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Read these operating instructions carefully before you use the **Büchi** Rotavapor **R-114**. Keep these instructions in a safe place close to the mixer for quick reference whenever required.
Make sure you have completed all the necessary preparations before you connect the pump to the power supply and switch on.

Chapter 2 contains important notes concerning safety. It is imperative to read these notes in order to operate the Rotavapor safely.

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en, Version B (56 pages)	**Order code**
B-114 Instructions	**96554**

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1 Scope of delivery

Designation

Models:

Rotavapor	R-114 RE R-114 EL

Glass apparatus:

Glass apparatus A	uncoated plastic-coated
Glass apparatus V	uncoated plastic-coated
Glass apparatus C	uncoated plastic-coated
Glass apparatus S	uncoated plastic-coated
Glass apparatus E	uncoated plastic-coated
Glass apparatus CR	uncoated plastic-coated

Heating baths

Water bath analog	B-480
Water bath digital	B-481
Oil bath analog	B-485

	Standard accessories:	**Order code**
1	Power cable PNE, 2.5 m	
	type CH	**10010**
	type Schuko	**10016**
	type GB	**17835**
	type AUS	**17836**
	type USA	**10020**
	Connecting cable from bath to Rotavapor (only in combination Rotavapor with bath)	
	Connecting cable120 V	**30973**
	Connecting cable230 V	**30983**
1	Instruction	
	German	**96553**
	English	**96554**
	French	**96555**
	Italian	**96556**
	Spanish	**96557**

Table 1: Scope of delivery

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2 Safety

The Rotavapor is built in conformance with the state of engineering and the recognized rules of safety.
Nevertheless, it can still be a source of risks and hazards

- if used by persons with insufficient training
- if used for purposes other than that for which it is intended.

These laboratory units are not suitable for use in areas subject to explosion hazards.

2.1 Symbols



Stop
Information about hazards which can lead to serious material damage or cause serious or potentially fatal injury.



Warning
Information about hazards which can be harmful to your health and lead to material damage.

Please note
Information about technical requirements. Non-observance can lead to malfunctions, inefficiency and lost production.

2.2 Requirements to be met by the customer

The Rotavapor must be operated only by laboratory or pilot plant personnel and other persons with the training or professional experience needed to comprehend the hazards that can arise when using the unit.
Personnel without such training or persons currently undergoing a course of training require thorough instruction. These operating instructions should form the basis of this instruction.

2.3 Proper use



Rotavapors are not intended to run under pressure. You must, therefore make sure, that no overpressure can develop inside the Rotavapor.

The Rotavapor is designed and built for laboratory service. It is intended to be used on jobs involving the evaporation of solvents.

The Rotavapor is used for:
- the distillation of solvents
- the concentration of solutions and suspensions
- recrystallization
- the synthesis and purification of fine chemicals
- Soxhlet extractions
- the drying of powder and granules



Electric charges can arise when drying powder.

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For the Rotavapor to be used properly, it must also be cleaned and handled carefully as described in these instructions.

The heating bath serves as heating source for distillations. Therefore, the heating medium must be water or thermal oil. (see chapter 4.4 "Heating bath")

2.4 Improper use

Any use other than those already listed, and any application that does not conform with the technical data is deemed to be a case of mis-use. The customer shall bare sole financial responsibility for any damage caused by such mis-use.



The following applications in particular are prohibited:

- Production or processing of explosives of all kinds.
- Processing of hard and brittle materials (e.g. stones, soil samples, ...) that can cause the destruction of the evaporation flask.
- The use of other sources of heat other than a water bath or an oil bath; in particular it is prohibited to use heaters with temperatures of over 180°C (e.g. bunsen burners, etc.).

2.5 General hazards

Hazards arise generally from:

- hot surfaces which develop during operation
- the hot water bath or oil bath (up to 180°C)
- solvents which can form peroxides
- solvents with low ignition, flash and/or explosion temperatures
- mixtures of unknown composition or with impurities
- combustible gases or solvent vapors in the direct vicinity of the rotary evaporator
- damaged glassware
- electrostatic charges when decanting solvents

2.6 Safety measures

These operating instructions are to be considered a part of the Rotavapor. They must always be kept at the point of use so that operating personnel can consult them at any time. This applies likewise to copies in other languages, which can be ordered separately (see Chapter 1, „Scope of delivery“).

The customer shall notify the manufacturer immediately of any incidents involving safety aspects during the use of the unit.

Regional and local laws and regulations must be observed.

Personal safety items such as goggles and a laboratory coat must be worn.

There is risk of scalding when replacing hot evaporation flasks. This can be prevented by wearing suitable gloves.

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The use of optional Büchi safety devices such as PLASTIC+GLAS coated glass components and guard shields will protect the user in the event of an accident.
Use only the recommended standard glass apparatus. Never use any haphazardly assembled glass components. Check glass components regularly each time before they are used.

Modifications are only permitted after consulting with the manufacturer and obtaining his written consent.

You are allowed to install and remove only those specific parts of the Rotavapor that are so designed to enable it to perform its function. To do so, you should use the tool supplied with the Rotavapor. Apart from authorized maintenance personnel, no one is allowed to use standard tools to remove any safety devices and covers.

If you want to move the heating bath, always wait for it to cool first.

When using an oil bath, make sure no water can drip into the bath or you may be hit by splashes of hot oil.

2.7 Safety elements

Electrics / Electronics

- All control units and the 230 V baths are equipped with fuses
- The baths have overtemperature protection

Operations

- Safety stop to control the depth of immersion of the evaporation flask into the heating bath
- Stabilization foot for tall glass apparatus
- Levelling screw for uneven standing surfaces
- Combi clip for fastening the evaporation flask and for safely releasing tight ground-in glass connections (evaporation flask/vapor duct)
- Ground-in ball clip for securely fastening the collecting flask

Glassware

- Use of high-grade, inert 3.3 borosilicate glass
- Threaded GL 14 hose connections to prevent glass breakage
- OPTIONAL:
  PLASTIC+GLAS (PLG for short) protective coating improves mechanical resistance to breakage and increases protection against glass splinters. It also prevents loss of the sample in the collecting flask should it break.

Protective shield

OPTIONAL (see Chapter 8.6 „Miscellaneous“):
If an accident occurs, the Büchi protective shield will protect the user from flying splinters of glass and splashes of solvent, and hot bath liquid.

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3 Function

3.1 Definitions

In these operating instructions you will come across a number of terms which require explanation.

RE: In the RE sealing system the seal (KD-22) is stationary and the vapor duct rotates inside the seal.
Characteristics:
- No reflux operations possible
- The seal is on the condenser side
- Use of flanged evaporation flasks not possible

EL: In the EL sealing system the vapour duct is stationary and the seal (KD-26) rotates around the vapour duct.
Characteristics:
- Reflux operations possible with glass apparatus S and CR
- The seal is on the bath side
- Use of flanged evaporation flasks possible

Glass apparatus

A: RE sealing system with diagonal condenser
V: RE sealing system with vertical condenser
C: RE sealing system with cold trap

S: EL sealing system with vertical condenser and backflow option
E: EL sealing system with descending condenser without reflux
CR: EL sealing system with cold trap and reflux

PLASTIC + GLAS

PLASTIC+GLAS protective coating improves mechanical resistance to breakage and increases protection against glass splinters. It also prevents loss of the sample in the flask should it break. The coating also provides protection from implosions.

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Figure 1: R-114/V

3.2 Functional principle

The rotary evaporator is used to carry out single-stage distillations at high speed and low stress. The process is based on the evaporation and condensation of solvents using a rotating evaporation flask. Operation under vacuum is possible to protect the product from stress and to improve efficiency.

The following description is based on the V type apparatus by way of example.

① Evaporation zone
The solvent is heated by the hot bath.
A thin film of solvent forms on the inside of the rotating evaporation flask, resulting in a high rate of evaporation. The rotation also causes the sample to be mixed uniformly, thus preventing stationary overheating in the flask.

② Rotary drive
The drive unit ensures uniform rotation of the evaporation flask with its related benefits (see point 1).

③ Cooling zone
The solvent vapor flows at high speed into the condensation zone of the rotary evaporator, i.e. the condenser. This is where the energy inside the solvent vapor is transferred to the cooling medium (mostly water) and the condensed solvent.
The condensed solvent now flows by force of gravity into the collecting flask.

④ Collecting flask
The collecting flask is used to collect the condensed solvent.

⑤ Vacuum
Vacuum is applied to lower the boiling temperature and hence increase the distillation efficiency.

The efficiency of the evaporator is influenced by the pressure of distillation (vacuum), the temperature of the heating bath, the speed of rotation and the size of the evaporation flask.
For details of how to select the optimum distillation conditions, see Chapter 5.4, „Selecting the conditions of distillation“.

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Figure 2: R-114/S

3.3 Overview of components

① Quick-lift
② Drive unit
③ Electronics head / Control unit
④ Bracket
⑤ Evaporation flask
⑥ Glass apparatus
⑦ Collecting flask
⑧ Sealing system
⑨ Heating bath

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4 Putting into operation

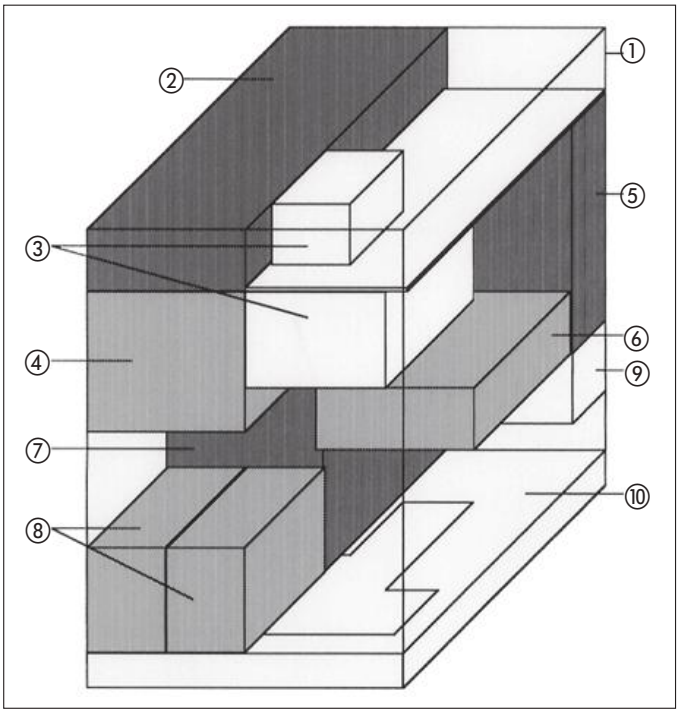


Figure 3: Packaging

4.1 Unpacking

① Outer box
② Accessories package for A, V, C, S, E and CR
③ Rotavapor retainer
④ Condenser package for A, V, C, S, E and CR
⑤ Glass apparatus package for S, E and CR
⑥ Glass apparatus package for E
⑦ Heating bath package
⑧ Packages for the evaporator and collecting flask
⑨ Spacer
⑩ Base for Rotavapor foot



Open the boxes carefully so as not to break any glass!

Keep the original packaging in a safe place in case you ever want to move the Rotavapor.

4.2 Point of use

The unit must stand on a firm, horizontal surface.
It is not to be used in potentially explosive locations.

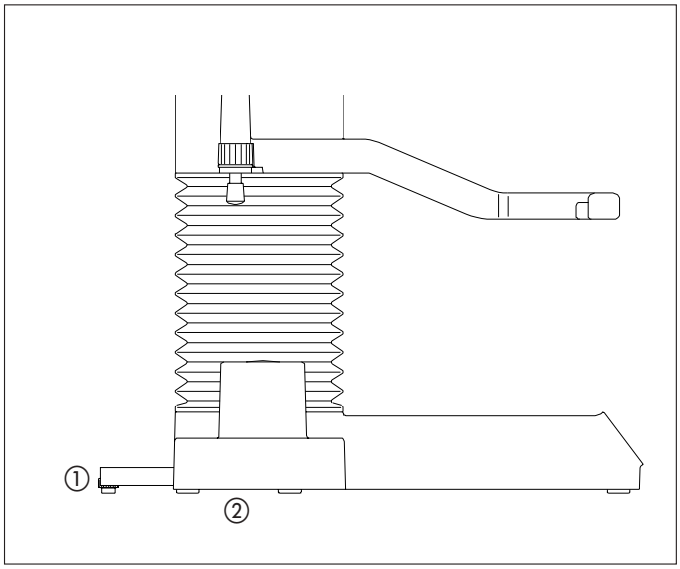


Figure 4: Quick-lift

4.3 Quick-lift with control unit

- On an uneven surface the quick-lift may wobble. This can be corrected by adjusting the levelling screw ①.
- The quick-lift has an additional support at the rear bottom of the tower. This support can be pulled out after loosening the hexagon socket screw ②.

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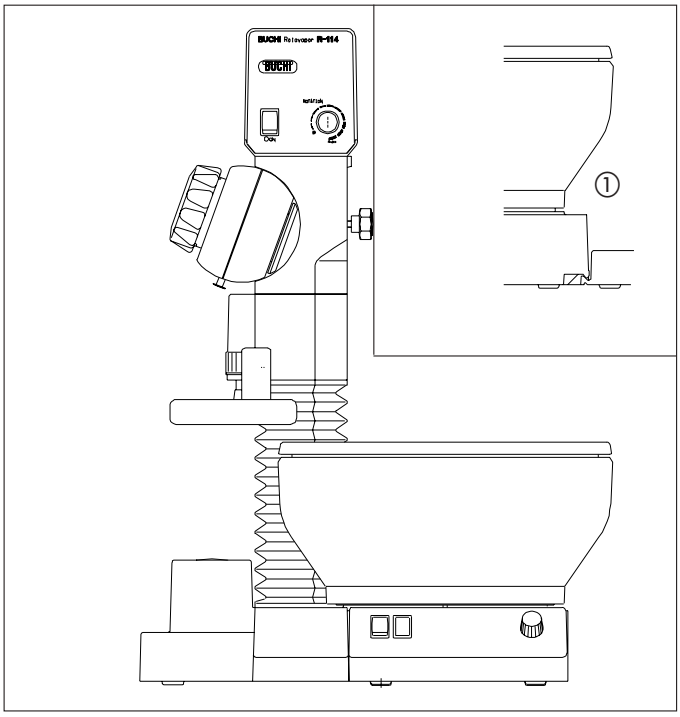


Figure 5: R-114

4.4 Heating bath

The bath is hooked in the guide rail of the quick-lift ①. To use a flask bigger than 2 l, you need only to move the bath on this rail. The bath draws its power supply through a connecting cable from the quick-lift.

Heating medium

Never use the heating bath without a heating medium!
The following heating media are suitable:

- Distilled water for the water baths B-480 and B-481.
- Heat transfer oil for an operating range of up to 250°C or water-soluble polyethylene glycol (PEG) for the oil bath B-485.

It is imperative to add 2 g of borax ($Na_2B_40_7$ x $10H_20$) to the distilled or water in order to prevent corrosion to the bath.

Saving energy

There are various ways to save energy with the heating baths.

Water evaporation can be reduced by placing floats (spheres) in the water bath.
The bath heater will then switch on less frequently. An energy saving of up to 50% is possible with this measure. At the same time you will cut your water consumption by approx. 70%.

It takes little time for the bath to heat up. The heating bath should not be switched on, therefore, until around 10-15 minutes before you want to start with the distillation.

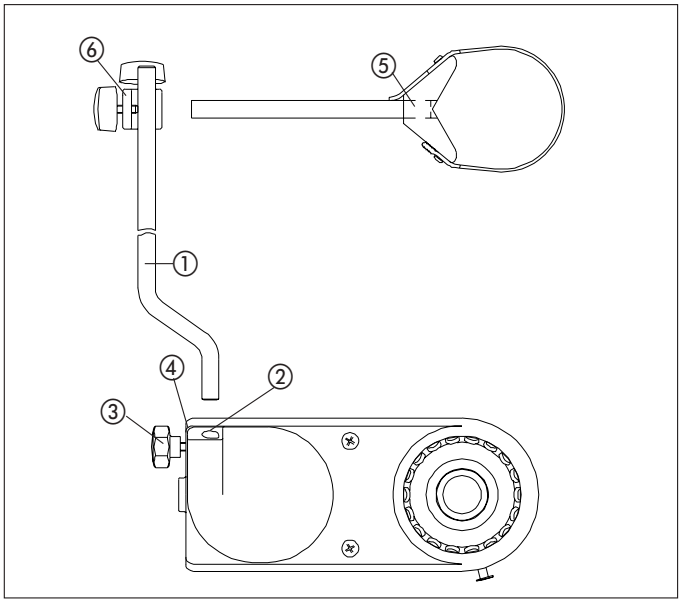


Figure 6: Condenser bracket

4.5 Mounting the bracket

The bracket with the plastic clip is used with glass apparatus V, C, S and CR. Its sole purpose is to provide stability.

Attach the bracket to the drive unit as follows:

- Insert the bracket rod ① in the hole ②
- Using the screw knob ③ in hole ④, tighten the bracket rod firmly in place (see chapter 8.6, Miscellaneous)
- Fasten the clip ⑤ at the height of your choice with cross sleeve ⑥



The bracket is not designed to carry the weight of the glass apparatus on its own. Its sole purpose is to stop the glass apparatus tilting forward or backward when the flanged coupling is released.

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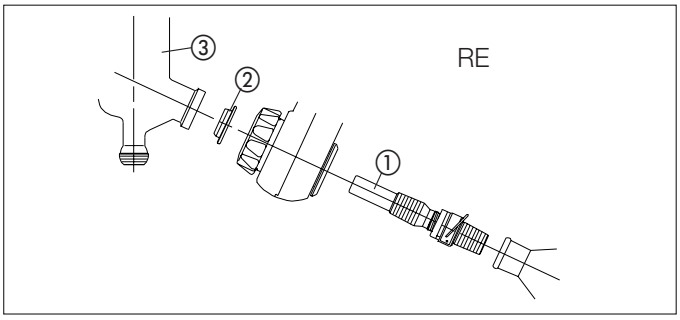


Figure 7: Sealing system RE

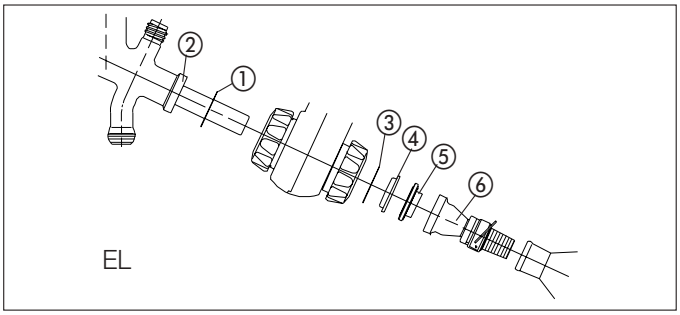


Figure 8: Sealing system EL

4.6 Sealing system

Seals KD-22 and KD-26 are subject to wear and tear. They will need to be replaced occasionally.

To install the seals, carry out the steps in the order numbered in the two drawings.

Converting from sealing system RE to EL or from EL to RE is described in detail in Chapter 6.1, „Converting the sealing system“

To prolong seal life, observe the following points:

The seals:

- **Never apply grease**
- **Never touch the seals with sharp objects**
- **Clean with soapy water or alcohol**
- **Examine regularly**

4.7 Glass apparatus

The different parts which make up a glass apparatus are shown in chapter 8.4, "Glass apparatus".

- All the flanges (condensers, distributors, evaporation flasks, adapters) can be fastened without having to remove the black screw cap. You need to loosen the cap only just enough to be able to push the flange through.
- Glass apparatus V, C, S, E and CR must be secured with the matching condenser bracket.
- The collect flask must be secured with the KS clip.



Use only glassware that is in perfection condition, i.e. without cracks, chips or any other damage.
Examine the glassware each time before use.

All the ground-in connections should be greased for optimum sealing of the system.

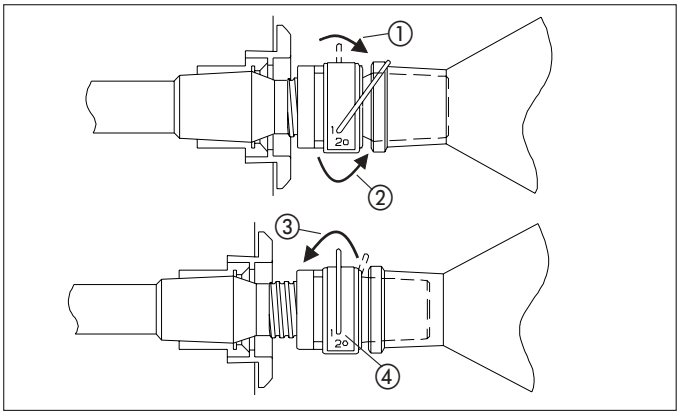


Figure 9: Combi clip

4.8 Combi clip

The patented combi clip performs the following functions:

① Holding the evaporation flask

② Releasing the evaporation flask

③ Removing out a tight vapor duct

④ Holding non-Büchi evaporation flasks (clip in positioning hole 2)

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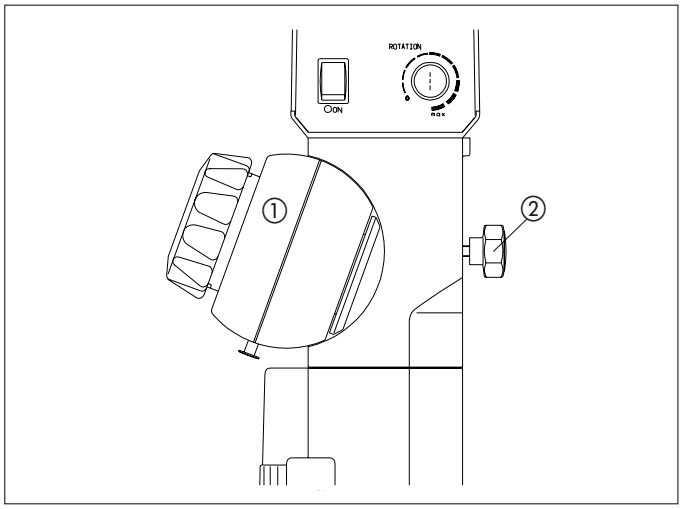


Figure 10: Drive unit

4.9 Angle of immersion in bath

If a Rotavapor application calls for a different angle for the glass apparatus, adjust to the required angle as follows:

- Switch off the unit
- Hold the glass apparatus with one hand and undo the screw knob ② with the other hand
- Move the drive unit ① to the position
- Re-tighten the screw knob ②

Never adjust the immersion angle when the unit is working!
Make sure, that the condenser is straight. If not destillate might be found in the gears and will destroy them.

When the screw knob is released, the glass apparatus can tilt to the left with a risk of breaking. Hold the glass apparatus firmly when you release the screw knob.

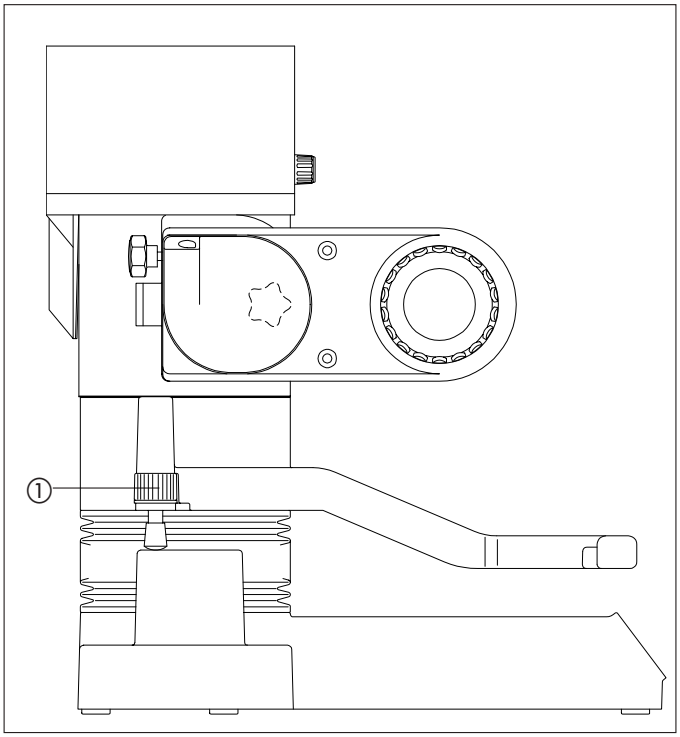


Figure 11: Immersion depth of the evaporation flask

4.10 Depth of immersion of the evaporation flask

The bottom stop of the quick-lift can be varied by adjusting the stop screw ①. You can therefore set the depth at the level to which you want the evaporation flask to be immersed in the bath. Set the bottom stop of the quick-lift so that neither the vapor bushing tube nor the adapter or combi clip contact the bath rim.

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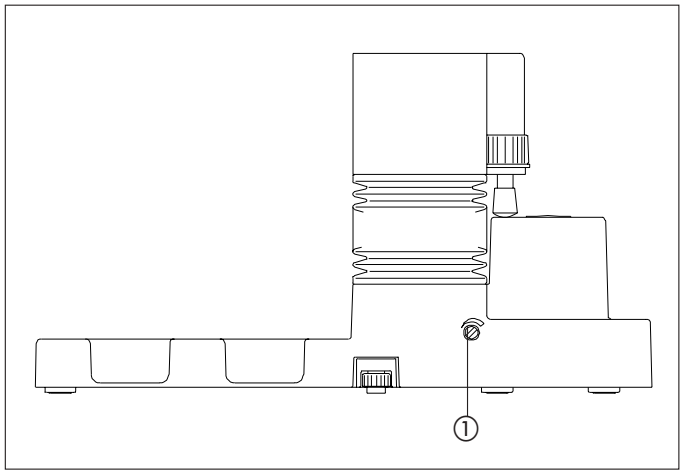


Figure 12: Energy-storage mechanism

4.11 Adjusting the quick-lift energy-storage mechanism

The energy-storage mechanism can be adapted to the weight of the glass apparatus in order to minimize the force input needed to operate the quick-lift.

Turn the screw ① clockwise to increase the power boost, making it easier for you to raise the quick-lift. Turn counterclockwise to reduce this power.

You must turn the screw several times to obtain a noticeable change of power output.

4.12 Hose connections

Cooling water:

- Use GL-14 couplings
- All the hoses used must have the same internal diameter (approx. 6 mm)
- To be safe, secure the hoses with standard hose clips or cable ties
- To save cooling water, it is possible to use a closed-loop cooling system condenser
- Replace brittle hoses

Vacuum:

- Use GL-14 couplings
- All the hoses used must have the same internal diameter (approx. 6 mm)
- All the vacuum hoses must be kept as short as possible
- It is advisable to install a Woulfe bottle or cold trap between the vacuum source and the Rotavapor
- There is no need to secure the hoses
- Replace brittle hoses

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Hose system

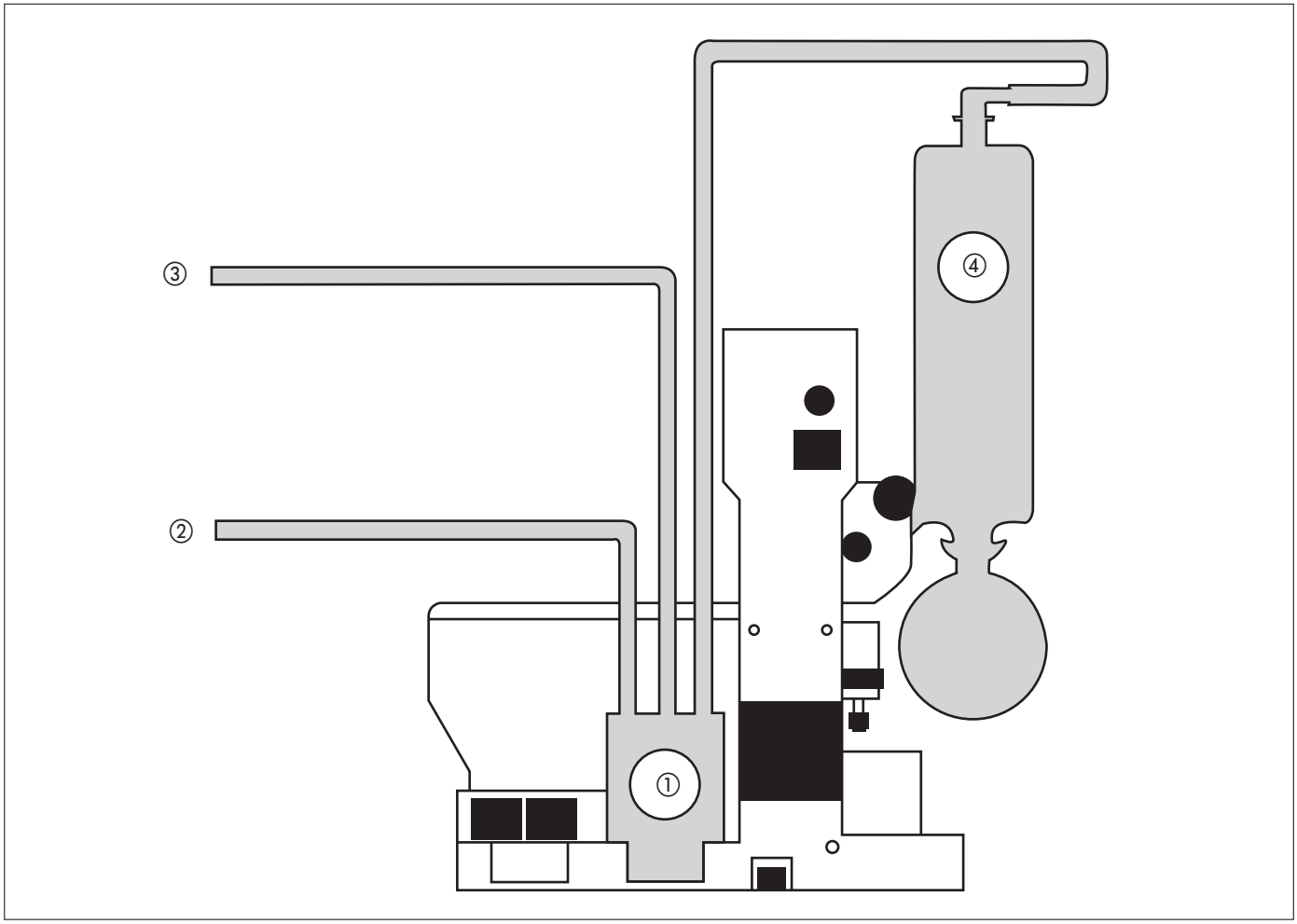


Figure 13: Hose system

① Woulff bottle
② To the vacuum source
③ To the vacuum controller
④ Glass apparatus

The woulff bottle ensures that no impurities, solvent or water (if a water jet pump is used) can pass through the hose system from the vacuum source into the Rotavapor and vice versa.

In the case of glass apparatus type E the vacuum connection is located on the vacuum adapter (Order Code: 01004). (Chapter 8.4, „Glass apparatus“).

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4.13 Electrical connections



Always connect the Rotavapor to a grounded socket-outlet. External couplings and extension cables must incorporate a protective conductor. The protective conductor must never be interrupted as this can cause the unit to become „live“.

Check that the voltage of the socket-outlet corresponds to the value marked on the rating plate.

Cable system

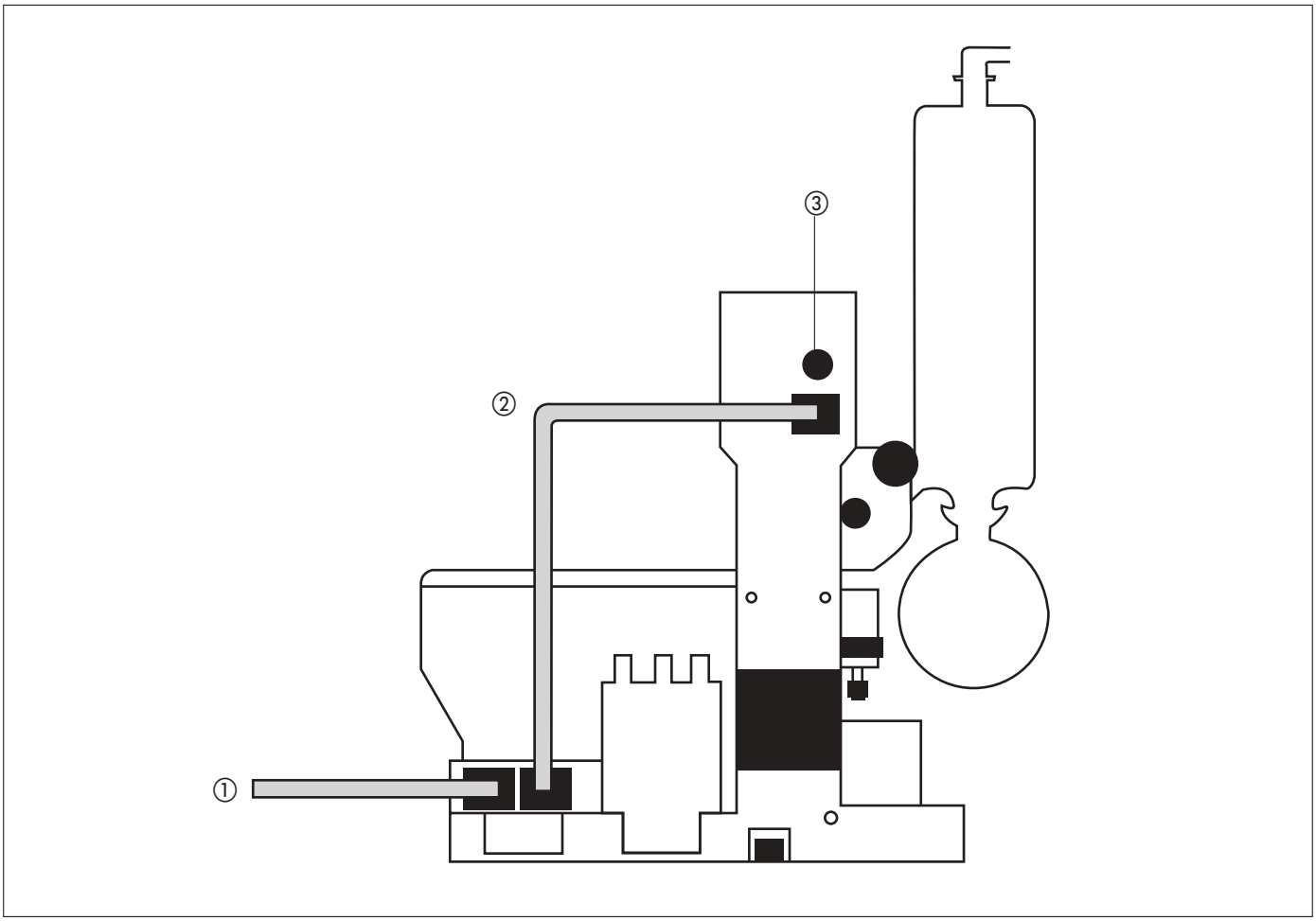


Figure 14: Cable system

① Power connection
② Connecting cable from the bath to the Rotavapor
③ Connection for the temperature sensor

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5 Operation

Make sure that the unit was put into operation correctly as per the instructions in Chapter 4.

If the power switch is turned on, the unit will start up as soon as the power plug is inserted. If the rotation switch is turned on, the evaporation flask will also start to rotate.

5.1 Rotavapor

Connections at rear

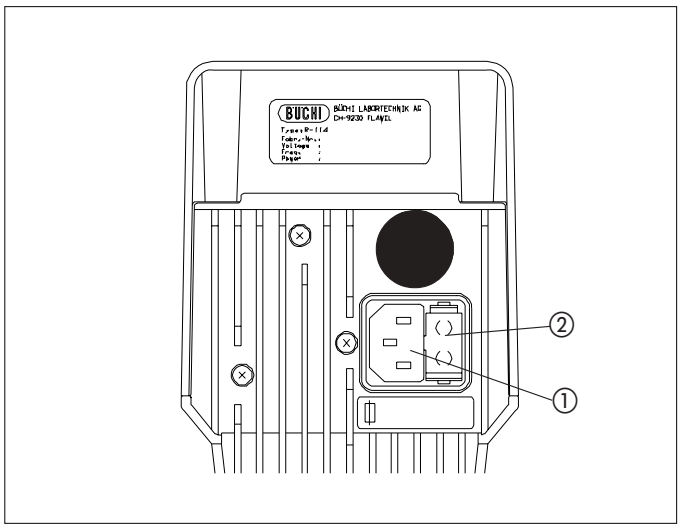


Figure 17: Rear side of R-114

① Power connection and power link to the bath

② Fuse
100/120 V 2AT
230/240 V 1AT

Controls



Figure 18: Front side of R-114

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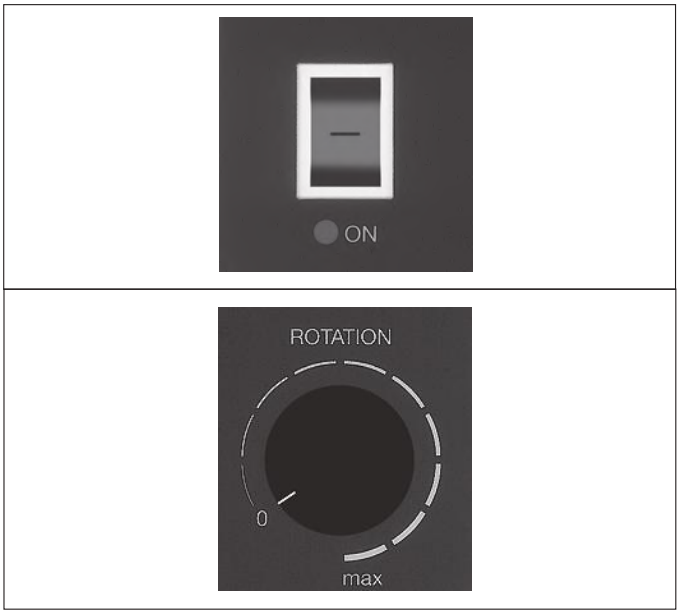


Figure 19: Operating elements

Unit On/Off

Setting the speed of rotation
The speed of rotation is infinitely variable between 5 and 240 rpm.

Hot liquid may be splashed out of the bath as the evaporation flask begins to rotate. Immerse and remove the flask at a low speed of rotation (approx. 50 rpm).

5.2 Heating bath

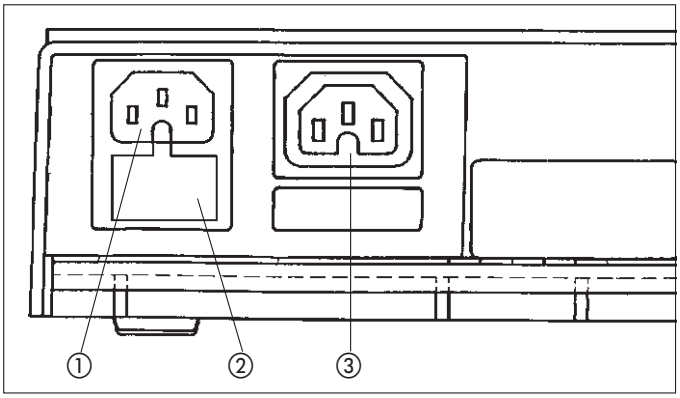


Figure 20: Rear side of bath

If the power switch is turned on, the bath will begin to heat as soon as the main power plug is inserted in a socket-outlet.

① Power connection

② Connection for the cable from the heating bath to the Büchi Rotavapor

③ 1AT fuse (only on the 230V version)

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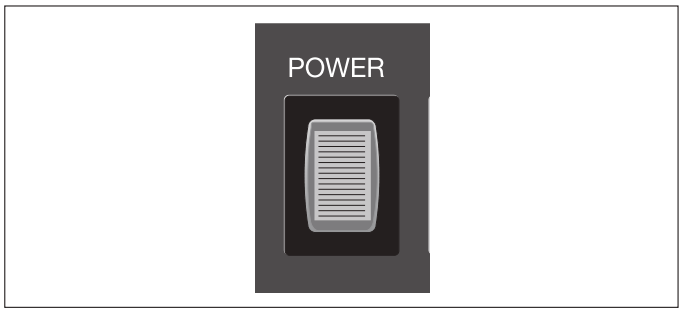


Figure 21: Power switch

Controls

Unit On/Off

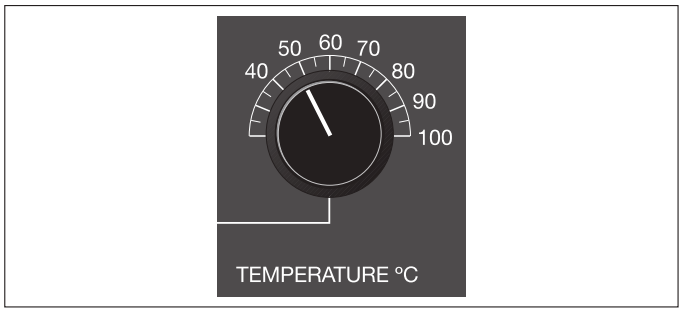


Figure 22: Temperature controller

Setting the bath temperature in °C

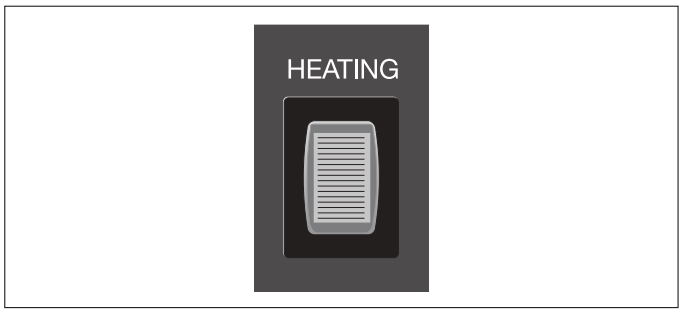


Figure 23: Heating indicator

Heating indicator lamp

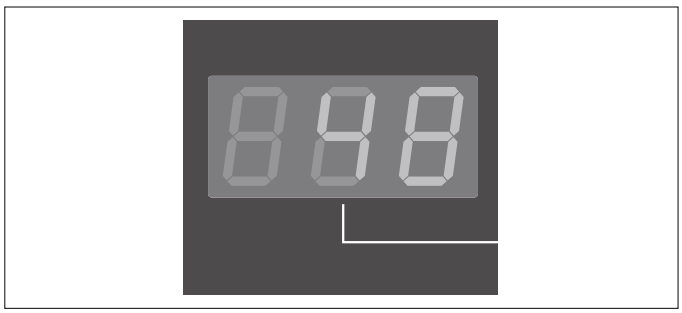


Figure 24: Bath temperature indicator

Indication of the actual bath temperature (only on model B-481)

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5.3 Performing a distillation run

In the following section we shall describe how to start, optimize and end a distillation run on the basis of a checklist.

1. Assemble the unit completely
- All the electrical connections are correct
- All the seals properly installed
- All the ground-in connections greased
- An empty evaporation flask is attached

2. Evacuate the unit in order to test for leaks
(see also Chapter 6.2.2, „Function check“)
(< 3 mbar pressure rise/min.)

3. Set heating bath to 60°C

4. Heating liquid has reached 60°C

5. Cooling water
Have cooling water flow through the condenser at a rate of approx. 40 - 50 l/h and at a temperature not higher than 20°C

6. Fill solution into the evaporation flask
- It is also possible for the solution to be drawn in by vacuum (with glass apparatus A, V, S, C and CR) using the continuos feed tube

7. Start the evacuation process
- Select the pressure so that the boiling point of the solvent is at approx. 40°C —> See the solvent table in Chapter 5.4
- Set the speed of rotation
- Use the quick-lift to immerse the flask in the bath
- When the set vacuum level is reached, wait 1-2 minutes for distillation to start
- If it does not start, you will have to make adjustments (lower the pressure or raise the bath temperature)
- Ideally the condenser should be utilized to between 2/3 and 3/4 of its capacity. If necessary, lower the pressure until this optimum condition is reached.
  → Not possible for every distillation job!

8. If the distillation „goes to sleep“
Change the collection flask to prevent the risk of reverse evaporation. Then continue the distillation as described in point 7

Repeat this process until all the solvents are distilled as required.

When finished, stop the rotation, remove the flask out of the heating bath and vent the system.

If you do not want to carry out the next distillation run immediately, switch off the heating bath to save energy.

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Figure 25: R-114/A

5.4 Selecting the conditions of distillation

For optimum conditions of distillation, the energy transferred to the distillation from the bath must be removed again by the condenser. To guarantee this relationship it is advisable to apply the following rule of thumb:

Cooling water	Vapor	Bath temperature
max 20° C	40° C	60° C

How do you obtain these conditions?

- Set the bath temperature to 60°C
- Set the cooling water to a temperature of no higher than 20°C
- Have the cooling water flow through the condenser at a rate of 40 to 50 l/h
- Select the working vacuum so that the boiling point of the solvent lies is at approx. 40°C. Consult the solvent table (on the next page) for the corresponding pressure.

Advantages of a bath temperature of 60°C:

- You can change the evaporation flask without risk of scalding
- Water does not evaporate from the heating bath at a high rate
- The heating bath energy is utilized with optimum efficiency

Optimierung der Destillation:
Depending on the solvent to be distilled, it may be necessary to optimize the distillation by making certain re-adjustments.
Do not make any re-adjustments, however, before the heating bath reaches a temperature of 60°C.

The goal:
Condensation of solvent between 2/3 and 3/4 of the cooling coil.

There are two basic ways to optimize the distillation:

1. **Lower the pressure slowly**
   The bath must have reached a temperature of 60°C!
(the boiling point is lowered and T_1 is raised, resulting in a higher efficiency of distillation)

or

2. **Raise the bath temperature**
   (T_1 is raised, resulting in a higher efficiency of distillation)
When you raise the bath temperature, not all the additional energy is channelled into the distillation. More energy is also radiated into the surroundings on account because of the bigger temperature differential between the bath temperature and the ambient temperature.

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5.4 Solvent table

Solvent	Formula	Molary weight in g/mol	Energie of evaporation in J/g	Boiling point in °C at 1013 mbar	Tightness in g/cm³	Vacuum in mbar for boiling at 40 °C
Acetic acid	$C_2H_4O_2$	60.0	695	118	1.049	44
Aceton	C_3H_6O	58.1	553	56	0.790	556
N-Amylalcohol, n-Pentanol	$C_5H_{12}O$	88.1	595	37	0.814	11
Benzene	C_6H_6	78.1	548	80	0.877	236
n-Butanol, tert. Butanol	$C_4H_{10}O$	74.1	620	118	0.810	25
2-Methyl-2-Propanol	$C_4H_{10}O$	74.1	590	82	0.789	130
Carbontetrachloride, tetra Chloromethane	CCl_4	153.8	226	77	1.594	271
Chlorobenzene	C_6H_5Cl	112.6	377	132	1.106	36
Chloroform	$CHCl_3$	119.4	264	62	1.483	474
Cyclohexane	C_6H_{12}	84.0	389	81	0.779	235
Diethyl ether	$C_4H_{10}O$	74.0	389	35	0.714	850*
1,2,-Dichloroethane	$C_2H_4Cl_2$	99.0	335	84	1.235	210
1,2,-Dichloroethylene (cis)	$C_2H_2Cl_2$	97.0	322	60	1.284	479
1,2,-Dichloroethylene (trans)	$C_2H_2Cl_2$	97.0	314	48	1.257	751
Di isopropyl ether	$C_6H_{14}O$	102.0	318	68	0.724	375
Dioxane	$C_4H_8O_2$	88.1	406	101	1.034	107
DMF (Dimethylformamide)	C_3H_7NO	73.1		153	0.949	11
Ethanol	C_2H_6O	46.0	879	79	0.789	175
Ethyl acetat	$C_4H_8O_2$	88.1	394	77	0.900	240
Heptane	C_7H_{16}	100.2	373	98	0.684	120
Hexane	C_6H_{14}	86.2	368	69	0.660	335
Isopropyl alcohol	C_3H_8O	60.1	699	82	0.786	137
Isoamyl alcohol, 3-Methyl-1-Butanol	$C_5H_{12}O$	88.1	595	129	0.809	14
Methyl ethyl ketone	C_4H_8O	72.1	473	80	0.805	243
Methanol	CH_4O	32.0	1227	65	0.791	337
Methylenechloride, Dichloromethane	CH_2Cl_2	84.9	373	40	1.327	850*
Pentane	C_5H_{12}	72.1	381	36	0.626	850*
n-Propyl alcohol	C_3H_8O	60.1	787	97	0.804	67
Pentachlorethane	C_2HCl_5	202.3	201	162	1.680	13
1,1,2,2,-Tetrachloroethane	$C_2H_2Cl_4$	167.9	247	146	1.595	35
1,1,1,-Trichloroethane	$C_2H_3Cl_3$	133.4	251	74	1.339	300
Tetrachloroethylene	C_2Cl_4	165.8	234	121	1.623	53
THF (Tetrahydrofurane)	C_4H_8O	72.1		67	0.889	357
Toluene	C_7H_8	92.2	427	111	0.867	77
Trichloroethylene	C_2HCl_3	131.3	264	87	1.464	183
Water	H_2O	18.0	2261	100	1.000	72
Xylene (Isomers mixture)	C_8H_{10}	106.2	389			25
(o)				144	0.880	
(m)				139	0.864	
(p)				138	0.861	

Table 2: Solvents * only possible when cooling water is 20°C

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5.5 Malfunctions

Malfunction	Possible cause	Remedy
Unit does not work	Power switch off	Switch on unit
	Unit not connected to mains supply	Connect up power and link cable
	Fuse in instrument socket defective	Replace fuses at rear of instrument
Bath does not heat up	Power switch off	Switch on unit
	Unit not connected to mains supply	Connect up power cable
	Fuse defective (only with 230/240V)	Replace fuses at rear of instrument
	Overtemperature cut-out triggered	Replace defective heater
		Fill bath with water
Flask does not rotate	Rotation set to 0	Turn button clockwise until rotation starts
	Hall sensor on drive unit defective	Call customer service
Flask does not rotate evenly but intermittently	Distance between Hall sensor and belt pulley in drive unit too big	Call customer service
System is leaking	Ground-in connections not covered with grease	Grease ground-in connections
	Threaded couplings poorly screwed or defective	Check threaded couplings
	Leaky (brittle) hoses	Replace hoses
	Sealing system installed incorrectly	Check sealing system
	Seal (KD-22 or KD-26) defective or warn	Replace seal
Indicator flashes	Indicator selector switch set to °C but no temp.	Attach temperature sensor (bath or vapor)
	Temperature sensor defective	Replace temperature sensor

Table 3: Malfunctions

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6 Maintenance

Compulsory inspection and maintenance
All regulations aimed at keeping the Rotavapor in good working order must be observed. They include cleaning the unit at regular intervals and examining it for any signs of damage.

6.1 Converting the sealing system



You must use the special pin ⑦ to fit the EL adapter as otherwise there is a risk of injuring your hand (sharp edges on the adapter).

When carrying out these conversions, take care to dismantle and fit the vapor duct correctly. Follow the instructions in Chapter 4.8, „Combi clip“.

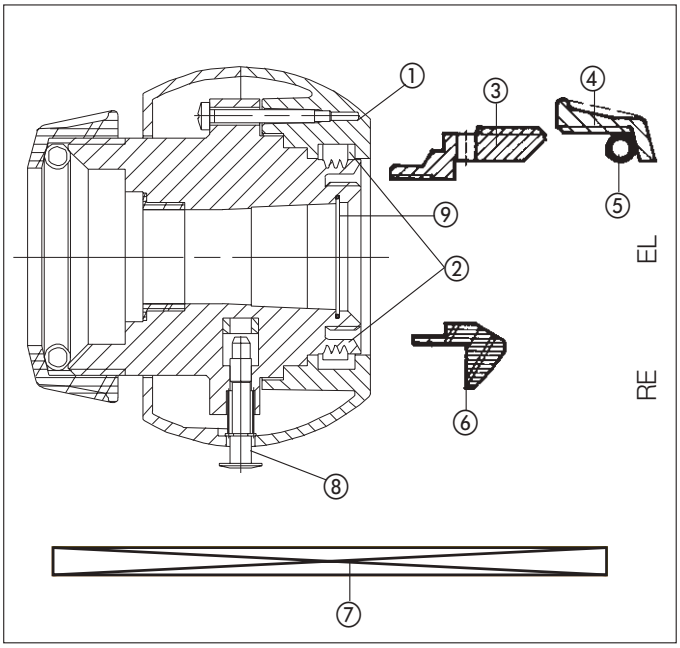


Figure 26: Cross section of bearing

Converting from the RE (stationary) to the EL (rotating) sealing system:

- Use a plastic spatula to ease out the cover ring ⑥
- Remove the retaining spring ⑨
- Press in the lock button ⑧
- Screw the EL adapter ③ into the hole ②
- Tighten the EL adapter ③ using the pin ⑦
- Screw on the threaded flange ④ with spring ⑤

Converting from the EL (rotating) to the RE (stationary) sealing system:

- Press in the lock button ⑧
- Unscrew the threaded flange ④ with spring ⑤
- Unscrew the EL adapter using the pin ⑦
- Insert the retaining spring ⑨ in the groove
- Insert the cover ring ⑥ in the hole ②

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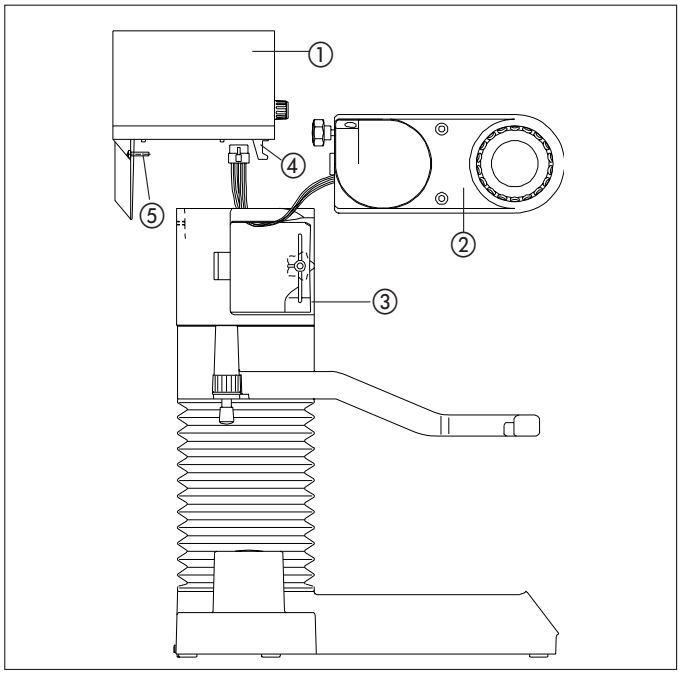


Figure 27: Quick-lift

6.2 Replacing the electronic control head

Removing the head ①:
- Switch off the unit and pull out the power plug
- Unscrew and remove the head fixing screw ⑤
- Carefully lift up the control head ① from the back and tilt forward to the front
- Pull out the plug ④

Attaching the control head ①:
- Insert the plug ④
- Move the head in from the front and then lower to the back
- Fasten the head ① with the head fixing screw ⑤
- Re-connect the unit to the main power

6.3 Replacing the drive unit

Removing the drive unit ②:
- Switch off the unit and pull out the power plug
- Remove the electronics control head
- Release the screw knob ③
- Carefully lift the drive unit out ② of the housing
- Pull the drive unit plug ④ off the control head ①

Attaching the drive unit ②:
- Fasten the drive unit ② in the position you want using the screw knob ③
- Insert the drive unit plug ④ in the control head ①
- Attach the electronics control head

6.4 Cleaning and inspection

Glass components

Wash the glass components with commercial detergents (e.g. a mild soap solution). Remove stubborn dirt (e.g. algae) from inside the condenser coils with suitable cleaning agents (if necessary, leave for a while to take effect). After cleaning and completely drying the glass components, you must examine each item for signs of chipped areas or cracks. The glass components of a rotary evaporator are under vacuum when in use - it is important, therefore, to carry out this visual examination conscientiously!

Vapor ducts

Follow the same procedure as for the other glass components.

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Adapters
Follow the same procedure as for the other glass components.

Seals KD-22 and KD-26
Examine the seal and replace with a new seal if you discover signs of severe wear.

- You will prolong the life of the seal if you clean it by rinsing and drying with a soft cloth. This will also prevent solvent from entering into the drive unit.
- Clean the seal and glass component regularly, especially after bumping and working with crystalline products.
- Do not tilt the seal when fitting or removing it.
  Always move it on the glass component at right angles to the axis of rotation. Do not damage the sealing lip.
- Do not apply grease to the seal (fine abrasions and grease act like grinding paste).

Case/housing
Clean the case with a damp cloth but do not use detergents. Examine for defects (controls, plug).

Hose connections
Examine the hose connections and replace with suitable new hoses if you discover any signs of cracking or brittleness.

Heating bath
The heating bath requires no real maintenance but it should be cleaned from time to time. It is time to clean the bath if:

- there are signs of lime deposits, dirt or rost formation in the water bath,
- the oil in the oil bath changes its color or viscosity, polymerizes or becomes dirty.

The bath must be emptied in order to clean it.

Minor deposits of lime can be removed with non-abrasive detergents (e.g. a bathroom cleaning agent).
Stubborn deposits will need to be dissolved with dilute acetic acid. Rinse out the bath thoroughly when finished.
Clean the housing with a damp rag, using no solvents, and examine for defects (controls, plug).

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6.5 Function test

Assemble the unit with dry and solvent-free glass components.

- **Vacuum tightness**
  Evacuate the unit with the flask rotating.
  If a pressure gauge is available, check whether the vacuum is constant. To do so, interrupt the vacuum line between the vacuum source and the pressure gauge by carefully kinking the hose. The rise in pressure should amount to no more than less than 3 mbar per minute.

- **Adjustability of the speed of rotation**
  Turn the speed control knob slowly from the minimum to the maximum setting (in clockwise direction). The motor should rotate in every position.

6.6 Inspection intervals

Just how often regular inspections should be carried out on the unit depends on its frequency of use and the importance of the particular application (e.g. risk of failure).
A three-month cycle is normal for many customers.

6.7 Customer service



Only authorized service technicians are allowed to intervene with the Rotavapor. They have undergone thorough professional training and are acquainted with the hazards that ensue from ignoring the safety precautions.

Büchi service centers have a model-specific service manual that is supplied only to authorized personnel.

The addresses of Büchi service centres are listed on the back cover of these operating instructions. Please contact these centres if you have any technical questions, problems with an application or trouble with your Rotavapor.

You are welcome to contact the Büchi service centers for:
- Spare parts service (please quote the item numbers printed in the operating instructions)
- Repair service
- Maintenance service
- Technical consulting. Please contact the Büchi agent in your country by phone, letter, fax or telex.

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7 Taking out of operation



All hoses and electrical connections must be disconnected before transporting the unit. The bath, the glass components and the quick-lift must each be transported separately. If you want to transport the quick-lift unpacked, make sure it is in its extended position as otherwise it could shoot up unexpectedly.

The unit must be emptied of any harmful substances and cleaned thoroughly (Chapter 6.4, „Cleaning and inspection“). This will rule out all risk of persons suffering injury from harmful materials.

Storage / Transportation
Store the unit in a dry place in its original packaging.

Disposal
To help you dispose of the unit in an environmentally-friendly way, we have listed the materials of the main components in Chapter 9.2 „Materials used“. You are thus able to sort the parts accordingly for recycling. We wish to point out that there are regional and local regulations and laws in force for the disposal of electronic components.



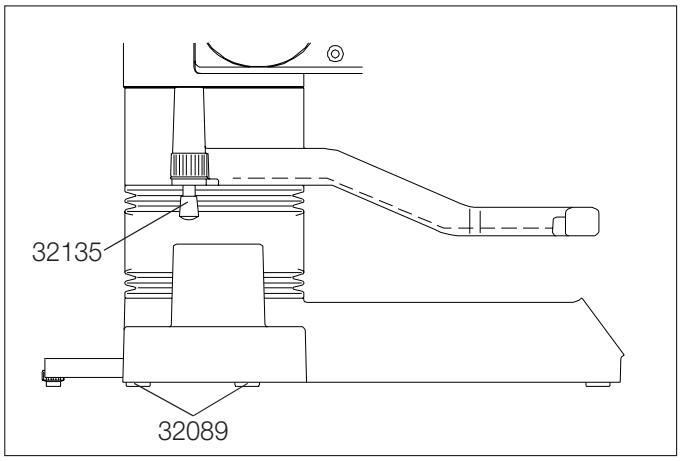
The tensioned spring in the energy-storage mechanism is a source of danger. The energy-storage mechanism should only be opened by specialists who are acquainted with the hazards involved.

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8 Replacement parts

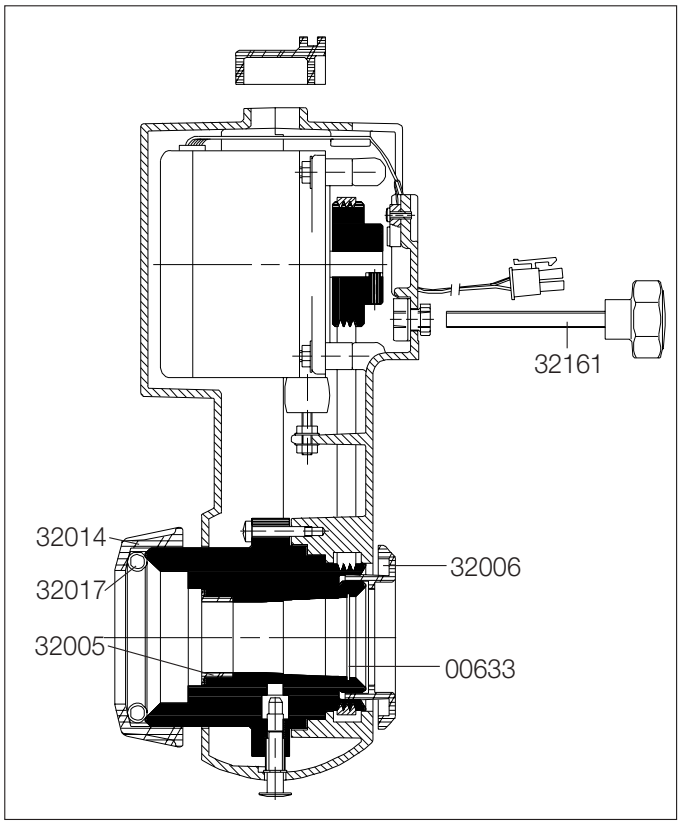


The Rotavapor's operational safety and serviceability are only guaranteed using original Büchi accessories. The use of other manufacturer's replacement parts and accessories is only permitted with the express consent of the manufacturer.
The replacement parts catalogue may only be used in conjunction with Chapter 5 and 7 of these operating instructions for installation and dismantling purposes. Third parties are not allowed access to or possession of this manual. The use of this manual for production purposes is prohibited.
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8.1 Quick-lift

Quick-lift, compl.	**32373**
Foot	**32089**
Rubber buffer	**32135**

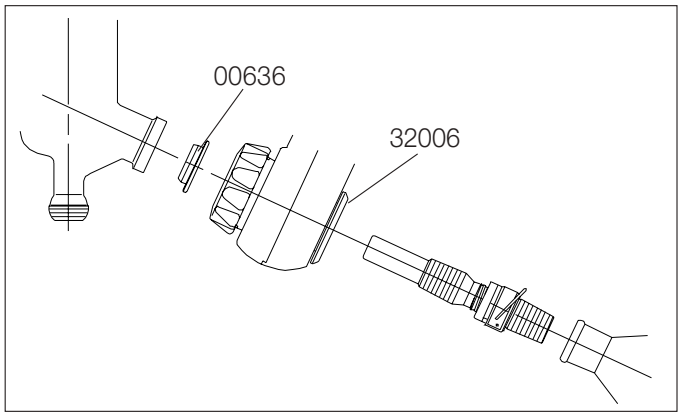


8.2 Drive unit

Drive unit, compl. RE	**32371**
Drive unit, compl. EL	**32372**
Retaining spring	**00633**
Centrifugal ring	**32005**
Cover ring	**32006**
Threaded flange	**32014**
Spring insert	**32017**
Knob screw	**32161**

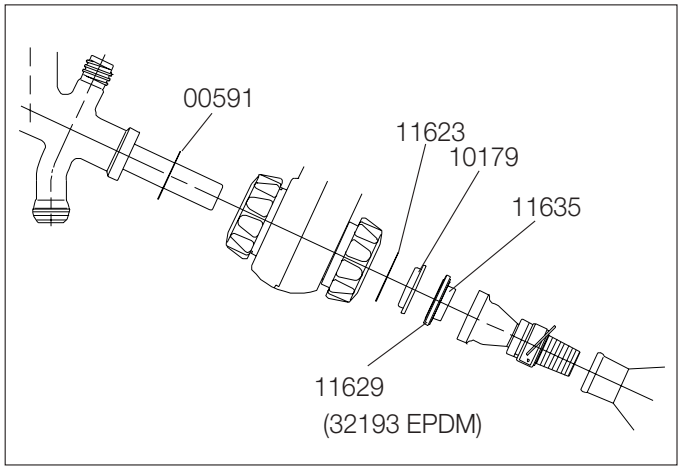
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8.3 Sealing systems



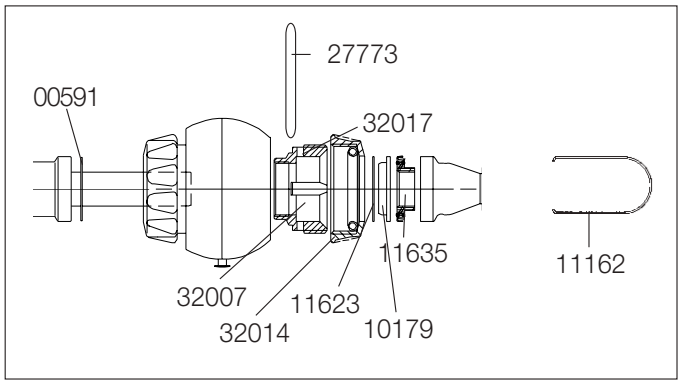
RE-Sealing system

KD-22 seal	**00636**
Cover	**32006**

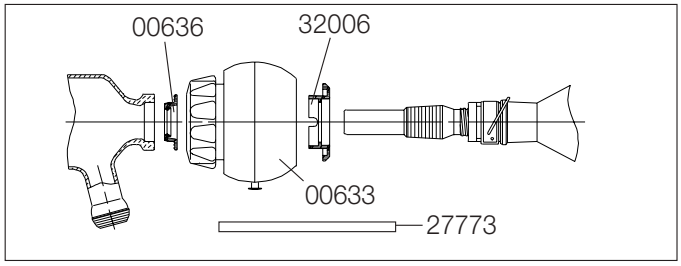


EL-Sealing system

Seating ring for distribution head	**00591**
KD-26 seal	**10179**
Supporting ring, stainless steel	**11623**
FPM O-ring	**11629**
Guard ring with 2 O-rings	**11635**
EPDM O-ring (optional)	**32193**

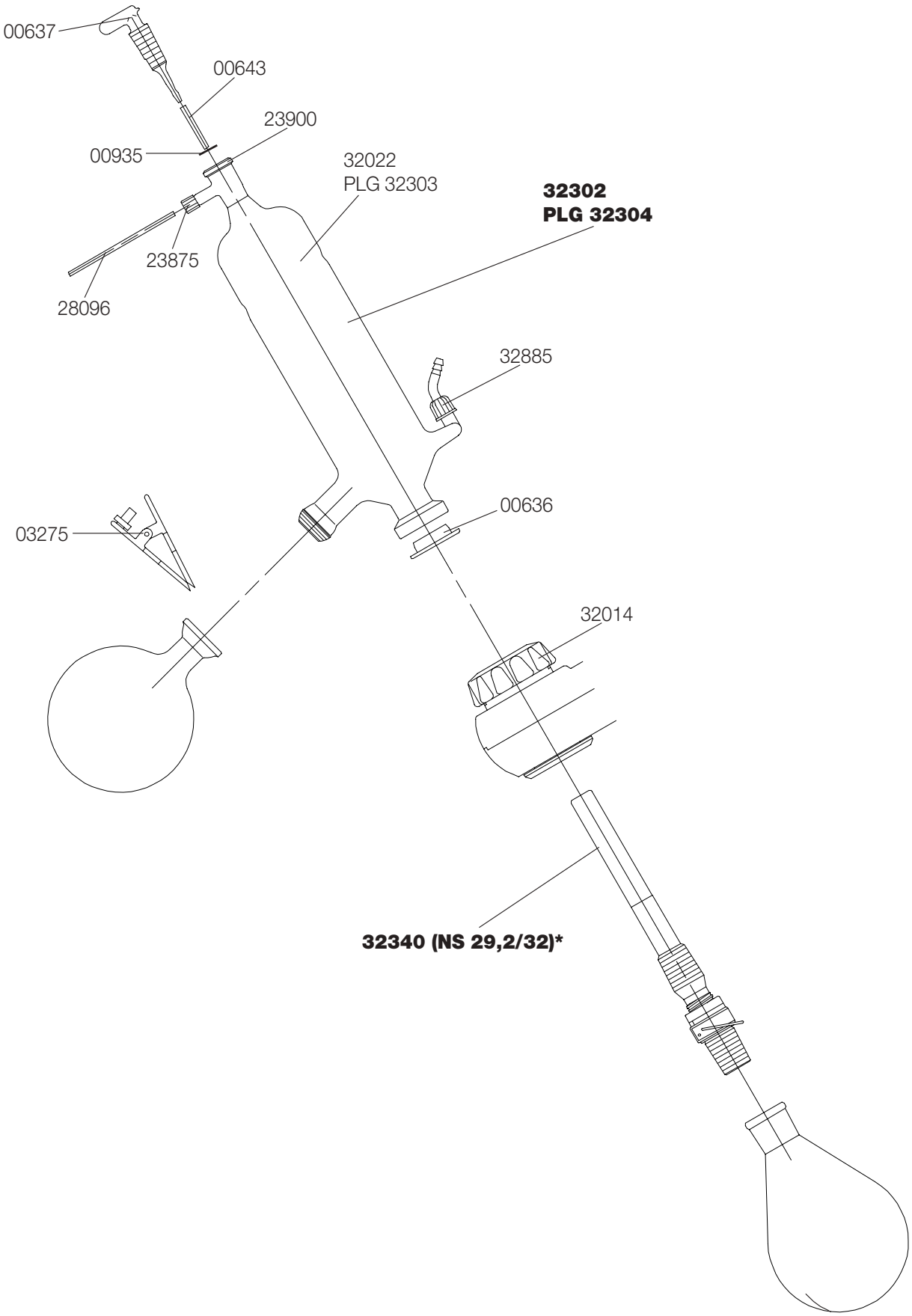


RE → EL conversion set, compl.	**32299**
Seating ring for distributor	**00591**
KD-26 seal	**10179**
Extraction tool	**11162**
Supporting ring, stainless steel	**11623**
Guard ring with 2 O-rings	**11635**
Assembly pin	**27773**
EL Adapter	**32007**
Threaded flange	**32014**
Spring insert	**32017**



EL → RE conversion set, compl.	**32160**
Fixing spring	**00633**
KD-22 seal	**00636**
Assembly pin	**27773**
Cover ring	**32006**

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8.4 Glass apparatus

Glass apparatus A

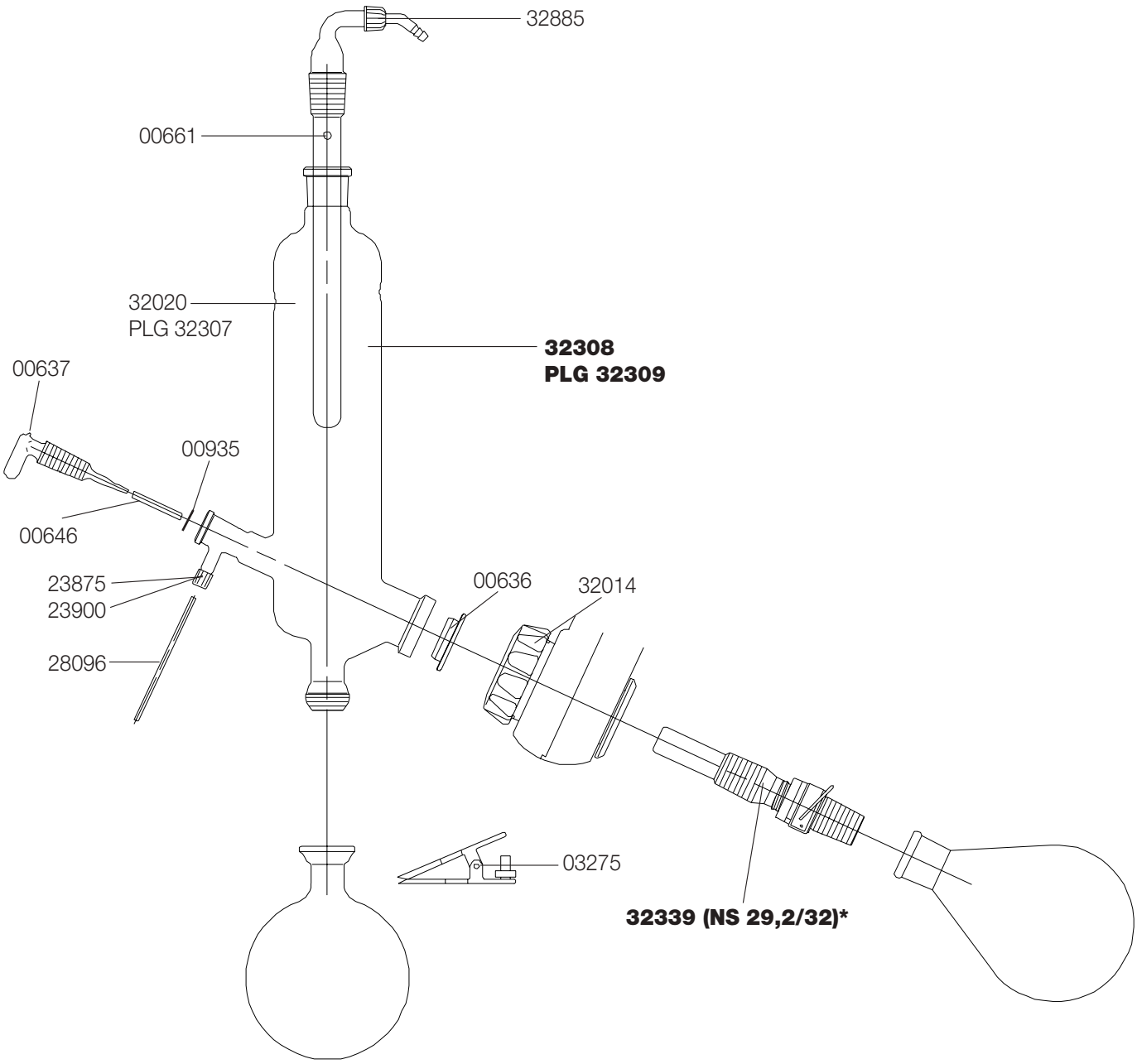
32300	**Glass apparatus A compl.** (as per drawing with 1 l evaporation flask and 1 l collecting flask)
00636	KD-22 seal
00637	Glass plug NS 18.8/38
00643	PTFE hose 460 mm
03275	KS clip
23875	Screw cap GL-10
23900	O-ring 2,7 x 3 mm
28096	PTFE hose, 600 mm
32014	Threaded flange
32022	Diagonal condenser A (incl. 3 x 32885 + 23875 + 23900)
32302	**Diagonal condenser A, compl.** (00636+00637+00643+28096+32022)
32340*	**Vapor duct with combi clip, NS 29.2/32, 280 mm compl.**
32885	Hose connection GL-14, bent, compl.

PLASTIC + GLAS (PLG)

32301	**Glass apparatus A, compl., PLG** (as per drawing with 1 l evaporation flask uncoated and 1 l collecting flask coated)
32303	Diagonal condenser A PLG (3 x 32885+23875+23900)
32304	**Diagonal condenser A, compl., PLG** (00636+00637+00643+28096+32303)

*** See Chapter 8.5 „Glass apparatus“ for other standard tapered ground-glass sizes**

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Glass apparatus V

32305	**Glass apparatus V compl.** (as per drawing with 1 l evaporation flask and 1 l collecting flask)
00636	KD-22 seal
00637	Glass plug NS 18.8/38
00646	PTFE hose 300 mm
00661	Vacuum socket
00935	PTFE disk (drip disk)
03275	KS clip
23875	Screw cap GL-10
23900	O-ring 2.7 x 3 mm
25435	Threaded cap GL-14
28096	PTFE hose, 600 mm
32014	Threaded flange
32020	V-condenser (incl. 2 x 32885, 23875, 23900, 25435)
32308	**V-condenser, compl.** (00636+00637+00646+00935+28096+32020)
32339*	**Vapor duct with combi clip, NS 29.2/32, 175 mm compl.**
32885	Hose connection GL-14, bent, compl.

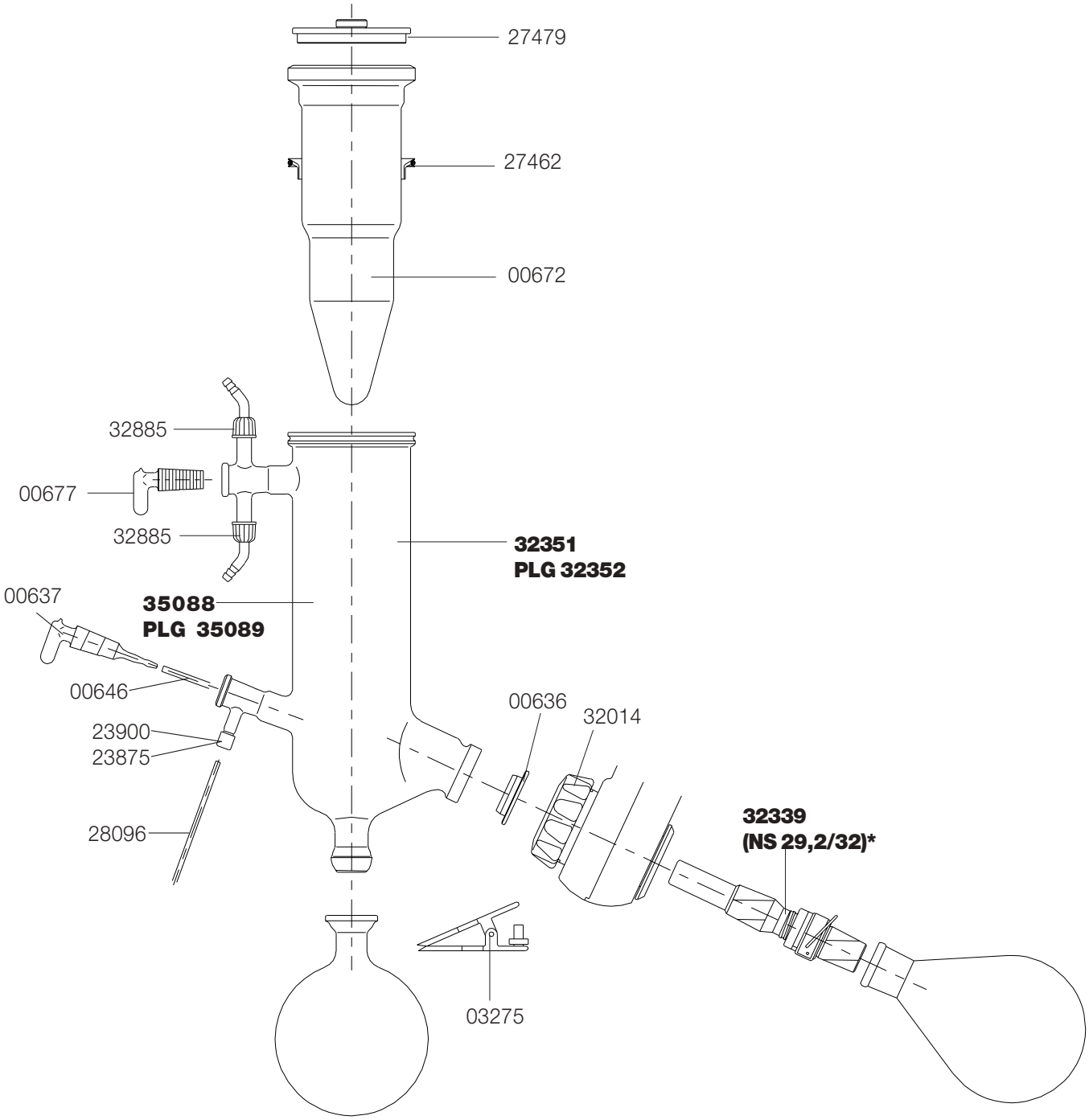
PLASTIC + GLAS (PLG)

32306	**Glass apparatus V, compl., PLG** (as per drawing with 1 l evaporation flask coated and 1 l collecting flask coated)
32307	V-condenser PLG (2 x 32885, 23875, 23900, 25435)
32309	**V-condenser, compl.** (00636+00637+00646+00935+28096+32307)

*** See Chapter 8.5 „Glass apparatus“ for other standard tapered ground-glass sizes**

See Chapter 8.6 „Miscellaneous“ for the condenser bracket

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Glass apparatus C

32315	**Glass apparatus C, compl.** (as per drawing with 1 l evaporation flask and 1 l collecting flask)
00636	KD-22 seal
00637	Glass plug NS 18.8/38
00646	PTFE hose 300 mm
00672	Cooling finger
35088	Cold trap outer mantle (incl. 2 x 32885)
00677	Glass plug NS 18.8/38
03275	KS clip
23875	Screw cap GL-10
23900	O-ring 2.7 x 3 mm
27462	PTFE/Viton seal, compl.
27479	Lid for the cold trap
28096	PTFE hose, 600 mm
32014	Threaded flange
32339*	**Vapor duct with combi clip, NS 29.2/32, 175 mm compl.**
32351	**Cold trap, compl.** (00636+00672+00673+00677+27462+27479)
32885	Hose connection GL-14, bent, compl.

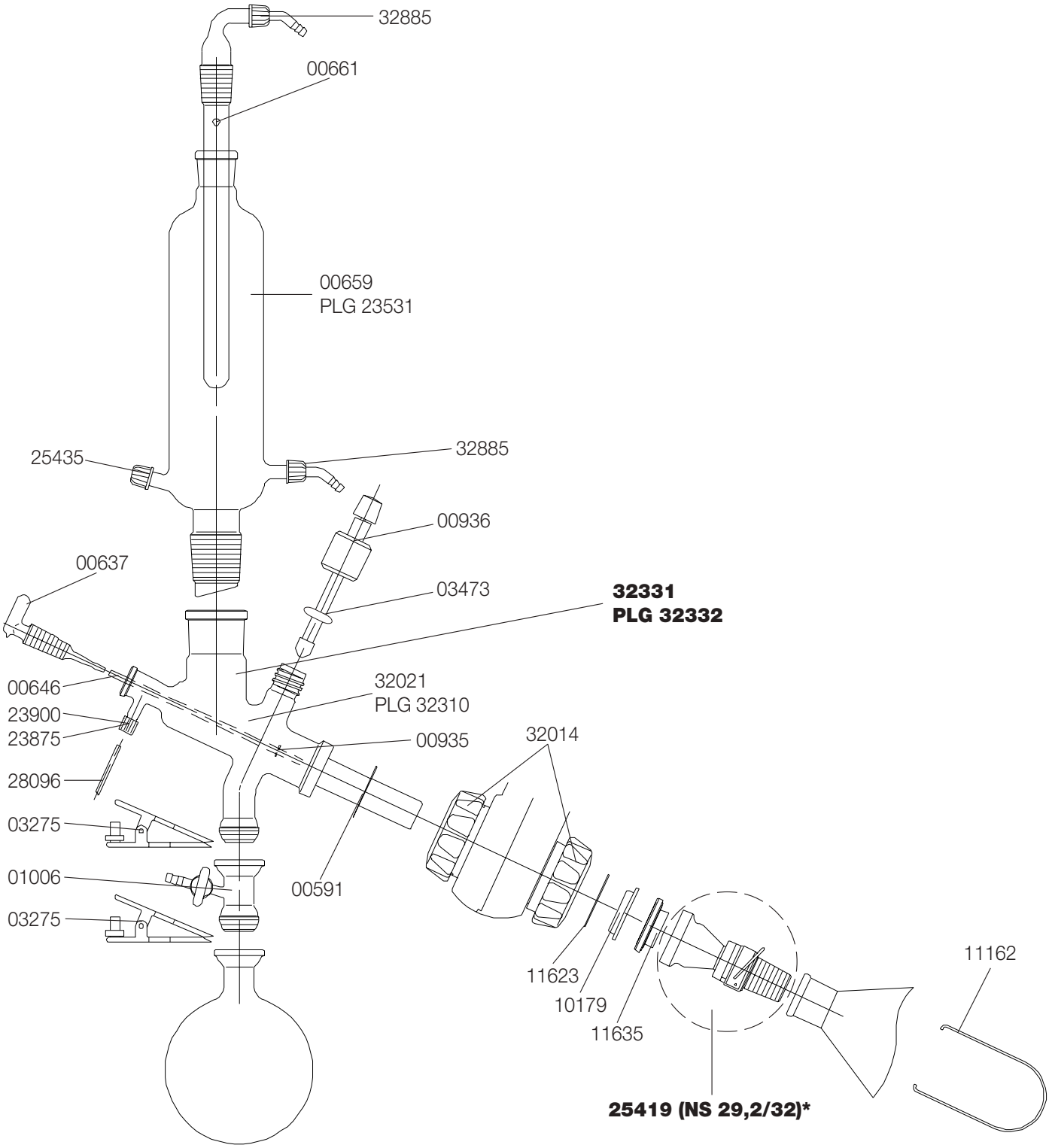
PLASTIC + GLAS (PLG)

32316	**Glass apparatus C, compl., PLG** (as per drawing with 1 l evaporation flask uncoated and 1 l collecting flask coated)
35089	Cold trap outer mantle PLG (incl.2 x 32885)
32352	**Cold trap, compl. PLG** (00636+00672+00677+23532+27462+27479)

*** See Chapter 8.5 „Glass apparatus“ for other standard tapered ground-glass sizes**

See Chapter 8.5 „Glass apparatus“ for suspendable cooling coils
See Chapter 8.6 „Miscellaneous“ for condenser bracket

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Glass apparatus S

32319	**Glass apparatus S, compl.** (as per drawing with 1 l evaporation flask and 1 l collecting flask, without vacuum adapter 01006)
00591	Seating ring for distributor
00637	Glass plug NS 18.8/38
00646	PTFE hose 300 mm
00659	Vertical condenser S (incl. 2 x 32885+25435)
00661	Vacuum socket
00935	PTFE disk (drip disk)
00936	Shut-off valve
01006	Vacuum adapter with cock (option)
03275	KS clip
10179	KD-26 seal
11162	KD-26 extraction tool
11623	Supporting ring, stainless steel
11635	Guard ring with 2 O-rings
23875	Screw cap GL-10
23900	O-ring 2.7 x 3 mm
25419*	**Adapter with combi clip, NS 29.2/32 compl.**
25435	Threaded cap GL-14
28096	PTFE hose, 600 mm
32014	Threaded flange
32021	Distributor (incl. 23875+23900)
32331	**Distributor, compl.** (00591+00637+00646+00935+00936+28096+32021)
32885	Hose connection GL-14, bent, compl.

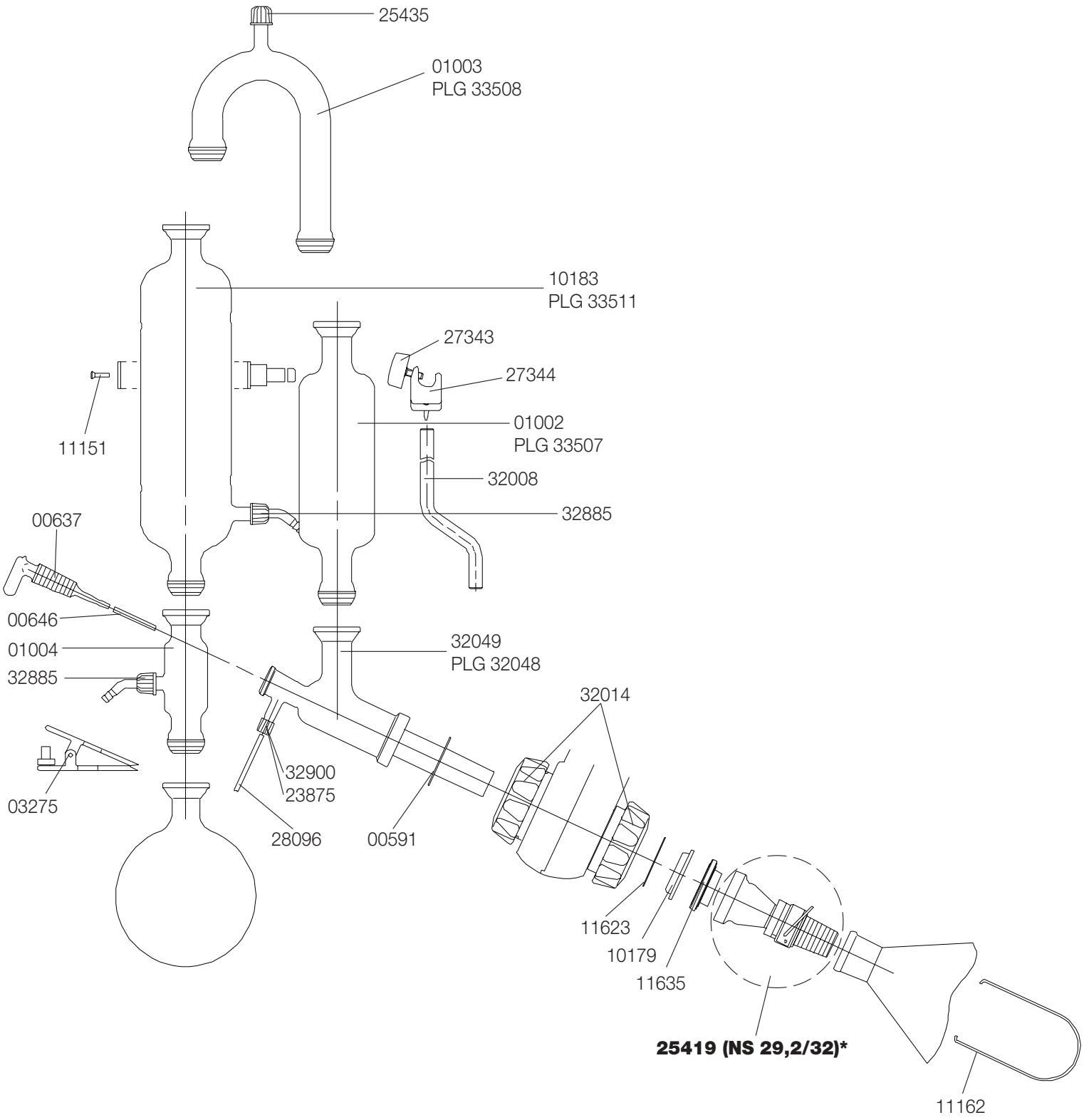
PLASTIC + GLAS (PLG)

32320	**Glass apparatus S, compl., PLG** (as per drawing with 1 l evaporation flask coated and 1 l collecting flask coated, without vacuum adapter 01006)
23531	Vertical condenser S PLG (incl. 2 x 32885+25435)
32310	Distributor PLG (incl. 23875+23900)
32332	**Distributor, compl., PLG** (00591+00637+00646+00935+00936+28096+32310)

*** See Chapter 8.5 „Glass apparatus“ for other standard tapered ground-glass sizes**

See Chapter 8.6 „Miscellaneous“ for condenser bracket

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Glass apparatus E

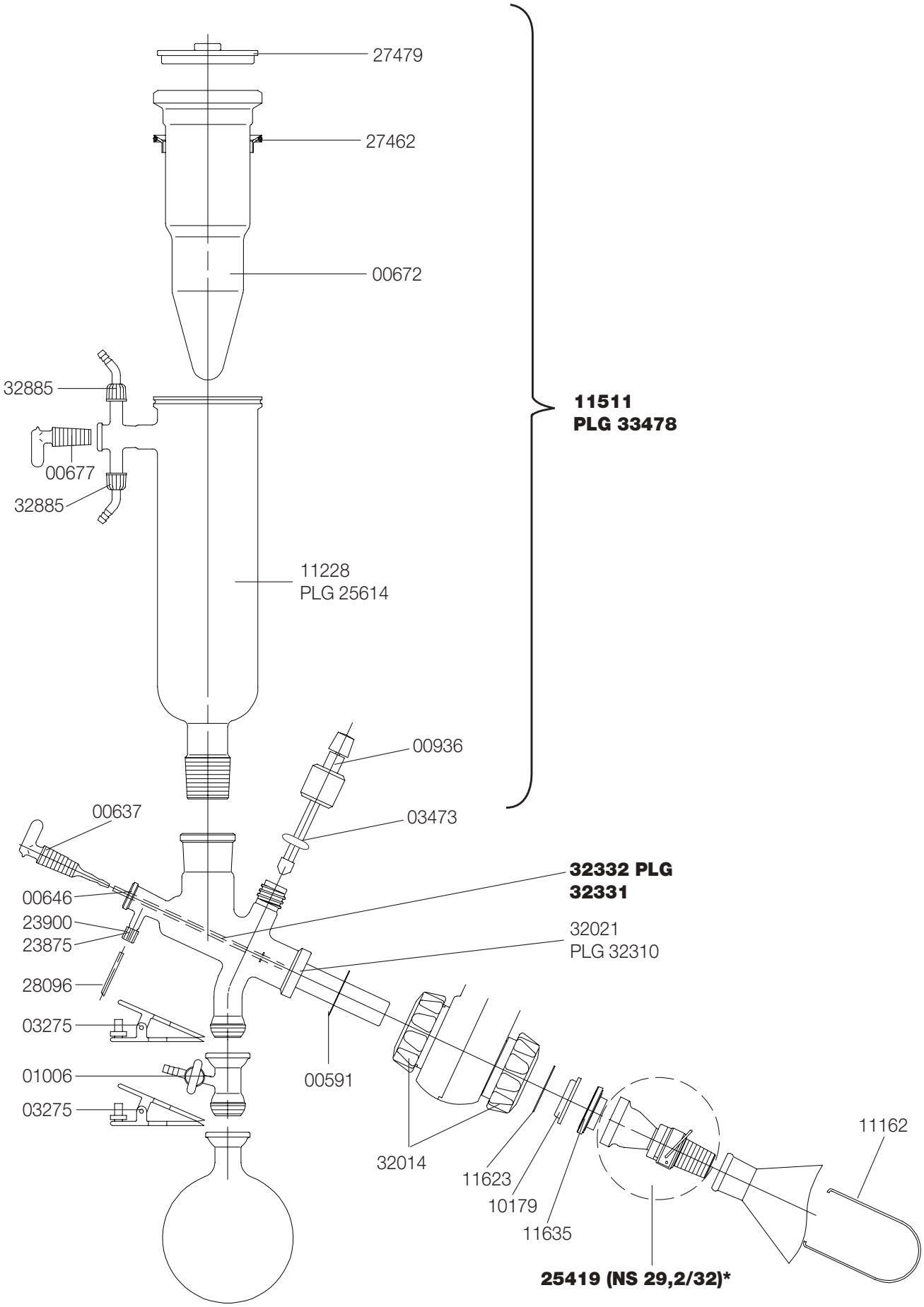
32323	**Glass apparatus E, compl.** (as per drawing with 1 l evaporation flask and 1 l collecting flask)
00591	Seating ring for distributor
00637	Glass plug NS 18.8/38
00646	PTFE hose 300 mm
00935	PTFE disk (drip disk)
01002	Expansion vessel
01003	U-tube (incl. 25435)
01004	Vacuum adapter (incl. 32885)
03275	KS clip
10179	KD-26 seal
10183	Condenser (incl. 2 x 32885)
11151	Condenser clips
11162	KD-26 extraction tool
11623	Supporting ring, stainless steel
11635	Guard ring with 2 O-rings
23875	Screw cap GL-10
23900	O-ring 2.7 x 3 mm
25419*	**Adapter with combi clip, NS 29.2/32 compl.**
25435	Threaded cap GL-14
27343	Wing screw
27344	Cross sleeve, compl.
28096	PTFE hose, 600 mm
32008	Bent rod
32014	Threaded flange
32019	Screw knob
32049	Distributor (incl. 23875+23900)
32885	Hose connection GL-14, bent, compl.

PLASTIC + GLAS (PLG)

32324	**Glass apparatus E, compl., PLG** as per drawing with 1 l evaporation flask coated and 1 l collecting flask coated)
32048	Distributor PLG (incl. 23875+23900)
33507	Expansion vessel PLG
33508	U-tube PLG (incl. 25435)
33511	Condenser PLG (incl. 2 x 32885)

*** See Chapter 8.5 „Glass apparatus“ for other standard tapered ground-glass sizes**

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Glass apparatus CR

32327	**Glass apparatus CR, compl.** (as per drawing with 1 l evaporation flask and 1 l collecting flask, without vacuum adapter 01006)
00591	Seating ring for adapter
00637	Glass plug NS 18.8/38
00646	PTFE hose 300 mm
00672	Cooling finger
00677	Glass plug NS 18.8/38
00935	PTFE disk (drip disk)
00936	Shut-off valve
01006	Vacuum adapter with cock (optional)
03275	KS clip
10179	KD-26 seal
11162	KD-26 extraction tool
11228	CR cold trap outer mantle (incl. 2 x 32885)
11511	**Cold trap, compl.** (00672+00677+11228+27462+27479)
11623	Supporting ring, stainless steel
11635	Guard ring with 2 O-rings
23875	GL-10 union nu
23900	O-ring 2.7 x 3 mm
25419*	**Adapter with combi clip, NS 29.2/32, compl.**
27462	PTFE/Viton seal
27479	Lid for cold trap
28096	PTFE hose, 600 mm
32014	Threaded flange
32021	Distributor
32331	**Distributor, compl.** (00591+00637+00646+00935+00936+ 28096+32021)
32885	Hose connection GL-14, bent, compl.

PLASTIC + GLAS (PLG)

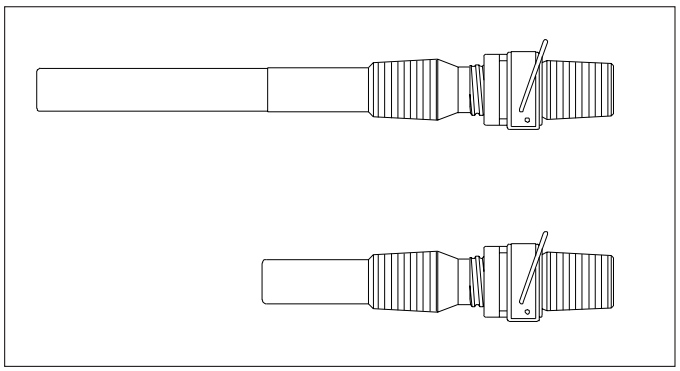
32328	**Glass apparatus CR, compl., PLG** (as per drawing with 1 l evaporation flask coated and 1 l collecting flask coated, without vacuum adapter 01006)
25614	Cold trap exterior CR PLG (incl. 2 x 32885)
32310	Distributor PLG
32332	**Distributor, compl., PLG** (00591+00637+00646+00935+00936+ 28096+32310)
33478	Cold trap, compl. (00672+00677+25614+27462+27479)

*** See Chapter 8.5 „Glass apparatus“ for other standard tapered ground-glass sizes**

See Chapter 8.5 „Glass apparatus“ for suspendable cooling coils
See Chapter 8.5 „Miscellaneous“ for condenser bracket

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8.5 Glass components

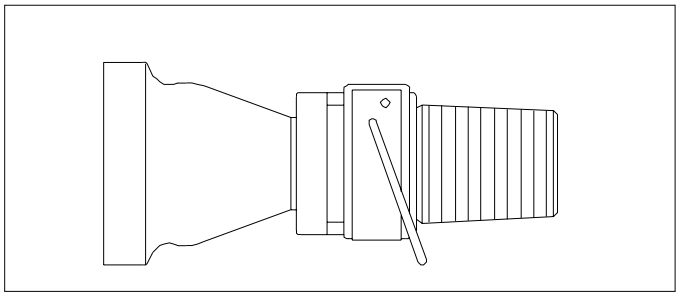


Vapor ducts

Apparatus	Standard ground-glass connections	Without combi clip	With combi clip
A	NS 29,2/32	**32001**	**32340**
A	NS 24/40	**32336**	**32342**
A	NS 29,2/42	**32338**	**32344**
V+C	NS 29,2/32	**32002**	**32339**
V+C	NS 24/40	**32335**	**32341**
V+C	NS 29,2/42	**32337**	**32343**

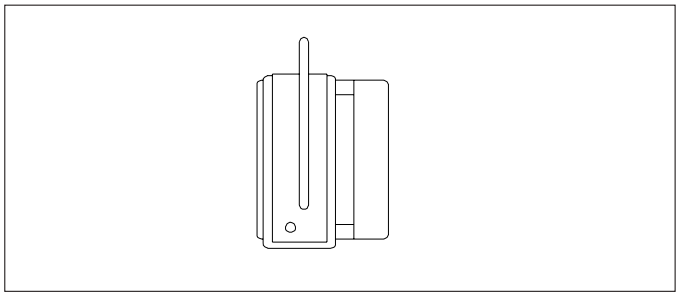
Vapor ducts for 50 ml flasks

Apparatus	Standard ground-glass connections	Without combi clip	With combi clip
A	NS 29,2/32	**32887**	**32890**
V+C	NS 29,2/32	**32888**	**32889**



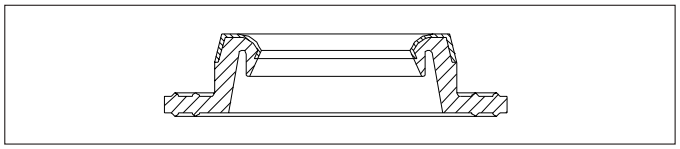
Adapters for NS flange to EL units

Standard ground-glass connections	Without combi clip	With combi clip
NS 29,2/32	**23733**	**25419**
NS 24/40	**23747**	**25421**
NS 29,2/42	**27101**	**25420**



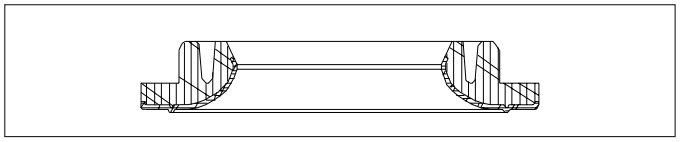
Combi clips

Standard ground-glass connection	
NS 29,2/32	**23375**
NS 29,2/42	**23375**
NS 24/40	**27267**



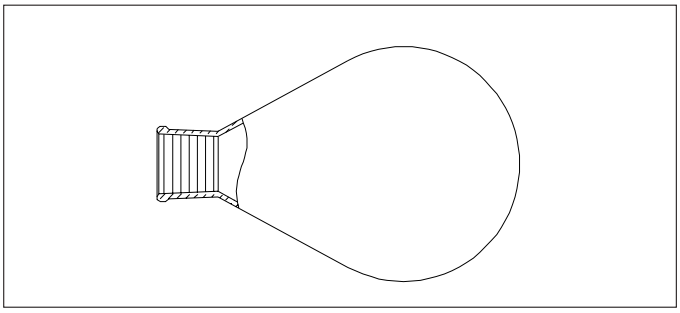
BÜCHI seals

KD-22 (for A, V and C glass apparatus)	**00636**



KD-26 (for S, E and CR glass apparatus)	**10179**

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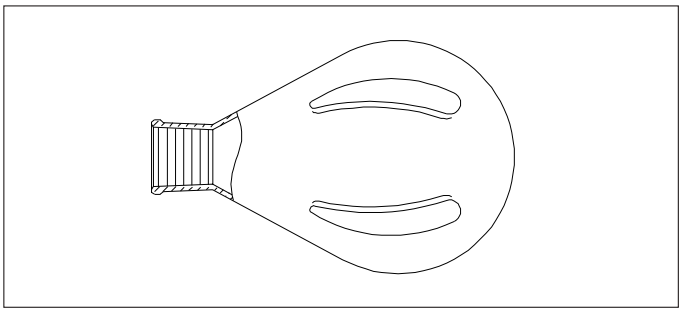


NS evaporation flasks (pear-shaped)
An NS flange adapter is required in addition for EL units

Capacity	NS 29,2/32	NS 24/40	NS 29,2/42
50 ml	**00431**	**08750**	**08736**
100 ml	**00432**	**08751**	**08737**
250 ml	**00433**	**08754**	**08738**
500 ml	**00434**	**08758**	**08739**
1000 ml	**00435**	**00440**	**08762**
2000 ml	**00436**	**08765**	**08769**
3000 ml	**00437**	**08767**	**08770**

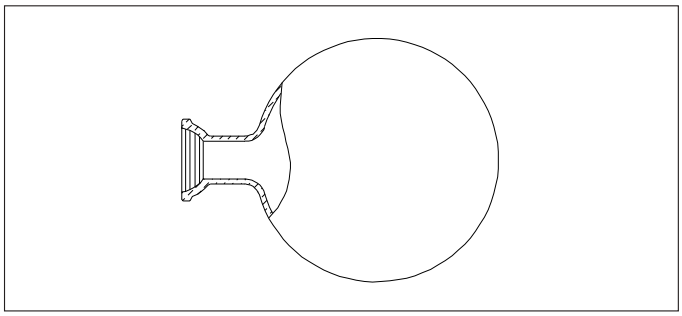
NS evaporation flasks (pear-shaped) PLASTIC + GLAS

Capacity	NS 29,2/32	NS 24/40	NS 29,2/42
50 ml	**33450**		
100 ml	**33404**		
250 ml	**25520**		
500 ml	**25322**	**25261**	
1000 ml	**20729**	**20730**	**25517**
2000 ml	**25323**	**25262**	**27345**
3000 ml	**25324**	**25263**	**27346**



NS drying flasks

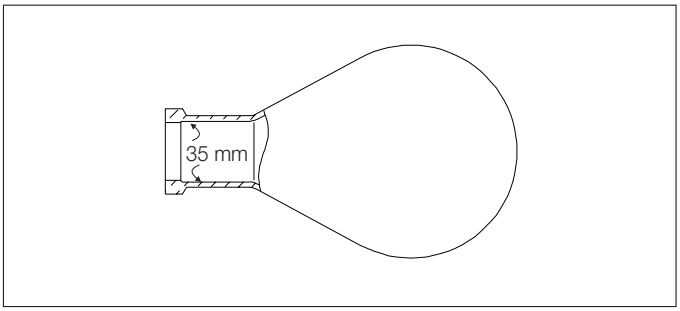
Capacity	NS 29,2/32	NS 24/40
500 ml	**00452**	**11579**
1000 ml	**00453**	**00420**
2000 ml	**00454**	**11580**



Collecting flasks (with KS 35/20)

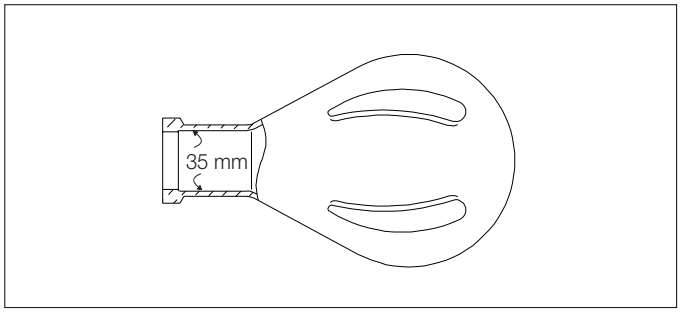
Capacity	Uncoated	PLASTIC + GLAS
50 ml	**00421**	
100 ml	**00422**	
250 ml	**00423**	
500 ml	**00424**	**25264**
1000 ml	**00425**	**20728**
2000 ml	**00426**	**25265**
3000 ml	**00427**	**25266**

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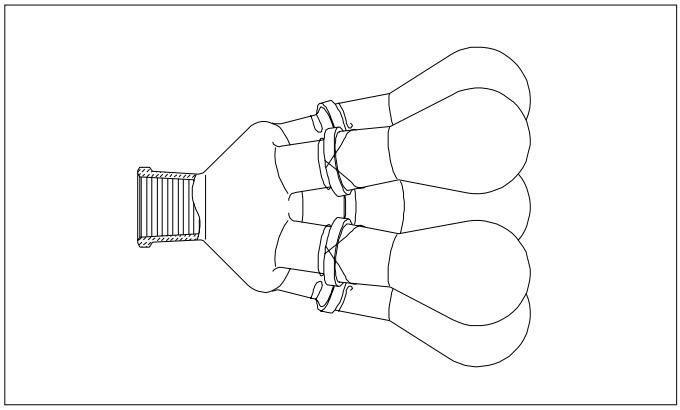
Evaporation flasks with flange only for EL systems

Capacity	
100 ml	**11607**
250 ml	**11146**
500 ml	**11147**
1000 ml	**11148**
2000 ml	**11149**
3000 ml	**11150**



Drying flasks with flange only for EL systems

Capacity	
500 ml	**11610**
1000 ml	**11611**
2000 ml	**11612**



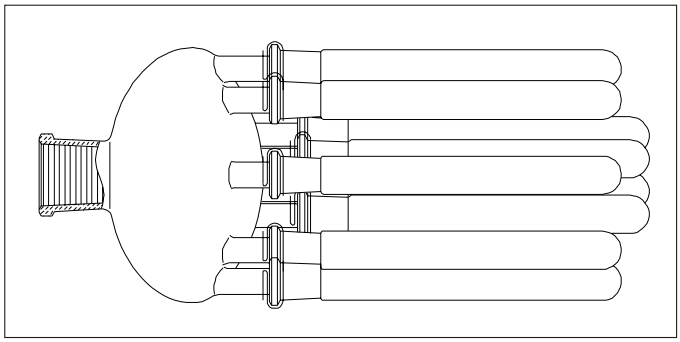
Distillation spider

For simultaneous distillation from 5 evaporation flasks with NS 24/29

Complete with 5 flasks	NS 29,2/32	NS 24/40
50 ml	**01332**	**11574**
100 ml	**01333**	**11575**

Evaporation flasks for the distillation spider

Flask capacity	NS 24/29
50 ml	**00472**
100 ml	**00473**



Distillation spider

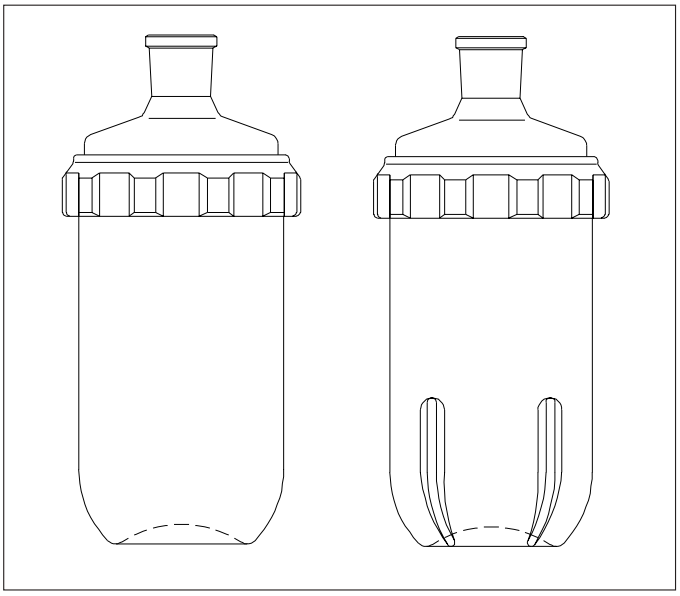
For simultaneous distillation from 20 ml cylindrical flasks with NS 14.5/23

	NS 29,2/32	NS 24/40
6 flasks	**01334**	**11576**
12 flasks	**01335**	**11577**
20 flasks	**01336**	**11578**

Evaporation flasks for the distillation spider

Flask capacity	NS 14,5/23
20 ml	**00477**

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Beaker flasks

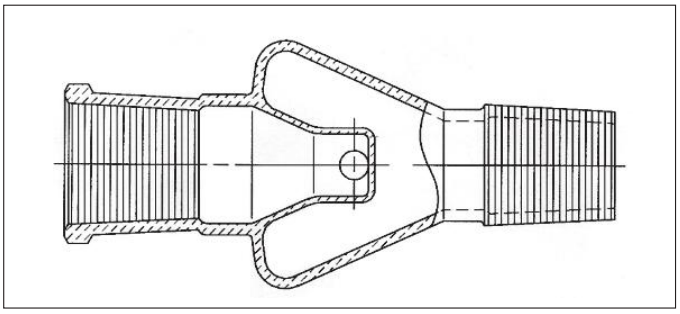
For the processing of high-viscosity and solid substances. With their large openings the flasks can be emptied and cleaned without difficulty. You will also find it better to process foaming solutions in beaker flasks.

1,5 l version	Beaker flask, compl.	Drying flask, compl.
with flange for EL	**34142**	**34268**
NS 29,2/32	**34230**	**34269**
NS 24/40	**34247**	**34770**

0,5 l version	Beaker flask, compl.	Drying flask, compl.l.
mit Flansch für EL	**34763**	**34766**
NS 29,2/32	**34764**	**34767**
NS 24/40	**34765**	**34768**

Filling volume

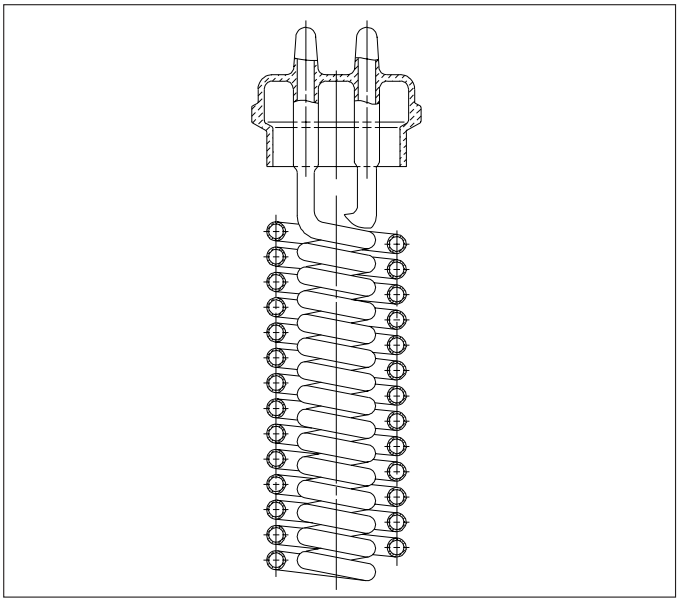
1.5 l version = 500 ml
0.5 l version = 150 ml



Reitmeyer top

For solutions with a strong inclination to foam

NS 29,2/32	**36576**
NS 24/40	**36577**

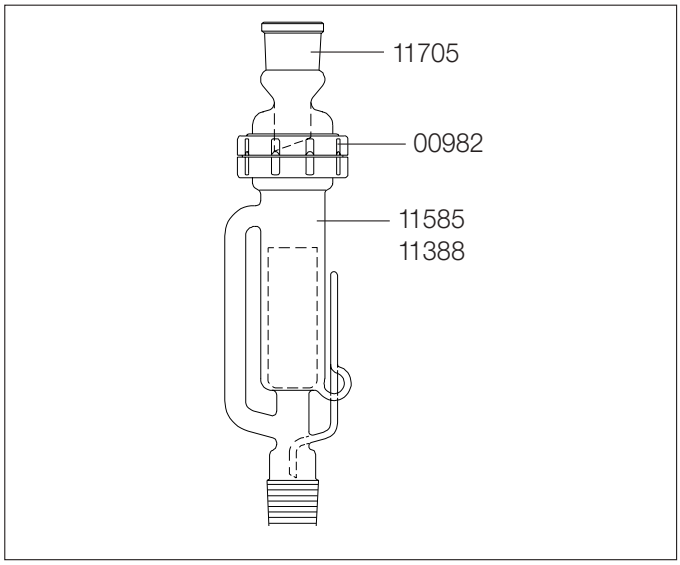


Suspendable cooling coil

This coil can be suspended in the insert cold trap in place of the cooling finger.
With this accessory you can operate the cold trap like a normal liquid-cooled condenser.

Suspendable coil, complete (27487+27462)	**27488**
Suspendable coil	**27487**
Seal, complete (27461+21071)	**27462**
PTFE Ring	**27461**
O-ring	**21071**

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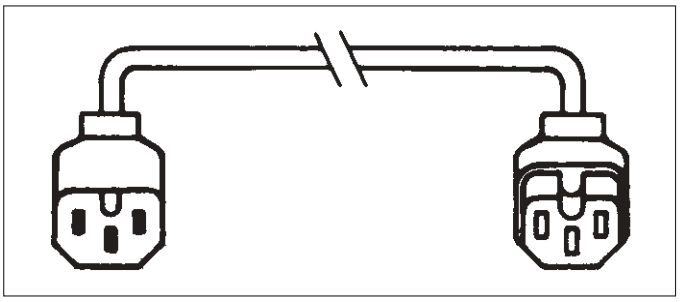
„Soxhlet“ extraction top

Using this accessory in conjunction with glass apparatus S you can carry our extractions.
This extraction top is available for 200 ml and 500 ml.

Extraction top, complete (11705+11585+11904+19051+00982+08560)	200 ml	**11744**
Extraction top, complete (11705+11388+11904+19051+00982+00989)	500 ml	**11745**
Reducing top 200 and 500 ml version		**11705**
Extraction top, lower section	200 ml	**11585**
Extraction top, lower section	500 ml	**11388**
Bracket rod 12 x 750 mm		**11904**
PTFE O-ring		**19051**
Threaded connection, complete		**00982**
1 x extraction sleeve for	200 ml	**08560**
1 x extraction sleeve for	500 ml	**00989**
25 x extraction sleeve for	200 ml	**18106**

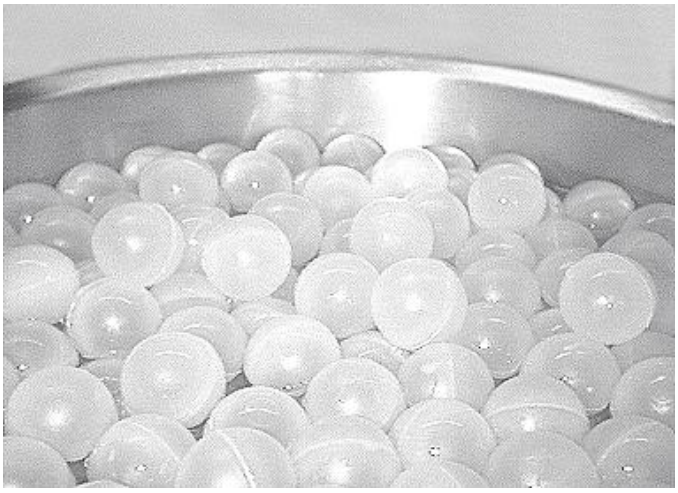
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8.6 Miscellaneous

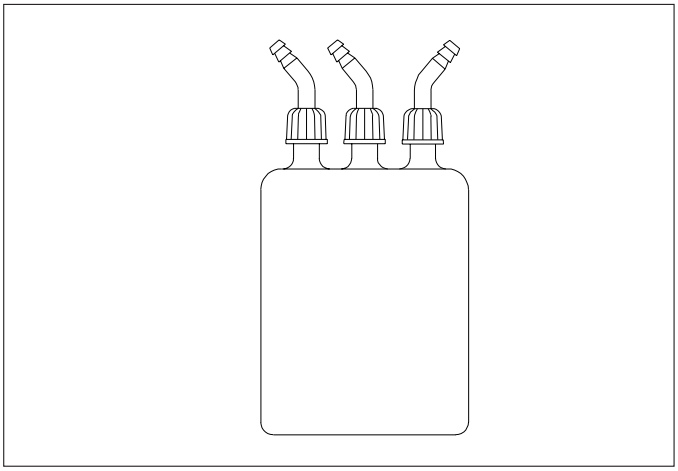


Connecting cable for the electrical connection between the heating bath and the rotary evaporator

230 V	**30983**
120 V	**30973**
Fuses for 230 V units, 10 pcs	**22562**



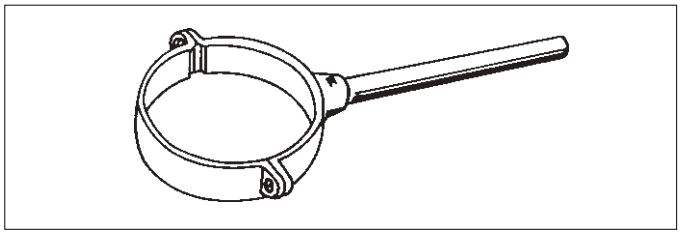
Floats, 125 pieces	**35001**



Woulff bottle

Woulff bottle, complete (25518+32885)	**25519**
Woulff bottle	**25518**
Threaded connection GL-14, complete	**32885**

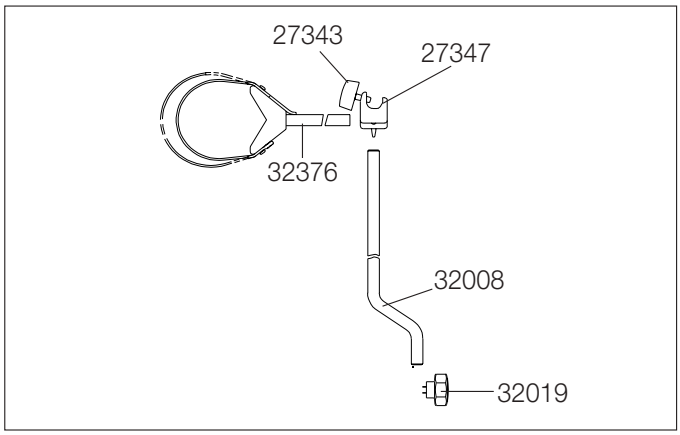
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Supporting clip

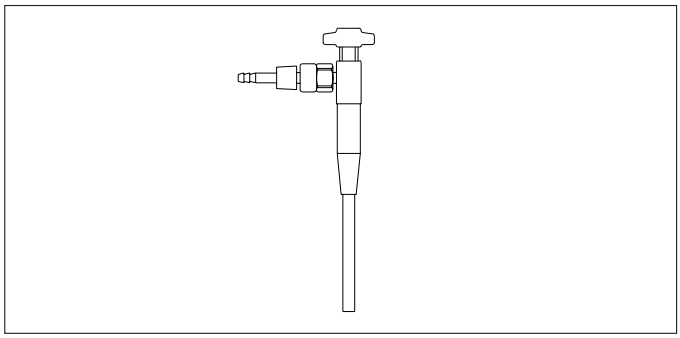
for fitting the woulff bottle to a bracket

Clip diameter ø 100 mm	**11152**



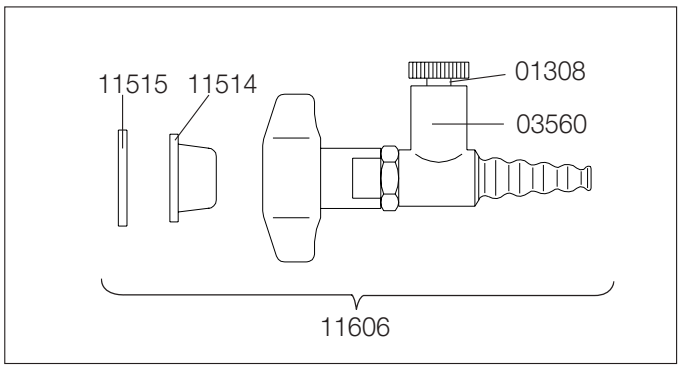
Condenser scarbbonding

Condenser scarbbonding, complete (32376+27347+27343+32008)	**32012**
Condenser clip with elastic band	**32376**
Cross sleeve	**27347**
Wing screw	**27343**
Bracket rod 300 mm	**32008**
Knob screw	**32019**



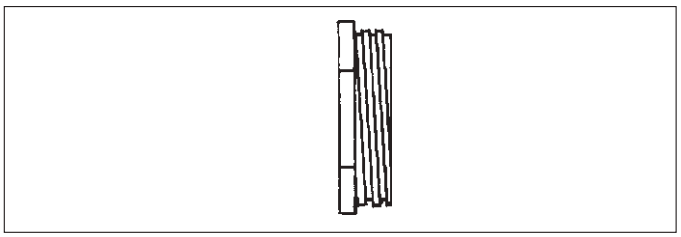
Water jet pump, plastic

Water jet pump	**02913**



Water control nozzle 1/2"

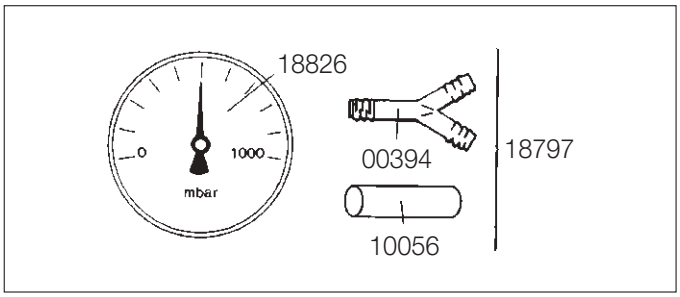
Water control nozzle 1/2", complete (01308+03560+11514+11515)	**11606**
Control nozzle	**01308**
O-ring	**03560**
Filter insert	**11514**
Seal	**11515**



Reducing thread

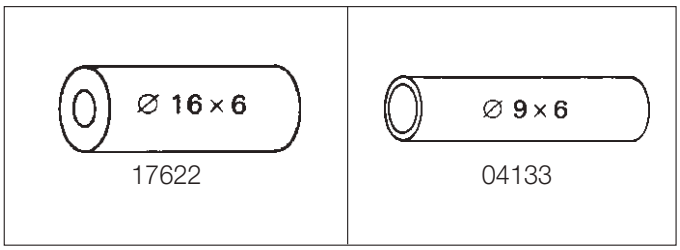
Reducing thread 1/3* – 3/8*	**11289**
Reducing thread 1/2* – 3/4*	**11290**

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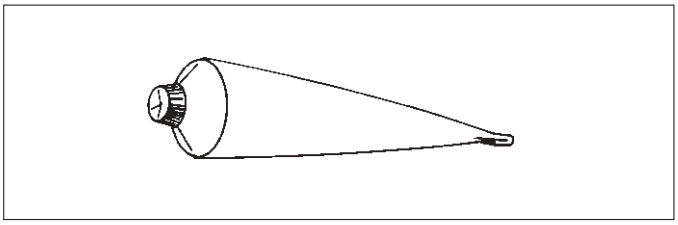
Vacuum gauge

Vacuum gauge, complete (18826+00394+10059)	**18797**
Vacuum gauge	**18826**
Bracket rod 12 x 500 mm	**10056**
Y-piece diameter ø 10 mm	**00394**



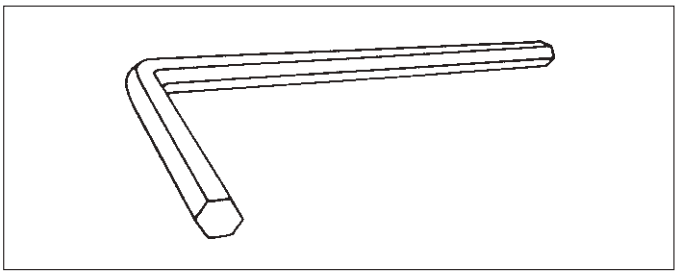
Hoses

Vacuum hose 16/6 mm	**17622**
Nyflex hose 14 x 8 (Alternative to the vacuum hose 17622)	**04113**
Cooling water hose made of silicon 9/6 mm	**04133**



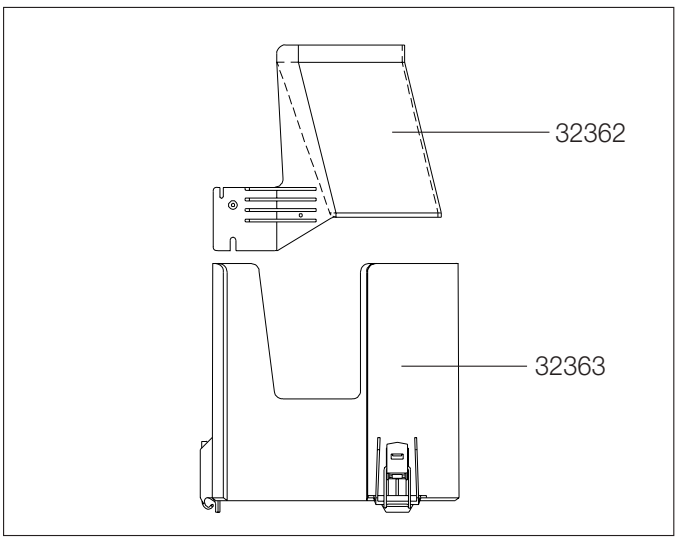
Glisseal laboratory grease

60 g tube	**01330**



Allen key SW3

Allen key	**00610**



Safety shield

Safety shield, complete	**32140**
Face shield	**32362**
Bath shield	**32363**

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9 Appendix

9.1 Data

	R-114	**R-480**	**B-481**	**B-485**
Unit type	Rotavapor Basic	Water bath	Water bath	Oil bath
Glass apparatus	A, V, C, S, E, CR			
Dimensions (W x H x D)	40 x 61 x 41 cm	31 x 23 x 29 cm	31 x 23 x 29 cm	31 x 23 x 29 cm
Weight	14 – 16 kg acc. to glass apparatus	5,5 kg	5,5 kg	5,5 kg
Mains connection	3-pole (P, N, E) via power cable	3-pole (P, N, E) via power cable	3-pole (P, N, E) via power cable	3-pole (P, N, E) via power cable
Voltage	100, 120, 230, 240 V	120, 230 V	120, 230 V	120, 230 V
Tolerance	-15% – 10%	-15% – 10%	-15% – 10%	-15% – 10%
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Power consumption	~ 35 W	1300 W	1300 W	1300 W
Current consumption at 230 V at 120 V	~ 0,2 A ~ 0,4 A	~ 6 A ~ 13 A	~ 6 A ~ 13 A	~ 6 A ~ 13 A
Overvoltage category	2	2	2	2
Pollution severity	2	2	2	2
Drive	Stepping motor			
Speed range	5 – 240 rpm infinitely variable			
Temperature control range		20 – 100°C	20 – 100°C	30 – 180°C
Display			digital °C	
Ambient temperature	10 – 35°C	10 – 35°C	10 – 35°C	10 – 35°C
Bath capacity		5 l	5 l	5 l
Internal diameter at top		282 mm	282 mm	282 mm
Overtemperature protection		140°C	140°C	260°C
Pressure load on condenser coil	max. 6 bar			
Connected load at unit socket		max. 100 W	max. 100 W	max. 100 W

Table 4: Technical data

9.2 Materials used

Part	**Material**	**Material code**
Quick-lift	Cast aluminium alloy	ALMG 9
Bellows	Rubber	EPDM
Electronic case	Cast aluminium alloy	ALMG 9
Bath insulation	Plastic	PETP
Bath pan	Stainless steel	X5CRNI 1810
Bath base	Cast aluminium alloy	ALMG 9
Seal	Polytetrafluor ethylene	PTFE

Table 5: Materials

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9.3 Routine unit check-up

1 Introduction

All new units leave our works in an impeccable condition and have been tested. They have been manufactured in accordance with current standards and regulations and are designed for an extended operation requiring little maintenance.

The adequate use of these units is described in the manual which is specific of the unit.

The knowledge of the contents of the manual is presupposed in the subsequent text.

The following benefits result from an additional regular check-up of all major functions of the units:

- The safety of operability of the unit is ensured.
- Faulty functions can be recognized at an early stage and be remedied on time by a trained service technician.
- Requirements set by quality management standards and regulations can be met efficiently.

2 Cleaning and visual control

Glass parts
Disassemble the glass set-up according to the instructions in the operating instructions.

Glass parts
Wash the glass parts with commercially available cleansing agents. Remove dirt trapped in the condenser spirals (e.g. algae formation) with the appropriate cleansing agents (if necessary, allow to soak for a period). Degrease all joints. After cleaning and complete drying, visually inspect every glass part for chipped areas or crack formation. Since the glass parts of a rotary evaporator are operated in an evacuated state (under vacuum) when in use, this visual check should carried out in conscientious manner.

Vacuum gasket KD 22/KD26
Examine the vacuum gasket visually and replace with a new gasket in case of signs of wear. The vacuum asket is subject to a certain amount of wear according to use and load. The leakproofness of the Rotavapor is only guaranteed with an intact vacuum gasket.
This is the prerequisite for the safe and clean operation of the apparatus.

Vapour duct
Same procedure as with the other glass parts.

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Housing
Clean the housing with a damp cloth without the use of solvents and visually inspect for defects (operating elements, plug).

Hoses
Visually inspect the hoses as well. Eliminate crack development, brittleness by replacement with the appropriate new hose material.

3 Functional check

Assemble the apparatus with dry and solvent-free glass parts as per instructions in the operating instruction.

Vacuum thigtness
Evacuate the apparatus under rotation.
If an instrument for the measurement of pressure is available, check whether the vacuum remains constant. In order to do this, interrupt the vacuum hose between the vacuum source and the pressure measurement device by careful kniking of the tube.

Guide value:
- 2 to maximum 5 mbar pressure increase per minute.

Adjustability of the rotation speed
Change the regulator slowly from the minimum setting to the maximum stroke (clockwise). The motor should turn without interruption in every position of the regulator.

Without any change of the regulator, the display shouldn't change with more then 2 digits.

4 Measures to be taken if demands are not met

The after-sales service of BÜCHI is ready to carry out the following services:

- **Spare parts service**

Please refer to the ordering code printed in the perating manual.

- **Repair service**
- **Maintenance service**
- **Technical advice**

Please contact BÜCHI by telephone, in writing or by fax, telex or e-mail.

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5 Suggested check-up intervals

The frequency of a routine check-up of units is only dependent on the frequency and importance of their use (e.g. risk of failing).
With many customers, a cycle of 3 months or half a year is customary. In any case, the check-up should be carried out at least once every year.

6 Documentation

We recommend to keep a documentary record of the routine check-ups of the unit.
This page may serve as a model.

Unit

Designation : **BÜCHI** Rotavapor **R-124**

Serial No.
(see signplate) : _____

Ident. No.
(if provided) : _____

Visual unit check-up

Result : o in order
o not in order

Remarks : _____
_____

Function check-ups

Result : o in order
o not in order

Remarks : _____
_____

Performance:

Date : _____

Signature : _____

Remarks : _____
_____

Next performance:

Date : _____

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9.3 Declaration of EC conformance

We **Büchi** Labortechnik AG
Postfach, CH-9230 Flawil
Switzerland

declare under our sole responsibility that the product:
BÜCHI Rotavapor **R-114**

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

EN 292-1:1991
Safety of machinery: Basic terminology and methodology

EN 292-2:1991
Safety of machinery: Technical principles and specifications

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

UL 1262: 1989 (~ UL 31010-1:1993, CSA 22.2 No. 151) (120V)
Standard for laboratory equipment

EN 55011:1991/B (~ VDE 0875/B, VDE 0871/B)
Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical radiofrequency equipment

EN 50081-1:1992
Electromagnetic compatibility: Generic immunity standard: Residential, commercial, light industry

EN 60555-2:1987 (~ IEC 555-2)
Disturbances in supply systems caused by hosehold Rotavapors and similar electrical equipment: Harmonics

Following the provisions of EU-Directive:
89/392/EEC (Machinery Directive)

Flawil, 25 October 1994

D. Simmler
Quality management
Büchi Labortechnik AG

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Declaration of EC conformance

We **Büchi** Labortechnik AG
Postfach, CH-9230 Flawil
Switzerland

declare under our sole responsibility that the product:
BÜCHI Waterbath **B-480/B-481**
BÜCHI Oilbath **B-485**

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

UL 1262: 1989 (~ UL 31010-1:1993, CSA 22.2 No. 151) (120V)
Standard for laboratory equipment

EN 50014:1993
Limits and methods of measurement of radio disturbance characteristics of electrical motoroperated and thermal appliances for household and similar purposes, electric tools and similar electrical apparatus

Following the provisions of EU-Directive:
73/23/EEC (Low voltage)
89/336/EEC (Electromagnetic compatibiliy)

Flawil, 14 February 1995

D. Simmler
Quality management
Büchi Labortechnik AG

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