LAB Online Exhibition

Operation Manual

knowledge

Action movie

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Table of contents

Read through these operating instructions thoroughly before you use the **BÜCHI** Distillation Unit **B-324**.
Keep these instructions in the immediate area of the apparatus so that they can be referred to at any time.

Chapter 2 contains important safety tips. Knowledge of these is indispensable for the safe operation of the apparatus.

en, Version D(30 pages)	**Order no.**
B-324 Instructions	**96680**

1 Scope of delivery

Figure 1: Distillation Unit B-324

Description	Order No.
B-324 Distillation Unit 230 V / 50/60Hz	**37745**

Table 1: Distillation Unit B-324

Additional contents

1	Sample tube 300 ml	**03904**
1	Pair of glass tongs	**02004**
1	Distillation outlet tube, cpl.	**26115**
1	10 l tank for water cpl.	**26113**
1	10l tank for sodium hydroxide solution cpl.	**26112**
1	10l tank for boric acid cpl.	**26372**
1	Hand pump for tank	**26122**
1	Allen wrench 7 mm	**26121**
3	Flow through tube Ø 8/6	**26058**
3	Soflaflex hose, 1.5 m Ø 14/8	**04113**
1	Silicone hose, 1.5 m Ø 9/6	**04133**
2	Silicone hose, 1.5 m Ø 14/10	**04134**
3	Hose clamps	**22352**
1	Cooling water hose, cpl.	**37780**
1	Hose tail	**19082**
1	Mains cable PNE,1.5m	
	Type CH	**10021**
	Type Schuko	**10029**
	Type GB	**17833**
	Type USA	**33756**
	Type AUS	**17834**
1	Instructions	
	German	**96679**
	English	**96680**
	French	**96681**
	Italian	**96682**
	Spanish	**96683**

Table 2: Additional contents

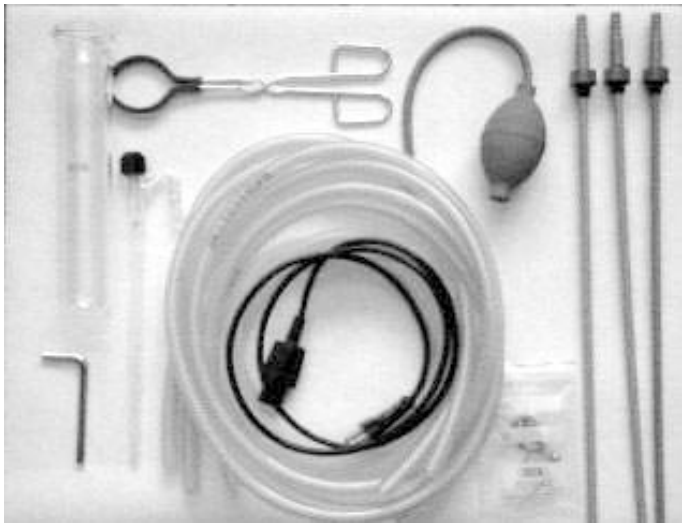


Figure 2: Additional contents

Optional accessories

Sher indicator, 100 ml	**03512**
Cooling water valve cpl.	**37798**
10 liter tank with level sensor, cpl.	
Water	**37721**
Sodium hydroxide solution	**37722**
Boric acid	**37723**
Waste	**37724**
Distributor cable level sensor	**31448**
Printer Citizen 230-240 V, 50/60 Hz	**29546**
Printer Citizen 100-120 V, 50/60 Hz	**29545**
Printer cable Centronics	**29547**
Keyboard for simplified text entry	
Keyboard CH	**31457**
Keyboard USA	**31456**
Titration set	**37744**
Stirrer rod, cpl.	**26316**
Titrator cable	
Metrohm	**31455**
Mettler	**31454**
Schott	**31453**
Handle with cam for Tecator/Gerhardt tubes	**26109**
Rubber bung for Tecator/Gerhardt tubes	**16890**
Sample tube 500 ml	**26128**
Rack for 4 Sample tubes, 500 ml	**16951**
Rack for 4 Sample tubes, 300 ml	**02013**
Rack for 8 Sample tubes, 300 ml	**01248**
Bent funnel	**16662**

Table 3: Optional accessories

2 Safety

The apparatus is constructed in accordance with state-of-the art technology and recognized technical safety regulations. Nevertheless risks and danger can arise from the apparatus:

- if the apparatus is not used according to instructions.
- if the apparatus is operated by insufficiently trained personnel.

2.1 Symbols

Stop
Information on the dangers which can lead to great damage to property or to severe or life-threatening injuries.

Warning
Information on the dangers which can lead to damage to one's health or to damage to property.

Please note
Information which indicates technical requirements. Non-compliance can lead to disturbance, uneconomical operation or production losses..

2.2 Requirements to be met by the customer

The apparatus may only be used by laboratory personnel and other persons who on account of training or professional experience have an overview of the dangers which can develop when operating the apparatus.
Personnel without this training or persons who are currently being trained require careful instruction. The present operating instructions serve as the basis for this.

2.3 Proper use

The apparatus is conceived and built as a piece of laboratory equipment. Its regulation use is for the distillation of steam-volatile substances.

2.4 Improper use

Any and every use other than the above-mentioned as well as any and every application which does not correspond to the technical data is a misapplication. The operator bears the sole risk for any possible damage traced back to such a use.

In particular, the following uses are improper:

- Use of the apparatus in rooms which require explosion-proof apparatus.
- Determination of samples which can explode or ignite themselves through impact, friction, heat or sparking (Example: explosives, etc.).

2.5 General hazards

Fundamental dangers arise from
- hot acids and lye
- inflammable gases or solvent fumes in the direct vicinity of the apparatus.
- damaged glassware.
- too small of a distance between the apparatus and the wall (see Chapter 4.1, Set-up location).
- burns caused by contact with hot glass parts.

The removal of covers with the aid of a commercially available tool is - except for authorized maintenance personnel - forbidden. The apparatus is not to be operated with damaged glassware.

Danger to life by contact with voltage carrying parts!

2.6 Safety measures

The Distillation Unit B-324 has a monitored protective door which prevents a start to distillation with open door. A running distillation is immediately interrupted through the opening of the door. The dosing of reagents is also immediately stopped.

The wearing of personal protective equipment such as **safety glasses**, **gloves** and **laboratory coats** is necessary.
These operating instructions must, as a component of the Distillation Unit B-324 be available at all times to the operating personnel at the place of use of the apparatus. This is also true for the additional language versions of these instructions which can be separately ordered.
The service doors may only be opened for cleaning purposes. Before doing this the apparatus is to be turned off and disconnected from any and all voltage sources.

There is a danger of burns if the service doors are opened directly after operation

Modifications

Modifications of the apparatus or to the replacement parts or accessories as well as the use of replacement parts or accessories other than those mentioned in these operating instructions is only allowed with the written permission of Büchi Labortechnik AG.

Responsibility of the operator

The operator is responsible for the instruction of his or her personnel. For this purpose these operating instructions may be ordered in other languages.
The operator is to inform the manufacturer immediately about all safety related incidents which take place during operation of the apparatus.

3 Function

The Distillation Unit B-324 is suitable for Kjeldahl and Devarda nitrogen determination. Through the steam regulation from 30 to 100% other steam distillations (e.g. alcohol determination) can also be easily carried out.
The interface/software as well as the integrated boric acid pump make automation possible with an external titrator.

3.1 Functional principle

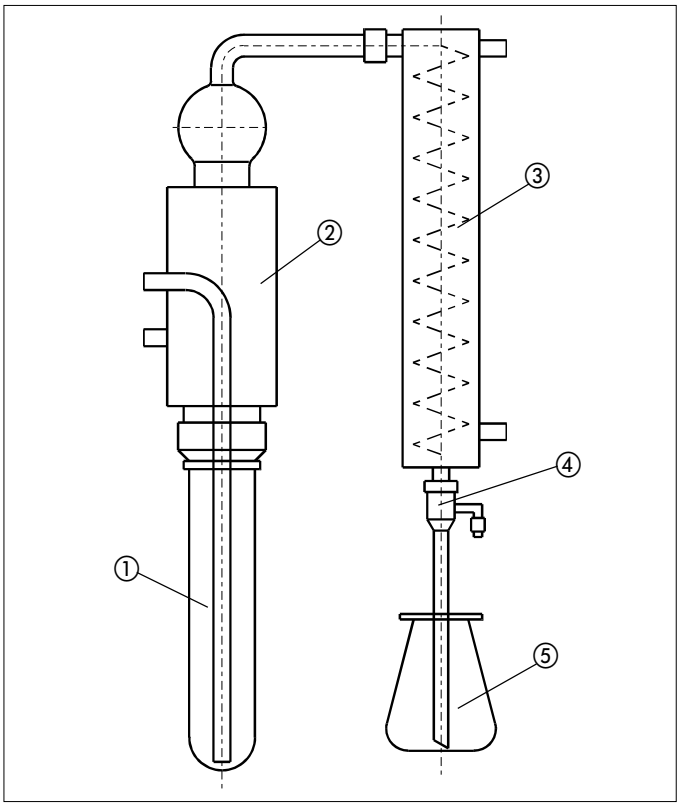


Figure 3: Function principle B-324

① Sample vessel

② Splash protector

③ Condenser

④ Distillate outlet tube

⑤ Receiver

3.2 Standby function

The software of the B-324 is so programmed that after 30 minutes without operation the heating of the steam generator is turned off. The apparatus signals this state by showing “Standby“ on the display.
In order to activate the apparatus one must simply press any key. The steam generator requires 90 seconds after this to heat up to operating temperature.

3.3 Standard/on-line titration

The B-324 can send signals to an external titrator over the TTL interface. The pin assignment of the interface is described in Chapter 4.5, peripheral devices.

There are two possibilities open in the configuration menu of the B-324 as to when the signal can be sent:

Standard

1. The signal is sent after completion of the distillation time.
2. The titration process is carried out independently of the B-324.
3. After completion of the titration the titrator sends a signal back to the B-324.
4. The program in the B 324 is run to the end as defined in the parameter menu.

Online

1. After completion of the distillation period entered, the B-324 sends a start signal to the titrator, the distillation continues to run until the titration is complete.
2. The titrator sends the signal back to the B-324. Distillation is ended.
3. The program in the B-324 is run to the end as defined in the parameter menu

The on-line mode does not operate together with all titrators. The function is supported by the Metrohm 719S and the Mettler DL 58.

4 Putting into operation

Pay attention to any damage while unpacking. It is important that any possible shipping damage is recognized while unpacking. If necessary an immediate report is to be made (report to postal service, railroad or shipping agency).
The original packing material should be saved for possible later shipping.

4.1 Set-up location

The apparatus must be set-up on a stable, clean and level base.
For reasons of safety the distance between the back side of the apparatus and the wall or to another object must be at least 30 cm. There should be no containers, chemicals or other devices located behind the apparatus.

4.2 Electrical connections

The voltage of the socket outlet should be the same as the voltage given on the apparatus plate. The apparatus is always to be connected to an earthed socket outlet.
External couplings and extension cords must have a protective earthed conductor (three-pole coupling, cable and socket outlet and plug).

Any kind of disconnection of the protective earthed conductor whatsoever is forbidden. Risks on account of internal faults are thus avoided.

At the first start up after the installation of this unit a penetrating smell emerges. This smell developes because of the warming up of the heating tube and the insulation. An overheating of the steam generator or other parts is not possible.

4.3 Water/reagent connections

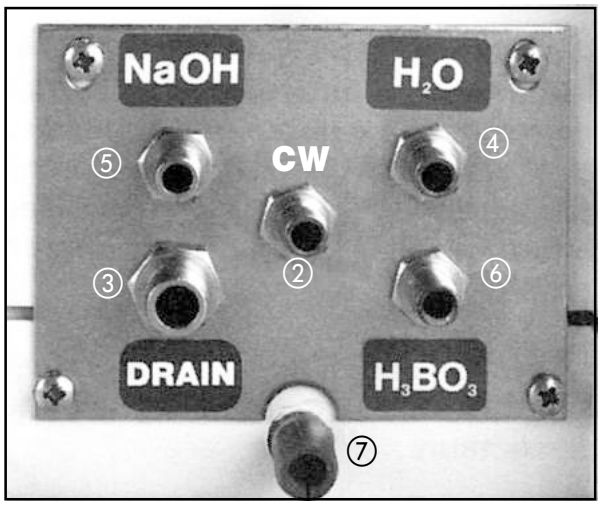


Figure 4: Back side/water connections

① Cooling water input (not visible on Figure 4)
② Cooling water exit
③ Drain to waste
④ H2O input from 10l tank
⑤ NaOH input from 10l tank
⑥ Boric acid input from 10l tank
⑦ Overflow exit

It may happen by initial operation or in changing hoses that as a result of empty connecting hoses the diaphragm pump cannot aspirate the reagents. In this case an overpressure on the canister can be created with the small manually operated pump.

4.3.1 Cooling water connection

The cooling water hose is to be shortened to the optimal length and to be secured on both the apparatus side and the water connection ① with a hose clamp. The water pressure should be a maximum of 8 bar.
The flanged screw coupling for the water connection has a standard screw thread of G 1/2“

4.3.2 Drainage

Cooling water
The drainage of the cooling water ② should be conducted directly into the drain. For this purpose the silicone hose is to be shortened to the optimal length. The drain should show no kinks, sharp bends and no siphon.

Waste/aspiration hoses
The distillation and sample residue can be aspirated and collected separately form the cooling water. For this purpose a separate canister is necessary. The collecting tank must be located lower than the apparatus, since drainage is otherwise not guaranteed.
The waste exit is connected to the “Drain” connection ③ and conducted to the drain or the waste canister. The hose must be shortened to the optimal length and checked for kinks, sharp bends and siphon. The hose may only be placed to a distance of approx. 10 cm into the canister.
In this way a resuction of the waste solution is avoided.

4.3.3 Connection of the storage tank

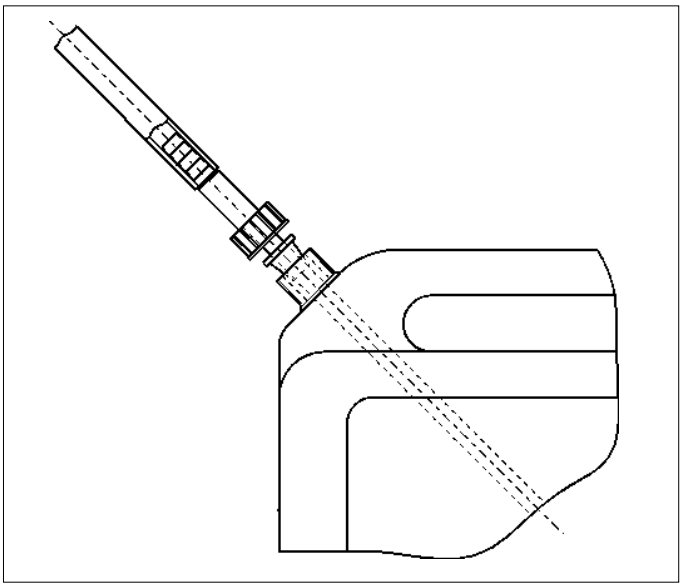


Figure 5: Storage tank connection

The Nyflex hoses are connected with the flow through tubes. The tubes themselves are fastened to the tank with the screw covers. The hoses are connected to the appropriate hose adapters (④,⑤,⑥) on the back side of the apparatus. A securing of the hoses is not necessary.

The storage tanks should not be positioned higher than the apparatus itself and not more than 1 meter lower than the apparatus.

The “H20” storage tanks serves both as the feed for the steam generator as well as for dosing for sample.

Only **distilled water** should therefore be used. In this way the steam generator is maintenance free.

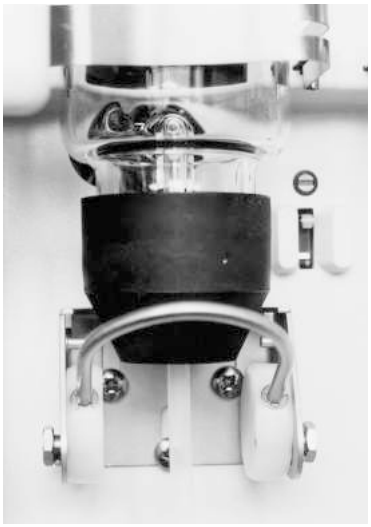


Figure 6: Sample vessel holder 1

4.4 Connecting stopper/sample vessel holder

Before the first distillation the sample vessel holder and the connecting stoppers must be examined. The two connecting stoppers should be solidly mounted on the vessel. Then the sample vessel is installed. The connecting stoppers should close the vessel tightly but not be deformed themselves. An adjustment of the sample vessel holder is carried out already in the factory and should only be necessary on account of shipping vibrations. The positioning is effected then by means of the recessed-head screw on the vessel holder.

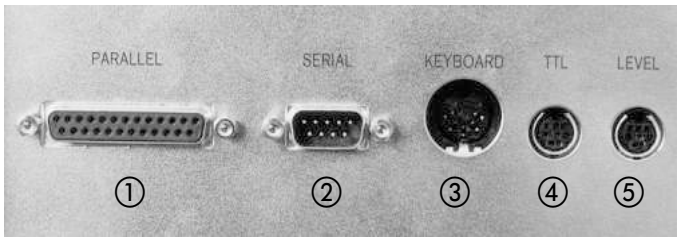


Figure 7: Back side/electrical connections

4.5 Connections peripheral devices

① Parallel	Interface for Printer
② Serial	Interface RS 232 for PC
③ Keyboard	Connection for an external keyboard
④ TTL	Interface Titrator
⑤ Level	Interface level sensor/ external cooling water valve

4.5.1 Printer

The B-324 supports the following types of printers:

- Citizen
- Epson
- Hewlett Packard
- Seiko

The printer is controlled by means of a parallel Centronics interface.

4.5.2 Titrators

The B-324 supports the following types of titrators

- Metrohm 719S
- Mettler DL 58
- Schott TitroLine 96

4.5.3 Description of the TTL interface

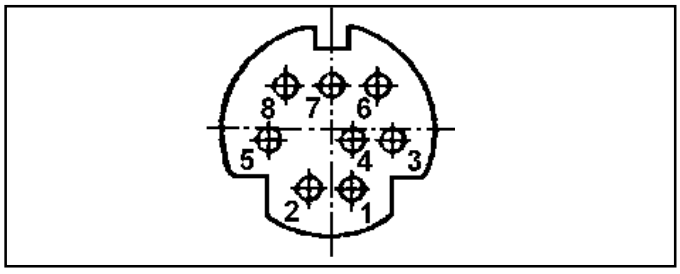


Figure 8: TTL plug

① +24V (200 mA max)
② PWR1
③ PWR2
④ IN1
⑤ IN2
⑥ OUT1
⑦ OUT2
⑧ GND

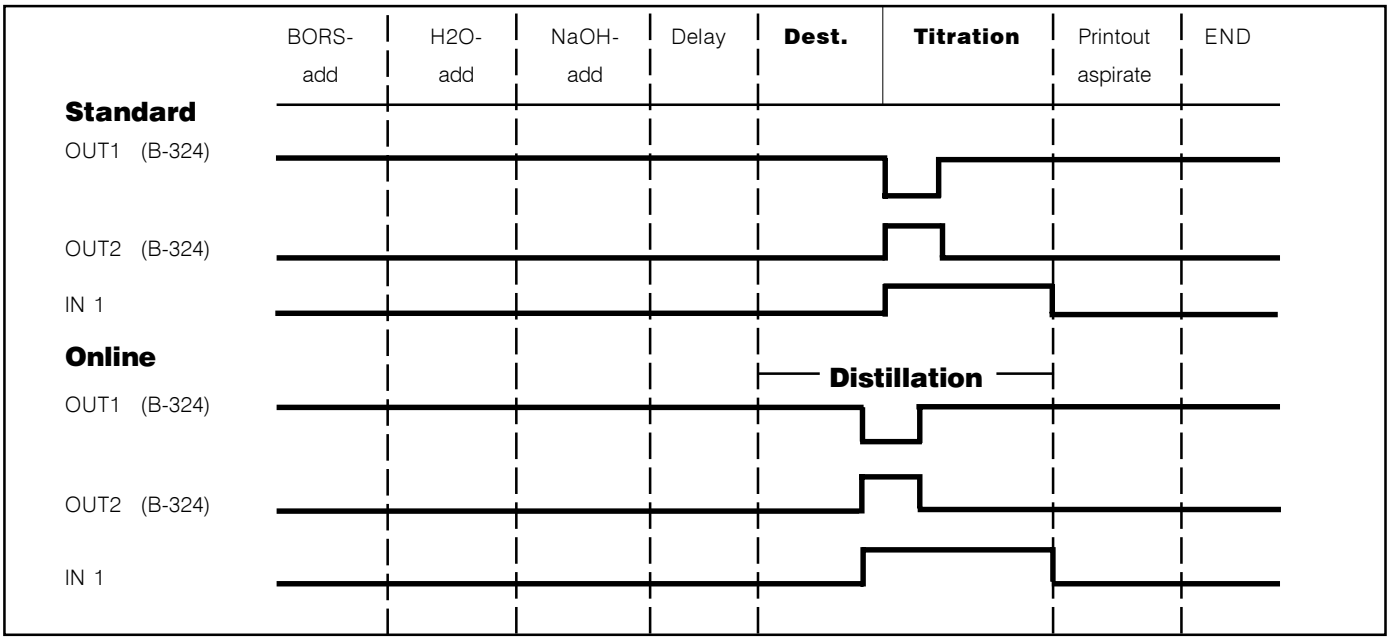


Figure 9: TTL situation Metrohm

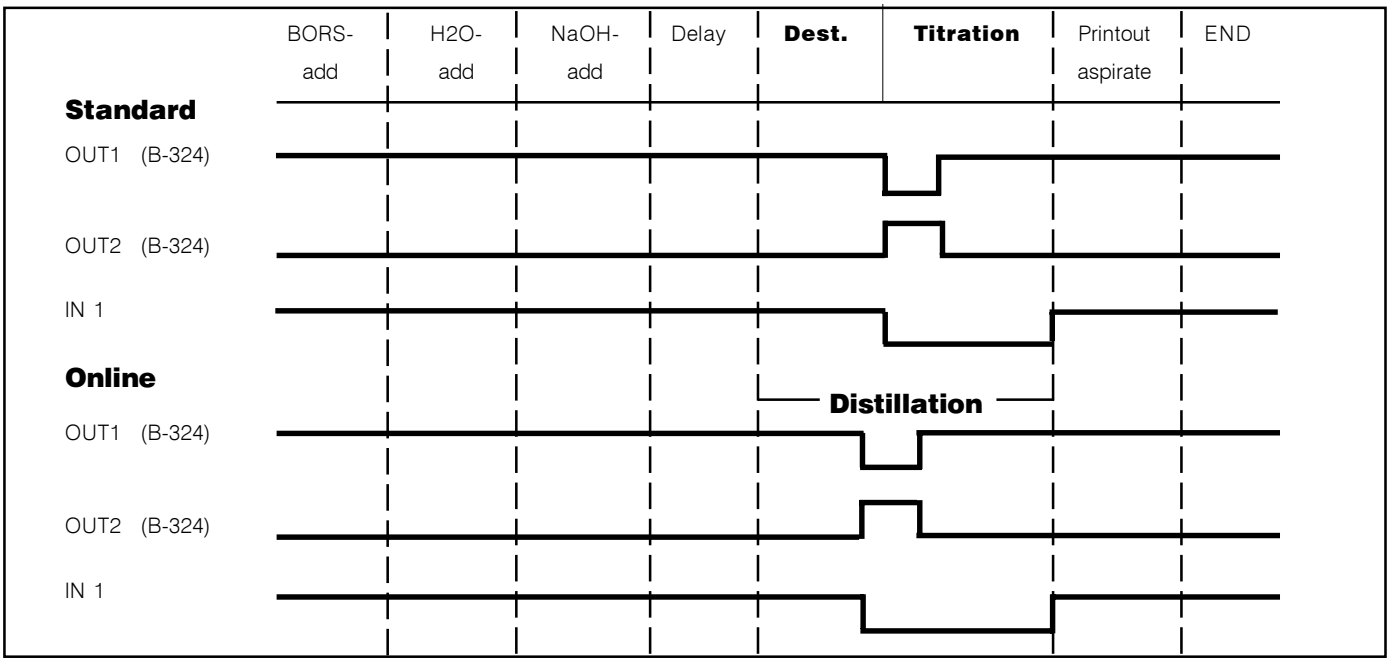


Figure 10: TTL situation Mettler

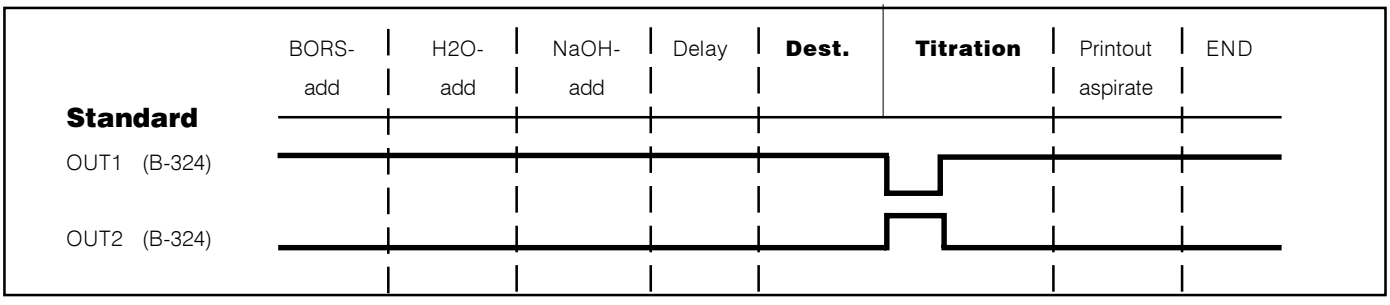


Figure 11: TTL situation Schott

4.5.4 Level monitoring

Level sensors are available for all Büchi tanks as an option. The individual sensors are connected to the to the distributor cable. The plugs are color coded:

- Black Waste
- White Boric acid
- Yellow H20
- Red NaOH

The end of the distributor cable is connected to the B-324. The level sensors can also be used individually (e.g. only for waste).

4.5.5 External keyboard

The connection for the external keyboard is to be found on the back side of the apparatus.
All functions of the operating panel can also be carried out by means of the external keyboard.

In this case there is the following keyboard assignment:

Taste B-324	**Key external keyboard**
<UP>	arrow up
<DOWN>	arrow down
<ENTER>	ENTER key
<EDIT>	arrow right
<START>	F10 key
<STOP>	F9 key
<F1>	F1 key
<F2>	F2 key
<F3>	F3 key
<F4>	F4 key / arrow left / ESC

Table 4: Keyboard assignment

The keys F1 / F2 / F3 / F4 are function keys. They are just labeled on figure 12, but not on the control unit.

5 Operation

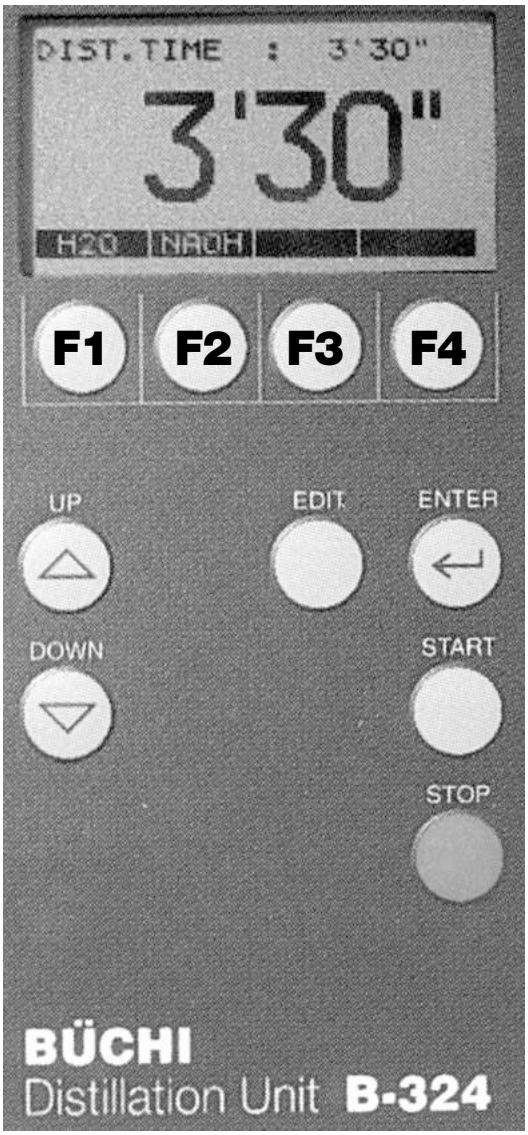


Figure 12: Operational unit B-324

5.1 Operational unit

Observe that the apparatus is put into operation in accordance with the instructions in Chapter 4, Start-up.

Function keys 1-4
The 4 function keys are assigned different functions according to the display menu.

Up/Down
Individual menus or the parameters are chosen with these.

EDIT
Opens the dialog field for parameter entry.

ENTER
Confirms the chosen position and leads back into menu.

START
Starts the distillation according to the current parameter values.

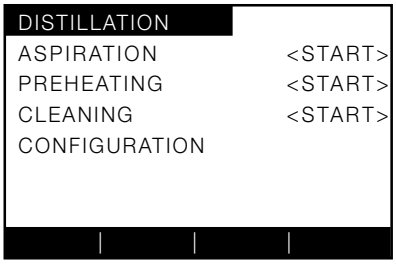
The functions aspiration, preheating and cleaning are also started from the main menu.

STOP
Immediately stops the distillation in progress.

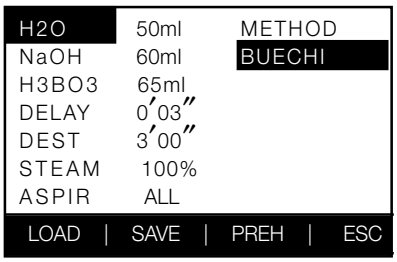
Description of the function keys

Various functions can be started with the function keys beneath the display according to the menu.

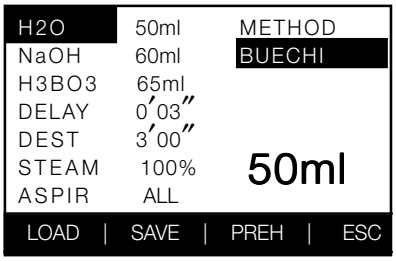
5.2 Choosing the distillation parameters

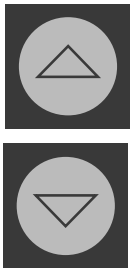


The distillation menu appears.

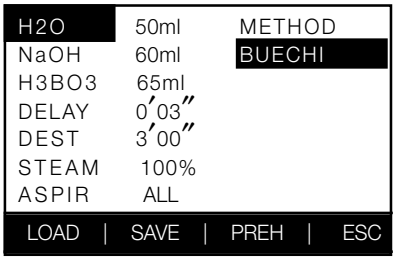


The current value blinks bottom right

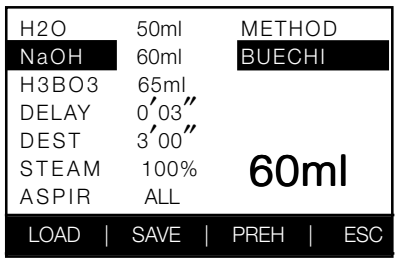


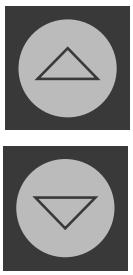


The parameter "50 ml" can be changed.
The amount of water can vary between 0 and 200 ml



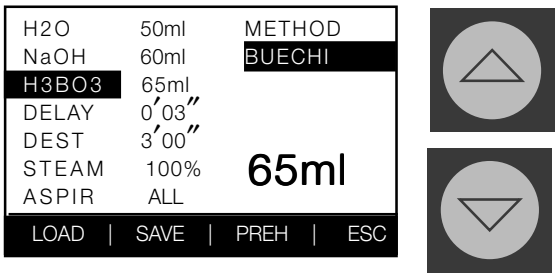
The new value is taken over into the parameter menu



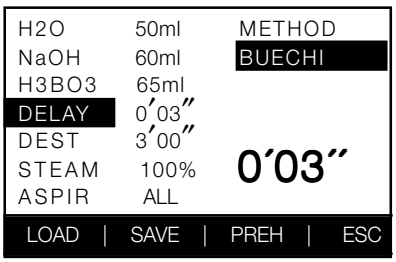


The next parameter is chosen

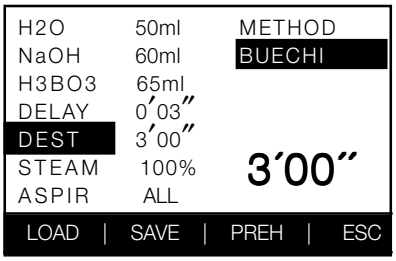
The current value for the NaOH dosing blinks and can be entered again.



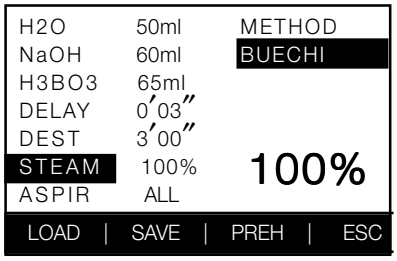
The value of the boric acid amount can now be edited.



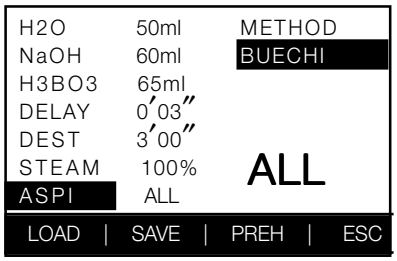
The waiting period between reagent addition and distillation is called “Delay". This avoids an overly intense reaction by distillation start or can be used as a reaction time (e.g. in Devarda reactions)



The “Dest” function is the actual distillation time. In connection with a titrator the description can also be “Ttime“. This means that the titration mode of the B-324 is on-line (see Chapter 5.7.2, titrator configuration)



The steam amount can be varied between 30 and 100%.



Aspiration allows 4 possibilities:

1. Only the sample is aspirated SAM
2. Only the distillate receiver is aspirated REC
3. There is no aspiration OFF
4. Both the distillate receiver and the sample are aspirated ALL

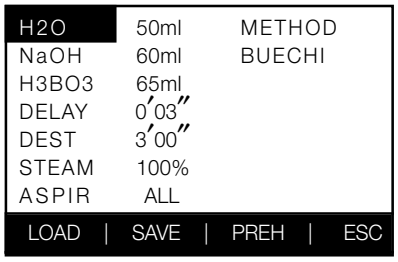
Samples with solid residue in the sample vessel may not be aspirated since they could possibly block the valve.

5.2.1 Carrying out a distillation

A start is only possible in the parameter menu with the <START> key. The parameters implemented one after another and shown in the display. During the distillation the total time and the steam amount are also displayed.

5.3 Storing and loading of methods

5.3.1 Storing



SAVE

The cursor appears underneath the method name

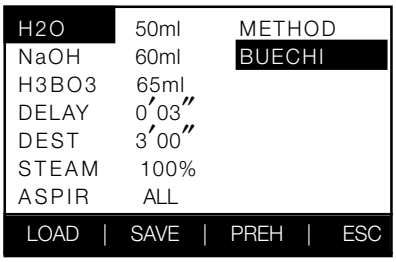
Choose the first letter, number or sign

The cursor jumps to the second position. If an external keyboard is connected entry can take place directly.

Ends the entry

SAVE

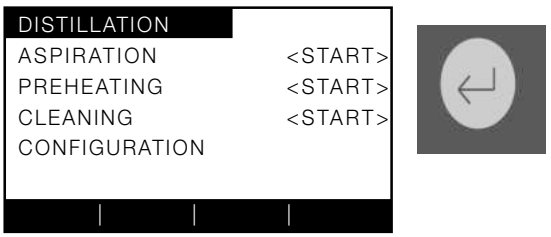
OK

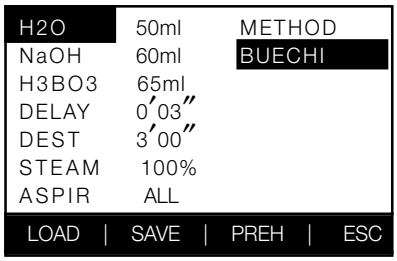


The method is now stored and appears in the parameter menu.

The actual parameters will be set with the method.

5.3.2 Loading

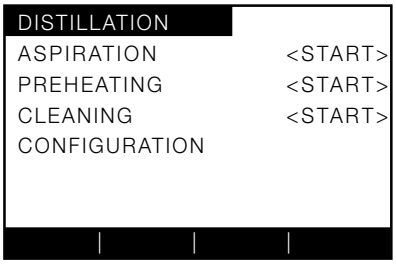


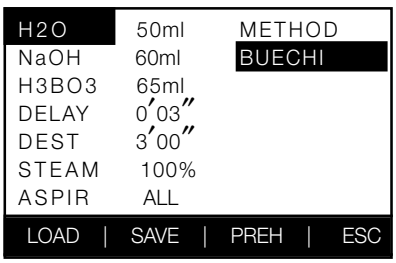


LOAD

OK

5.3.3 Deleting

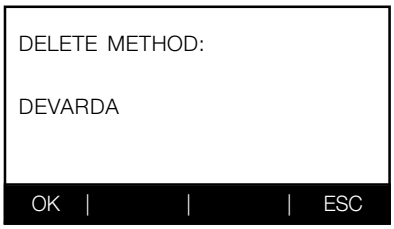




LOAD

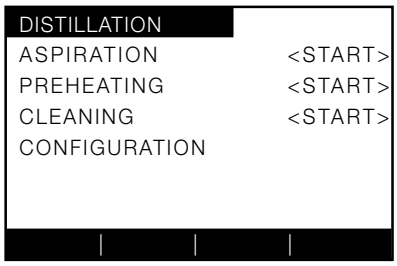
Select method

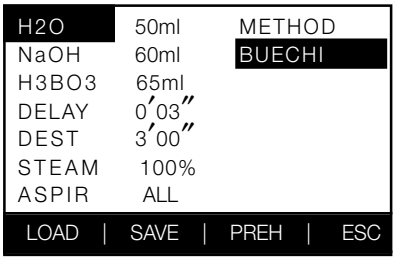
DEL



OK

5.3.4 Printing/Display

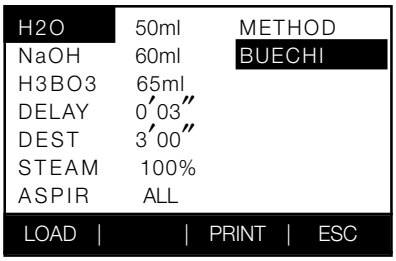




LOAD

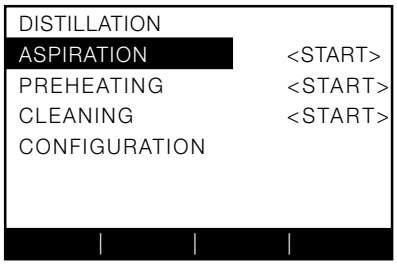
Select method

SHOW
The parameters of the method will be shown on the display. (Back to the distillation menu with ESC)



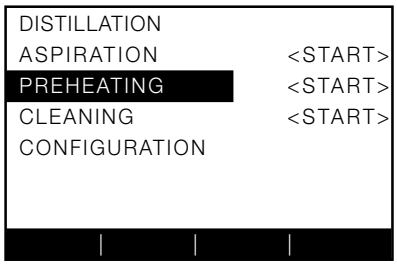
PRINT
The parameters of the method will be printed.

5.4 Aspiration



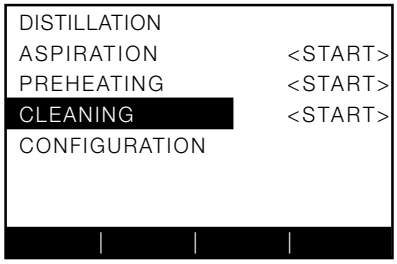
As a standard operation only the sample side will be emptied. To empty the receiving side as well as the sample side the aspiration valve has to be activated from the system configuraton (see chapter 5.2). The process will last 10 seconds.

5.5 Preheating



The preheating serves to warm up the glass parts. It should be carried out every time before the start of a determination series.
The distillation time is displayed as a countdown. The time is set to 2 minutes and can not be changed.

5.6 Cleaning



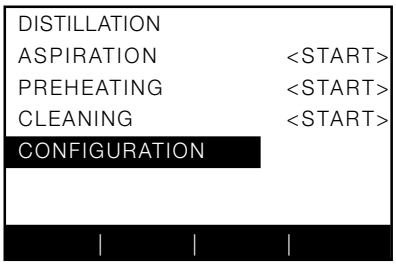
The cleaning function should be run regularly. It serves above all to clean the valves which regularly come into contact with acids and lye. In order to increase the life of the valves the cleaning should be run at the end of a work day at least once.

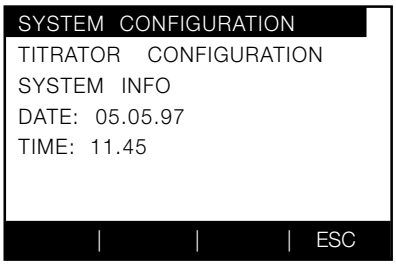
The cleaning runs with the following parameters:

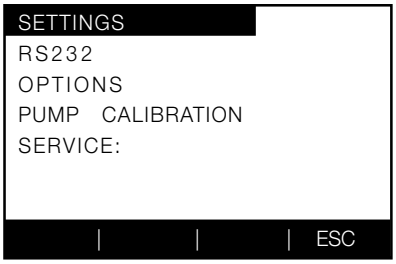
H2O	100 ml
NaOH	0 ml
H3B03	0 ml
Delay	0 s
Distillation time	2 min
Aspiration	ALL

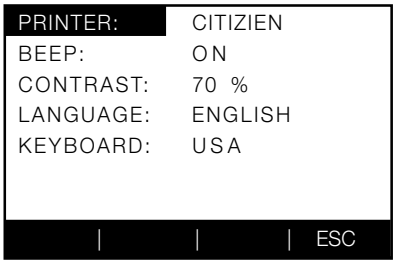
Table 5: Cleaning parameters

The parameters are fixed and cannot be changed.









5.7 Configuration

5.7.1 System configuration

5.7.1.1 Adjustment

Printer: Choice of connected printer

Autoprint: ON: After each distillation, the parameters will be printed

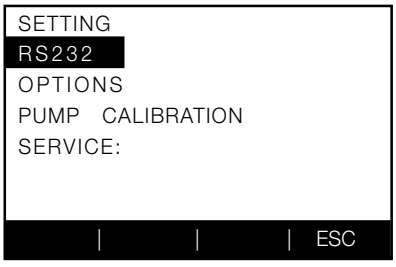
OFF: No printout after each distillation

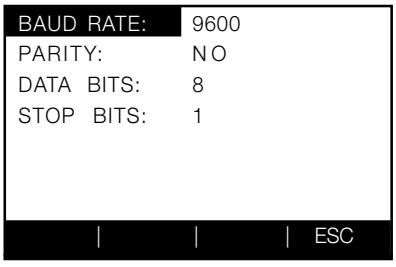
Buzzer: Off/half/full, choice of volume

Contrast: 10% (light) to 100 % (dark)

Language: Choice of dialog language (English, French, German, Spanish, Italian)

Keyboard: Choice of keyboard layout (USA, D)





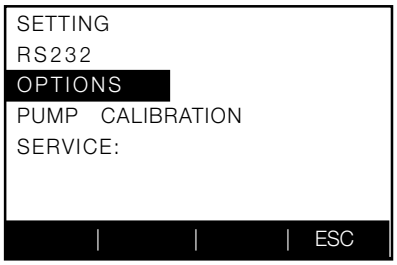
5.7.1.2 RS232

Baud rate: 1200/2400/4800/9600

Parity: NO/EVEN/ODD

Data bits: 7/8

Stop bits 1/2



5.7.1.3 Options

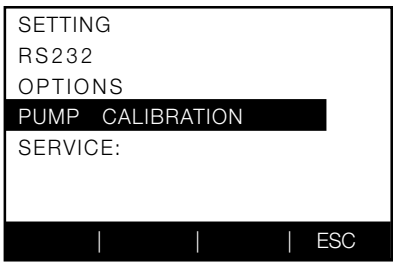
Boric acid: Activate/deactivate the boric acid pump
- ON: The boric acid can be set in the distillation menu
- OFF: The boric acid pump is disabled

Steam regulation:
- ON: The steam regulation can be adjusted in parameter menu
- OFF: The steam regulation is always 100 %

Aspiration distillate receiver:
- ON: The aspiration of the distillate receiver can be chosen in the parameter menu
- OFF: The distillate receiver is not aspirated

This option only makes sense when the B-324 is connected to a titrator. Otherwise it can lead to errors. It is therefore deactivated as the standard setting.

5.7.1.4 Pump calibration



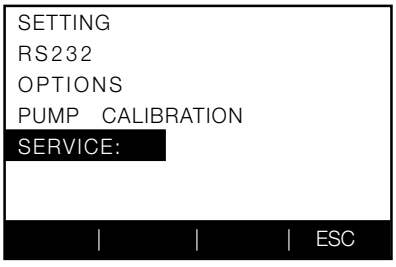
The pump calibration has been made in the factory. If the error E-25 occures, the unit must be reset.

A 200 ml graduated cylinder is required for the pump calibration.

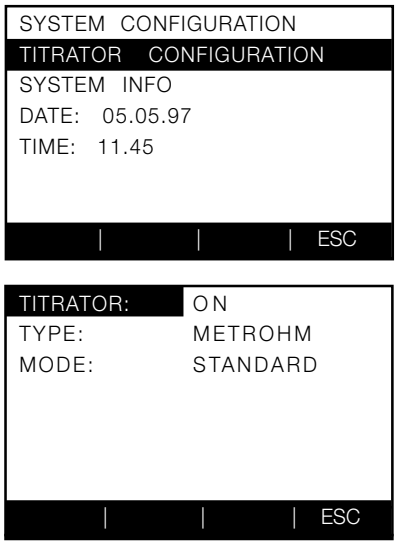
Select the pump which has to be calibrated.

Further action appears step-by-step on the display.

5.7.1.5 Service



The service menu is protected with a password and is only accessible for service personnel.



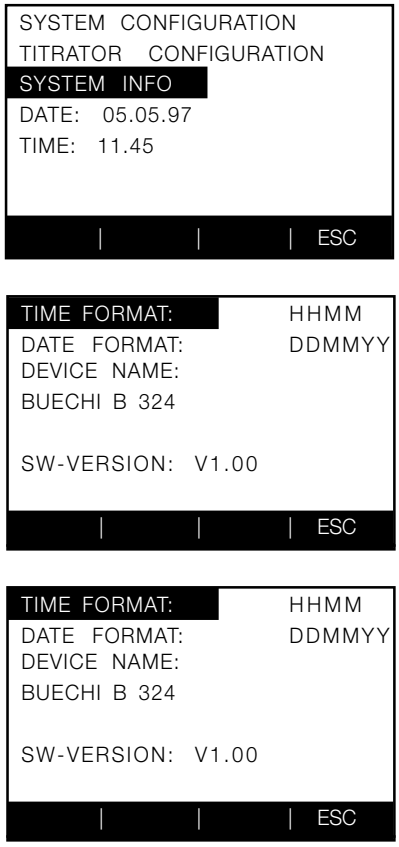
5.7.2 Titrator configuration

Titrator: OFF: No signals are sent over the TTL interface
ON: The signals are sent in accordance with the chosen titrator

Model: The model of the connected titrator is chosen

Mode: Either on-line or standard can be chosen.
Both modes are described in Chapter 3.3

5.7.3 System information



Time format: Switch between US and European format

Date: Switch between US and European format

Apparatus name:
The apparatus can be given any choice of description.
The name appears on every protocol print-out.

5.8 Error messages

Error	Display text	Action
E-1	Please close door	Close door
E-2	Distillation time = 0	Enter parameter
E-3	H20 empty	Fill canister
E-4	NaOH empty	Fill canister
E-5	Boric acid (H3BO3) empty	Fill canister
E-6	Waste full	Empty canister
E-7	Water for steam is missing	Check H20 canister
E-10	Titrator did not reach the end	Check titrator settings (see chapter 5.7.2 titrator configuration)
E-11	Steam is not ready	Wait; function desired will be automatically started when the time is over
E-21	Printer buffer full	Press ESC or OK key
E-22	Printer not active	Press ESC or OK key
E-24	RAM newly initialized	Press ESC key
E 25	Eprom newly initialized	Press ESC key
E 26	Method storage full	Clear old methods

Table 6: Error messages

6 Maintenance

All instructions aimed at maintaining the distillation unit in a reliable operational condition are to be observed. This also includes periodic cleaning and checking for any possible damage.

6.1 Cleaning

In order to ensure the functioning of the B-324 the program “Cleaning” in the menu of the B-324 must be regularly carried out. This action prevents a drying of the lye in the valves. At the same time an attack (tarnishing) of the glass parts is prevented.

Housing

The housing is made of plastic. Cleaning should be done with water. The use of organic solvents (except for ethanol) can lead to damage and is not recommended.
A long-term durability of the housing in relation to lye is guaranteed. Acid splashes can be tolerated by the housing for short periods, but should however be immediately removed with water in order to avoid color change of the housing.

The service doors can be opened for improved cleaning of the housing. The apparatus must be turned off prior to this and disconnected from all voltage sources.

Glass parts

The glass parts can be removed and washed with commercially available cleansing agents. After cleaning and complete drying, every glass part is to be visually examined for chipped areas and crack development.

Connecting stoppers

The two neoprene stoppers should be removed at least once a week and thoroughly washed with water. At the same time the crusts and residue must be cleaned from the condenser.

6.2 Customer service

Operations on or in the apparatus can only be carried out by authorized service personnel. These are persons with a sound technical training and knowledge of the dangers which can result from not following safety precautions. Büchi customer service centers have apparatus-specific service manuals which are available only to authorized personnel.

The addresses of official Büchi customer service centers are given on the last jacket page of these operating instructions. Please contact one of these centers in the case of problems or technical queries as well as application problems.

Büchi company customer service is available for the following services:

- Replacement part service
- Repair service
- Maintenance service
- Technical advice.

6.3 Apparatus monitoring

In order to test the functioning of the apparatus, a nitrogen determination with an ammonium salt can be carried out. We recommend the following parameters as standard application:

Standard substance:	Ammonium sulfate for analysis, anhydrous
Nitrogen content:	21.19 %
Recovery rate:	99.5 %
Original sample weight:	300 to 400 mg
H2O:	20 ml
NaOH:	20 ml
Distillation time:	4 min
Titration:	Sulfuric acid 0.5 N

Table 7: Apparatus monitoring parameters

7 Taking out of operation

Figure13: Steam generator emptying

Before the apparatus is shipped, the mains cable must be taken out and all water/reagent tubing removed.
The boric acid and sodium hydroxide solution tubing must be rinsed with distilled water.

The steam generator is to be emptied in the following manner:

- Turn off apparatus
- Allow steam generator to cool at least 30 minutes
  Attention: Burn danger!
- Pull the plug
- Open the service doors
- Attach appropriate silicon tube to drain cock
- Place receiver vessel with 1000 ml volume at the end of the tube
- Open the cock with a screw driver and completely empty the steam generator

7.1 Storage/shipping

The apparatus is to be thoroughly cleaned. Chemical residues must be completely removed. The apparatus is to be stored and shipped in the original packaging.

In order to avoid static damage to the valves and pumps proceed as described in Chapter 7 “Closing down”.

7.2 Disposal

In order that the Distillation Unit be disposed of in the most environmentally sound manner possible. In Chapter 9, Appendix, a list of the materials of the most important parts, some of which are provided with material codes. In this way it is ensured that the parts can be separated and recycled. We refer to the corresponding guidelines for the disposal of the electronic parts. Incidentally, regional and local laws must be observed by disposal.

8 Replacement parts

Only Original Büchi accessories and replacement parts guarantee operational safety and the correct functioning of the apparatus. The use of other than Büchi replacement parts and accessories is only allowed with the permission of the manufacturer. For assembly and disassembly replacement parts may only used in connection with Chapter 6, Maintenance. Assembly according to this handbook is forbidden.

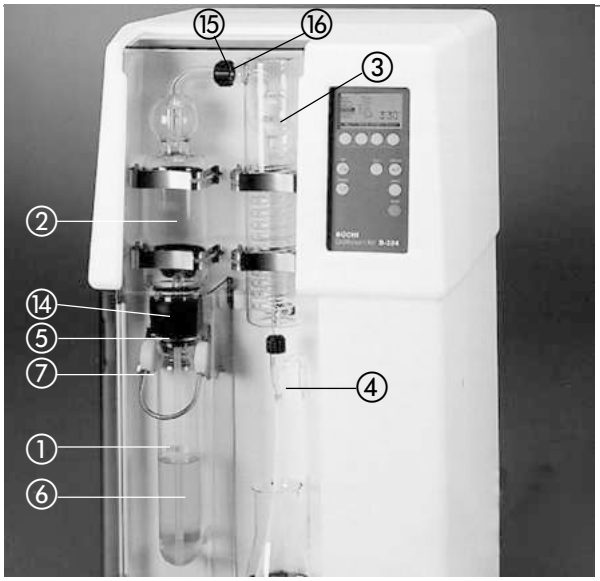


Bild 13: Destillationseinheit B-324

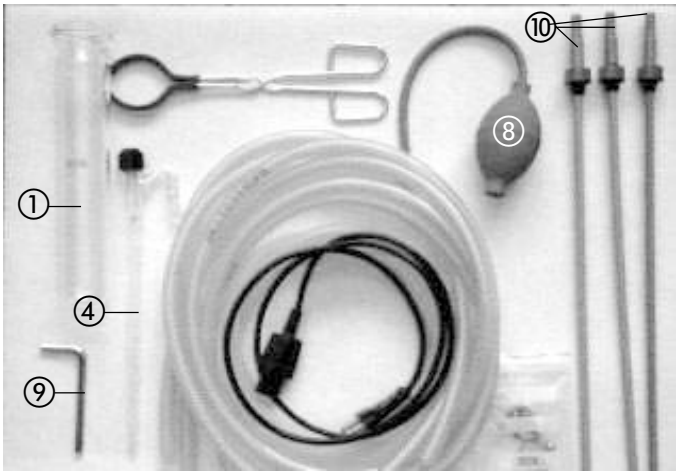


Bild 14: Beipackteile

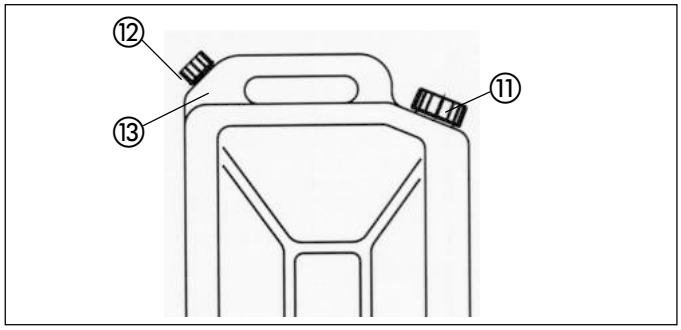


Bild 15: Tank

8.1 Replacement parts

① Sample tube 300 ml, set of 4	**37377**
② Splash protector	**36900**
③ Condenser	**26004**
④ Distillation outlet tube, cpl.	**26115**
⑤ Rubber bung, Neoprene	**03907**
⑥ PTFE hose for sample tube, 275 mm	**19010**
⑦ Holder for sample tube, cpl.	**26042**
⑧ Hand pump for tank	**26122**
⑨ Allen wrench 7 mm	**26121**
⑩ Flow-through tube Ø 8/6	**26058**
Soflaflex hose, 1.5 m Ø 14/8	**04113**
Silicone hose, 1.5 m Ø 14/10	**04134**
Silicone hose, 1.5 m Ø 9/6	**04133**
Water connector, cpl.	**10992**
Hose clamp	**22352**
⑪ Screw cap, large	**25869**
⑫ Screw cap, small	**26660**
⑬ Gasket	**26411**
Printer paper	**28261**
Printer ribbon	**37303**
Titraton set	
Cover for receiving vessel	**26366**
Receiving vessel	**15543**
Sample tube 500 ml	**26128**
⑭ Hose connector, Hypalon	**19002**
⑮ Screw cap SVL 22	**03577**
⑯ Gasket SVL 22	**02073**

Table 8: Replacement parts

9 Appendix

9.1 Technical data

Model	B-324
Voltage	230V (+10% / -10%)
Frequency	50/60 Hz
Current consumption	9A
Power consumption	2100 W
Ambient temperature	5 - 40°C
Max. humidity	80%
Mains connection	3-pole (P,N,E) via power cable
Apparatus dimensions (w x d x h)	410 x 750 x 420 mm
Weight	25 kg
Overvoltage category	II
Pullution degree	2

Table 9: Technical data

9.2 Materials used

Description	**Materials**	**Material code**
Housing	Polyurethane integral foam	IHS/PUR
Glass parts	Borosilicate glass 3.3	DIN/ISO 3585
Insulated steam generator	Alkaline earths-silicate-fibers	X-607
Steam generator housing	Polysulphon with 20% glass fibers	PSU/20% GF
Safety screen	Polymethyl methacrylate	PMMA
Connecting stopper	Polychloroprene-rubber	CR

Table 10: Materials

9.3 FCC requirements (for USA and Canada)

English:

This equipment has been tested and found to comply with the limits for a Class A digital device, pusuant to both Part 15 of the FCC Rules and the radio interference regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is like to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Français:

Cet appareil a été testé et s'est avéré conforme aux limites prévues pour les appareils numériques de classe A et à la partie 15 des règlementation FCC à la règlementation des radio-interférences du Canadian Department of communications. Ces limites sont destinées à fournir une protection odéquate contre les interférences nétastes lorsque l'appareil est utilisé dans un environnement commercial.

Cet appareil génère, utilise et peut radier une énergie à fréquence radioélectrique, il est en outre susceprible d'engendrer des interferences avec les communications radio, s'il n'est pas installé et utilisé conformément aux instructions du mode d'emploi. L'utilisation de cet appareil dans les zones résidentielles peut causer des interférences nèfastes, auquel cas l'exploitant sera amené à prendre les dispositions utiles pour polier aux interférences à ses propres frais.

9.4 Declaration of conformity

We

BÜCHI Labortechnik AG
Postfach, CH-9230 Flawil
Switzerland

declare under our sole responsibility that the product:
BÜCHI Distillation Unit **B-324**

to which this declaration relates is in conformity with the following standards:

EN 61010-1:1993 (~ IEC 1010-1, VDE 0411-1)
Safety requirements for electrical equipment for mesurement, control an laboratory use: General requirements

EN 55011:1991/B (~ VDE 0875/B, VDE 0871/B)
Maximum permissible values and measurement technique for radio interference by industrial, scientific and medical high-frequency devices

EN 61000-3-2: 1995/1996
Limits for harmonic current emissions

EN 61000-3-3: 1995
Limitation of voltage fluctuations and flicker

In accordance with the regulations of the EU guidelines:
73/23/EWG (Electrical special tools/low voltage guidelines)
89/336/EWG (electromagnetic compatibility)

Flawil, 10. August 1997

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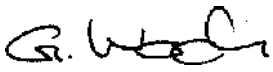

Guido Worch
Qualitymanager