

# OPERATING INSTRUCTIONS

for vertical autoclave

**KSG 40/60-2**  
KSG 50/70-2  
KSG 50/80-2

**double-walled execution**

Temperature regulation

by

contact thermometer and timer

with

condensate receptacle

for sterilization of hospital utensils  
as instruments, laundry and rubber goods

Modifications reserved. 14.09.06

Order No. **XXXXXX**

Serial No. **XXXX**

62XEUMXKXXX

72XEUMXKXXX

82XEUMXKXXX

Electric diagram No. **2000-2**

Wiring diagram No. **1417-2**

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# 1. Description

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Apparatus No.:

**XXXX**

Year of construction:

**2007**

Full mark of steam sterilizer:

**KSG 40/60-2**

Aukl 002 067

Zube 004 081

Zube 004 078

double-walled  
electrically heated

KSG 50/70-2

double-walled  
electrically heated

KSG 50/80-2

double-walled  
electrically heated

## 2. Legend

- 1 Sterilizing chamber
- 2 Outer chamber / steam jacket
- 3 Sterilizer lid with swivel bow
- 3a Operation handles for (3)
- 4 Filling funnel for distilled/demineralized water
- 5 Filling valve
- 5a Flap trap for (5)
- 6 Water level with protective covering
- 7 Water level valve, top
- 8 Water level valve, bottom
- 9 Sterilization valve
- 10 Plunger-type radiators (2x) (Heating)
- 10a Contactor for (10)
- 11 Water shortage sensor with micro radiator
- 11a Water shortage protected switch, resettable
- 12 Switch box / electric control case
- 13 ON/OFF switch / main switch
- 14 Sterilization timer
- 15 Control lamp "operation/sterilization" (white)
- 16 Control lamp "heating" (yellow)
- 17 Control lamp "water shortage" (red)
- 18 Sterilizing time thermometer (contact thermometer)
- 18a Sensor for Sterilizing time thermometer
- 19 Pressure gauge for sterilizing chamber (1)
- 20 Pressure gauge for steam jacket (2)
- 21 sterilizing pressure regulation - adjustable
- 22
- 23 safety valve for lid (with exhaust tube)
- 24 Operating lever for (23)
- 25 Release valve for chamber pressure for (2)
- 26 Automatic aerator and deaerator (condensate trap)
- 27 Flow valve **(optional)**
- 29
- 30 Safety valve (with exhaust tube)
- 31 Emptying valve for (2)
- 32 Apparatus feet with fixation holes
- 33 Gasket for (1) / (3)
- 34 Aeration valve
- 35 Aeration filter
- 36 Flap trap for (35)
- 37 Flap trap for flow
- 38 Condensate receptacle
- 39 Dosing valve – Cooling water
- 40 Cooling water valve
- 41 Valve for condensate emptying
- 42 Drain for cooling water

### **Remark:**

All valves are in closed position when they are moved clockwise - seen on the operation handle - until the limit stop.

## 3. Installation

**Read the operating instructions before setting the apparatus into operation.**

Take care that electric supply satisfies the valid regulations on site, see name plate.

Take care that the electric power supply satisfies the valid regulations on site.

Prepare the connection of cold water for the condensate receptacle..

Take care that under the sterilizer there is a water outlet (e.g. gully) for the waste pipes of the sterilizer.

To guarantee the stability of the sterilizer, the apparatus feet (32) have to be fixed to the ground.

If the sterilizer is not used, close the cooling water valve (40).

## 4. Technical Data

Type	Chamber Diameter	Chamber Height	Chamber Volume	Current	Capacity:	Operating water to NW	Operating water NW to HW
40/60-2	40 cm	60 cm	075 dm <sup>3</sup>	14,5 A	9,5 kW	25 litres	16 litres
50/70-2	50 cm	70 cm	137 dm <sup>3</sup>	19,0 A	12,5 kW	42 litres	21 litres
50/80-2	50 cm	80 cm	157 dm <sup>3</sup>	19,0 A	12,5 kW	40 litres	18 litres

Operating pressure  $p_e$  : 2,5 bar

Operating temperature: 134 ° C

Nominal voltage: 230/400 V

Current: Rotary current

Nominal frequency: 50/60 cs

## 4.1. General Remarks

Feeding water: For operation of the sterilizer either distilled, demineralized or completely desalted water is necessary.

Indications concerning the filling quantity of operating water for steam jacket in case of empty chamber until min. water level (NW) and from minimum water level (NW) to max. level (HW) can be taken from paragraph 4. **Technical data.**

The switchboard with command, operating and indicating elements (12 - 18) makes it possible to operate the sterilizer acc. to the operating instructions and the control of the programme cycle.

**Attention:** Main switch to be installed on site

Two radiators (10).

Water shortage sensor (11) with micro heating element 0,5 kW and water shortage protected switch (11a), resettable.

Sterilization pressure regulator – adjustable - (21), max. 2,5 bar.

### 4.1.1 Installation

#### **Cooling water**

The effect of the cooling water for producing the underpressure in the condensate receptacle and the sterilizing chamber during the drying process does not result from the cooling water pressure, but from the cooling water temperature. A water temperature of 15° C should not be exceeded. The cooling water can be led from a correspondingly higher receptacle into the condensate receptacle. The condensate and water escaping during the sterilization from the exhaust tubes of the condensate trap (26) and the valve for condensate emptying (41) as well as from the drain for cooling water (42) can be collected and filled into the receptacle.

#### **Dosing valve**

The dosing valve (39) has been adjusted in our factory in a way that for a drying process of 30 minutes approx. 42 litres of water are necessary. The adjustment of the dosing valve must be made acc. to the conditions at the place of installation.

#### **Condensate receptacle**

The condensate receptacle must be placed on the bottom besides the sterilizer. The connection line from sterilizer to condensate receptacle must be horizontal or falling.

#### **Drain lines**

All drain lines of the sterilizer and the condensate receptacle must be falling.

## 5. Operating Instructions

For setting the sterilizer into operation, please proceed as follows:

### 5.1. Control of feeding water

Level of feeding water at the water level glass (distilled or demineralized water) has to be between the markings for minimum and maximum water level. Should this not be the case, the outer chamber (2) has to be filled with a corresponding quantity of water. **This can only be done when the outer chamber (2) is without pressure resp. cold, i.e. the pressure gauge for the steam jacket (20) indicates "0" bar.**

#### 5.1.1 Filling in of water for first filling of after having emptied the jacket completely

Open the sterilization valve (9).

Open the function safety valve (23) by means of the operating lever (24), if the sterilizer lid (3) is closed.

Open the filling valve (5).

Fill in distilled or demineralized water into the filling funnel (4) until water level (6) has reached the maximum marking.

Close the filling valve (5).

Close the sterilization valve (9).



## 5.1.2 Filling in of jacket water when the minimum marking is reached and the jacket is heated up and under pressure between two sterilizing processes.

**The filling of jacket water can only be executed when the outer chamber (2) is without pressure.**

If you observe that the water level has reached the minimum marking, the outer chamber (2) **must** be set into pressureless condition before filling the water into the jacket.

The outer chamber (2) becomes pressureless by self radiation, e.g. by switching off the sterilizer at the on/off switch (13), so that the heating elements (10) are switched off.

**If the sterilizer lid is orderly closed** you can additionally open the sterilization valve (9) and the release valve for chamber pressure (25) as well as the valve for condensate emptying (41) carefully, so that a rapid pressure reduction of the jacket (2) via the sterilizing chamber (1) is reached.

Open the sterilization valve (9). Thus steam streams out of the jacket (2) into the sterilizing chamber (1).

Afterwards open carefully the release valve for chamber pressure (25). Thus steam escapes via the condensate receptacle (38) and the valve for condensate emptying (41). into the drain.

When the pressure of the outer chamber (2) is **0** bar, you open the safety valve for lid (23) with the operation levers (24).

Afterwards close the filling valve (5) and fill in distilled and demineralized water in the filling funnel (4), until the water level has reached max. marking.

After the end of the filling process close the valves (5), (9), (25) and (41).

When you have reset the unit into operation by actuation of the on/off-switch (13), the adjusted steam pressure is produced in the outer jacket.

### 5.1.3 Filling in of jacket water when the min. marking has been passed, the outer chamber (2) is heated up and under pressure and the water shortage protection switch (11a) has reacted.

**The filling of jacket water can only be executed when the outer chamber (2) is without pressure.**

If the red control lamp "water shortage" (17) is illuminated at the electric switch board (12), the water level in the steam jacket has fallen below the admissible value during operation. Before filling the water into the outer chamber, it has to be put into a **pressureless** condition.

The outer chamber becomes pressureless by self-radiation, e.g. by switching off the sterilizer at the on/off-switch (13), so that the heating elements (10) are switched off.

**If the sterilizer lid is orderly closed** you can additionally open the sterilization valve (9) and the release valve for chamber pressure (25) as well as the valve for condensate emptying (41) carefully, so that a rapid pressure reduction of the jacket (2) via the sterilizing chamber (1) is reached.

Open the sterilization valve (9). Thus steam streams out of the jacket (2) into the sterilizing chamber (1).

Afterwards open carefully the release valve for chamber pressure (25). Thus steam escapes via the condensate receptacle (38) and the valve for condensate emptying (41). into the drain.

When the pressure of the outer chamber (2) is "0 bar", you open the function safety valve (23) with the operation levers (24).

Afterwards close the filling valve (5) and fill in distilled and demineralized water in the filling funnel (4), until the water level has reached max. marking.

After the end of the filling process close the valves (5), (9), (25), (41) and the function safety valve (23) by putting the operating lever (24) from horizontal to vertical pos.

Afterwards the water shortage protection switch (11a) has to be set into operation by pressing the reset button, which is situated behind the protection cover at the front side of the water shortage protection switch (11a).

After having reset the unit into operation by actuating the on/off switch (13), the adjusted steam pressure is produced in the outer jacket.

The sterilizing process interrupted by the water shortage must be repeated, as the goods cannot be sterile.

## 5.2. Heating / preheating of the sterilizer

The saturated steam necessary for sterilization is produced in the steam jacket (2) by means of two electric radiators (10). To start the heating process, please proceed as follows:

Control the water level at the water level indication (6).

Control that filling valve (5) and sterilization valve (9) are closed.

Adjust the sterilizing pressure on the adjusting device (21) as shown in table 7.  
121° C = ca. 1,3 bar, 134° C = ca. 2,5 bar

Press ON/OFF switch (13) to "ON"-position (control lamp lights green).

Now the initiated heating process lasts approx. 30 - 35 min., when there is maximum water level and maximum required pressure, until the necessary steam pressure is reached. As long as the operating pressure is not reached, heating is in operation. This can be seen by the lighting of the yellow control lamp "heating" (16).

The process of preheating is finished when the pressure gauge for the steam jacket (20) indicates the pressure preselected on the adjusting device for sterilizing pressure and the yellow control lamp "heating" (16) goes out for the first time. Now the apparatus is ready for sterilization.

### 5.3. Loading of the sterilizer

Please classify the sterilizing goods acc. to sterilizing temperature and time (see table 7).

If necessary/scheduled, put the sterilizing goods into the provided packages/boxes (accessories).

Place the sterilizing goods into the sterilizing chamber (1) and put them on the ground plate resp. on the trays (accessories). The chamber can be filled up until its upper edge.

### 5.4. Close sterilizing lid

To that end turn the lid by the operating handles (3a) counter-clockwise until the limit stop.

Then tilt the lid downwards until it lies on the gasket (33).

Afterwards please turn the lid by means of the operating handles (3a) in clockwise direction until the limit stop. The lid is closed properly when the red markings (22) are one above each other.

At last close the function safety valve (23) with the operating lever (24). This process is executed properly when the lever (24) is situated in the intended groove of the link of the operating handle.

**Attention:** Only by this procedure it is secured that the chamber lid and the function safety valve are closed orderly and pressure in the sterilizing chamber can be produced after opening the sterilization valve.

### 5.5. Pressure and temperature adjustments

Before the sterilizing cycle you have to control the adjustment of the sterilizing pressure regulation (21). Compare the pressure at the pressure gauge for steam jacket (20) (actual value) – when control lamp "Heating" (16) is gone out – with the required value acc. to table 7 for the goods to be sterilized and adjust it at the sterilizing pressure regulation (21), if necessary.

121° C = approx. 1,3 bar,      134° C = approx. 2,5 bar

Adjust the sterilizing temperature (121° C / 134° C) acc. to table 7 for the goods to be sterilized at the contact thermometer (18).

## **5.6. Displacement of air**

In order to prepare the sterilizing chamber and the goods to be sterilized optimally for the following sterilizing process, the air in the sterilizing chamber and the goods to be sterilized must be displaced.

Especially in case of packed goods as well as porous goods like textiles it is absolutely necessary to take care for a optimum air displacement from chamber and goods to be sterilized before the sterilizing process.

On the one hand the displacement of the air is done by the gravitation principle via the opened flow valve (27) and the condensate trap (26) during the steam inlet from the outer chamber (2) into the sterilizing chamber (1) when the sterilizing valve (9) is open. On the other hand the displacement is reached by letting off the steam-air mixture after opening the release valve for chamber pressure (25).

**The following valves have to be closed:**

Release valve for chamber pressure (25)  
Flow valve (27)  
Cold water valve (40)  
Valve for condensate emptying (41)  
Aeration valve (34)

**Attention:** The sterilizer lid (3) is hot during operation!

**1. Pressure production in the chamber - 1:**

The flow valve (27) must be opened completely.

The sterilization valve (9) must be opened slowly and completely.

The steam is streaming from the outer chamber (2) via the sterilization valve (9) into the sterilizing chamber (1).

Pressure and temperature in the sterilizing chamber (1) are rising.

Pressure and temperature in the outer chamber (2) are decreasing.

The Control lamp Heating (16) is illuminated, the heating elements are switched on.

Condensate and steam-air mixture are escaping at the exhaust tube of the condensate trap (26).

When the control lamp Heating (16) goes out, the max. pressure in the outer chamber (2) and the sterilizing chamber (1) is reached.

When the control lamp heating (16) has gone out, wait for 1 minute.

Waiting time 1 minute

**2. Pressure reduction in the chamber - 1:**

The sterilization valve (9) must be closed completely.

The valve for condensate emptying (41) must be opened completely.

The release valve for chamber pressure (25) must be opened slowly and completely.

The steam stream from outer chamber (2) into sterilizing chamber (1) is interrupted.

Pressure and temperature in the sterilizing chamber (1) are decreasing. Steam must be let off until at least 1100 mbar. The steam-air mixture is displaced from the sterilizing chamber.

The release valve for chamber pressure (25) must be closed completely.

**3. Pressure production in the chamber - 2:**

The sterilization valve (9) must be opened slowly and completely

Steam is streaming from the outer chamber (2) via the sterilization valve (9) into the sterilizing chamber (1).

Pressure and temperature in the sterilizing chamber (1) are rising.

Pressure and temperature in the outer chamber (2) are decreasing.

The control lamp Heating (16) is illuminated, the heating elements are switched on.

Condensate and steam-air mixture are escaping at the exhaust tube of the condensate trap (26).

When the control lamp Heating (16) goes out, the maximum pressure in the outer chamber (2) and the sterilizing chamber (1) is reached.

When the control lamp Heating (16) has gone out, wait for 1 minute.

Waiting time – 1 minute

**4. Pressure reduction in the chamber - 2:**

The sterilization valve (9) must be closed completely.

The release valve for chamber pressure (25) must be opened slowly and completely.

The steam stream from outer chamber (2) into sterilizing chamber (1) is interrupted.

Pressure and temperature in the sterilizing chamber (1) are decreasing. Steam must be let off until at least 1100 mbar.

The release valve for chamber pressure (25) must be closed completely.

**5. Pressure production in the chamber - 3:**

The sterilization valve (9) must be opened slowly and completely

Steam is streaming from the outer chamber (2) via the sterilization valve (9) into the sterilizing chamber (1).

Pressure and temperature in the sterilizing chamber (1) are rising.

Pressure and temperature in the outer chamber (2) are decreasing.

The control lamp Heating (16) is illuminated, the heating elements are switched on.

Condensate and steam-air mixture are escaping at the exhaust tube of the condensate trap (26).

When the control lamp Heating (16) goes out, the maximum pressure in the outer chamber (2) and the sterilizing chamber (1) is reached.

When the control lamp Heating (16) has gone out, wait for 1 minute.

Waiting time – 1 minute

**6. Pressure reduction in the chamber - 3:**

The sterilization valve (9) must be closed completely.

The release valve for chamber pressure (25) must be opened slowly and completely.

The steam stream from outer chamber (2) into sterilizing chamber (1) is interrupted.

Pressure and temperature in the sterilizing chamber (1) are decreasing. Steam must be let off until at least 1100 mbar.

The release valve for chamber pressure (25) must be closed completely.



## 5.7. Heating-up time

Turn the sterilization timer (14) in clockwise direction – for a sterilizing temperature of 134 ° C to at least 20 minutes and for a sterilizing temperature of 121 ° C to at least 30 minutes.

### 7. *Heating-up time:*

The sterilization valve (9) must be opened slowly and completely

Steam is streaming from the outer chamber (2) via the sterilization valve (9) into the sterilizing chamber (1).

Pressure and temperature in the sterilizing chamber (1) are rising.

Pressure and temperature in the outer chamber (2) are decreasing.

The control lamp Heating (16) is illuminated, the heating elements are switched on.

Condensate is escaping at the exhaust tube of the condensate trap (26).

When the control lamp Heating (16) goes out, the maximum pressure in the outer chamber (2) and the sterilizing chamber (1) is reached.

The black pointer of the contact thermometer (18) rises until it has reached the red pointer resp. the sterilizing temperature.

## 5.8. Sterilisation

### 8. *Sterilization:*

When the control lamp Operation/Sterilization (15) is illuminated, sterilization starts. The sterilization timer runs down reversibly.

For maintaining the sterilizing temperature the heating is switched on correspondingly.

#### *Hint:*

- a) The timer only counts the sterilizing time when the required temperature resp. pressure in the sterilizing chamber (1) are available.
- b) At the time indication of the timer you can see the still necessary sterilizing time.

## 5.9. Pressure reduction / Drying

### 9. *Pressure reduction / Cooling*

The sterilization valve (9) must be closed completely.

The flow valve (27) must be closed completely.

The release valve for chamber pressure (25) must be opened slowly and completely.

When the pressure has decreased to approx. 1100 mbar, the valve for condensate emptying must be closed completely.

The cooling water valve (40) must be opened completely.

The steam stream from the outer jacket (2) into the sterilizing chamber (1) is interrupted.

Pressure and temperature in the sterilizing chamber (1) are decreasing.

Sterilizing chamber (1) and condensation room of the condensate receptacle (38) from a closed system.

The cooling water enters at the bottom of the cooling room of the condensate receptacle (38), surrounds the condensate room and leaves at the top from the drain for cooling water (42). Thus condensate and steam are cooled down in the cooling room. An underpressure is produced in the cooling room and the sterilizing chamber (1). The collaboration of the underpressure in the chamber and the radiation heat of the outer chamber lead to a drying of the sterile goods. The drying process must be carried out for at least 30 minutes.

## 5.10. Aeration of sterilizing chamber

### 10. *Aeration of sterilizing chamber:*

The release valve for chamber pressure (25) must be closed completely.

The cooling water valve (40) must be closed completely.

The aeration valve (34) must be opened slowly and completely.

The cooling water flow is stopped.

Via the aeration filter (35) surrounding air is led into the sterilizing chamber (1). The sterilizing chamber is aerated to atmospheric pressure. This step is finished when the pointer of the pressure gauge for sterilizing chamber (19) shows **0**.

## 5.11. Safety valve for lid

### 11. *Open the safety valve for lid:*

The operating level (24) for the safety valve for lid (23) must be opened completely.

The safety closure of the sterilizer lid (3) is repealed. The lid can be opened.

## 5.12. Open the sterilizer lid

**The sterilizer lid (3) may only be opened when the sterilizing chamber is pressureless and the sterilizing valve (9) is closed - Indication "0" bar at the pressure gauge for chamber (19).**

For that purpose the safety valve for the lid (23) is opened by the operation lever (24). The eventually remaining overpressure now escapes from the sterilizing chamber via the **exhaust tube** of the safety valve for the lid.

**Attention:** It is still possible that steam escapes at the exhaust tube of this valve.

By means of the operation handles the lid is turned until the limit stop and then opened.

**Attention:** It is still possible that hot steam escapes from the sterilizing chamber.

Now the - possibly still hot - sterile goods can be removed.

## 5.13. Preparations for further sterilizations

After the chamber has been emptied, the sterilizer can quickly be prepared for the next charge.

## 5.14. Switching off of sterilizer

For final switching off of the sterilizer, e.g. after the last load of the day, the ON/OFF switch (13) has to be switched off (light goes out) and control resp. close the cooling water valve (40).

## 6. Diagram

The pressure curve on the following diagram shows the ideal pressure conditions in the sterilizing chamber during the individual programme steps. The diagram corresponds to sterilization at a temperature of 134° C and a pressure of approx. 2,5 bar operating pressure.

The step sequence during the sterilization at 121° C / 1,3 bar runs identically with the corresponding times and values.

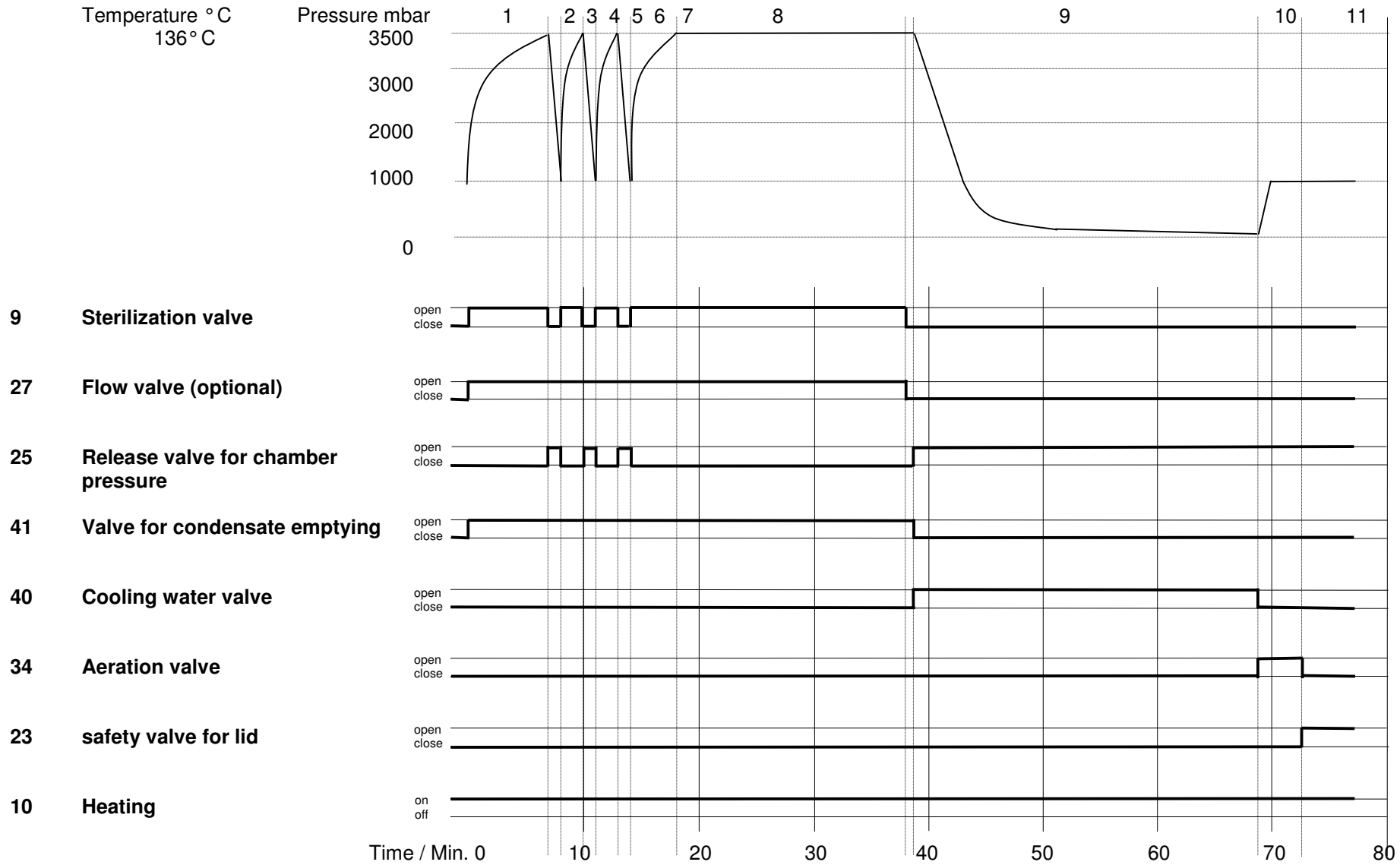
The diagram shows the actual valve positions during the corresponding programme steps.

The valve position is always shown by the location of the black line.

*Black line in the lower position* - *Valve in closed position..*  
*Black line in the upper position* - *Valve in opened position.*

The times and values indicated in the operating instruction are minimum values and should not be fallen below.

The sterilizer is not suitable for operation without supervision, as it needs a continuous control.



## 7. Table

Programme	Goods to be sterilized	Sterilizing pressure	Sterilizing temperature	Sterilizing time	Method of cooling
A	Rubber goods	1,2 bar	121 ° C	30 Min.	Vacuum drying
B	Utensils Textiles	2,4 bar	134 ° C	20 Min.	Vacuum drying
C					

### Goods which may be combined

In programme "A" (1,2 bar / 121 ° C) only solids with a destroy temperature of 124 ° C may be sterilized.

In programme "B" (2,4 bar / 134 ° C) only solid, like instruments and other similar utensils, may be sterilized.

**In case of sterilization of textiles and/or packed goods a sufficient air dilution factor must be produced.**

## 8. Safety Devices

### 8.1. Water shortage in the outer chamber

A sensor (11) is built in above the radiators, so that they cannot burn through in case of extreme shortage of distilled resp. demineralized water. The sensor consists of a small radiator with integrated temperature sensor. In case of water shortage the temperature sensor - heated up by the small radiator - gives a signal to the water shortage protected switch. Via a contactor (10a) this switch durably separates the radiators (10) and the small radiator in the water shortage sensor (11) from electric mains. At the same time the red control lamp "water shortage" (17) lights up. Due to the falling temperature the sensor (18a) switches the sterilization thermometer (18) to undertemperature. Thus the sterilization timer (14) is stopped.

To remove the water shortage, proceed as described in point 5.1.3

### 8.2. Safety valve for lid

When the sterilizer lid is orderly closed, this valve (23) prevents by its operation lever (24) that the lid can be opened when the sterilizing chamber is under pressure. If anyone tries to open the chamber nevertheless, the lever (24) has to be operated first. This would mean that via the activated valve (23) possibly existing pressure would be reduced and be led away via the exhaust pipe.

### 8.3. Sterilizer lid

The sterilizer lid is opened and closed by a turning bayonet system. Because of the occurring friction (and because of 6.2) it is not possible to operate the lid bayonet in direction "open" when there is pressure inside. Should the lid be opened - due to an accumulation of misfunctions (depending on the apparatus or on wrong operation) - when there is still a remaining pressure inside the chamber, this inner pressure presses the lid into catch hooks, before it can be opened completely. Due to the arrangement of these hooks the remaining pressure between chamber and lid can escape, but a dangerous flying open of the lid is surely prevented.

### 8.4. Safety valve

If the radiators (10) are not switched off due to a failure of the regulator for sterilization pressure (21) and an inadmissible high steam pressure is established inside the sterilizer, the safety valve (30) reacts upon an overpressure of more than 2,5 bar. It opens the way outside, removes safely the surplus pressure via a tube, thus preventing dangerous overpressure.

In case of reaction of the safety valve, switch off the apparatus by the ON/OFF switch (13) and examine the apparatus.



## **9. Maintenance of Sterilizer**

In case of external contamination of unit and inner chamber, clean these parts moistly. When the switchboard is cleaned, separate it first from mains supply.

The inner chamber must always be kept clean. If necessary, wash it out.

In case of calcareous water, the apparatus has to be decalcified once a year. These intervals can be extended when the outer chamber is emptied regularly.

### **9.1. Sterilizer gasket**

In course of time the sterilizer gasket (33) is subject to a natural wear and tear and has to be exchanged, if necessary, e.g. if it is deformed or damaged or if during sterilization steam escapes at the gasket. The gasket has to be greased in regular intervals (with silicone fat or similar).

### **9.2. Aeration filter**

Acc. to its construction the aeration filter guarantees a safe air sterilization and makes it possible to exchange the filter elements easily.

Our service staff is instructed to exchange the filter elements acc. to the frequency of use under consideration of the local conditions, as dust and humidity.

To guarantee the operation safety of the sterilizer and to prevent a recontamination of the sterile goods, it is necessary that the filter elements are regularly exchanged every six months.

Under consideration of local conditions, like dust and humidity, as well as in case of frequent use, it might be necessary to exchange the filter more often.

## 10. Search for Errors

### ***Temperature indication does not work***

- > sensor defective
- > flowing obstructed
- > condensate trap defective

### ***No pressure in the chamber***

- > no water in the chamber
- > no current / fuse defective
- > water shortage protection disengaged

### ***Chamber gasket leaky***

- > gasket defective
- > dirt on the gasket
- > gasket has to be greased

## 11. Short Operating Instructions

for vertical autoclave KSG 40/60-2 / KSG 50/70-2 / KSG 50/80-2, double-walled with sterilization timer, contact thermometer and condensate receptacle

***Working according to these short operating instructions is only allowed to persons, who understood the operating instructions and are able to operate the unit accordingly.***

**Starting when the outer chamber (2) is without pressure.**

Close valves (25), (27), (34), (40) and (41), if still open.

Open filling valve (5) and sterilization valve (9), fill outer jacket (2) via filling funnel (4) with distilled water up to max. filling (6). Then close filling valve (5) and sterilization valve (9) again.

Actuate on/off-switch (13) and switch on heating (10) in the steam jacket (2).

Adjust pressure at the pressure regulator (21).

Adjust sterilization timer (14).

Adjust the sterilizing temperature at the contact thermometer (18).

Fill the chamber (1) with the goods to be sterilized and close the lid (3).

Close operation lever (24) for function safety valve (23).

After having reached the operating pressure in the outer chamber (2)

### **1. Step 1. Production of steam in the chamber**

Open flow valve (27) and sterilization valve (9).

When control lamp heating (16) has gone out – wait for 1 minute.

### **2. Step 1. Reduction of chamber pressure**

Close the sterilization valve (9).

Open valve for condensate emptying (41) and the release valve for chamber pressure (25).

After having reached a chamber pressure of 1100 mbar – close the release valve for chamber pressure (25).

### **3. Step 2. Production of steam in the chamber**

Open the sterilization valve (9).

When control lamp heating (16) has gone out – wait for 1 minute.

### **4. Step 2. Reduction of chamber pressure**

Close the sterilization valve (9).

Open the release valve for chamber pressure (25).

After having reached a chamber pressure of 1100 mbar – close the release valve for chamber pressure (25).

**5. Step 3. Production of pressure in the chamber**

Open the sterilization valve (9).

When control lamp heating (16) has gone out – wait for 1 minute.

**6. Step 3. Reduction of chamber pressure**

Close the sterilization valve (9).

Open the release valve for chamber pressure (25).

After having reached a chamber pressure of 1100 mbar – close the release valve for chamber pressure (25).

**7. Step Heating-up time**

Open sterilization valve (9).

**8. Step Sterilization**

Wait until the sterilizing time has run down.

**9. Step Pressure reduction / Drying**

Close sterilization valve (9) and flow valve (27).

Open the release valve for chamber pressure (25).

After having reached approx. 1100 mbar chamber pressure – close the valve for condensate emptying (41).

Open the cooling water valve (40).

Attend the drying time.

**10. Aeration of sterilizing chamber**

Close the release valve for chamber pressure (25) and the cooling water valve (40).

Open the aeration valve (34).

Attend the aeration process.

**11. Open the safety valve for the lid**

Open the operation lever (24) for the safety valve for the lid (23).

**Open the lid of the sterilizer**

When the pointer of the pressure gauge for sterilizing chamber (19) shows **0**, the sterilizer lid (3) can be opened.

**Attention:** Hot air escapes from the sterilizing chamber when opening the sterilizer lid.

**Removal of sterile goods**

Now the sterile goods can be removed from the sterilizing chamber.

**Attention:** The sterile goods may still be hot.

