

P21

P26

P30

# **I**nstruction **M**anual



**This machine, which works with the solvent  
TETRACHLORETHENE (perc), complies with  
the EC Machinery Directive 98/37 EC,  
the EC Low Voltage Directive 73/23 EEC  
in the version RL 93/68 EEC,  
EMC Directive 89/336/EEC  
and the harmonized standards**

**EN ISO 12100-1 and 12100-2  
EN 60204-1 (DIN-VDE 0113 Part I)**

The contents are correct to the best of our knowledge  
and belief and correspond to the present state of the  
technology. No legal claims can be derived.  
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**BÖWE**  
Textile Cleaning

**Dear Customer,**

It gives us great pleasure to present you with your **BÖWE** machine. You are acquiring a machine that has been designed and manufactured to meet the highest quality standards and that corresponds to the latest standards in research and technology.

Please do not put these operating instructions away without reading them!

This manual contains all of the important information that you need to operate your drycleaning machine.

If the prescribed maintenance work is neglected or improperly performed, if repair work is carried out by service technicians other than those authorized by BÖWE or if parts other than original BÖWE spare parts are used, we naturally cannot fulfill the guarantee obligations according to our General Terms of Delivery.

Measurements and other values reflect the status as of the printing date.

We reserve the right to make technical changes, at any time and without prior notice, in the interest of continuing development or when changes are considered to be necessary for constructional reasons.

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# Necessary Operating Materials and Chemical Additives

Dear Customer,

In order to prevent any delays in the commissioning of your P21/P26/P30 drycleaning machine, we ask you to make sure that the following operating materials and chemical additives are available.

## - Solvent

Use only stabilized, high-purity TETRACHLORETHENE (PERC), in accordance with DIN 53978.

We recommend that only fresh solvent should be used in order to avoid contamination through dirt, foreign substances and smells.

Total filling amount for the first filling:

P21, approximately: 445 l (721 kg) or 115 US gal (1590 lb) \*

P26, approximately: 510 l (826 kg) or 135 US gal (1820 lb) \*

P30, approximately: 565 l (915 kg) or 150 US gal (2020 lb) \*

Tank I: Minimum filling volume:

P21: 110 l or 29 US gal

P26: 135 l or 36 US gal

P30: 155 l or 41 US gal

\* Machine with 1 economy filter

For machines with 2 economy filters: + 50 l (13.2 US gal)

For machines with 2 economy filters and 1 cartridge filter: + 75 l (19.8 US gal)

For machines with 2 economy filters and 2 cartridge filters: + 90 l (23.8 US gal)

## - Chemical additives

The chemical additives used must be heat-resistant under operating conditions.

Depending on the equipment, the following should be available:

- Drycleaning detergent
- Waterproofing agent
- Pre- and post-spotting agents

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# BÖWE P21 /P26 /P30

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# 1. General Information

1.

## 1.1 Technical Literature

1.1

We make particular reference here to the literature and leaflets of the trade and professional associations, research institutes and mutual indemnity associations, as well as safety data sheets provided by the solvent producers.

## 1.2 Laws, Ordinances, Regulations

1.2

To avoid health risks and environmental damage, you must strictly comply with all directives and regulations pertaining to the industry, particularly with regard to proper handling of TETRACHLORETHENE (Perc).

**In any case, you must observe the applicable laws and regulations in the country in which the machine is installed.**

**The machine complies with the following regulations:**

- EC Machinery Directive 98/37 EC
- EC Low Voltage Directive 73/23 EEC in the version RL 93/68 EEC
- EMC Directive 89/336/EEC
- Pressure Equipment Directive 97/23/EC

Applied harmonized standards:

- EN ISO 12100-1 and 12100-2
- EN 60204-1 (DIN-VDE 0113 Part 1)

Applied national standards and directives:

- Accident Prevention Regulations for Refrigeration Plants, Heat Pumps und Cooling Equipment (BGVD4)
- CFC and Halon Prohibition Ordinance
- Operating safety regulation (Your local regulations for operational safety)

**When operating the system in Germany, the following laws and directives must be observed:**

- 2nd BimSchV (German Federal Pollution Control Act)
- Accident Prevention Regulations for Chemical Cleaning (BGR 500 Kapitel 2.14)
- Water Resources Law (WHG § 19)
- Waste Disposal Law
- Technical Regulations for Dangerous Working Materials (TRGS 402)
- VDI guidelines
- VDE regulations
- GefStoffV with technical rules (Regulation for hazardous material)
- Operating safety regulation

## 1.3 Corrective Maintenance Work

1.3

We recommend that you commission the customer service department of the BÖWE organization for the maintenance, servicing and operating safety of this valuable drycleaning machine. They use original BÖWE spare parts.



## 2. Safety Regulations

## 2.

Each person who is charged with the installation, commissioning, operation, maintenance or repair of the drycleaning machine must first have read and understood the operating and installation instructions. In particular, we refer to the observation of the relevant laws and regulations for the countries in question.

The cleaning machine has been built according to the latest state of the technology. Only persons who are familiar with the machine and informed of the possible risks are authorized to set up, install, commission, operate, maintain and repair this machine. The relevant accident prevention regulations and other regulations involving safety and medical care for workers must be strictly adhered to.

### Safety Symbols Used



This safety symbol identifies particular information regarding occupational safety. It points out hazards and serves to protect personnel from physical injury. You must observe all applicable laws and regulations; information on occupational safety only emphasizes particularly dangerous areas. Failure to observe this information can result in serious consequences for the health, up to and including life-threatening injuries.



This symbol provides important information on the correct use of the machine. Failure to observe this information can lead to disturbances in the machine or surrounding area.

### Mandatory signs for use of the machine



Use respiratory equipment



Use eye shield



Use hand guards

You are not permitted to bypass or turn off safety devices or to make them otherwise inoperative. You must observe all applicable industrial safety regulations during installation and repair work. You must dispose of distillation residues and process water in accordance with regulations.

### 2.1 Safe Installation and Commissioning

### 2.1

You must install the drycleaning machine according to the enclosed installation instructions. The room must be sufficiently ventilated.

You are not permitted to operate the machine in potentially explosive areas or in areas in which systems with open flames have been installed.

**The BÖWE Organization Customer Service department is responsible for carrying out the first startup.**

### 2.2 Authorized Use

### 2.2

This drycleaning machine is designed exclusively for operation with the solvent TETRACHLORETHENE (perc). ( See "Necessary Operating Materials and Chemical Additives"). Handle these solvents directly only when absolutely necessary and wear protective gloves and goggles.

## 2. Safety Regulations

## 2.

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This closed-circuit drycleaning machine for industrial use (including use in cleaning shops) is intended for cleaning textile articles (also leather or fur or for treating skins). This drycleaning machine is not intended for customer access (such as in self-service shops).

You are not permitted to treat textiles that are easily inflammable or poisonous or that contain radioactive materials.

The definition of authorized use includes compliance with the operating, maintenance and repair conditions prescribed by BÖWE.

The manufacturer is not liable for damages resulting from unauthorized use or from changes to the system made without proper authority.

### 2.3 Operation and Maintenance

### 2.3

Only trained service personnel who are familiar with the machine are authorized to operate and maintain the BÖWE drycleaning machine. Safety regulations must be observed during operation and maintenance.

Do not start the system unless all protective devices (belt guard for cage and filter drive) are in place and working.

Check the operating safety of the machine (sealing test) and the liquid levels daily before turning it on. Dispose of lint, process water and distillation residues according to the operating instructions.



Do not perform any maintenance work when the machine is in operation. Make sure that the solvents, lubricants and chemical additives meet the specified quality requirements.

**Perform maintenance work only when the machine is turned off and secured and has cooled off.**


**When the machine is not in operation cooling water feed must be cut off by means of a stop valve to be fitted on site.**

## 2. Safety Regulations

## 2.

	<b>Attention:</b> Check the liquid level before opening the still door. The collecting tank must hold the amount that is expected to be drained and must be temperature and solvent-resistant.
	<b>Attention:</b> Do not allow distillation residues to reach the sewer system or garbage. You must dispose of these residues according to country-specific regulations on special waste.

### Requirements for the owner and operating personnel

	According to the legal stipulations of the German accident prevention regulations BGR 500 Kapitel 2.14 and the 2nd BImSchV, special knowledge is required for the operation and maintenance of drycleaning systems. A person with this special knowledge must regularly be present during the operation of drycleaning systems.
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As a person / body who runs a plant one is obliged to have the refrigerating plant of the dry cleaning machine inspected annually with regard to tightness.

### 2.4 Repair Work

### 2.4

Only skilled workers with suitable protection devices and work tools are authorized to carry out repairs. Make sure that there are no solvent emissions.

#### During repair and cleaning work:

Turn main switch off.

Close the stop valves on the supply lines (steam, condensate and compressed air).

Make sure that the system cannot be turned on without permission (close off and put up sign "DO NOT TURN ON - REPAIR WORK").

Always remove the main fuse when working on the electrical system.

Use only original fuses to replace defective ones.

When working on pneumatic control parts, make sure that there is no pressure in the system.

Only specially trained refrigeration technicians are authorized to make repairs to the refrigeration unit.



All spare parts used must comply with the technical standards set by the manufacturer.

## 2. Safety Regulations

2.

### 2.5 Decommissioning and Disassembling

2.5



Only skilled workers with suitable protection devices and work tools are authorized to decommission and disassemble the system.



When decommissioning and disassembling the machine, drain all solvent from the machine, including the pipelines, valves and fittings. You must remove residues that could cause environmental pollution.



You must separate electric lines and pipelines that were used to supply or drain the machine from the supply network. Make sure that they cannot be turned on by unauthorized persons.

Have an authorized customer service technician dispose of the cooling agent from the refrigeration unit.

### 2.6 Further Safety Regulations

2.6



This BÖWE drycleaning machine works with a solvent, TETRACHLORETHENE (PERC). This solvent is harmful to the health in the context of the Hazardous Substances Ordinance.

**Drinking, eating and food storage are prohibited in the area where the machine is installed.**

**Open flames and fires are not allowed in the operating area. No smoking is allowed.**

Install steam generators in such a way that they do not draw in air that contains solvent.

A BÖWE customer service representative must train the personnel in the operation of the machine before the first startup. This training must include information on safe operation and possible hazards.

The owner is responsible for employing trained personnel to load and unload the machine and must employ well-informed and expert personnel for maintenance work. No unauthorized personnel are allowed in the area of the machine.

The daily checks prescribed in the operating instructions represent the minimum requirements. Operating personnel must immediately report any changes in the machine that could affect the safety.

## 2. Safety Regulations

## 2.

---

The owner is obligated:

- to draw up clear regulations regarding responsibility for operation and maintenance, to ensure that the machine is only operated when it is in perfect condition and to ensure the order, safety and cleanliness at the workplace by means of instructions and inspections.

The owner is obligated to make sure that no working method is used that could place the health of the personnel, the environment or the safety of the machine at risk.

Notice and warning signs must be placed on the machine or in the operating area in plain sight. Damaged or missing signs must be replaced immediately. The specified safety regulations must be followed at all times.

In the event of any kind of hazard, stop the machine immediately and turn off the main switch.

If there is a solvent leak:



Turn off the machine

Immediately send all personnel into the open air

Open windows and doors

Cut off the cause of the solvent leak

Change any clothing that is wet with TETRACHLORETHENE (perc)

If necessary, request a BÖWE customer service technician.

The escape of larger amounts of solvent is a reportable malfunction. It must be reported to the responsible authorities, industrial control group, fire department, water resources board or subordinate water authorities.

## 2. Safety Regulations

## 2.

---

The proper handling of perchlorethylene is an important prerequisite for workplace safety.

Note the following potential hazards:

TETRACHLORETHENE (perc) is a very good grease remover; it also removes natural oils from unprotected skin.

Protection: Wear solvent-resistant protective gloves; apply skin cream with oil to the hands.

Liquid TETRACHLORETHENE (perc) is strongly irritating to the eyes.

Protection: Wear protective goggles.

Inhalation of TETRACHLORETHENE (perc) vapors reduces alcohol tolerance.

Protection: Do not consume alcohol while working or for a short time after.

TETRACHLORETHENE (perc) decomposes in the presence of an open flame or red-hot parts.

Protection: No smoking.

TETRACHLORETHENE (perc) vapors irritate the mucous membranes of the respiratory passage and eyes.

Protection: Prevent vapors from escaping and wear respiratory equipment when performing extensive maintenance work (DIN 3181 gas filter, brown).

Caution: It is possible to smell perc (odor threshold) in concentrations as low as 5ml/m<sup>3</sup> of air.

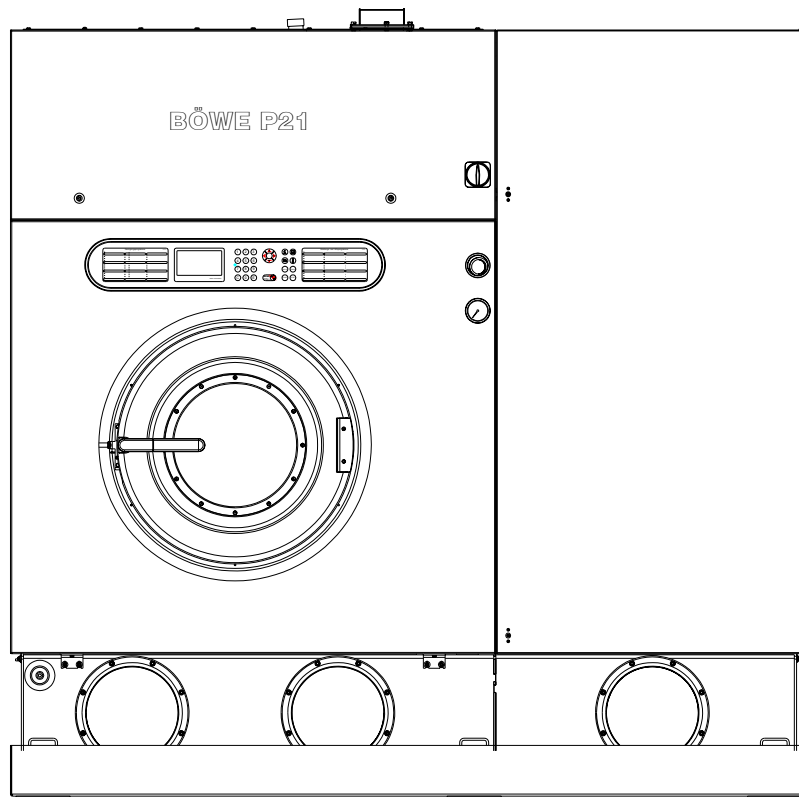
TETRACHLORETHENE (perc) has an affect on the central nervous system similar to an anesthetic and can result in unconsciousness and, in very high concentrations, even in death.

### **Do not overload the machine.**

Special rules and regulations for the area where the machine is installed are defined in the operating instructions provided by the customer company. These instructions also contain information on all additional protective measures, information on correct behavior during operating malfunctions, according to the local conditions, and first aid instructions.

### 3. View of the Machine

3.



707761-16-01

#### 3.1 General Information

3.1

The BÖWE P 21/P26/P30 is a state of the art drycleaning machine with computer control.

The high level of the processing technology it offers allows you to treat virtually all textiles on the market without problems.



**Look for the "P" or dry cleaning instructions in the clothing's care label.**

The machine has been designed for use with the solvent TETRACHLORETHEN (perc).

Perc's technical specifications:

Density: 1.62 kg/dm<sup>3</sup>  
 Boiling point: 121° C (250° F)  
 Flash point: Noncombustible  
 Start of decomposition: 150° C (302 °F)

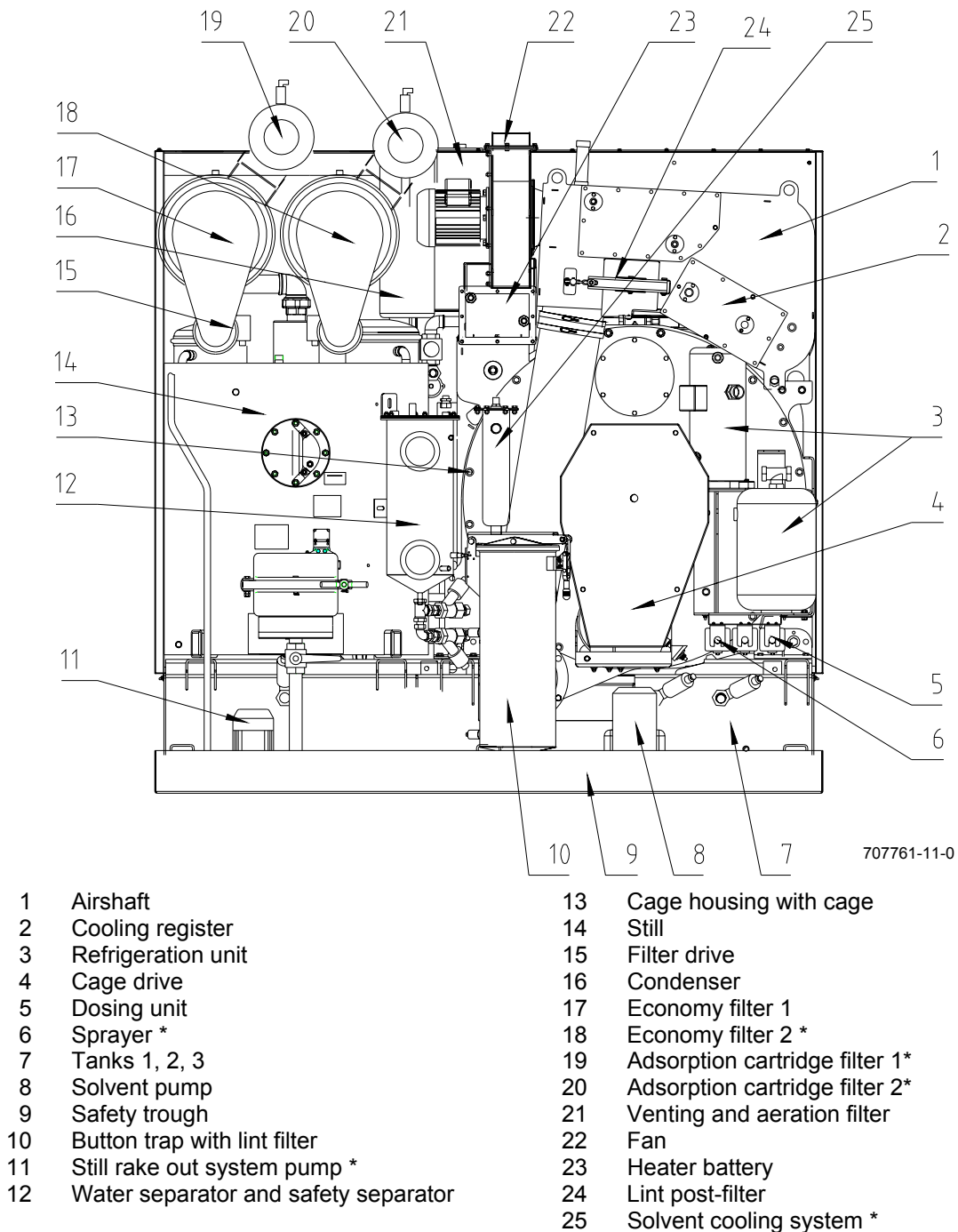
The machine serial number is on the nameplate.

### 3. View of the Machine

3.

#### 3.2 Rear of the Machine

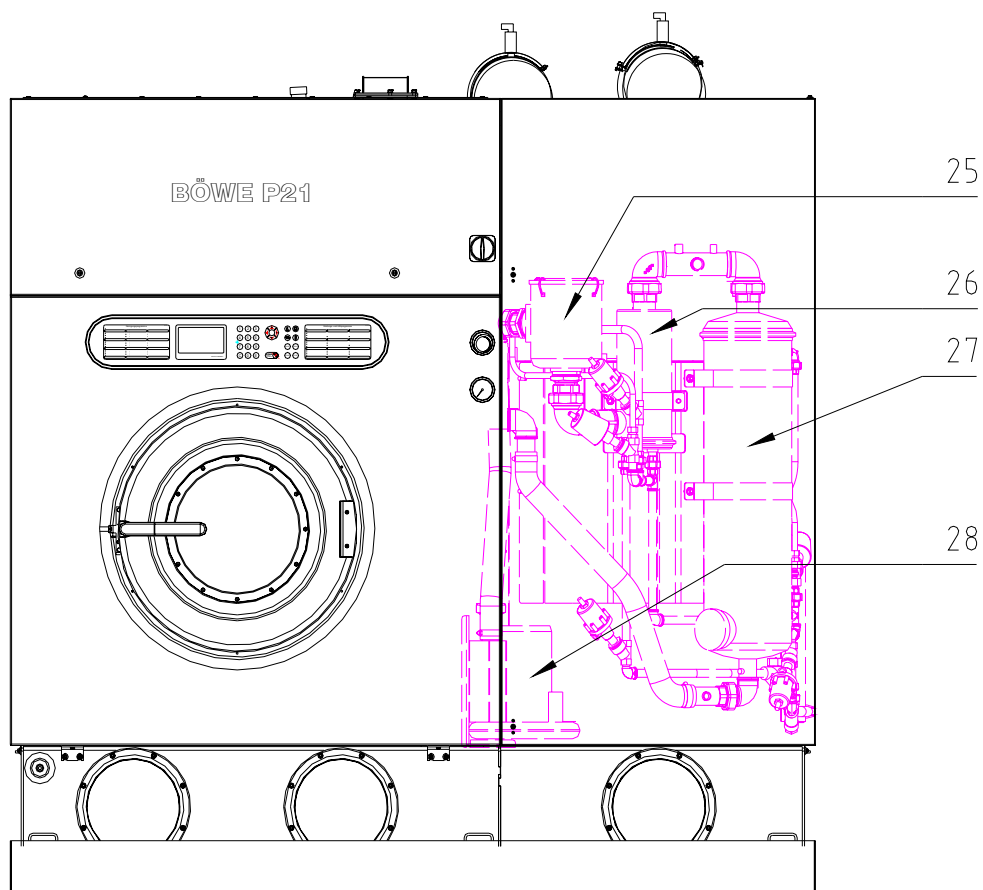
3.2



\* Option



### 3. View of the Machine

**3.**

707761-16-0

Slimsorba option:

- 25 Air filter
- 26 Preheater
- 27 Carbon container with heating coil
- 28 Fan

## 4. Technical Specifications

## 4.

### P21

Heating		Steam	Electric
Filling quantity	kg (lb)	21 (46.3)	21 (46.3)
Cage volume	l (US gal)	420 (110.9)	420 (110.9)
Cage diameter	mm (in)	1000 (39.4)	1000 (39.4)
Cage depth	mm (in)	535 (21.1)	535 (21.1)
Cleaning speed/drying speed	RPM	35	35
Spinning speed:	RPM	500	500
Max. g-factor		140	140
Low level	l (US gal)	52.5 (13.9)	52.5 (13.9)
High level	l (US gal)	105 (27.7)	105 (27.7)
<b>Operating load</b> (max. at 400 V, 50Hz)			
Standard model	kW	12	42
With all options	kW	13	43
<b>Connected loads:</b>			
Compressor capacity	kW	4.0	4.0
Fan capacity	kW	1.5	1.5
Solvent pump capacity	kW	1.1	1.1
Still rake out system pump capacity	kW	0.55	0.55
Cage drive capacity	kW	5.5	5.5
Filter drive capacity	kW	0.55	0.55
Slimsorba fan capacity	kW	0.75	0.75
Steam generator capacity		-	30
<b>Dimensions:</b>			
Machine dimensions:			
Width with distillation	mm (in)	2200 (86.6)	2200 (86.6)
Depth	mm (in)	1500 (59.1)	1500 (59.1)
Height without cartridge filter	mm (in)	2180 (85.8)	2180 (85.8)
Height with cartridge filter	mm (in)	2340 (92.1)	2340 (92.1)
Floor space	m <sup>2</sup> (ft <sup>2</sup> )	3.3 (35.5)	3.3 (35.5)
<b>Filling volumes:</b>			
Tank I filling	l (US gal)	200 (52.8)	200 (52.8)
Tank II filling	l (US gal)	125 (33.0)	125 (33.0)
Tank III filling	l (US gal)	200 (52.8)	200 (52.8)
Economy filter 1	l (US gal)	75 (19.8)	75 (19.8)
Economy filter 2	l (US gal)	50 (13.2)	50 (13.2)
Distillation filling	l (US gal)	220 (58.1)	220 (58.1)
Cartridge filter 1 (long)	l (US gal)	25 (6.6)	25 (6.6)
Cartridge filter 2 (short)	l (US gal)	15 (4.0)	15 (4.0)

The dimensions may differ if special options are used

## 4. Technical Specifications

4.

### P21

Heating		Steam	Electric
<b>Consumption for drying:</b>			
Drying time inc. reduction	min.	15	15
Elec. energy drying			
Without Slimsorba	kWh	2.4	4.0
With Slimsorba	kWh	2.6	4.2
Saturated steam drying			
Without Slimsorba	kg (lb)	4.0 (8.8)	-
With Slimsorba	kg (lb)	4.0 (8.8)	-
Cooling water drying (12 °C/53.6 °F)			
Without Slimsorba	l (US gal)	85 (22.4)	85 (22.4)
With Slimsorba	l (US gal)	75 (19.8)	75 (19.8)
<b>Consumption for distillation(1x at low level):</b>			
Elec. Energy, distillation	kWh	-	8.0
Saturated steam, distillation	kg (lb)	12.0 (26.5)	-
Cooling water for dist. (12 °C/53.6 °F)	l	160 (42.2)	160 (42.2)
<b>Consumption per cycle: *</b>			
Total elec. energy			
Without Slimsorba	kWh	2.8	12.0
With Slimsorba	kWh	3.0	12.2
Total saturated steam			
Without Slimsorba	kg (lb)	16.0 (35.3)	-
With Slimsorba	kg (lb)	16.0 (35.3)	-
Total cooling water (12 °C/53.6 °F)			
Without Slimsorba	l (US gal)	245/235	245/235
With Slimsorba	l (US gal)	(64.7/62.0)	(64.7/62.0)
Compressed air (6 bar/87 psi)	l (US gal)	6 (1.6)	(1.6)

## 4. Technical Specifications

4.

### P21

Heating		Steam	Electric
<b>Other:</b>			
Dist. throughput (DIN 11916) max.	l/h (US gal/h)	240 (63.4)	180 (47.6)
Filter throughput	l/h (US gal/h)	5000 (1320)	5000 (1320)
Filter surface, economy filter 1	m <sup>2</sup> (ft <sup>2</sup> )	5.0 (53.8)	5.0 (53.8)
Filter surface, economy filter 2	m <sup>2</sup> (ft <sup>2</sup> )	3.5 (37.7)	3.5 (37.7)
Weight without solvent (with 2 economy filters, 2 cartridge filters, Slimsorba)			
	kg (lb)	2025 (4465)	2025 (4465)
Weight with solvent (with 2 economy filters, 2 cartridge filters, Slimsorba)			
	kg (lb)	2890 (6372)	2890 (6372)
Floor space	m <sup>2</sup> (ft <sup>2</sup> )	3.3 (35.5)	3.3 (35.5)
Floor surface **	m <sup>2</sup> (ft <sup>2</sup> )	2.3 (24.8)	2.3 (24.8)
Cage centrifugal force	N (lb)	12600 (2832.5)	12600 (2832.5)
Floor load, stat. and dyn.	N/m <sup>2</sup> (lb/ft <sup>2</sup> )	17500 (365.6)	17500 (365.6)
Noise level	dB (A)	62	62
<b>Heat balance: *</b>			
Heat to dissipate via cooling water ***:			
	kJ/cycle	33800	33800
Heat dissipated to the surroundings:			
	kJ/cycle	8400	8400

\* Values apply to a standard 2-bath load, 1<sup>st</sup> bath low level for distillation at cooling water inlet temperature + 12 °C (53.6 °F), steam supply 4 – 5 bar (58.0 - 72.5 psi) overpressure saturated steam, ambient temperature 5 to + 40 °C (41 to 104 °F)

\*\* For portion of the floor surface for force transmission, see Installation Instructions, Point 5.3.1

\*\*\* Refers to water without additives

**Subject to change!**

## 4. Technical Specifications

4.

Machine		P26	P30	
Heating		Steam	Steam	
Filling quantity	kg (lb)	26 (57.3)	30 (66.2)	
Cage volume	l (US gal)	520 (137.3)	600 (158.4)	
Cage diameter	mm (in)	1000 (39.4)	1000 (39.4)	
Cage depth	mm (in)	665 (26.2)	770 (30.3)	
Cleaning speed/drying speed	RPM	35	35	
Spinning speed:	RPM	500	500	
Max. g-factor		140	140	
Low level	l (US gal)	65 (17.2)	75 (19.8)	
High level	l (US gal)	130 (34.3)	150 (39.6)	
Operating load (max. at 400 V, 50Hz)				
Standard model	kW	12	12	
With all options	kW	13	13	
Connected loads:				
Compressor capacity	kW	4.0	4.0	
Fan capacity	kW	1.5	1.5	
Solvent pump capacity	kW	1.1	1.1	
Still rake out system pump capacity	kW	0.55	0.55	
Cage drive capacity	kW	5.5	5.5	
Filter drive capacity	kW	0.55	0.55	
Slimsorba fan capacity	kW	0.75	0.75	
Dimensions:				
Machine dimensions:				
Width with distillation	mm (in)	2200 (86.6)	2200 (86.6)	
Depth	mm (in)	1630 (64.2)	1735 (68.3)	
Height without cartridge filter	mm (in)	2180 (85.8)	2180 (85.8)	
Height with cartridge filter	mm (in)	2340 (92.1)	2340 (92.1)	
Floor space	m <sup>2</sup> (ft <sup>2</sup> )	3.6 (38.7)	3.8 (40.9)	
Filling volumes:				
Tank I	filling	l (US gal)	225 (59.4)	250 (66.0)
Tank II	filling	l (US gal)	140 (37.0)	155 (40.9)
Tank III	filling	l (US gal)	225 (59.4)	250 (66.0)
Economy filter 1		l (US gal)	75 (19.8)	75 (19.8)
Economy filter 2		l (US gal)	50 (13.2)	50 (13.2)
Distillation	filling	l (US gal)	220 (58.1)	220 (58.1)
Cartridge filter 1 (long)		l (US gal)	25 (6.6)	25 (6.6)
Cartridge filter 2 (short)		l (US gal)	15 (4.0)	15 (4.0)

The dimensions may differ if special options are used

P21/P26/P30

## 4. Technical Specifications

4.

Machine		P26	P30
Heating		Steam	Steam
<b>Other:</b>			
Dist. throughput (DIN 11916) max.	l/h (US gal/h)	240 (63.4)	240 (63.4)
Filter throughput	l/h (US gal/h)	5000 (1320)	5000 (1320)
Filter surface, economy filter 1	m <sup>2</sup> (ft <sup>2</sup> )	5.0 (53.8)	5.0 (53.8)
Filter surface, economy filter 2	m <sup>2</sup> (ft <sup>2</sup> )	3.5 (37.7)	3.5 (37.7)
Weight without solvent (with 2 economy filters, 2 cartridge filters, Slimsorba)	kg (lb)	2175 (4795.9)	2325 (5126.6)
Weight with solvent (with 2 economy filters, 2 cartridge filters, Slimsorba)	kg (lb)	3140 (6923.7)	3380 (7452.9)
Floor space	m <sup>2</sup> (ft <sup>2</sup> )	3.6 (38.7)	3.8 (40.9)
Floor surface **	m <sup>2</sup> (ft <sup>2</sup> )	2.6 (28.0)	2.8 (30.1)
Cage centrifugal force	N	15600 (3506)	18000 (4046)
Floor load, stat. and dyn.	N/m <sup>2</sup> (lb/ft <sup>2</sup> )	17600 (368)	18000 (376)
Noise level	dB (A)	62	62
<b>Heat balance: *</b>			
Heat to dissipate via cooling water ***:			
	kJ/cycle	38600	44800
Heat dissipated to the surroundings:			
	kJ/cycle	10000	11600

\* Values apply to a standard 2-bath load, 1<sup>st</sup> bath low level for distillation at cooling water inlet temperature + 12 °C (53.6 °F), steam supply 4 – 5 bar (58.0 - 72.5 psi) overpressure saturated steam, ambient temperature +5 to + 40 °C (+41 to +104 °F)

\*\* For portion of the floor surface for force transmission, see Installation Instructions, Point 5.3.1

\*\*\* Refers to water without additives

**Subject to change!**

## 5. Settings and Optimum Operating Values

## 5.

Machine		P21	P26	P30
<b>Basic values:</b>				
Steam pressure (saturated steam)	bar (psi)	4 – 5 (58.0 – 72.5)	4 – 5 (58.0 – 72.5)	4 – 5 (58.0 – 72.5)
Steam temperature (max. permitted)	°C (°F)	150 (302)	150 (302)	150 (302)
Cooling water pressure	bar (psi)	2 – 4 (29.0 – 58.0)	2 – 4 (29.0 – 58.0)	2 – 4 (29.0 – 58.0)
Low cooling water level switch	bar (psi)	2 (29.0)	2 (29.0)	2 (29.0)
Cooling water temperature, max.	°C (°F)	25 (77)	25 (77)	25 (77)
Compressed air	bar (psi)	6 (87.0)	6 (87.0)	6 (87.0)
Low air pressure switch (if present)	bar (psi)	4 (58.0)	4 (58.0)	4 (58.0)
<b>Cage speeds:</b>				
Cleaning /drying	RPM	35	35	35
Spinning	RPM	400 /500	400 /500	400 /500
Reversing cycle (cleaning)	sec.	10 /5 /10	10 /5 /10	10 /5 /10
Low level	l (US gal)	52.5 (13.9)	65 (17.2)	75 (19.8)
High level	l (US gal)	105 (27.7)	130 (34.3)	150 (39.6)
Pump pressure (max.)	bar (psi)	2.5 (36.3)	2.5 (36.3)	2.5 (36.3)
Filter surface, economy filter	m <sup>2</sup> (ft <sup>2</sup> )	5.0 (53.8)	5.0 (53.8)	5.0 (53.8)
Filter powder (only for machines without emission-free still rake out system)	kg (lb)	2.5 (5.5)	2.5 (5.5)	2.5 (5.5)
Tank I: optimum filling volume (high level)	l (US gal)	110 (29.0)	135 (35.6)	155 (40.9)
<b>Detergent solution cooler:*</b>				
Detergent solution thermal sensor:				
Detergent solution cooler ON	°C (°F)	15 – 30 (59 – 86)	15 – 30 (59 – 86)	15 – 30 (59 – 86)



## 5. Settings and Optimum Operating Values

## 5.

Machine		P21	P26	P30
<b>Refrigeration technology:</b>				
Filling capacity, cooling agent R 404A	kg (lb)	4,6 (10.14)	4,6 (10,14)	4,6 (10,14)
Expansion valve:				
Nozzle size: solvent cooling	No.	03	03	03
Drying /reduction	No.	01	01	01
High pressure control ON	bar (psi)	21 (304.6)	21 (304.6)	21 (304.6)
High pressure control OFF	bar (psi)	25 (362.6)	25 (362.6)	25 (362.6)
Low pressure control	bar (psi)	2 (29)	2 (29)	2 (29)
<b>Drying:</b>				
Cooling water regulator setting:				
Adjust 4 – 6 min. after start of drying	bar (psi)	18 (261.1)	18 (261.1)	18 (261.1)
Temp. sensor, cage inlet	°C (°F)	60 (102)	60 (102)	60 (102)
Temp. sensor after cooler:				
Control value, drying	°C (°F)	40 (104)	40 (104)	40 (104)
Control value, cycle end	°C (°F)	15 (59)	15 (59)	15 (59)
<b>Distillation:</b>				
Cooling water regulator condenser	°C (°F)	45 (113)	45 (113)	45 (113)
Thermal sensor:				
Cycle distillation OFF	°C (°F)	135 (275)	135 (275)	135 (275)
Still stripping OFF	°C (°F)	138 (280)	138 (280)	138 (280)
Thermal sensor, distilled solvent	°C (°F)	55 (131)	55 (131)	55 (131)
Restrictor in steam feeder	mm (in)	6 (0.24)	6 (0.24)	6 (0.24)
Restrictor in direct steam line	mm (in)	4 (0.16)	4 (0.16)	4 (0.16)

\* Option

## 6. Operation

## 6.

### 6.1 First Startup

### 6.1

The BÖWE Customer Service department is responsible for carrying out the first startup.



**Attention:** Before opening the switch panel or removing paneling, set the main switch to "0".

#### 6.1.1 Preparatory Work

Set up supply systems (electrical current, cooling water, compressed air, steam and condensate lines).

#### 6.1.2 Filling Machine With Solvent



Use only stabilized, high-purity TETRACHLORETHENE (perc), in accordance with DIN 53978.

The amount of solvent needed is:

Machine P21 tank I: approximately: 110 l (178 kg) or 29 US gal (400 lb)

Machine P26 tank I: approximately: 135 l (219 kg) or 36 US gal (480 lb)

Machine P30 tank I: approximately: 155 l (251 kg) or 41 US gal (555 kg)

Total filling amount P21: approximately: 445 l (721 kg) or 115 US gal (1590 lb)\*

Total filling amount P26: approximately: 510 l (826 kg) or 135 US gal (1820 lb)\*

Total filling amount P30: approximately: 565 l (915 kg) or 150 US gal (2020 lb)\*

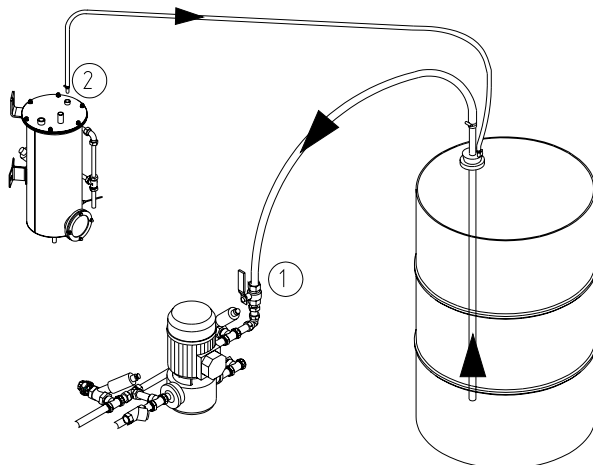
\* Machine with 1 economy filter.

For machines with 2 economy filters: + 50 l (13.2 US gal)

For machines with 2 economy filters and 1 cartridge filters: + 75 l (19.8 US gal)

For machines with 2 economy filters and 2 cartridge filters: + 90 l (23.8 US gal)

When filling the machine using the gas pendulum process, refer to diagram.



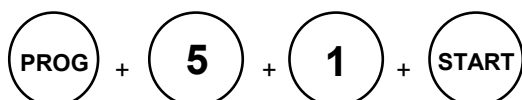
If there is no suction from the pump, pour about 5 liters (1.3 US gal) of solvent into the button trap. Check that the direction of rotation is correct.

## 6. Operation

6.

### Execution:

- Connect a hose between the barrel and ball valve (1).
- Connect the gas displacement line between the barrel and water separator (2).
- Open ball valve (1).
- Start program P51:



The tanks fill up, with one overflowing into the other.

- Watch the level of the liquid in the tank at the sight-glass until the tanks are full enough.
- Lift the suction line out of the barrel.
- Close the ball valve (1).
- Stop program P51 and leave:



- Remove the hose connections to the barrel.
- Put the screw cap on to the ball valve (1).
- Close the barrel and store in accordance with regulations.

Depending on the filter you have, you may have to refill with solvent after you fill the filter.

### If the barrel becomes empty during the filling, do the following:

- Close the ball valve (1).
- Stop program P51:



- Change the barrel.
- Open the ball valve (1).
- Continue program P51:



### 6.1.3 Refilling Solvent

Follow the procedure given in Point 6.1.2 for routine refilling of solvent.



**Attention:** Even empty containers can still hold solvent residues. Therefore, tightly seal the container (barrel) again and store or dispose of in accordance with regulations!

## 6. Operation

**6.**

---

### 6.1.4 Filling Slimsorba Carbon Container (Optional Equipment)

For the first startup, perform the following steps in the order given to fill the carbon container with activated carbon:

1. Loosen the upper tube of the carbon container
2. Loosen the quick release fastener on the cover and lift off the cover
3. Remove fine filter sieve and clamping ring.
4. Fill in 15 Kg of activated carbon (cylindrical pellets with approx. 4 mm/0.16 inch diameter, type SUPERSORBON K40). The heating coil must be covered.
5. Replace the fine filter sieve and clamping ring.
6. Replace the cover and close the quick release fasteners.
7. Secure the upper tube of the carbon container again.

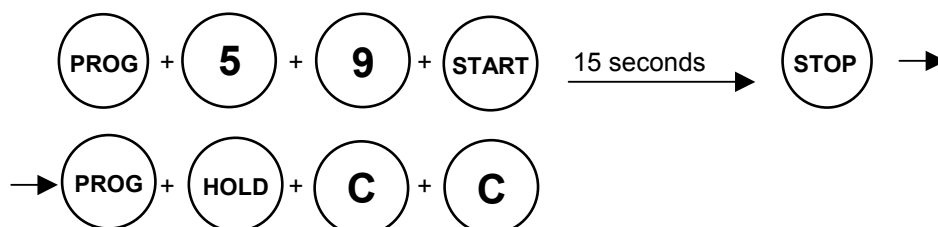
The Slimsorba is an integrated multiple-cycle unit for reducing the solvent residue in perc machines. The Slimsorba is desorbed with hot air.

## 6. Operation

6.

### 6.1.5 Filling the Water Separator

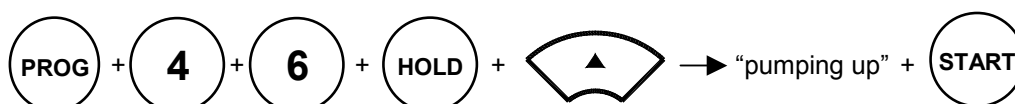
- Pump solvent from tank I to the still for about 15 seconds:



The distillation heating starts automatically. Distillation fills the water separator.

### 6.1.6 Filling the Economy Filter

- Start filter maintenance program P46 (filter 1) or P47 (filter 2), starting with step “pumping up” :



When using filter powder (optionally):

- First place the precoating bag with the prescribed amount of filter powder (2.5 kg/5.5 lb) into the cage, then start P46 (filter 1) or P47 (filter 2), as described above.




**Attention! Do not use filter powder on machines with an emission-free still rakeout system.**

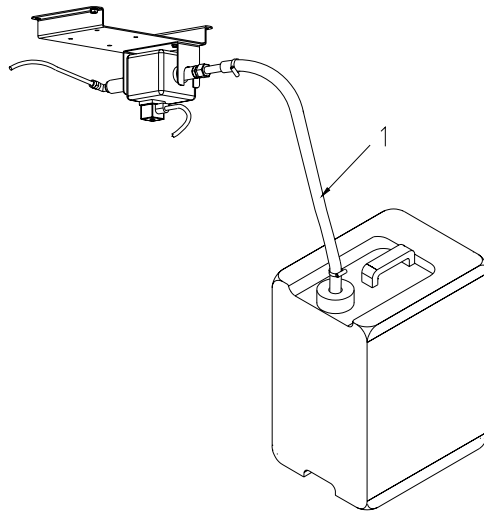
## 6. Operation

6.

### 6.1.7 Dosing Unit

- Insert suction hose (1) into cleaning agent container.
- Use function 60E + 26E  
or 60E + 27E  
or 60E + 28E to start the pump suction, until the pump runs quietly.

	<b>Attention:</b> Watch the liquid level in the product container. The pump should not run when it is dry! Please put out of operation when the pump is not used! Addition of cleaner intensifier in the correct quantity (no overdosing) improves product run-off, minimises the risk of smell and prevents static charging.
---	--




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### 6.1.8 Sprayer (Optional Equipment)

The SPRAYER draws the product out of a tank and sprays it onto the garments in the cage.

- Insert suction hose into cleaning agent container.
- Use function 60E + 29E  
or 60E + 30E to start the pump suction, until the pump runs quietly.

The monthly multi-maintenance program P50 also has an integrated step to rinse the lines and nozzle.

	<b>Attention:</b> Watch the liquid level in the product container. The pump should not run when it is dry! Please put out of operation when the pump is not used!
---	---

### 6.1.9 Electrical Steam Generator (Optional Equipment Only for P21)

Look at the manual of the steam generator

## 6. Operation

6.

### 6.1.10 Opening the Loading Door

#### Never leave the loading door standing open!

Before each start, make sure that the loading door is closed.  
During longer standstills, concentrations of the solvent gas can form.

You can unlock the loading door with the  button for up to 10 minutes.

Starting with the 11<sup>th</sup> minute, you cannot open the loading door until after you have started the "DEODORIZING" program (P43) and the horn has stopped sounding.

Once the machine has been turned on, it is not possible to open the loading door until the "deodorizing" program (P43) starts and the horn sounds to signal the end of the program.



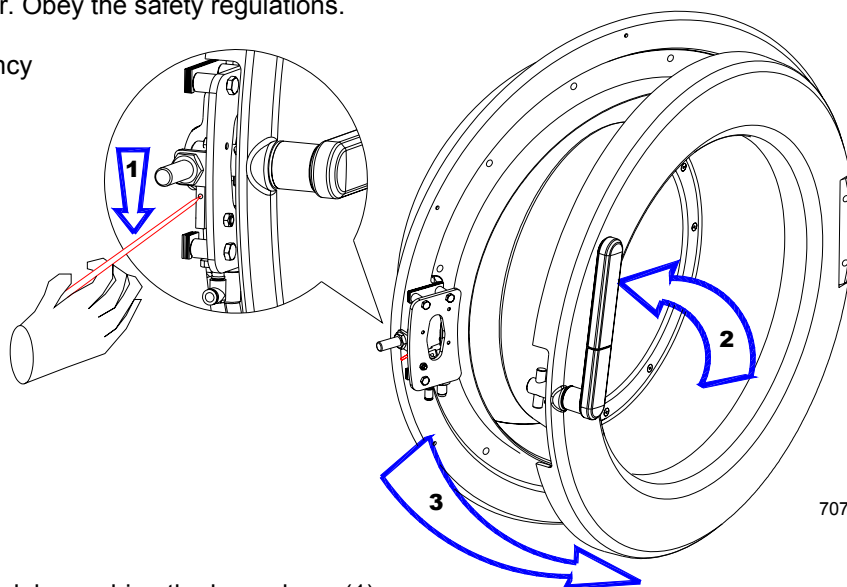
**Attention:** When neither current nor compressed air is present or when the program has been interrupted, a mechanical **EMERGENCY** opening is possible with the help of a tool.



The trained user is permitted to carry out an EMERGENCY opening only when the program has stopped and the cage is not turning. Before the emergency opening, carefully open the button trap cover in order to release any overpressure.

After removing garments that have not finished drying, place them in a solvent-tight transport container. Obey the safety regulations.

Emergency release:



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- Unlock by pushing the lever down (1).
- Open the loading door at the same time (2+3).

After correcting the error, close the loading door and cover and continue the program by pressing the "Start" button.

## 6. Operation


**6.**

### 6.1.11 Performing a Test Run

Load the machine with test garments (note the filling capacity!)

Start program P2 (see 6.2 Automatic Operation - Brief Instructions) and, during the cycle, check the settings and operating values listed under Point 5; correct if necessary.

### 6.1.12 Refrigeration unit

	<p><b><u>Attention:</u></b></p> <p><b>No cooling agent is allowed to escape into the atmosphere during operation, servicing work and decommissioning of refrigeration units.</b></p> <p><b>You must keep a record of the quantities of cooling agent used and present this record to the authorities upon demand.</b></p> <p><b>Only people who have the necessary special knowledge and technical equipment are authorized to service and decommission refrigeration units.</b></p>
---	--



## 6. Operation

6.

### 6.2 Automatic Operation - Brief Instructions

6.2

Open valves for water, steam, condensate, compressed air.  
Set up the power supply  
Before starting, make sure that all doors and covers are closed.

Turn main switch "ON"

Display: "BOEWE"  
"Textile Cleaning"

Machine type, for example: "P21"

Then the deodorizing program "P43" is displayed.  
Press the "Start" button.  
After the signal sounds, press the "Stop" button.

Loading:

Open the loading door; load the cage according to the filling capacity.  
Close the loading door.  
Erase the displayed, previous program P43 by pressing "C".  
Select a program according to the overview.  
Input the required program  
(program and number)

Start:

Press "Start".

The program executes automatically.

During automatic and manual operation, the loading door is locked from the start of the cycle until the end (signal).

If there is a failure or if the door limit switch is not adjusted correctly, there will be an alarm indication.

A signal that sounds in intervals announces that the program has ended.

Stop: Press the "Stop" button\*.

Open the loading door and unload the garments.

Close the loading door.

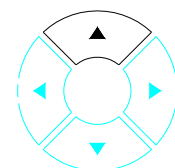
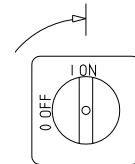
If you repeat the same program, you only need to load the garments, close the loading door and press the "Start" button.

If you do not restart the machine, the loading door locks. You can unlock the door with the "↑" button for up to 10 minutes. Starting with the 11<sup>th</sup> minute, start "P43" deodorizing.



**Caution**

**Turn off the main switch if there is a risk of any kind.  
If the machine is severely out of balance during spinning, stop it by pressing the "STOP" button.**



\* When pressure in the machine has built up (visible as a block diagram in the display) the signal E106 appears. When the pressure has dissipated, the loading door unlocks and can be opened.

## 7. Functional Units

7.

### 7.1 Tanks (Work Tank /Clean Tank /Extra Tank)

7.1

The **work tank** contains solvent, which is used over and over.

The solvent is pumped from the work tank to the cage. If there is not enough solvent in the work tank, fresh solvent is taken from the clean tank. After the garments have been cleaned, the solvent is pumped back to the work tank or to the distillation.

**Tank 3** is an extra tank for special applications. If an optional second centrifuge filter is used, this is allocated to the third tank. This permits separate cleaning of light and dark products.

The **clean tank** holds clean solvent that has been recovered from the distillation and drying. When the clean tank overflows, it fills up the work tank again.

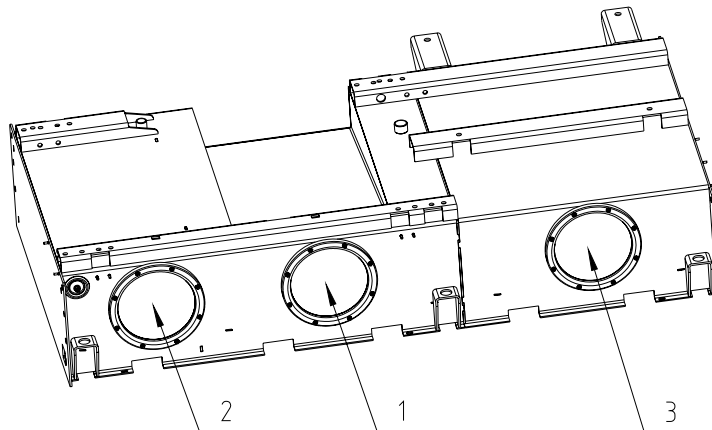
Sacrificial anodes in the tanks protect against corrosion.

P21	Filling volumes	Recommended filling quantity
Work tank	200 l (52.8 US gal)	105 l (27.7 US gal) (high level)
Tank 3	200 l (52.8 US gal)	105 l (27.7 US gal) (high level)
Clean tank	125 l (33.0 US gal)	125 l (33.0 US gal)

P26	Filling volumes	Recommended filling quantity
Work tank	225 l (59.4 US gal)	130 l (34.3 US gal) (high level)
Tank 3	225 l (59.4 US gal)	130 l (34.3 US gal) (high level)
Clean tank	140 l (37.0 US gal)	140 l (37.0 US gal)

P30	Filling volumes	Recommended filling quantity
Work tank	250 l (66.0 US gal)	150 l (39.6 US gal) (high level)
Tank 3	250 l (66.0 US gal)	150 l (39.6 US gal) (high level)
Clean tank	155 l (40.9 US gal)	155 l (40.9 US gal)

All three tanks are self-cleaning, which means that the sloping bottoms remain free of dirt.



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- 1 = Work tank
- 2 = Clean tank
- 3 = Tank 3 (extra tank)

### 7.2 Solvent Pump

7.2

The solvent pump is a self-priming vertical pump with a delivery rate up to 175 l/min (46.2 US gal/min)

## 7. Functional Units

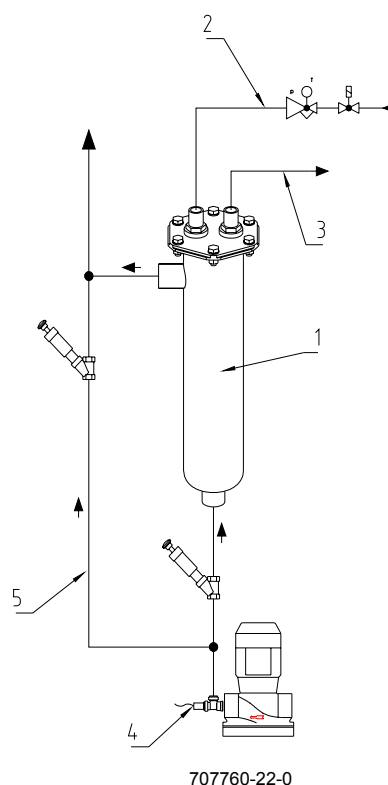
## 7.

### 7.3 Solvent Cooling System (Optional Equipment)

### 7.3

A heat exchanger, which is cooled by **cooling agent**, cools the detergent solution. The cooling of the solvent is set to 20 °C (68 °F) in gentle programs. The cooling is controlled over a thermal sensor at the input to the heat exchanger. During each bath with detergent solution cooling, the program remains stopped before pumping up (the cage does not move) until the selected detergent solution temperature has been reached (with water cooling, a max. of 3 minutes). Then the detergent solution temperature is monitored while the program runs.

Cooled with a cooling agent:



- 1 Solvent cooling system
- 2 Cooling agent inlet
- 3 Cooling agent outlet
- 4 Thermal sensor
- 5 Bypass without cooling

## 7. Functional Units

7.

### 7.4 Economy Solvent Filter

7.4

The economy filter is a filter without a precoating (without filter powder).  
You must perform filter maintenance after a selectable number of cycles or at least once a week.



**Attention! Do not use filter powder on machines with an emission-free still rakeout system.**

After you start the filter maintenance program P46 or P49, the machine executes all necessary processes fully automatically (draining, spinning, rinsing, precoating, cage drying with reduction).

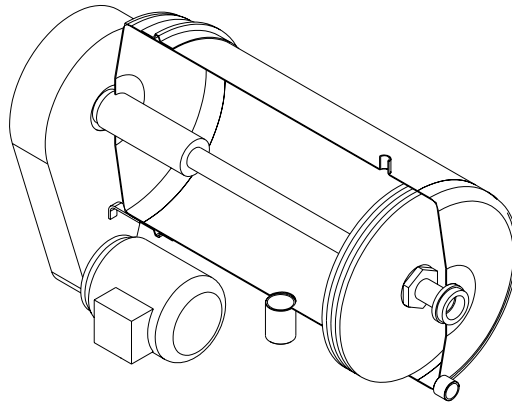
A signal sounds after the reduction.  
The machine is ready for use again.

#### Second economy filter, (optional equipment):

Use a second filter when you want to filter the solvent separately for white and dark garments.  
It is allocated to the third tank.

Separate standard cleaning programs are available for the second filter. Select filter maintenance program P47 for fully-automatic maintenance of the 2nd filter.

Economy filter



707760-06-0

## 7. Functional Units

7.

### 7.5 Adsorption Cartridge Filter

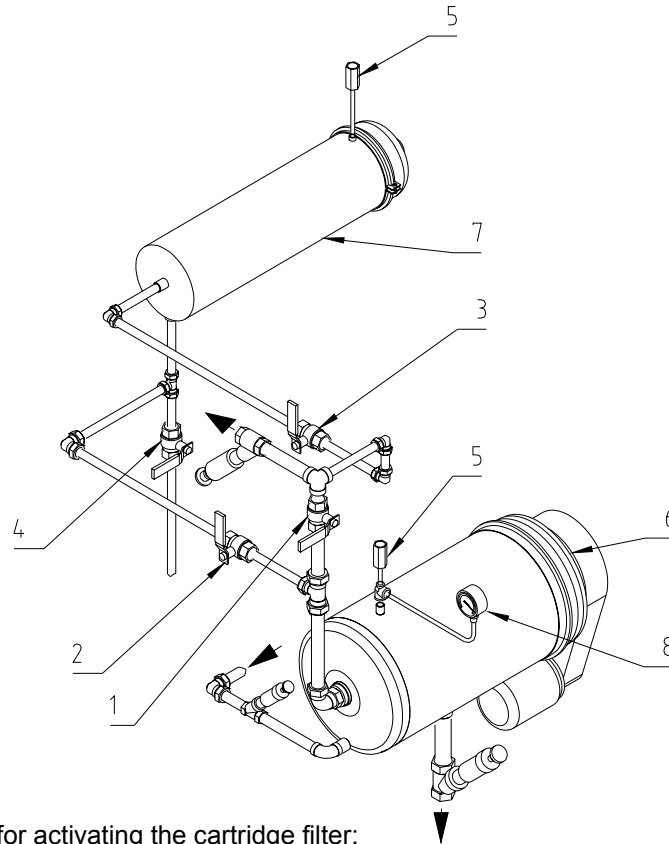
7.5

#### (Optional equipment /USA Standard)

The reason that the economy filter and the cartridge adsorption filter are both used on one machine is that this provides separate filtration of pigment dirt and soluble dirt (fatty acids, dyes).

The insoluble pigment dirt is separated with the help of the extraction filter, and the soluble dirt (especially dyes) is adsorbed on the cartridge.

In case there is discoloration of the solvent during the cycle, it is possible to manually activate the cartridge filter (7) in the filter circuit after the economy filter (6).



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Steps for activating the cartridge filter:

- Open ball valves (2) and (3)
- Close ball valve (1)

If you want to remove the filter from the solvent circuit again and use only the economy filter, make the following setting by hand:

- Open ball valve (1)
- Close ball valves (2) and (3)



**According to the 2nd BImSchV, you are not permitted to use cartridge filters.**

## 7. Functional Units

7.

### 7.6 Cage

7.6

The cage has a dynamic channeling of holes for optimum air flow during drying.

### 7.7 Cage Drive

7.7

The cage drive is an adjustable V-belt drive with 3 V-belts.

### 7.8 Button Trap

7.8

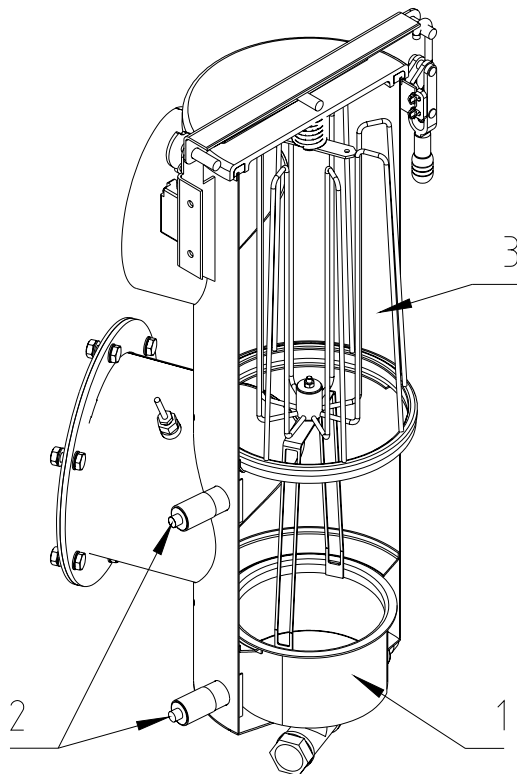
The button trap strainer (1) catches large impurities (such as buttons, etc.) and lint in the detergent solution. Never operate the system without the button trap strainer. (Risk of damaging the solvent pump). During the drying, a flow of air dries the dirty lint in the button trap strainer.

### 7.9 Level Controller

You can adjust the low and high levels with a capacitive sensor. (2)

### 7.10 Lint filter

The lint filter (3) catches the lint that is carried along in the air flow. The lint filter is in the button trap housing. Never operate the system without the lint filter. Never use a damaged lint filter. Make sure that the lint filter sits firmly in place. (Risk of lint on the cooling register)



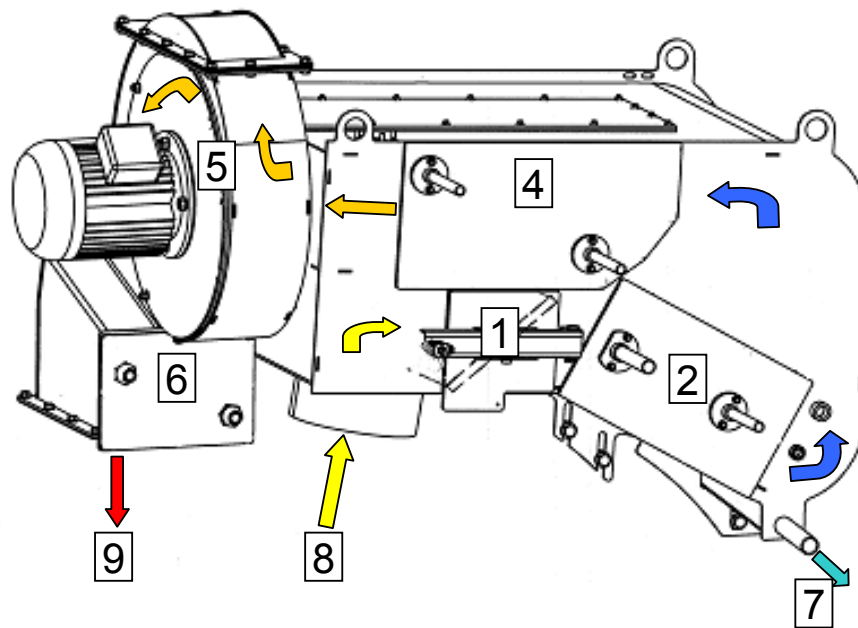
## 7. Functional Units

## 7.

### 7.11 Airshaft

### 7.11

An additional lint filter, refrigeration unit and fan, with housing, are integrated in the airshaft.



Luftschacht Rück.jpg

- 1 Additional lint filter
- 2 Intense cooling unit
- 4 Pre-heater
- 5 Fan with housing
- 6 Heater battery
- 7 Solvent recovery
- 8 Air inlet
- 9 Air outlet

#### 7.11.1 Refrigeration unit

Refrigeration technology is used to cool the air cooler in the airshaft and, in special cases (optional equipment), for cooling the solvent. The low aftercooler temperature of the air cooler reduces the solvent residue concentration in the cage and the solvent emissions.

The heated gas that arises in the cooling compressor (heat pump principle) is fed through the pre-heater. The energy consumed for drying is considerably reduced because the thermal energy is fed back.

The air cooler is specially coated as protection against corrosion.

## 7. Functional Units

## 7.

### 7.12 Drying Controller (Volume Drystat)

### 7.12

The drying controller is in the solvent drain line from the air duct to the water separator. It consists of a valve and a sight-glass with built-in level sensor, positioned above the valve.

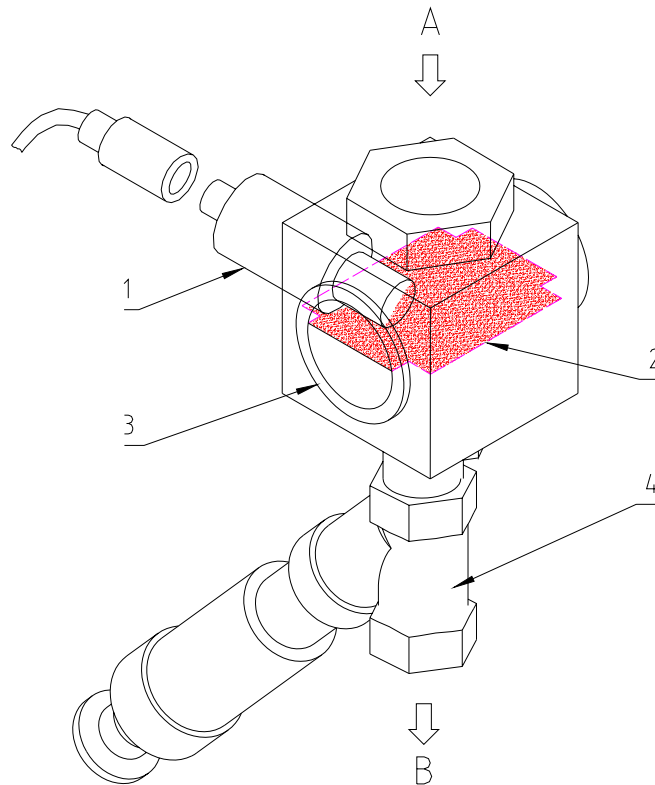
The drying controller determines the amount of recovery to be expected in a predefined period of time. If this particular amount of recovery is no longer attained during the predefined time period, the garments are dry.

The valve closes after the end of the specified drying time. The recovery causes the volume (measurement chamber) between the valve and sensor to fill.

When the filling level has been reached, the sensor opens the valve and the solvent drains into the water separator. This procedure keeps repeating until the filling time (adjustable in the specification code) is exceeded.

The programme enters the post-drying phase, when additionally a certain temperature is reached. The measurement chamber must empty within a specific time. If this time is exceeded, an error message is displayed and the machine switches to the malfunction state.

Note the diagnostic message!



707760-03-0

- |                                      |                                       |
|--------------------------------------|---------------------------------------|
| A = Solvent feed from air duct       | 3 = Measurement chamber (sight-glass) |
| B = Solvent drain to water separator | 4 = Valve                             |
| 1 = Level sensor                     |                                       |
| 2 = Solvent level                    |                                       |



## **7. Functional Units**

## **7.**

---

### **7.13 Loading Door Venting**

### **7.13**

When the loading door is opened, the machine fan starts to run (in machines with Slimsorba, only the Slimsorba fan). This fan prevents air containing solvent from entering the area around the machine operator during loading and unloading of the machine. The cage is ventilated until the loading door is closed.

In machines with integrated Slimsorba, the air drawn off is directed over the Slimsorba carbon bed.

## 7. Functional Units

7.

### 7.14 Distillation

7.14

The distillation unit consists of a still with ascending pipe (1) and condenser (2).

The still is equipped with an overfill preventer (optional equipment) and still rinser. The still and the sight-glass are rinsed each time the still is pumped out. You can turn the distillation heater on and off with 13E. Furthermore, distillation can be stopped by pressing the 0 button (for about 2 seconds). For information on still stripping and maintenance, see Point 11.

#### 7.14.1 Overfill Preventer in Still (Optional Equipment)

A built-in sensor interrupts the pumping in process when the upper edge of the view-glass has been reached. The horn sounds and a diagnostic message is displayed. Delete the diagnostic message with the "C" button. You can also decide if you want to pump the excess solvent to tank 1 and continue with the program sequence, or if you want to wait until the solvent is distilled off.

### 7.15 Emission-Free Still Rake Out

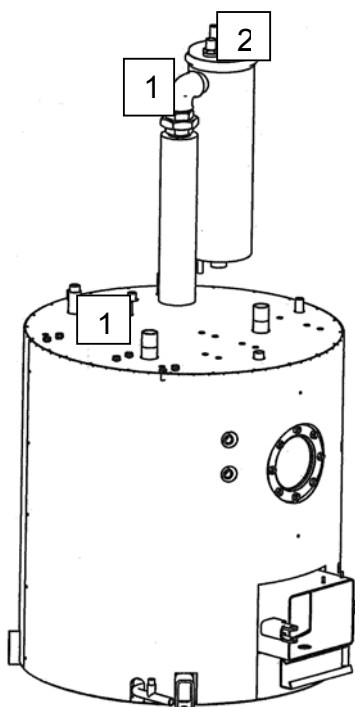
7.15

#### (Optional equipment)

If you have an economy filter, you can only perform the emission-free still rake out if you have not precoated with filter powder.

With each distillation pump out process, the sludge pump pumps out the entire contents of the still.

Use maintenance program P45 or P49 for emission-free still rake out.



Destille.jpg

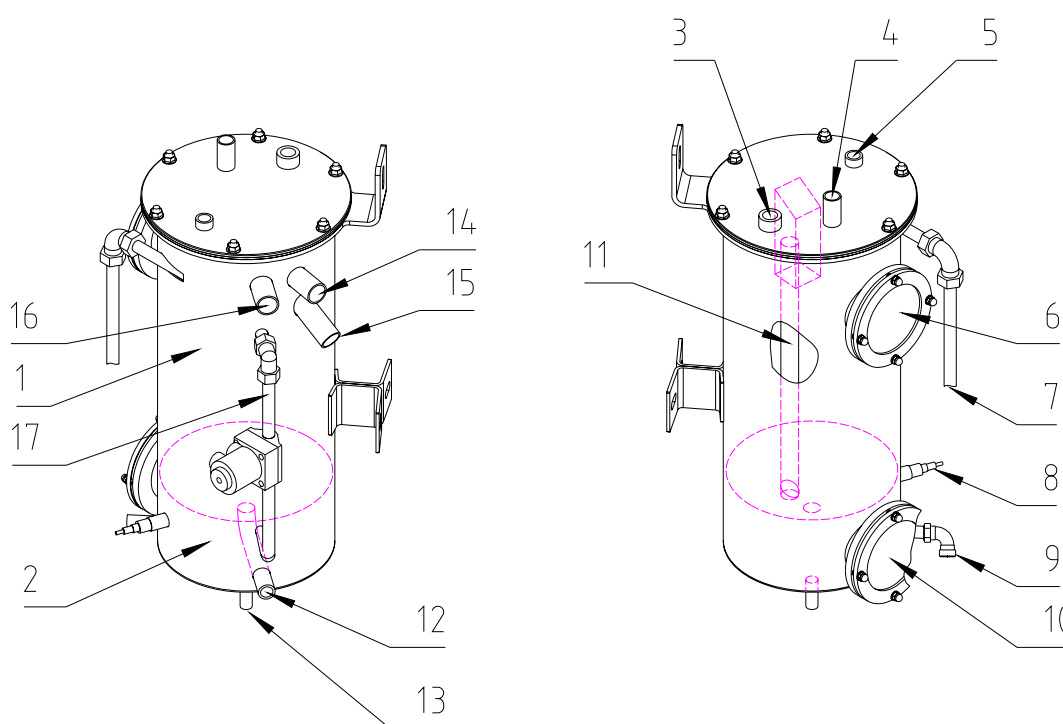
## 7. Functional Units

## 7.

### 7.16 Water Separator With Safety Separator

### 7.17

The safety separator is integrated in the water separator. The water phase from the water separator flows continually to the safety separator. The solvent runs to the clean tank. The safety separator is protected against overfilling with a sensor. The process water from the safety separator is automatically polled after each cycle by a sensor and drained into the process water tank. Rinsing and pumping out with P54 automatically cleans the water separator.



707760-01-A

- |  |  |
|--|--|
| 1 Water separator                      | 10 Sight-glass, safety separator           |
| 2 Safety separator (integrated)        | 11 Water overflow                          |
| 3 Ventilation and aeration atmospheres | 12 Drain, water separator                  |
| 4 Tank aeration                        | 13 Drain, safety separator                 |
| 5 Aeration for filling machine         | 14 Distillation inlet                      |
| 6 Sight-glass, water separator         | 15 Perc overflow to clean tank             |
| 7 Connection, rinsing with pump        | 16 Drying inlet                            |
| 8 Sensor for process water             | 17 Drain, water phase from water separator |
| 9 Drain, process water                 |  |

## 7. Functional Units

## 7.

### 7.17 Dosing Unit


### 7.18

The device, a vibrating reciprocating pump (1), automatically doses chemical additives from the supply pack:

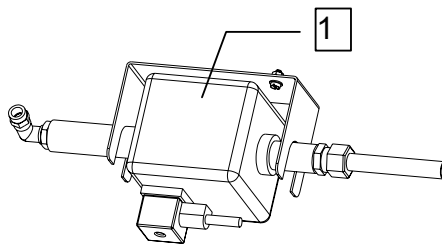
- In each cycle
- At the right time
- In the right amount.

The dosing amount is based on the information provided by the manufacturer of the product.

Use only products that remain liquid at room temperature.

	<b>Attention:</b> <b>Watch the liquid level in the product container.</b> <b>The pump should not run when it is dry!</b> <b>Use only suitable chemical additives.</b>
---	---

Before longer standstills and when changing products, rinse out the unit with solvent.



707760-13-0

### 7.18 Sprayer

### 7.19

(Optional equipment)

#### General Information

The sprayer is a device for finishing and waterproofing the garments in the drycleaning machine. The sprayer draws the product or product mixture out of a tank and sprays it onto the garments in the cage. The drycleaning machine's computer control system controls the sprayer. Stored fixed programs or individually created customer programs handle the fully automatic sequence of the rinsing process.

With absorbent ski clothing, quilted jackets, down, Gore-Tex, microfiber textiles, etc., we recommend that you spray on to dry garments.

Rinsing the garments with solvent from the machine's clean tank before spraying usually results in better waterproofing results.

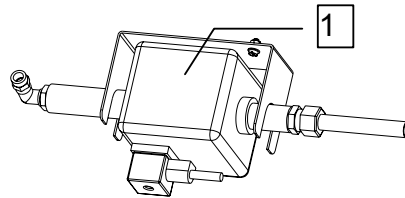
It is possible to build the sprayer on to the cleaning machine at a later time; everything has been prepared.

## 7. Funktionseinheiten

## 7.

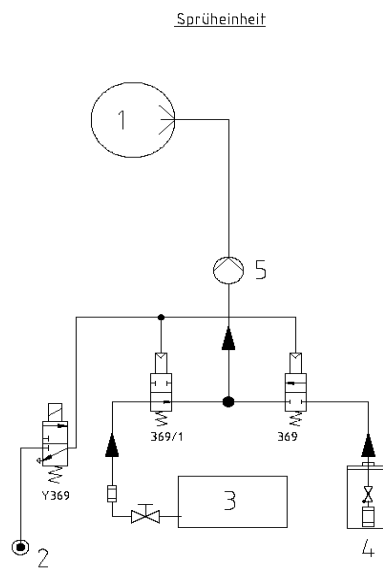
### Aufbau

Die Hauptbaugruppe ist eine Schwingkolbenpumpe (1) mit den Anschlüssen für Ansaugleitung Produkt, Ansaugleitung für Spülung mit Lösemittel aus dem Reintank, Sprühleitung, Anschluss für Druckluft zum Freiblasen der Sprühdüse und elektrischer Anschluss für die Pumpe.



707760-13-0

Funktionsschema Sprüheinheit:



707760-15-1C

- 1 Trommel
- 3 Reintank
- 4 Produkt
- 5 Sprühpumpe


## 7. Functional Units

7.

### Sprayer operation

The computer controls the sprayer.

Use only products that remain liquid at room temperature.

	<b>Attention:</b> <b>Watch the liquid level in the product container.</b> <b>The pump should not run when it is dry!</b> <b>Use only suitable chemical additives.</b>
---	---

Enter the number of the waterproofing program, press the "START" button; the spraying time, which you can change, if necessary, appears in the display field. Press "E" to start the program. The system suctions the product from the product container and passes it through the open stop valve (369); the system feeds the product through the spray pump to the spray nozzle in the cage via the non-return valve and then sprays the garments.

The flexible suction hose is shaped into a tube at one end so that the suction line always reaches vertically down to the bottom of the product container. A fine sieve with suction valve is located at the suction opening.


The total spraying time determines how much of the product is sprayed, according to the throughput capability of the spray nozzle and the pump pressure.

The amount of product to be sprayed is achieved according to the throughput capacity of the spray nozzle and the pump pressure by spraying.

After each spraying is switched from product tank to pure tank and rinsed the period from Spec-Code line.

Before longer standstill times or before you change the product, we recommend that you rinse the sprayer with solvent. This should prevent the sprayer from becoming gummed up with product residues.

Do this by starting program P50. For the duration of the spraying, the stop valve (369/1) is open, so that solvent from the clean tank is suctioned in for rinsing instead of the product.

 In order to achieve a good waterproofing effect, make sure not to put too much into the cleaning machine. It is useful to apply the amount of product to the number of garments instead of to the weight.

The recommended value is 40 ml of product for waterproofing each garment piece. Please refer to the datasheets from the appropriate manufacturer for the exact amount.

The machine uses a 1.5 nozzle; an additional 2.5 nozzle is included in the delivery. Your supplier of chemical additives can help you to make the exact adjustment.

## 7. Functional Units

## 7.

### 7.19 Slimsorba Adsorption Unit

### 7.20

#### (Optional equipment)

#### General Information

The Slimsorba is a multiple-cycle adsorption unit for reducing the perc solvent residue in the cage at the end of the cycle.

The Slimsorba is integrated into the machine. All functional sequences run completely automatically over the computer control of the drycleaning machine.

The carbon unit has been dimensioned so that it can adsorb approx. one week long during normal single shift operation.

Special maintenance programs are available for the Slimsorba; they allow you to perform desorption of the activated carbon outside of the cleaning cycles. If you want, you can have the system provide you with a maintenance message.

Desorption is performed in an environmentally acceptable way with hot air. It does not result in any process water that needs to be disposed of.

The Slimsorba is heated with steam.

The cage venting of the drycleaning machine runs over the Slimsorba when the loading door is open.

A special cooling system always keeps the carbon's temperature within the optimum range for good adsorption capabilities. (optional)

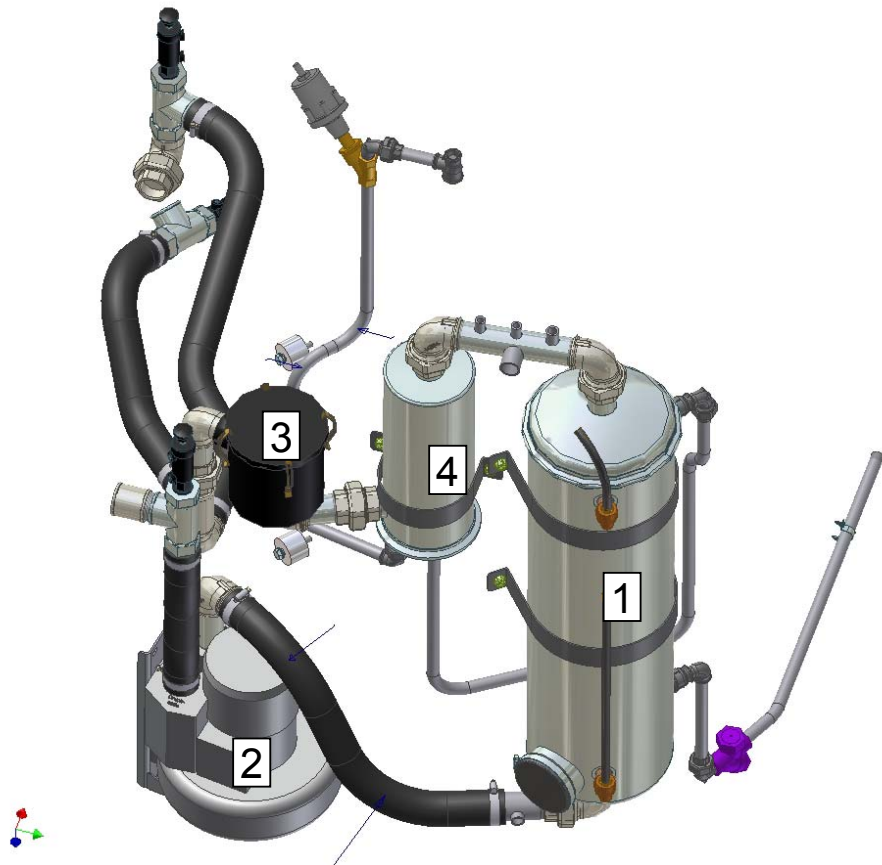
**Attention: There is a risk of burns on parts that are not insulated.**

The main components of the Slimsorba are:

- Carbon container      with a filling of absorbing carbon and an internal cooling coil (optional with additional cooling coil)
- Note: You must fill in activated carbon when commissioning the machine
- Heater battery      for hot air desorption
- Air filter      lint filter
- Fan      for moving the air flow
- Sensors      for temperature monitoring
- Connecting pipes      to the drycleaning machine

## 7. Functional Units

7.



Slimsorba.jpg

- 1 Carbon container with heating coil (and optional cooling coil)
- 2 Fan
- 3 Air filter
- 4 Preheater



## 7. Functional Units

7.

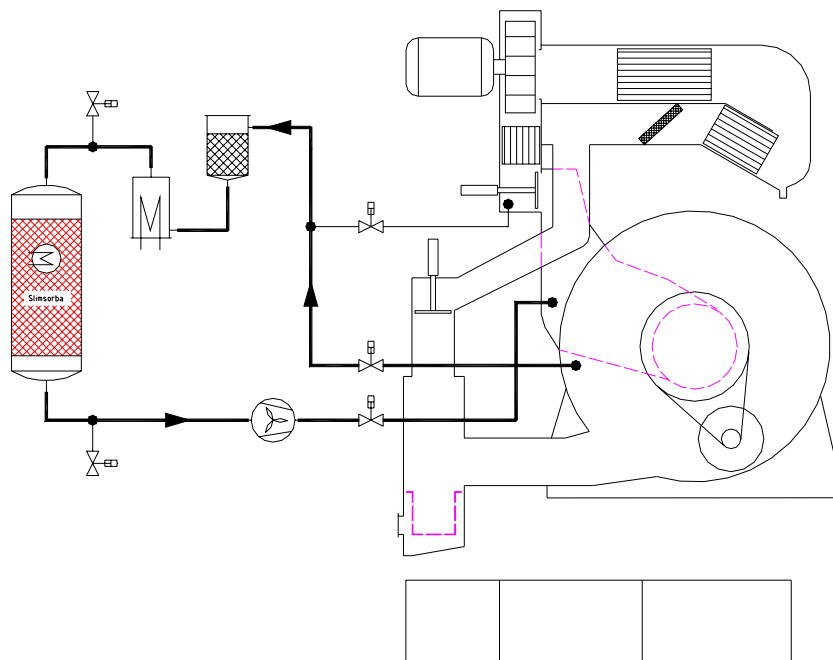
### Drying phases

The cleaning machine with Slimsorba has the following drying phases:

- Drying: Drying circuit in the machine  
Time: 12 min. + x (extension)  
  
this process is governed by the drying controller and the drum temperature sensor
- Reduction: Drying circuit in the machine  
Time: 3 min.
- Adsorption. Execution of the air circuit: Back wall of cage – Slimsorba fan – air filter - carbon container - cage entry.  
The airshaft is cut off by flaps and the refrigeration is turned off.  
Time: 4 min. fixed time + 2 min. (Spec. code)

### Adsorption phase

Adsorption is the last phase in the cleaning cycle program sequence; it reduces the solvent concentration in the cage at the end of the cycle to a level of, for example, < 2 g perc per m<sup>3</sup> air.



707760-07-A

Adsorption is a time-controlled process resp. concentration controlled (with measuring device), and the temperature at the bottom of the carbon bed is monitored.

After the predefined or required number of charges has been reached (factory setting is 60), desorption should be performed in order to regenerate the activated carbon.

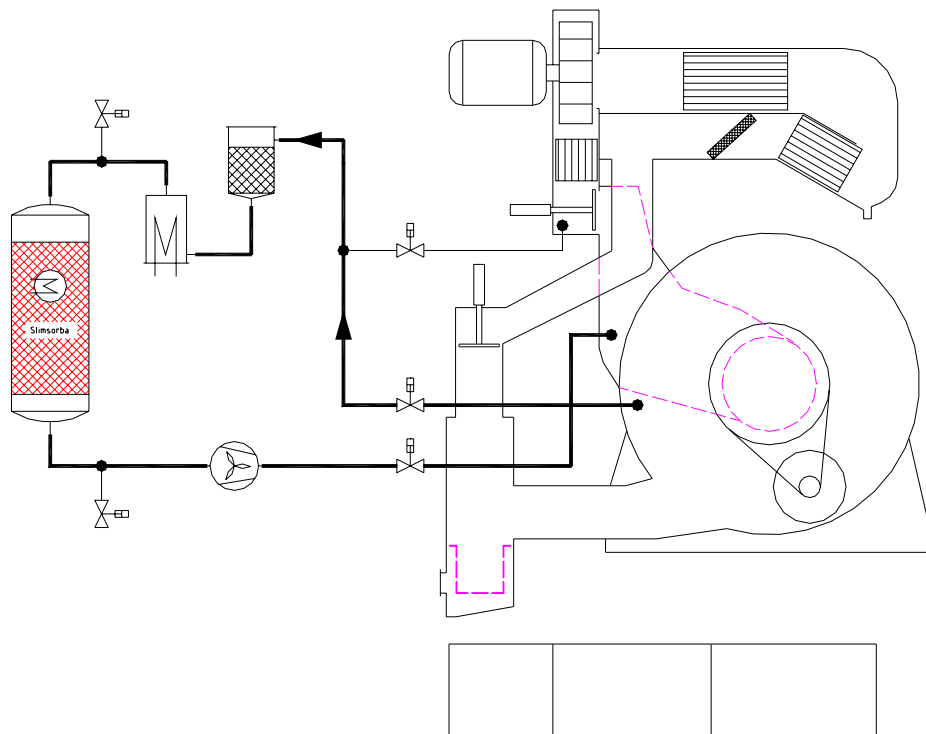
## 7. Functional Units

7.

### Loading Door Venting

After you open the loading door, the so-called loading door venting starts. The Slimsorba fan helps to draw fresh air in over the loading door; the air is guided over the carbon and then either blown back out into the open \* or fed back into the cage. Loading door venting should prevent the operator from being exposed to solvent fumes when loading and unloading the machine. Loading door venting runs until you close the loading door. When you open the loading door again, loading door venting starts again.

\* (only in certain countries)



707760-09-A

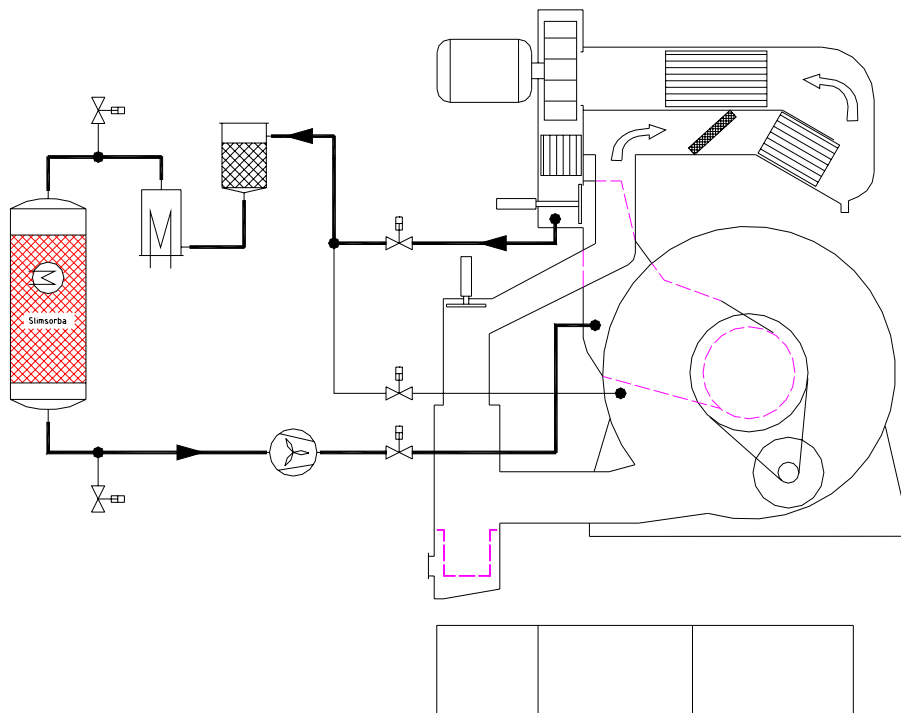
If any overpressure arises in the machine, it is also fed over the carbon into the open, just like the air drawn in during loading door venting when the cage is being loaded and unloaded.

## 7. Functional Units

7.

### Desorption phase

The carbon desorption is time-controlled. The adjustable time is in the specification code. The minimum time is approximately 1.5 hours. The solvent is condensed via the cooler in the airshaft and then fed into the water separator. The refrigeration plant and the machine fan run. The thermal sensor at the bottom of the carbon container monitors the heating after 15 min; if the selected temperature has not been reached, an error message "minimum carbon temperature not reached" appears.



707760-08-A

The cleaner has 2 programs that you can select for desorption:

1. Adsorber maintenance program P48
2. Adsorber maintenance included in multi-maintenance 1, program P49

Slimsorba maintenance has two steps: "Desorption" and "Cooling".

The subsequent **cooling** of the carbon is temperature-controlled by a sensor at the bottom of the carbon container. The steam valves are closed. The cooling phase runs until the temperature drops below the temperature given in the specification code.

**Recommendation:** Before resorption is completed the air filter should be removed and cleaned separately (suction it off).

## **7. Functional Units**

---

**7.**

### **7.20 Solvent Safety Trough**

**7.21**

The drycleaning machine and distillation system are equipped with an integrated solvent safety trough.

The safety trough prevents any liquid solvent that may possibly escape from getting into the ground.

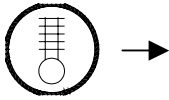
## 8. Data Display

8.

### 8.1 Temperature Display

8.1

- Press function key:



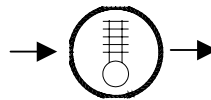
Temperatures 1 - 8 are displayed.

Machine	P21	User Guide
Time	10:45	
--	Temperature Display	
air outlet	:020°C	Condenser :020°C
air inlet	:020°C	Solvent :020°C
Bottom Still	:022°C	above carbon :020°C
After cooler	:011°C	under carbon :020°C
Temperatures →		

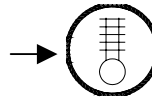
Machine	P21	User Guide
Time	10:45	
--	Temperature Display	
free	:---°C	
free	:---°C	
free	:---°C	
free	:---°C	
back		

707734-03-C4

- Display additional temperatures:



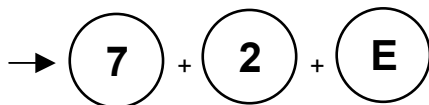
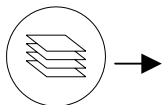
- Leave the temperature display:



### 8.2 Operating Data

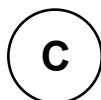
8.2

- Press function key:



A summary of all programmes run to date appears

- End the data display:



## **8. Data Display**

---

**8.**

### **8.3 What to Do If the Machine Malfunctions**

**8.3**

1. If there is an error, the machine stops and displays the error.
2. You can identify the error with the diagnosis list (or on the display).
3. After you have corrected the error, delete the error message with C and press the START button to restart the machine.

There is a difference between error messages (the machine stops) and error notices (the machine continues running and you can delete the notice with "C").

## 9. Control System and Programs

## 9.

### 9.1 Summary of Cleaning Programs

### 9.1

P18 to P20	Reserve
P21 to P42	Free programming locations
P43	Deodorizing: <b>Attention: Always select this if the loading door cannot be opened.</b>

Prog. no.	Program name	Application
P1	1-bath/filtration	For lightly soiled garments
P2	2-bath/preclean/filtration	For normally soiled garments
P3	3-bath/preclean/filtration/rinsing	For special quality
P4	1-bath gentle program	For wool and mohair
P5	2-bath gentle program	For delicate garments, silk
P6	2-bath/pump circuit	For heavily soiled garments
P7	1-bath /rinsing/waterproofing	Waterproofing moist garments
P8	Waterproofing	Waterproofing dry garments
P9	2-bath with interval spinning	For hard-to-dry garments/micro
P10	2-bath with int. spinning/waterproofing	Microfibers and spec. sportswear
P11	1-bath/pump circuit	For heavily soiled garments
P12	1-bath filtration with filter 2	For lightly soiled light-colored garments
P13	2-bath filtration with filter 2	For norm. soiled light-colored garments
P14	3-bath filtration with filter 2	For special light quality
P15	1-bath gentle program filter 2	For wool and mohair, light
P16	2-bath gentle program filter 2	For delicate white garments, silk
P17	1-bath filtration/without distillation	For barely soiled garments

Program overview sign

Cleaning programs			801727
P1 1-bath / filtration	P15 1-bath / gentle prog. filter 2	P29	
P2 2-bath / preclean / filtration	P16 2-bath / gentle progr. filter 2	P30	
P3 3-bath / preclean / filtration	P17 1-bath / filtr. / without distill.	P31	
P4 1-bath / gentle program	P18	P32	
P5 2-bath / gentle program	P19	P33	
P6 2-bath / pump circuit	P20	P34	
P7 1-bath / rinsing/waterproofing	P21	P35	
P8 waterproofing	P22	P36	
P9 2-bath with interv. extraction	P23	P37	
P10 2-bath / interv. extr. / waterpr.	P24	P38	
P11 1-bath / pump circuit	P25	P39	
P12 1-bath / filtration filter 2	P26	P40	
P13 2-bath / filtration filter 2	P27	P41	
P14 3-bath / filtration filter 2	P28	P42	

## 9. Control System and Programs

## 9.

### 9.2 Program Sequences (Extract)

### 9.2

Machine P21/P26 /P30	P 01	P 02	P 03	P 04	P 05	P 06	P 07	P 08
Pump tank to tank		00:10	00:10	00:40	00:40	00:10	00:10	
Pump up from tank 1	01:30	01:30	01:30	00:30	01:30	01:30		
Pump up from tank 2	01:00			00:30			01:30	
Pump circuit		02:00	02:00		02:00	02:00	02:00	
Spin to distillation		01:45	01:45		01:45	01:45	03:45	
Pump to distillation		00:30	00:30		00:30	00:30		
Pump up from tank 1		01:30	01:30					
Pump up from tank 2		01:00	01:00		02:30	01:15*		
Filtration	05:00	05:00	05:00	05:00	05:00			
Pump circuit	03.00*	03.00*	03.00*	03.00*	03.00*	03:00		
Pump to tank 1	01:30	00:30	01:30	01:30	00:30			
Pump to tank 2								
Pump to distillation							00:30	
Spin to tank 1		03:45			03:45			
Spin to tank 2								
Spin to distillation	03:45		02:45	03:45		03:45		
Pump to tank 1		00:30			00:30			
Pump to tank 2								
Pump to distillation	00:30		00:30	00:30		00:30		
Pump up from tank 2			01:15					
Pump circuit			02:00					
Pump to tank 1			00:15					
Pump to distillation								
Spin to tank 1			03:45					
Spin to distillation								
Pump to tank 1			00:30					
Tumble	00:30	00:30	00:30	00:30	00:30	00:30	00:30	00:30
Spray							XX	XX
Tumble							04:00	04:00
Predrying without heat:				03:00	03:00		03:00	03:00
Dry, cage outlet 50°C/122°F								
Dry, cage inlet: 65°C /149°F ***	12:00	12:00	12:00	09:00	09:00	12:00	14:00	14:00
Drying time controller	X	X	X	X	X	X	X	X
Reduction** from without Slimsorba until	02:00 06:00	02:00 06:00	02:00 06:00	02:00 06:00	02:00 06:00	02:00 06:00	02:00 06:00	02:00 06:00
Reduction with Slimsorba	03:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00
Adsorption (only with Slimsorba)	06:00	06:00	06:00	06:00	06:00	06:00	06:00	06:00

See next page for key to table



## 9. Control System and Programs

---

**9.**

- \* Dosing
- \*\* Temperature controlled
- \*\*\* at P04 /P05: 60 °C /140°F
- X Plus standstill times because of the drying controller
- xx Depends on the spraying time specified

The times given above correspond to the program sequences at the time of printing.

We reserve the right to make any procedural changes to times and program sequences in the interest of technical progress.

P04/P05: with solvent cooling = soft programs

## 9. Control System and Programs

9.

### Program Sequences (Extract)

Machine P21/P26 /P30	P 09	P 10	P 11	P 12	P 13	P 14	P 15	P 16	P 17
Pump tank to tank	00:10	00:10	00:10		00:10	00:10	00:40	00:40	
Pump up from tank 1 /3	01:30	01:30		01:30	01:30	01:30	01:30	01:30	01:30
Pump up from tank 2			01:30	01:00			00:30		01:00
Pump circuit	02:00	02:00	02:00		02:00	02:00		02:00	
Spin to distillation	01:45	01:45	03:45		01:45	01:45		01:45	
Pump to distillation	00:30	00:30			00:30	00:30		00:30	
Pump up from tank 1 /3	01:30	01:30			01:30	01:30			
Pump up from tank 2	01:00	01:00			01:00	01:00		02:30	
Filtration	05:00	05:00		05:00	05:00	05:00	05:00	05:00	05:00
Pump circuit	03.00*	03.00*		03.00*	03.00*	03.00*	03.00*	03.00*	03.00*
Pump to tank 1 /3	00:30	00:30		01:30	00:30	01:30	01:30	00:30	00:30
Pump to tank 2									
Pump to distillation		01:45	00:30						
Spin to tank 1 /3	01:45	01:45			03:45			03:45	03:45
Spin to tank 2									
Spin to distillation				03:45		03:45	03:45		
Pump to tank 1 /3	00:30	00:30			00:30			00:30	00:30
Pump to tank 2									
Pump to distillation	00:45			00:30		00:30	00:30		
Pump up from tank 2						01:15			
Pump circuit						02:00			
Pump to tank 1 /3						00:15			
Pump to distillation									
Spin to tank 1 /3	02:45	02:45				03:45			
Spin to distillation									
Pump to tank 1	00:30	00:30							
Spin to tank 1	05:15	05:15							
Pump to tank 1 /3	00:30	00:30				00:30			
Tumble		00:30					00:30	00:30	
Spray		XX							
Tumble	00:30	04:00	00:30	00:30	00:30	00:30			00:30
Pump tank 2 to tank 3				00:25	00:25		00:25	00:25	
Predrying without heat:		03:00					03:00	03:00	
Dry, cage outlet 50°C/122°F									
Dry, cage inlet: 65°C /149°F ***	12:00	14:00	12:00	12:00	12:00	12:00	09:00	09:00	12:00
Drying time controller	X	X	X	X	X	X	X	X	X
Reduction** from without Slimsorba until	02:00 06:00	02:00 06:00	02:00 06:00	02:00 06:00	02:00 06:00	02:00 06:00	02:00 06:00	02:00 06:00	02:00 06:00
Reduction with Slimsorba	03:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00	03:00
Adsorption (only with Slimsorba)	06:00	06:00	06:00	06:00	06:00	06:00	06:00	06:00	06:00

See next page for key to table

## 9. Control System and Programs

---

**9.**

- \* Dosing
- \*\* Temperature controlled
- \*\*\* at P15 /P16: 60 °C /140°F
- X Plus standstill times because of the drying controller
- xx Depends on the spraying time specified

The times given above correspond to the program sequences at the time of printing.

We reserve the right to make any procedural changes to times and program sequences in the interest of technical progress.

P15/P16: with solvent cooling = soft programs

P12/P13/P14/P15/P16: via tank 3 and filter 2 (when exist)

## 9. Control System and Programs

9.

### Program sequence (example):

Without Slimsorba

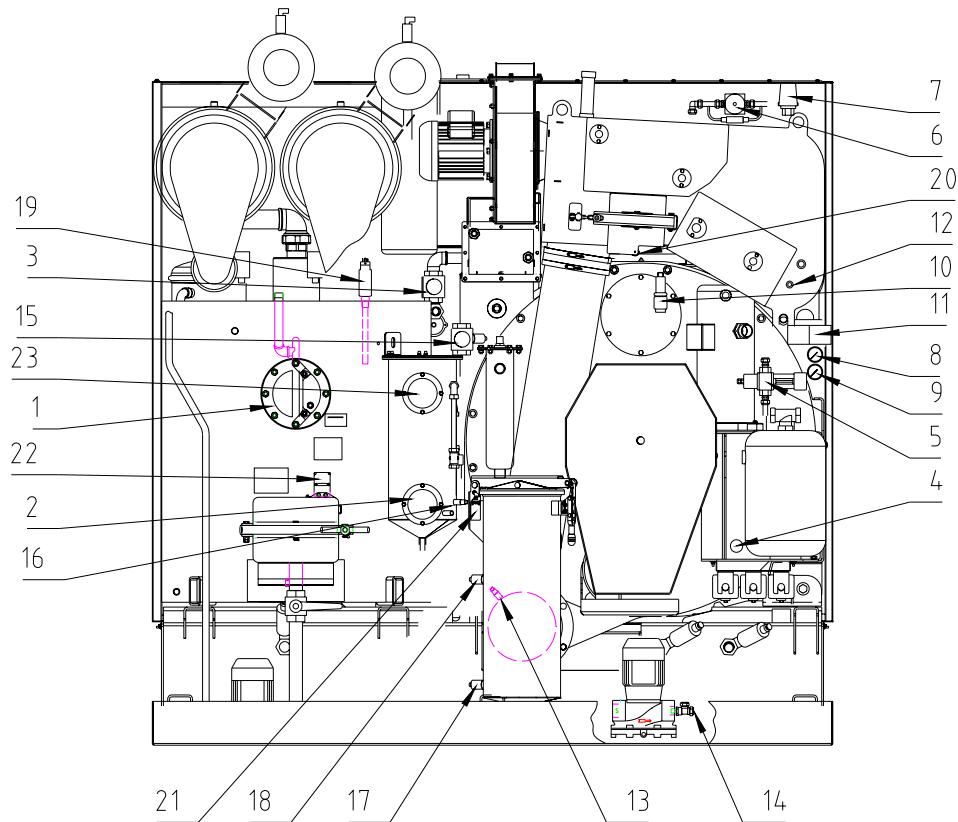
#### **P09                    2-bath for hard-to-dry garments/microfiber with interval spinning**

- 1<sup>st</sup> bath:            Pre-cleaning in pump circuit,  
10 seconds pumping from tank 1 to tank 1,  
75 seconds pumping up from tank I, pump circuit low level,  
2 minutes pump circuit,  
1 minute 30 seconds pumping out and spinning to distillation.
- 2nd bath:            Filtration  
90 seconds pumping up from tank I in pump circuit, high level,  
1 minute pumping from tank II, filter circuit high level,  
5 minutes filtration,  
3 minutes pump circulation with addition,  
30 seconds pumping to tank I,  
1 minute spinning to tank I.  
1 minute spinning run down,  
2 minutes spinning to tank I,  
1 minute spinning run down,  
2 minutes spinning to tank I,  
1 minute spinning run down.
- Drying  
12 minutes drying, high air flow, thermostat II 60 °C (140 °F),  
x minutes delay time, drying time controller,  
2 - 6 minutes reduction (temperature-controlled)

**Wrinkle protection:** If you do not press the **STOP** button at the cycle end, wrinkle protection deodorizing with gentle reversing continues to run. The machine automatically stops and locks after a maximum of 10 minutes. You cannot open it until program P43 has run.

## 10. Operating and Monitoring Systems

## 10.



707760-16-0

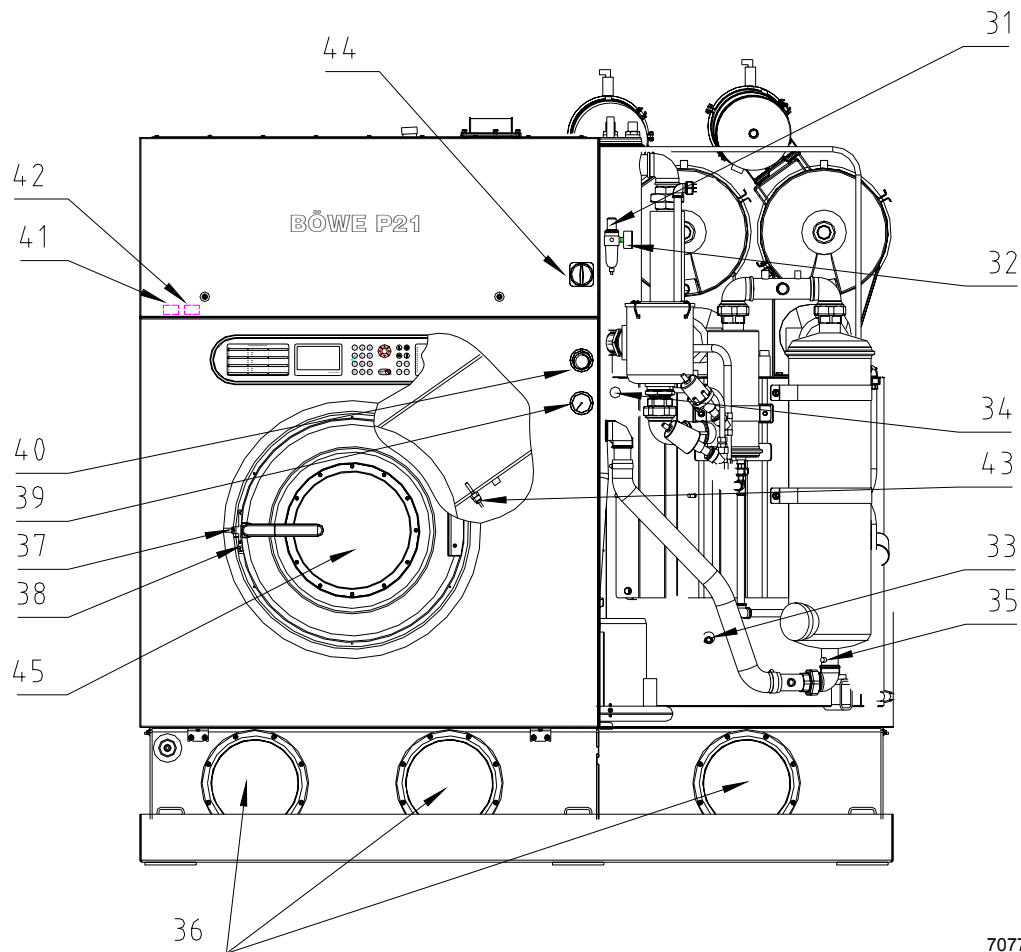
- |       |  |    |                                |
|-------|--|----|--------------------------------|
| 1     | Sight-glass, still                                 | 20 | Limit switch, lint post filter |
| 2 **  | Sight-glass, safety separator                      | 21 | Limit switch, button trap      |
| 3     | Sight-glass inlet to water separator               | 22 | Limit switch, still            |
| 4     | Sight-glass, refrigeration unit                    | 23 | Sight-glass, water separator   |
| 5     | Cooling water regulator, refrigeration unit        |    |                                |
| 6     | Cooling water regulator, distillation              |    |                                |
| 7     | Low cooling water level switch                     |    |                                |
| 8     | Low pressure gauge (refrigerating)                 |    |                                |
| 9     | High pressure gauge (refrigerating)                |    |                                |
| 10    | Pressure relief valve, machine                     |    |                                |
| 11    | High and low pressure controls, refrigeration unit |    |                                |
| 12    | Thermal sensor, aftercooler                        |    |                                |
| 13    | Thermal sensor, cage housing outlet                |    |                                |
| 14 *  | Thermal sensor, solvent                            |    |                                |
| 15    | Drying time controller                             |    |                                |
| 16 ** | Overfill sensor, safety separator                  |    |                                |
| 17    | Sensor, low level                                  |    |                                |
| 18    | Sensor, high level                                 |    |                                |
| 19 ** | Overfill sensor, distillation                      |    |                                |

\* Option

\*\* Only on machines that conform to the EN ISO 8230 standard

## 10. Operating and Monitoring Systems

10.



707760-17-0

- 31 Low air pressure switch
- 32 Pressure gauge, compressed air
- 33 Thermal sensor, distillation
- 34 Thermal sensor, distillation condenser
- 35 \*\* Thermal sensor, Slimsorba after carbon
- 36 Sight-glasses, tanks 1 + 2 + 3
- 37 Limit switch, loading door
- 38 Limit switch, loading door locking
- 39 Filter pressure gauge, Economy filter 1
- 40 Sight-glass, filter circuit:

- 41 0-bar (0 psi) switch
  - 42 0.1-bar (1.4 psi) switch
  - 43 Thermal sensor, cage housing inlet
  - 44 Main switch
  - 45 Loading door window
- Additional operating and monitoring systems:**

- \*\* Overfill sensor, disposal vessel

\*\* only on machines that conform to the EN ISO 8230 standard

## 10. Operating and Monitoring Systems

## 10.

1	Sight-glass, still: For observing the distillation process .	16	Overfill sensor, safety separator: if overfilling, diagnostic message appears.
2	Sight-glass, safety separator: For observing the process water and checking the safety separator.	17	Sensor, low level: Regulates the detergent solution level.
3	Sight-glass, inlet to water separator: For observing the condensate feed from distillation.	18	Sensor, high level: Regulates the detergent solution level.
4	Sight-glass, refrigeration unit: For checking whether the cooling agent is free of bubbles <u>during the reduction phase</u>	19	Overfill sensor, distillation: Stops the pumping process when the filling amount has been reached.
5	Cooling water regulator, refrigeration unit: You can set the condensation pressure in the refrigeration unit here.	20, 21, 22	Limit switches: All maintenance openings are protected with limit switches
6	Cooling water regulator, distillation: Regulates the cooling water flow (setting of the cooling water temperature at drain approximately +45 °C/113 °F)	23	Sight-glass, water separator: Visual inspection of solvent condition
7	Low cooling water level switch Monitors the cooling water supply. Set to 1 bar (14.5 psi).		
8	Low pressure gauge (refrigerating) For checking the evaporation pressure		
9	High pressure gauge (refrigerating) For checking the condensation pressure.		
10	Pressure relief valve, machine (0.3 bar/4.4 psi): Opens when the permissible operating pressure is exceeded.		
11	High pressure control (refrigerating): switches the system to the malfunction state if there is overpressure Low pressure control (refrigerating): switches the system to the malfunction state if there is not enough cooling agent		
12	Thermal sensor, aftercooler: Monitors the aftercooler temperature and switches the machine off when the temperature exceeds 40° C (104 ° F)		
13	Thermal sensor, cage housing outlet: Monitors the temperature at the air outlet		
14	Thermal sensor, solvent: Monitors the solvent temperature.	31	Low air pressure switch: Monitors the compressed air supply. Set to 4 bar (58.0 psi).
15	Drying time controller: Extends the drying time, depending on the type and amount of garments	32	Pressure gauge, compressed air: You can read off the required operating pressure (6 bar/87.0 psi) on the pressure gauge

## 10. Operating and Monitoring Systems

10.

33	Thermal sensor, distillation: Turns off the distillation heater	<b>Additional operating and monitoring systems:</b>	
34	Thermal sensor, distillation condenser: Monitors the solvent temperature.	-	Overfill sensor, disposal vessel: Prevents an overfilling of the disposal vessel.
35	Thermal sensor, Slimsorba after carbon: Monitors several temperatures during maintenance.		
36	Sight-glasses, tanks 1+2+3: You can read off the liquid level on the scale.		
37, 38	Limit switch on the loading door: Monitors loading door closing and locking.		
39	Filter pressure gauge, Economy filter 1: Visual inspection of the filter pressure.		
40	Sight-glass, filter circuit: For observing the flow and clearing of the detergent solution.		
41	0-bar (0 psi) switch: Releases the loading door for opening.		
42	0.1-bar (1.4 psi) switch: Opens the aeration valve.		
43	Thermal sensor, cage housing inlet: Monitors the air inlet temperature		
44	Main switch: Rotary switch for separating the machine from the electrical power system		
45	Loading door window: Observe the sign for the filling quantity. Visual inspection of cage movement		

to points 5 and 6

The cooling water controllers should be subjected to a regular function test.

When the machine is not in operation cooling water feed must be cut off by means of a stop valve to be fitted on site.



## 11. Maintenance

## 11.



**Attention:** Warranty claims will only be accepted if maintenance has been performed properly! Follow safety regulations! All recommendations concerning maintenance are minimum requirements and refer to a one-shift operation!

### 11.1 Operation and Maintenance Summary

### 11.1

#### When starting operation:

- Turn on steam supply
- Turn on room ventilation system
- Turn on cooling water supply
- Turn on compressed air supply
- Open condensate valve
- Turn on machine main switch
- Start deodorizing program P43, press "STOP" button when program ends and signal sounds

#### When stopping operation:

- Turn off machine main switch
- Turn off steam supply
- Close condensate valve
- Turn off cooling water supply
- Turn off compressed air supply cooling compressor
- Turn off room ventilation system or switch to night operation

#### Inspection and maintenance work:

##### Daily: (before starting the first cycle)

- Check machine for leaks
- Check solvent safety trough for solvent
- If necessary, add neutralization agent to still
- Clean button trap strainer and lint filter ([see 11.5.1](#))
- Check safety separator, if necessary, dispose of process water in accordance with the regulations that apply in your country
- Check the liquid level of the cleaning agent container
- Machine is ready for operation

##### Daily: (after the last cycle)

- Execute distillation maintenance program P45
- (Alternatively start with 15 E during the last charge)

#### Weekly:

- Execute multi-maintenance program P49
- Drain water from compressed air armature
- Clean the sprayer dirt strainers and spray nozzles
- Check the function of the disposal vessel overflow sensor
- Clean the Slimsorba air filter (suction off)

#### Monthly:

- Execute multi-maintenance program P50
- Check pH level (7 – 9 indicates good solvent condition)
- Check solvent levels in the tanks
- Clean strainers in water and steam feeders
- Lubricate cage bearing
- Check, clean post-filter

#### Semi-annually:

- Check, clean air cooler
- Clean tanks
- Retighten screwed unions
- Check V-belt tension, re-tension
- Replace carbon in venting and aeration filters

#### Annually:

- Machine inspection (according to BGR 500 chapter 2.14)
- Remove filter discs and clean in the machine (program P6)
- Check sacrificial anodes, replace if necessary
- Check Slimsorba activated carbon
- Check, clean back wall of cage

#### Attention:

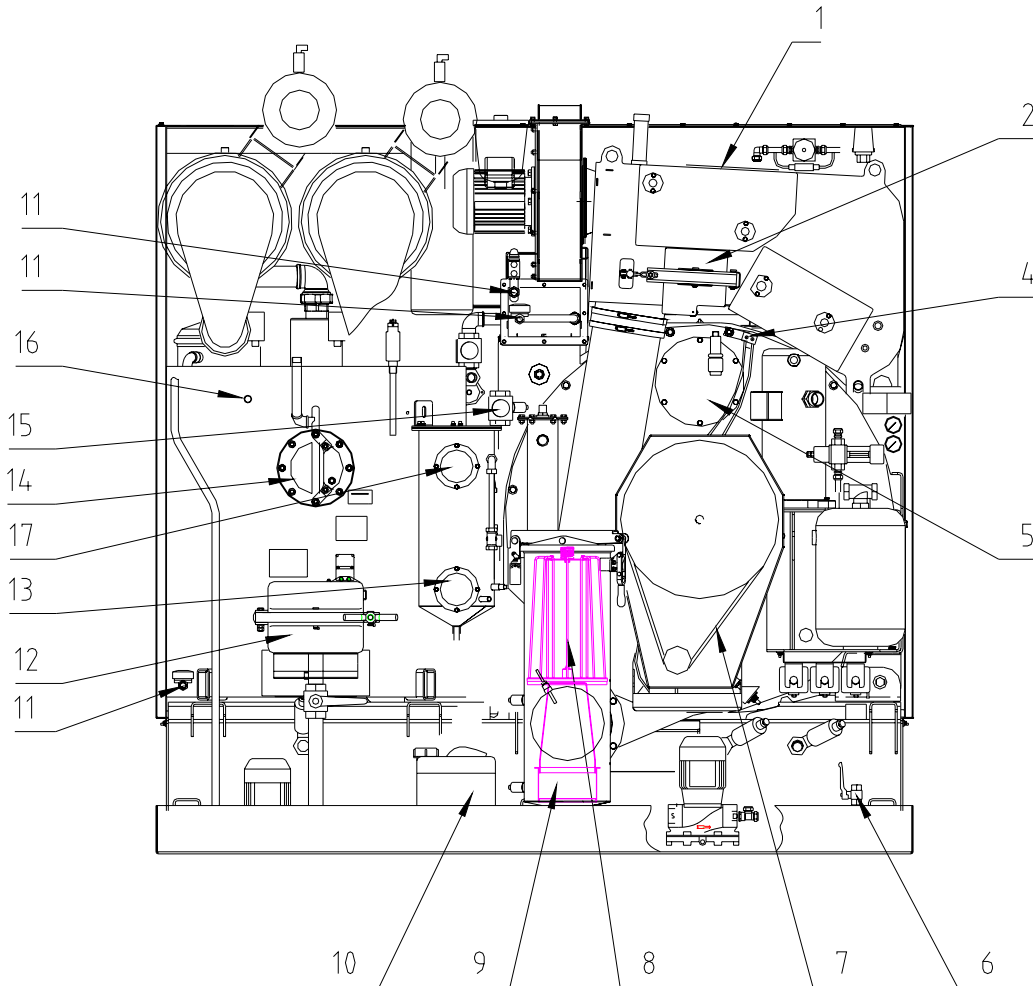
- **Close the loading door and maintenance openings again immediately**
- **Use only lithium-based lubricating greases, such as:**
  - ALVANIA 3 (SHELL)      - MARSON L2 (FINA)
  - BEACON 2 (ESSO)      - LGMT 3 (SKF)

# 11. Maintenance

11.

## 11.2 Maintenance Points

11.2



707760-18-0

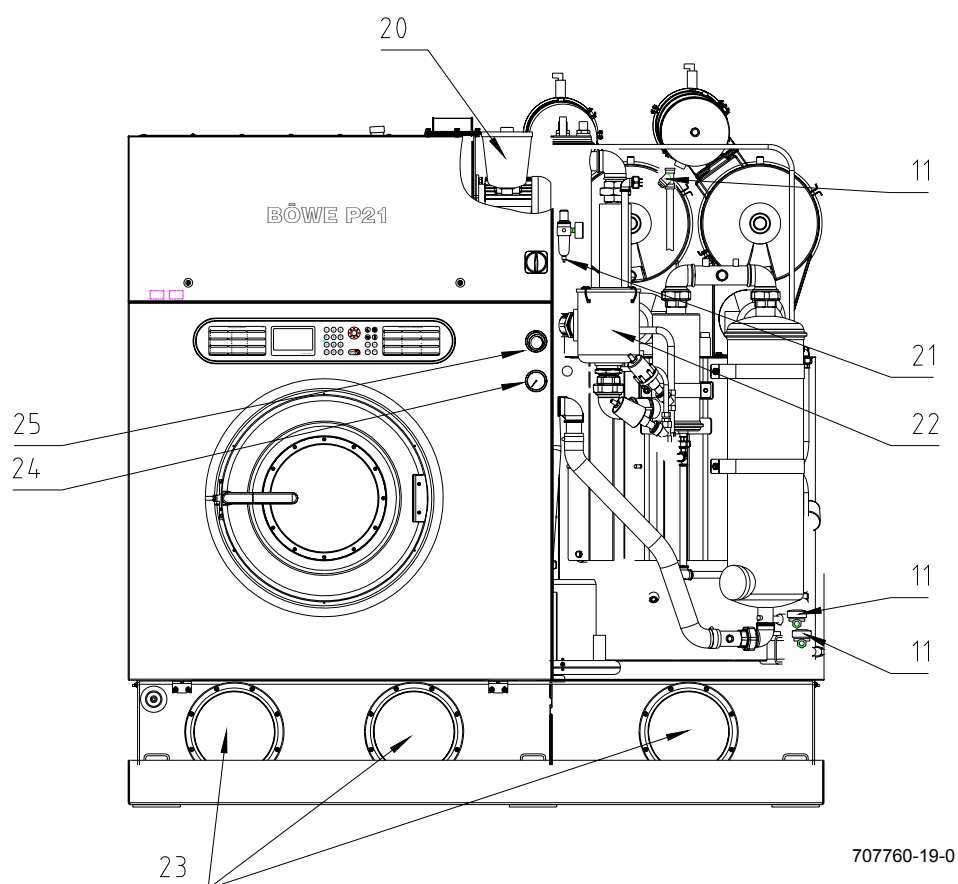
- |    |                               |    |                                  |
|----|-------------------------------|----|----------------------------------|
| 1  | Inspection cover, airshaft    | 14 | Sight-glass, still               |
| 2  | Lint post-filter              | 15 | Drying time controller           |
| 4  | Grease nipple, cage           | 16 | Gas displacement line connection |
| 5  | Inspection cover, cage flange | 17 | Sight-glass, water separator     |
| 6  | Solvent filling valve         |    |                                  |
| 7  | V belt                        |    |                                  |
| 8  | Lint filter                   |    |                                  |
| 9  | Button trap strainer          |    |                                  |
| 10 | Process water collecting tank |    |                                  |
| 11 | Strainer                      |    |                                  |
| 12 | Still rake-out door           |    |                                  |
| 13 | Sight-glass, safety separator |    |                                  |

### Additional maintenance points:

- Overfill sensor, disposal vessel

## 11. Maintenance

## 11.



707760-19-0

- 11 Strainer
- 20 Venting and aeration filter
- 21 Compressed air drain
- 22 Air filter, Slimsorba
- 23 Tank sight-glasses
- 24 Filter pressure gauge
- 25 Sight-glass, filter circuit

## 11. Maintenance

## 11.

Short description of the maintenance points.

Refer to [11.5](#) "Maintenance Work Instructions" for exact maintenance sequences.

### Machine:

1	Inspection cover, airshaft: Open semiannually, check airshaft for dirt.	10	Process water collecting tank: Dispose of process water in accordance with regulations. Do not allow to overflow!
2	Lint post-filter: Check it daily. Open once a month (more frequently if required), replace lint filter mat (wash used mat).	11	Strainer: Clean monthly (possibly more often after first startup). In the steam and water feeders.
		12	Still rake-out door: For cleaning out the distillation residues (See point 11.5.7)
4	Grease nipple, cage: For monthly lubrication of the cage bearing.	13	Sight-glass, safety separator: Remove and clean sight-glass when it is dirty.
5	Inspection cover, cage flange: Open when needed, remove lint on the back wall of the cage.	14	Sight-glass, still: Clean sight-glass when it is dirty.
6	Solvent filling valve: Open in connection with program P51, see Point 6.1.2 for further instructions.	15	Drying controller: Check for dirt
7	V belt: Check semi-annually and re-tension if necessary.	16	Gas displacement line connection: Check that passage is free.
8	Lint filter: Clean daily or more often when there is a lot of lint.	17	Sight-glass, water separator: Clean sight-glass when it is dirty
9	Button trap: Clean the button trap strainer daily or whenever it is dirty.		

## 11. Maintenance

## 11.

21	Compressed air drain: Drain water weekly at the valve of the glass tank.	24	Filter: Perform filter maintenance weekly (program P46 or P47).
22	Air filter, Slimsorba: Clean insert weekly	25	Sight-glass, filter circuit: If there is insufficient clearing of the solvent, check the filter disc for damage.
23	Tank sight-glass (front side): Semi-annual tank cleaning through the sight-glass opening. Rinse with program P50		
		<u>Additional maintenance points:</u>	
		-	Overfill sensor, disposal vessel: Check function weekly.

## 11. Maintenance

## 11.

### 11.3 Maintenance Program Summary

### 11.3

P71 to P84	Free programming locations
P43	Deodorizing: <b>Attention: Always select this if the loading door cannot be opened.</b>

The following maintenance programs are installed in the P21/P26/P30:

P44	Short drying	For afterdrying
P45	Distillation maintenance	Still stripping or program sequence "emission-free still rake out (see Point 11.5.7)
P46	Filter 1 filter maintenance	Extraction of the filter disc, followed by still stripping
P47	Filter 2 filter maintenance	Extraction of the filter disc, followed by still stripping
P48	Adsorber maintenance (only on machines with Slimsorba)	For desorption of the Slimsorba at times other than during the cleaning cycles. The program has two phases: desorption and carbon cool-down.
P49	Multi-maintenance 1	Combination of filter maintenance for filter 1, Slimsorba maintenance, water separator maintenance and distillation maintenance.
P50	Multi-maintenance 2	Combination of tank maintenance for tanks 1 + 2 + 3, spray nozzle rinsing and flushing of the drum back plate
P51	Fill tanks	Fill the clean tank and then overflow into the work tank and further into tank 3
P52	Prepare stock solution	Addition of drycleaning detergent into the solvent from the work tank and tank 3 through a recipient tank in the button trap.
P53*	Drain extraction tank	Pump the extraction tank out to distillation
P54	Rinse the water separator	Automatic cleaning of the water separator
P55	Pump out the distillation residue	(Only with emission-free still rake out system)
P56	From tank 1 to cage	For cleaning the work tank
P57	From tank 2 to cage	For cleaning the clean tank
P58	From tank 3 to cage	For cleaning the extra tank

\* only at M-machines

## 11. Maintenance

11.

P59	From tank 1 to distillation	Strip tank 1
P60	From tank 2 to distillation	Strip tank 2
P61	From tank 3 to distillation	Strip tank 3
P62	From cage to distillation	Pump to distillation
P63	From cage to tank 1	Pump to tank 1
P64	From cage to tank 2	Pump to tank 2
P65	From cage to tank 3	Pump to tank 3
P66	From tank 2 to tank 1	Refill clean tank
P67	From tank 2 to tank 3	Refill clean tank
P68	Empty tank 1	For pumping out the work tank. Empty the machine
P69	Empty tank 2	For pumping out the clean tank. Empty the machine
P70	Empty tank 3	For pumping out tank 3. Empty the machine

Sign program overview

maintenance and utility programs			801727
P43 deodorizing	P57 from tank 2 to cage	P71	
P44 short drying	P58 from tank 3 to cage	P72	
P45 still maintenance	P59 from tank 1 to still	P73	
P46 maintenance filter 1	P60 from tank 2 to still	P74	
P47 maintenance filter 2	P61 from tank 3 to still	P75	
P48 maintenance adsorption unit	P62 from cage to still	P76	
P49 Multi-maintenance 1	P63 from cage to tank 1	P77	
P50 Multi-maintenance 2	P64 from cage to tank 2	P78	
P51 filling tanks	P65 from cage to tank 3	P79	
P52 preparation / stock solution	P66 from tank 2 to tank 1	P80	
P53 draining sluice-tank	P67 from tank 2 to tank 3	P81	
P54 rinsing water separator	P68 empty tank 1	P82	
P55 pumping out still residues	P69 empty tank 2	P83	
P56 from tank 1 to cage	P70 empty tank 3	P84	

## 11. Maintenance

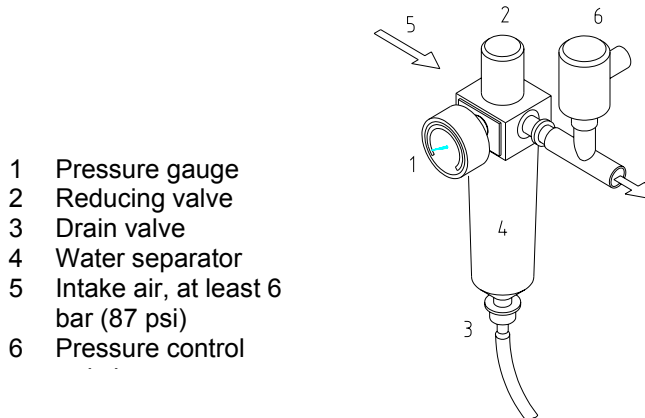
11.

### 11.4 Special Maintenance Features

11.4

#### Compressed air armature

When needed, drain the water separator at the drain valve and aerate the pneumatic control system over this valve during maintenance work. Check the water separator filter insert for dirt. Clean or replace as needed. Never work without an original filter insert!



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#### Strainer

Open strainers in the water and steam systems and clean the inserts (monthly).

#### Lubricating points

Use a grease gun to lubricate the cage bearing and sealing rings at the appropriate grease nipple (monthly).

Use only lithium-based lubricating greases, such as.

- ALVANIA 3 (SHELL)
- MARSON L2 (FINA)
- BEACON 2 (ESSO)
- LGMT 3 (SKF)

#### Limit switches at maintenance openings

The safety limit switches prevent the machine from starting operation as long as a lockable machine opening is open.

This means: cage loading door, still door, button trap cover  
insertion filter (post-filter)



## 11. Maintenance

11.

### Disposing of the machine



- Drain the filter
- Remove, clean and dry filter discs
- Drain water and safety separator or process water tank.
- Dispose of process water and decant solvent.
- Empty tanks. You can draw off the solvent residue by tilting the machine and attaching one end of a flexible suction tube to an external pump and inserting the other end through the sight-glass opening.
- Empty condenser.
- Empty out solvent and sludge pumps.  
Do not leave any solvent residue in the base of the pump.
- Empty and clean the still, dispose of residues.
- Pump cooling agent out of the refrigeration unit  
(done by authorized customer service technician).
- On machines with Slimsorba, remove carbon from the Slimsorba and dispose of in special waste.
- Close open solvent lines tightly when disassembling the machine.
- You must completely remove all residues that could present a hazard to people and the environment.

**Observe safety regulations concerning the handling of solvent (see Point 2).**

## 11. Maintenance

11.

### Pump solvent out of the machine



Pressure side of the pump:      Remove cap  
    Connect hose to barrel

Start program P68 (empty tank I)  
 Start program P69 (empty tank II)  
 Start program P70 (empty tank III)

If the tank does not empty out, you must start the required program again.

### 11.5 Maintenance Work Instructions

11.5



**Note that after cleaning the solvent tanks:**  
**If you opened any covers, sight-glasses or doors, you must check them for leaks when you fill the tanks again.**

**Make sure that the machine is turned off and secured before performing any maintenance work.**

**Observe safety regulations concerning the handling of solvent (see Point 2).**

**Only trained service personnel who are familiar with the machine are authorized to perform maintenance work.**

#### 11.5.1 Lint Filter/Button Trap



The button trap and lint filter are combined in a common maintenance unit with a single maintenance opening.

Maintenance of the lint filter and the needle seat should be carried out daily prior to the first and after the last cleaning charges (but only after P34 has been run!)

##### Sequence of the maintenance work on the lint filter:

- Loosen the cover fastener and open the cover.
- Remove the lint filter basket.
- Remove and clean the lint filter mat from the filter basket (wash if necessary).
- Check the lint filter mat for any damage.
- Place cleaned lint filter mat on to the filter basket and secure properly.



**Attention: Never work without the lint filter insert and never use damaged lint filter mats.**

- Then perform the button trap maintenance.

## 11. Maintenance

11.

Sequence of the maintenance work on the button trap:

- Remove strainer insert
- Clean strainer insert
- Clean additional round sieve
- Reinsert sieve cartridge



**Attention:** Never work without a strainer insert - the pump could be damaged by foreign bodies!



**Attention:** Perform maintenance only when the machine has been turned off and after the drying has finished.

- Insert the lint filter basket and make sure that it sits firmly in place
- Clean the cover seal
- Firmly close the cover of the common maintenance opening

### 11.5.2 Lint Post-Filter



Check the post-filter daily:

- Open the cover on the airshaft
- Remove the post-filter, suction it off, or, alternatively, clean it with a brush (wash if needed).
- Replace the post-filter.
- Close the cover

## 11. Maintenance

## 11.

### 11.5.3 Water Separator With Safety Separator

**Dispose of the process water according to the regulations in your country.**

You must clean the water separator routinely (and always after the distillation system has boiled over). The unit does this automatically with a fixed maintenance program P54 or as an integrated part of the so-called multi-maintenance program P49.

Start one of the maintenance programs listed above weekly.

You can run another program at the same time as the maintenance program.

Sequence of the maintenance program:

- Step 1: \*        The water phase drains from the safety separator into the tank provided (8).
- Step 2:        The water phase drains from the water separator into the safety separator or tank (13).
- Step 3: \*        The water phase drains from the safety separator into the tank provided (8).
- Step 4:        The water separator empties into the distillation system (11) with the solvent pump.
- Step 5:        The water separator is rinsed with solvent from the clean tank (7).
- Step 6:        The water separator empties into the distillation system (11) with the solvent pump.
- Step 7:        Produce the receiver in the water separator.

\* These steps are deleted if there is no safety separator

After the maintenance has completed, the horn sounds and the program ends. The cycle counter is reset to 0.

#### General function at the end of a cleaning cycle:

The water phase from the safety separator is drained into the process water tank when the loading door is opened.

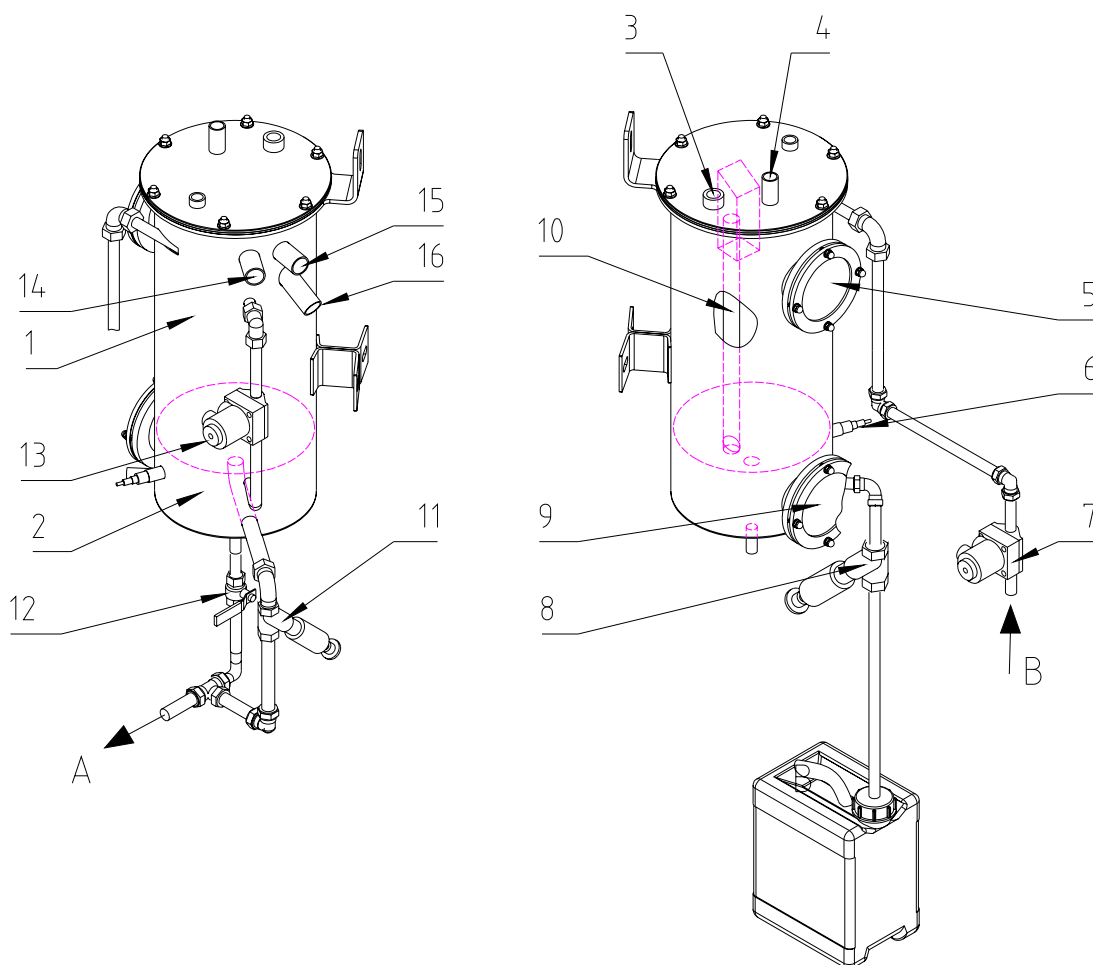
Over time, perc also slowly accumulates in the safety separator. You can pump this into the distillation system from time to time by opening the yellow manual ball valve (12) briefly when the system is pumping to the distillation system.

The safety separator is not rinsed! You can clean it through the sight-glass opening when needed.

**Attention: If during maintenance work the water phase in the separator was not completely developed, the solvent runs into the second separator.**

## 11. Maintenance

## 11.



707760-02-A

- 1 Water separator
- 2 Safety separator (integrated)
- 3 Ventilation and aeration atmospheres
- 4 Aeration, tank compensation
- 5 Sight-glass, water separator
- 6 Sensor for process water
- 7 Rinsing, water separator
- 8 Drain, water phase from safety separator
- 9 Sight-glass, safety separator

- 10 Water overflow
- 11 Drain, water separator
- 12 Drain, safety separator
- 13 Draining, water phase from water separator
- 14 Inlet, drying
- 15 Distillation inlet
- 16 Perc overflow to clean tank
- A – Pumping to distillation
- B – Pump line from clean tank

## 11. Maintenance

11.

### 11.5.4 Economy Filter Maintenance



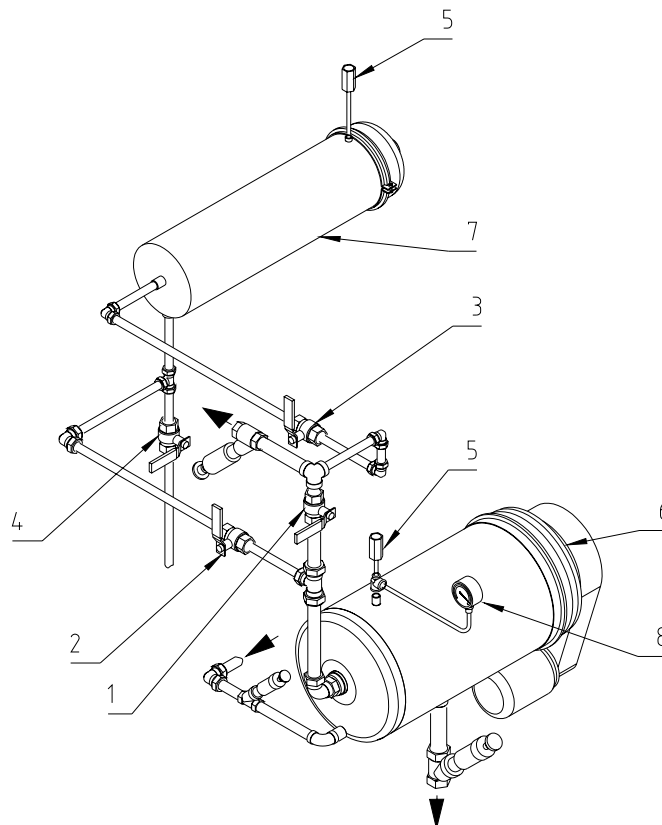
**Observe safety regulations concerning the handling of solvent (see Point 2).**

You must perform the maintenance on the economy filter when an adjustable number of cycles has run or at least once a week.

The filter pressure is displayed on the filter pressure gauge (8)\*. When the machine has run through the specified number of cycles, a diagnostic message (see diagnosis list) indicates that it is time for filter maintenance.

On machines with an additional cartridge filter (7), you must separate it from the economy filter (6) when you perform maintenance on the economy filter. Do this by opening the ball valve (1) and disconnecting ball valves (2) and (3) from the economy filter (6).

Start filter maintenance program P46 (filter 1) or P47 (filter 2):



\* For filter 1, the pressure gauge is on the front of the machine

707760-05-0

## 11. Maintenance

11.

Additional work **before** starting the program when using filter powder:

- If you do want to use filter powder after all (economy filter is without a precoating), place the necessary amount of filter powder (2.5 kg/5.5 lb) into a bag in the cage.
- Start fully automatic filter maintenance program P46 or P47
- After the program has finished (signal sounds), press the STOP button.
- The filter is ready for use again.

**Attention:**

- If you precoated with filter powder, remove the empty bag from the cage.
- If you want to use the additional cartridge filter, open ball valves (2) and (3) again and close ball valve (1).

### 11.5.5 Adsorption Filter Cartridge Maintenance



**Observe safety regulations concerning the handling of solvent (see Point 2).**

When changing the cartridge, separate the cartridge filter (7) from the economy filter (6) by setting:

Ball valve (1) open  
Ball valves (2), (3), (4) closed

Sequence for the rest of the work:

- Open ball valve (4), drain filter and let it sit and drain sufficiently (overnight or weekend)  
The filter vents automatically over ball valve (5).
- (The next day): loosen the tension clip on the filter housing and open the housing (7)
- Unscrew the thumb screw, replace the cartridge (if necessary, replace the sealing disc) and tighten the thumb screw again
- Check that the housing gasket sits correctly (replace gasket if necessary).
- Close the housing, mount the tension clip and then close ball valve (4) on the filter drain.

Fill the cartridge filter with solvent during the next cycle.  
Do this by closing ball valve (1) and opening ball valves (2) and (3).

Then either run the filtration over the cartridge filter to the end or separate the cartridge filter from the economy filter again.

Dispose of used filter cartridges as special waste in a way that avoids emissions!

## 11. Maintenance

11.

### 11.5.6 Distillation Maintenance



You must strip the still at the end of each work day.

		<p><b>The condenser and still (sight-glass, distillation opening) present a burn hazard</b></p>
<p><b>Caution</b></p>		

Sequence of the maintenance work:

- When the last cleaning cycle has ended, start distillation maintenance P45:

+ 
 + 
 + 
 
 The horn sounds at the end of the program and symbol 15 disappears.

Alternatively, you can start the distillation maintenance by entering 15E (before press ) while the last cycle is still running (but the last pumping out to distillation step must have completed).

On machines with an emission-free still rake out system, the distillation residue was automatically pumped into the disposal vessel. The maintenance is complete.

On machines without an emission-free still rake out system, you must perform additional maintenance work.

	<p><b>Attention:</b> Perform maintenance work only when the machine has been turned off and when the distillation blow-out is cold. Check the liquid level before opening the still door. Open the door carefully.</p>
--	--

Additional sequence of the maintenance work:

- Let the still cool off (preferably overnight)
- The next morning, hang the clean-out trough on to the still
- Open the door of the still and rake out the distillation residues
- Clean the overfill preventer probe
- Close the door of the still tightly

	<p><b>Attention:</b> Do not drain distillation residues into the sewer system or place with the normal garbage. You must dispose of the residues as special waste.</p>
--	--

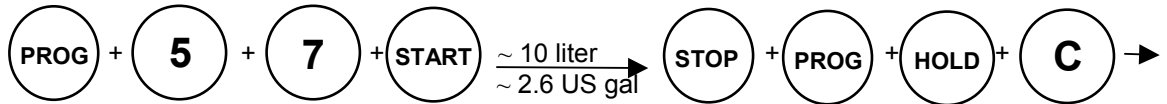


## 11. Maintenance

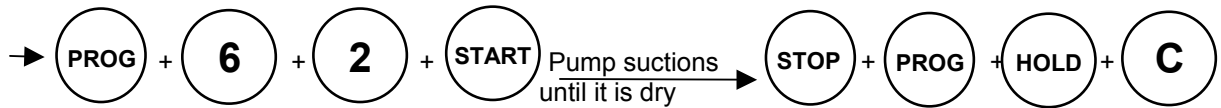
11.

- If necessary, add neutralization agent to the still:

- Put neutralization agent into the button trap.
- Pump solvent from tank 2 into the cage:



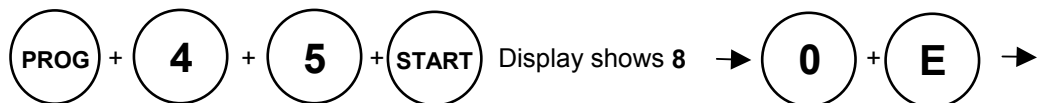
Pump solvent with neutralization agent for distillation:



- When necessary, you must also perform maintenance work on machines with an emission-free still rake out system with the still door open (lint balls, caked-on dirt).

Sequence of the maintenance work:

Start program P45:



The horn sounds at the end of the program and symbol 15 disappears.

Distillation maintenance runs without rinsing.

- Let the still cool overnight
- Now perform the maintenance work that is described under "Sequence for additional maintenance work."

## 11. Maintenance

## 11.

### Maintenance program P45 with emission-free still rake out:

If you have an economy filter, you can only perform the emission-free still rake out if you have not precoated with filter powder.

With each distillation pump out process, the sludge pump pumps out the entire contents of the still.

The number 8 appears in the display when the maintenance program P45 starts.

After you press the START button again, the emission-free still rake out proceeds as follows:

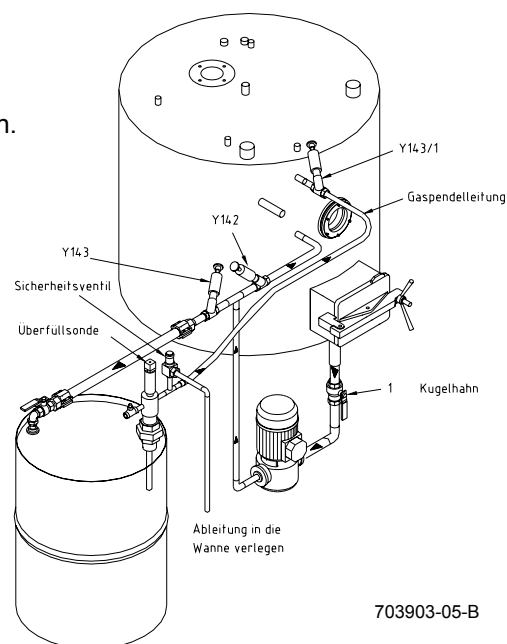
The residues are heated up.

After a predefined temperature has been reached, valve 142 opens and the sludge pump pumps over the residues \*. After the predefined pump-out time has completed, valve 142 closes and valves 143 and 143/1 open.

The sludge pump moves the residues from the still into the disposal vessel. The solvent-carrying air that is forced out of the vessel is directed back into the still through valve 143/1 (gas displacement line).

Then the sludge pump, nozzle and pipelines are rinsed with solvent. The last step of the still maintenance is drying the cage and reduction or adsorption (on machines with Slimsorba).

When the liquid level in the disposal vessel reaches the sensor-controlled overfill preventer, the sludge pump stops automatically and all valves of the still rake out system close. An alarm display appears and the signal sounds. After you delete the signal by pressing "C", replace the full disposal vessel with an empty one. Then you can start the maintenance program P45 and continue with the emission-free still rake out. Ball valve (1) is always open; close it only when repairing the pump.



703903-05-B



**Warning:** Before starting the emission-free disposal of distillation open the ball valve between the valve Y 143 and vat and make sure that the vat is connected.

## 11. Maintenance

**11.**

---

### Remarks on distillation:

Fill the still only up to the lower edge of the sight-glass.

When solvent containing water is distilled, the distillate becomes slightly cloudy as a result of the water traces.

The distillation performance is reduced if you do not remove distillation residues from the still daily. This also increases the risk of boiling over and the solvent consumption.

When operating with economy filters without filter powder, the distillation residue is liquid. This means that there will not be an increase in the consumption of solvent involved if the distillation equipment is used correctly.

If the detergent solution foams or boils over, you can use a defoamer.

The amount to use is approximately 0.1 % of the filling quantity (either over the button trap or using a separate pump). If the distillation unit boils over, empty and clean the water separator (if necessary, distill the contents of the clean tank. The distillation cleans the condenser automatically.

\* With direct addition of steam, almost all of the perc is stripped off because the boiling point is lowered.

## 11. Maintenance

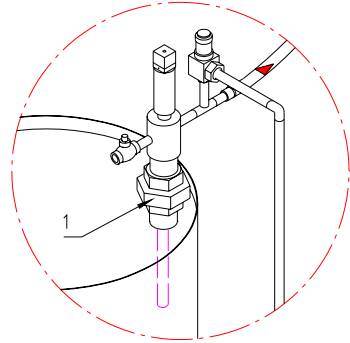
## 11.

### 11.5.7 Disposal Vessel Overfill Sensor (Optional Equipment)

You must check the function of the overfill sensor once a week.

Sequence of the check:

- Loosen the screwed union (1)
- Lift the ventilation pipeline
- The light-emitting diode (LED) on the probe is "green"
- Now touch the probe at the tip (3 - 5 cm/1.2 - 2.0"); the color of the LED must change from "green" to "red"
- If it does, the probe is in order
- Replace the ventilation pipeline
- Firmly tighten the screwed union (1) again

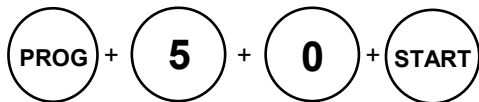


### 11.5.8 Maintenance of the Solvent Tank

In order to prevent a build-up of water in the tanks and, simultaneously, to rinse them, you must perform the tank maintenance once a month.

Before starting the maintenance program 50, you must clean the button trap strainer; the cage and distillation system must be empty.

Start multi-maintenance program P50:



## 12. Solvent Monitoring and Care

## 12.

The most important factor in solvent inspection and care is the use of high-quality perc and suitable chemical additives. The drycleaning detergent, in particular, should contain solvent-stabilizing components.

The pH value is an important indicator for the quality of the solvent. In a well-run operation, the value should be determined once a month as a matter of course.

Solvent care is an essential factor in the reliability and long-life of the machine and in the quality of the cleaning that the garments receive. It includes routine maintenance of the still and water separator and the use of quality products.

Because of the small amount of solvent used, we recommend that you add neutralizing, acid-binding adsorbents to the still as preventive neutralization. (See [Point 11.5.6](#))

### - Determining the pH Value:

Remove a few cm<sup>3</sup> of water from the water separator/safety separator and place in a test tube. Then dip the indicator paper into the water and determine the pH value by using the comparison scale. It is not possible to measure the solvent directly.

pH value	Reaction	Measure
under 5	Solvent highly acidic	Replace solvent
5 - 6	Solvent slightly acidic	Neutralize the solvent
7 - 9	Good solvent condition	
over 9	Solvent alkaline	Determine the cause and correct

### Possible causes of an acidic reaction:

- Instable solvent
- Steam temperature too high (solvent decomposition with acid formation)
- Unwanted addition of acids
- Incorrect solvent
- Bad quality of the solvent - new garments

### Possible causes of alkaline reaction:

- Highly alkaline pre-spotter or chemical additives (nitrogen compounds, ammonia),
- Overstabilized solvent,
- Garments containing a high level of sweat.

## 13 Safety Remarks Located on the Machine

13.

Gemäß EN ISO 8230 befinden sich an der Maschine nachfolgende Sicherheitshinweise:

*In accordance with EN ISO 8230 the machine displays safety hints as given below:*

Conforme à EN ISO 8230 les indications de sécurité suivantes se trouvent à la machine:

Kontaktwasser kann geringe Spuren von Lösemittel enthalten.  
Vorschriftsmäßig entsorgen!

*Contact water may contain small quantities of solvent.  
Please dispose of according to the regulations in your country!*

L'eau de contact peut contenir une petite quantité de solvant.  
Evacuer l'eau de contact conformément à la réglementation.

SN 708073

Nadelfänger täglich bzw. bei Bedarf öfter reinigen  
(Nur bei ausgeschalteter Maschine und nach beendeter Trocknungsphase).

*Clean button trap if necessary but at least once a day  
(only if machine is switched off and the drying phase has been finished).*

Nettoyer le filtre à épingle tous les jours et si nécessaire plus souvent  
(seulement hors fonctionnement de la machine et après une opération de séchage).

SN 708074

Reinigen der Destillation nur bei  
- ausgeschalteter Maschine und  
- kalter Destillierblase durchführen

*Clean still only if  
- machine is switched off and  
- distillation is cold*

Nettoyer l'alambic seulement si:  
- La machine est hors de fonctionnement  
- Le distillateur est revenu à température ambiante

SN 708075

### 13. Safety Remarks Located on the Machine

### 14.

<p><b>Vorsicht!</b> Heiße Oberflächen</p> <p><b>Attention!</b> <i>Hot surfaces</i></p> <p><b>Attention!</b> Surface chaude</p>	SN 708076
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<p><b>Zulässige Füllmenge</b></p> <p><b>Max. filling capacity</b></p> <p><b>Capacité admissible</b></p>	SN 708086
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<p><b>Filter täglich bzw. bei Bedarf öfter reinigen</b> (nur bei ausgeschalteter Maschine und nach beendeter Trocknungsphase)</p> <p><b>Clean lint filter if necessary but at least once a day</b> (only if machine is switched off and the drying phase has been finished.)</p> <p><b>Nettoyer le filtre tous les jours et si nécessaire plus souvent</b> (seulement hors fonctionnement de la machine et après une opération de séchage).</p>	SN 708087
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<p><b>Filter und Wasserabscheider dürfen manuell</b> nur bei leerer Destillation abgelassen werden.</p> <p><b>Filter and water separator must only be drained manually</b> <i>if the distillation is empty.</i></p> <p><b>La vidange manuelle du filtre à solvant et du séparateur d'eau</b> est seulement permise quand le distillateur est vide.</p>	SN 708077
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<p><b>21 kg /46 lbs</b> <b>Zulässige Füllmenge</b></p> <p><b>Max. filling capacity</b></p> <p><b>Capacité admissible</b></p> <p>SN 800195</p>	<p><b>26 kg /57 lbs</b> <b>Zulässige Füllmenge</b></p> <p><b>Max. filling capacity</b></p> <p><b>Capacité admissible</b></p> <p>SN 800196</p>
<p><b>30 kg /66 lbs</b> <b>Zulässige Füllmenge</b></p> <p><b>Max. filling capacity</b></p> <p><b>Capacité admissible</b></p> <p>SN 800197</p>	

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# **BÖWE**

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