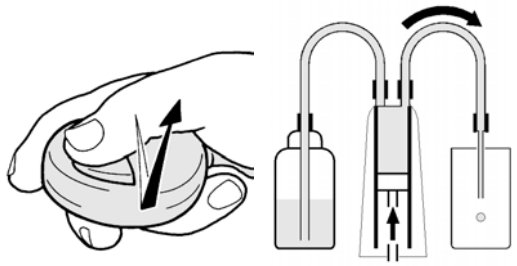


Fig. 15



0.01 ml - titration / stepwise titration

Press shortly violet key (max. 0.3 s). 0.01 ml will be ejected each time the key is depressed again.

The display shows the volume.

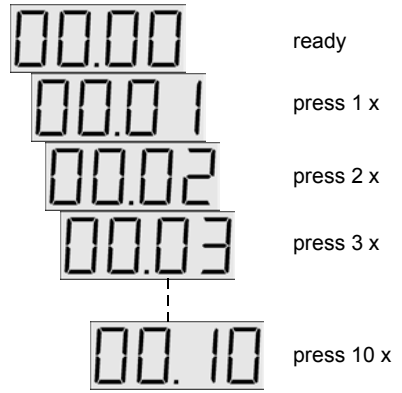
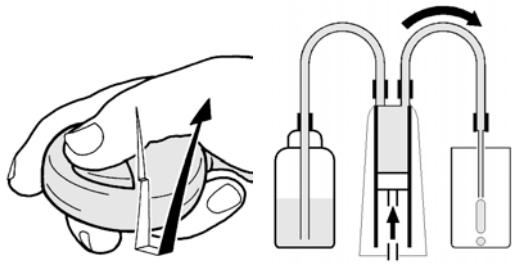


Fig. 16

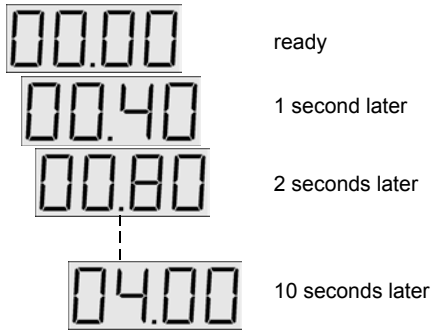


Fast titration / pretitration

Press violet key fully (to second stage) and keep depressed.

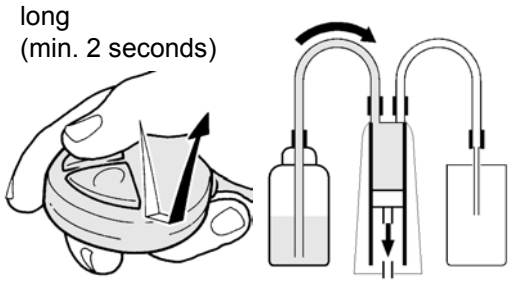
The titration solution will be dosed as long as the key is being depressed.

The display shows the volume, the titration rate is approx. 24 ml per minute.



3.3 Result output and filling

Fig. 17



Result output / filling

After pressing a key for the last time, wait at least for one second, then press the grey key for about 2 seconds. The Piston Burette TITRONIC® 96 will be filled, the display will be set to 00.00 ml.

If a printer / computer (PC) is connected, the result will be transmitted in terms of ml (millilitres).

The piston burette will fill automatically if the volume of 20.00 ml has been ejaculated and titration is not yet completed. The volume will be added on the display.

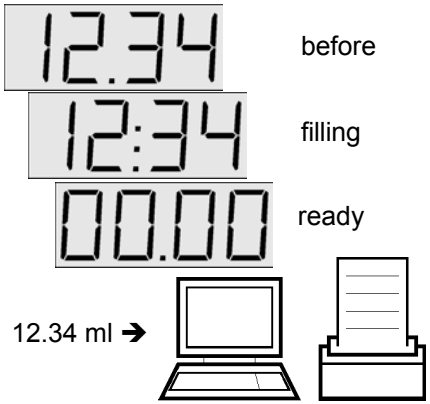


Fig. 18

Setting the display to 00.00 / result output

After pressing a key for the last time, wait at least for 1 second, then press the grey key twice in short intervals (0.3 sec. max.); the display will be set to 00.00 ml. If a printer / computer (PC) is connected, the result will be transmitted in terms of ml.

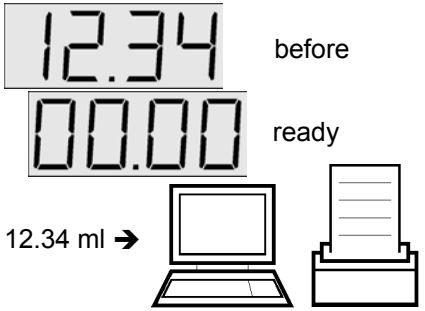
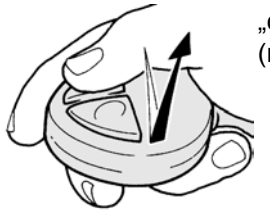


Fig. 19



Send intermediate result to the printer / computer (PC)

After the last pressing of a key, wait at least one second, the press the grey key once (0.3 sec. max.), and the displayed volume will be sent in terms of ml to the printer/computer.

The displayed value remains on the display, titration can be continued.