



Operating instructions

Small steam sterilizer for laboratories

STERILAB

CE



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	PACK SHEET
	BRIEF OPERATING INSTRUCTIONS
	USER'S EVALUATION

1 PRODUCT IDENTIFICATION

1.1 TYPE IDENTIFICATION

Steam sterilizer STERILAB for laboratories, sterilization chamber volume of 25 l.

1.2 NAME AND ADDRESS OF THE PRODUCER

MMM Medical Technology s.r.o
Cejl 50
CZ – 656 60 Brno

2 REQUIREMENTS ON THE USER

- **This product can be operated only by persons, who, on the basis of their appropriate education or knowledge and practical experience, guarantee correct and proper operation. Workers in charge of operating this product shall be trained for this work and made acquaint with these Operating instructions.**
- **The keeper is held responsible for proper training of the personnel in operating the product.**
- Names of the workers in charge of operating the product, further only “user” shall be entered in the so called log of the unit.
- The product shall be operated in accordance with these Operating instructions to secure safety.
- Installation and first putting into operation may be performed only by an authorized person in accordance with the instructions specified in chapter 7.4 Installation. The authorized person is a person, who, on the basis of professional education, theoretical and practical knowledge, proved satisfactory knowledge in relation to the problems of steam sterilizers and has a written authorization to perform service procedures with the product STERILAB issued by the manufacturing enterprise.
- Pay attention to chapter 8 Operation of the unit before the first use. Incorrect operation may cause damage to the unit.
- The electric installation shall be done by an authorized person according to respective regulations¹.

¹ Authorized person means a person who, on the basis of his professional education, theoretical and practical knowledge, proved sufficient knowledge in relation to the problematic of steam sterilizers and has a written authorization for servicing the sterilizers STERILAB issued by the manufacturing company.

3 PRESSURE UNITS

For the purposes of this product:

- pressure in Pa-units and their multiples (kPa, MPa) means the absolute pressure related to the vacuum (i.e. normal atmospheric pressure is 100 kPa)
- overpressure or underpressure in bar-units and their multiples (mbar) means a relative pressure related to the normal atmospheric pressure (i.e. normal atmospheric pressure is 0 bar).

4 PRODUCT SPECIFICATION

4.1 INTENDED PURPOSE OF THE DEVICE

The steam sterilizer STERILAB is intended for the sterilization of solutions or agars and unpacked non-porous objects (e.g. made of metal, glass, ceramics, etc.), tolerating the conditions of sterilization by the saturated water vapour, especially in laboratories. The solutions or agars must be sterilized in open bottles. If they are to be sterilized in closed bottles, such bottles must conform to the ISO 4796 standard and must be provided with a PP-screw tap with a GL 45 thread and a pouring ring. The device is equipped with the N-type sterilization cycles within the meaning of the ČSN EN 13060 standard. The device is not intended for the sterilization of porous objects (e.g. textile), cavities pursuant to Articles 3.19 and 3.20 of the EN 13060 standard, and of any packed objects. Sterilization means killing of all reproduction-able microorganisms, including their especially resistant spores. Viruses are inactivated irreversibly by sterilization. The sterilization or heating effect on the material loaded in the device is reached by the action of saturated water vapours under an appropriate overpressure.

4.2 TECHNICAL DESCRIPTION

4.2.1 TECHNICAL FEATURES

- compact dimensions and low weight,
- optimal effective output,
- digital display of temperature in the sterilization chamber,
- digital display of steam pressure in the sterilization chamber,
- doubled temperature sensors for an independent check of the sterilization process,
- flexible sensor for temperature sensing directly in the solution,
- system of a quick steam generation,
- optional times of sterilization exposures up to 60 minutes,
- possible option of sterilization programs in dependence on the kind of material to be sterilized,
- storing programs by means of a chip card,
- time-delayed switching-on and starting the program,
- sterilization chamber with an electric heated jacket made of stainless steel DIN 1.4571,

- independent pressure-separated steam generator made of stainless steel DIN 1.4571,
- automatic door lock,
- easy interactive operation by means of the touch-display (graphical LCD),
- heat removal from the sterilizer by means of a heavy-duty cooler, which does not require connection to a water supply,
- automatic microprocessor control (two microprocessors master and slave),
- built-in separated tanks for supply water and drain water,
- indication of max. and min. level of supply water and max. level of drain water,
- charge counter,
- interface RS232 for eventual connection to an external printer for program documentation,
- connection to an external PC possible,
- communication software for PC under Windows enables storing of programmable data,
- change of program parameters setting by means of the UNICONFIG software,
- check of individual sterilization phases during the whole cycle,
- a possibility of connection to the waste water treatment unit at the customer's request,
- a possibility of mounting of the air detector at the customer's request,
- Availability of sterilization with Fo parameter,;
- easy and comfortable operation,
- modest maintenance,
- modern ergonomic design,
- easy installation.

4.2.2 PRESSURE VESSEL

The pressure vessel is made of chromium-nickel-molybdenum stainless steel of DIN 1.4571 quality. The interior surfaces of the sterilization chamber and the door are brushed.

The pressure vessel was designed and checked in accordance with the standard EN 13444 Unfired Pressure Vessels and its strength and cyclical stress were tested according to the said standard.

For operation, service, maintenance, inspection and testing, national regulations shall be applied.

4.2.3 DOOR

The sterilization chamber is provided with a door with an automatic electric lock of the chamber. The door is sealed with a special sealing.

4.2.4 WAY OF STEAM SUPPLY

The sterilizer has its own built-in steam generator with a resistance heating body.

4.2.5 CONTROL SYSTEM

An important part of the unit is the double-processor automatics (master-slave), that serves for control, regulation and record of the automatic course of operation and evaluates all operating and fault conditions. In case

of interrupting the automatic course of operation due to external influences (electric energy outage) the automatics is able, after restoration of the normal operating conditions, either to continue the operation or to return the sterilizer safely into the initial status.

4.3 TECHNICAL DATA

4.3.1 DIMENSIONS AND WEIGHT

Sterilization chamber dimensions:

useful space:.....Ø269 x 440 mm

total volume:.....25 l

useful volume:.....20 l

Outside dimensions of the sterilizer:

width x height x depth:.....502 x 472 x 750 mm

Weight:

weight of the empty unit without water:.....77 kg

weight with the maximum load

and max. water amount:.....112 kg

transport weight:104 kg

4.3.2 OPERATING PARAMETERS

Operating overpressure:...0.9 to 2.1 bar (10 to 310 kPa)

Operating temperature:.....5 to 138 °C

4.3.3 ELECTRIC ENERGY

Mains connection:.....1P/N/PE/AC

Power input:.....2600 W

Operating voltage:.....230 V ± 10 %

Mains frequency:50 Hz ± 5 %

Power input in stand-by condition:.....10 W

Overvoltage installation category:.....2

Battery type:.....CR 2430

Fuses:.....6,3 × 32 mm F 16A / 250V 2 pcs

.....6,3 × 32 mm T 1A / 250V 1 pc

4.3.4 EMISSIONS

Average acoustic power :..... < 65 dB(A)

Heat radiation:.....max. 1020 W

at the ambient temperature of 25 °C

4.3.5 PROTECTION CLASS

IP 21 – against dropping water

4.3.6 AMBIENT CONDITIONS AND INTERFACE

Ambient conditions:

ambient temperature:.....+5 to +35 °C

maximum relative humidity:.....85 % at 31 °C

maximum altitude:.....2000 m

Serial interface:

type:.....RS 232

el. Isolation.....double

4.3.7 OTHER TECHNICAL DATA

Volume of supply tanks:.....max. 6,5 l / 6,5 l

Information for the continuous checking of the pressure vessel during the operation:

Permitted number of sterilizing cycles37,000

4.4 SAFETY

4.4.1 SAFETY DEVICES

- two-processor check system of the sterilization,
- mechanic – electrical system of blocking the door during the operation,
- system of the door interlocking during the operating cycle by means of the automatic control system,
- securing against door opening if the overpressure in the sterilization chamber is higher than 100 mbar,
- securing against door opening if the temperature in the sterilization chamber is higher than the boiling temperature of the respective liquid reduced by 5 K at the atmospheric pressure outside the unit,
- securing against door opening if there is a danger of hot liquid escape from the sterilization chamber,
- automatic return to a safe state in case of breaking the program course,
- warning error messages,
- antibacterial filter secures the quality of the chamber aeration after the underpressure cooling phase,
- protection against surpassing the maximum operating overpressure by means of safety valves,
- thermal fuse protection against inadmissible overheating of the chamber jacket electric heating,
- thermal fuse protection against inadmissible operation of the steam generator without water.

4.4.2 PERFORMANCE CHECK

4.4.2.1 CHECK BY CHEMICAL PROCESS TEST

- Chemical process tests react by colour change already on the presence of the sterilization media and serve for distinguishing between the goods to be sterilized and the goods already sterilized.
- Every package unit must be provided with this test indicator (it is also possible to use a self adhesive indication tape with the chemical process test, which is stuck on the package containing goods to be sterilized).
- Use only indication tapes destined for steam sterilization.
- This test cannot be used to prove the sterilization efficiency!

4.4.2.2 CHECK OF THE STERILIZATION CYCLE RECORD

- The sterilizer enables connecting to an external printer and printing a protocol. These protocols serve for documenting the sterilization process quality. An example of the protocols is given in chapter 17.2. The person responsible for the sterilizer operation determines the way of using these documents.

4.4.2.3 BIOLOGICAL CHECK

- Periodical “bacteriological tests with vital spores” give a reliable proof of the sterilizer’s functional ability.
- Indicators with *Bacillus stearothermophilus* are used for steam sterilizers.
- When performing biological tests, follow strictly the instructions of the indicator manufacturer.

4.4.3 UNINTENDED USE

Danger of electric shock

- As long as the unit is connected to the mains, the operating personnel shall not take off or open the covers of the unit. These activities as well as the work on electrical parts may be performed only by an authorized person or by a service engineer.

Danger of burns and injury to the operator



- The door of the sterilizer shall not be opened before the end of the sterilization program.



- The sterilizer load is hot after sterilization, use a special holder when unloading the trays, use gloves when unloading other goods!



- When the sterilizer door is opened after a finished sterilization cycle, hot condensed water leaks on the table from a small space between the door and the sterilization chamber partition. Handle the door with caution!
- Sterilize solutions in open bottles; solutions can be sterilized in closed laboratory bottles SIMAX meeting the requirements of ISO 4796 provided with PP-stopper with a thread GL 45 and a pour-out ring only with the program with spontaneous cooling. Other unsuitable closed bottles can explode when being unloaded from the sterilization chamber.

Danger of damage to the sterilizer

- Check the connecting mains voltage and compare it with the data put on the type label before installation. The voltage as well as the frequency shall correspond.
- No objects, liquids, etc. may be put or located on top of the sterilizer.
- Air vents of the unit shall not be covered up.
- Requirements on the operating media shall comply with the features presented in chapter 12.

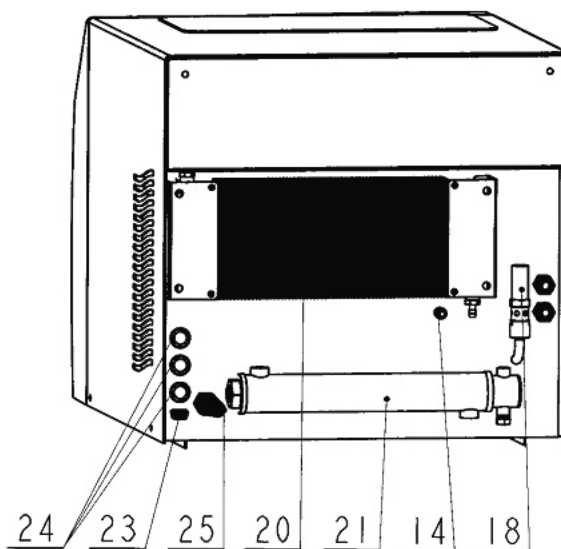
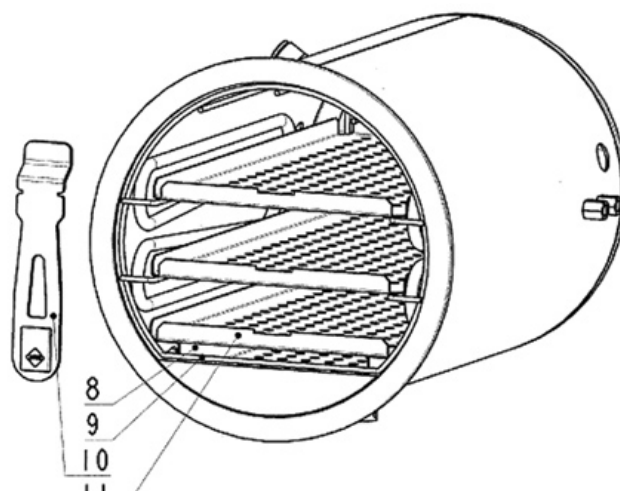
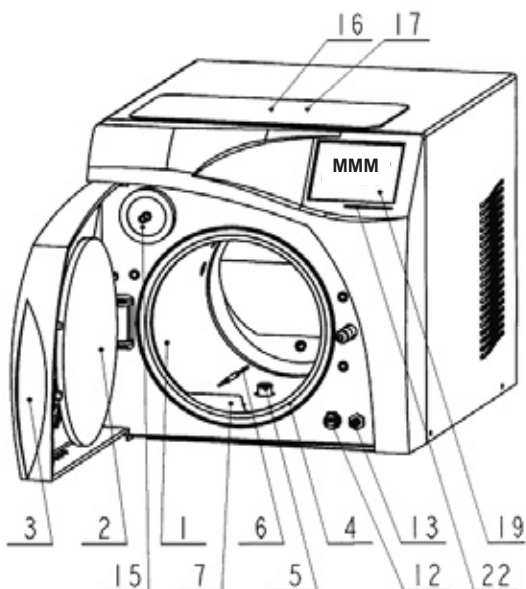
Danger of damage to the load

- Organic materials as wool, leather, optical fibers and other thermally unstable items shall not be sterilized with saturated water steam.
- Act upon the data of the material manufacturer or supplier.
- According to chapter 6 select the right program for every kind of load.

5 STERILIZER DESCRIPTION

5.1 INDICATING AND OPERATING ELEMENTS

- 1 Sterilization chamber
- 2 Sterilization chamber door
- 3 Projection of the chamber door
- 4 Door sealing
- 5 Drain screen
- 6 Flexible temperature sensor
- 7 Division of the sterilization chamber
- 8 Base of the built-in piece
- 9 Sterilization chamber built-in piece
- 10 Unloading holder
- 11 Dish
- 12 Quick coupler for pumping the supply water
- 13 Connector for discharging the used water
- 14 Connector for discharging the distilled water
- 15 Antibacterial filter
- 16 Drain tank
- 17 Check valve of the sterilization chamber and the generator
- 18 Touch-display
- 19 Laminated air cooler
- 20 Tubular heat exchanger
- 21 Chip card reader opening
- 22 Connector for PC and printer
- 23 Fuses
- 24 Mains cord



6 PROGRAMS

The maximum temperature during the whole cycle is equal with the sterilization temperature value increased by 4 K.

All programs work with the so called gravitational way of removing air from the load before the sterilization itself.

6.1 P1 SOLUTIONS – SPONTANEOUS COOLING-DOWN 121

Sterilization program for solutions in open bottles, vessels or containers at the sterilization temperature and time 121 °C/20 min.

In case the laboratory bottles SIMAX meeting the requirements of ISO 4796 provided with PP-stopper with a thread GL 45 and a pour-out ring are used as vessels for solutions, the solutions can be sterilized in these closed bottles.

For the safe sterilization the temperature in the solution is indicated by means of a flexible temperature sensor. Equalization of the operating saturated steam overpressure to the atmospheric pressure after the sterilization exposure

and cooling down to the maximum admissible temperature is performed spontaneously.

6.2 P2 AGARS – COOLING-DOWN 121

Sterilization program for solutions in open bottles, vessels or containers at the sterilization temperature and time 121 °C/20 min.

For the safe sterilization the temperature in the solution is indicated by means of a flexible temperature sensor. Equalization of the operating saturated steam overpressure to the atmospheric pressure after the sterilization exposure is performed through controlled cooling to the temperature in the zone 55 to 65 °C (in dependence on the load). After reaching this zone the time starts to be counted down, during which the spontaneous cooling-down to the temperature of 50 °C and keeping the load temperature on the temperature value of min. 50 °C takes place. During this holding phase the cycle can be interrupted and the load removed and considered as sterilized.

Caution:

The temperature drop is more rapid with this program than with the program P1. In any case do not use this program for sterilization of solutions in closed bottles and solutions inclinable to boiling over.

6.3 P3 ARNOLD 102

Sterilization program for solutions in open bottles, vessels or containers by means of „freely streaming steam“ at the temperature of 102 °C and for the time of 30 min.

For the safe sterilization the temperature in the solution is indicated by means of a flexible temperature sensor. There follows the spontaneous cooling-down after the sterilization exposure.

6.4 P4 TEMPERATURE CYCLE 100/121/60

Program for preprocessing and subsequent sterilization of agars in open bottles, vessels or containers with the holding time of 30 min. at the absolute pressure of 110 kPa, 10 min. at the absolute pressure of 120 kPa and 20 min. at the sterilization temperature of 121 °C.

For the safe sterilization the temperature in the solution is indicated by means of a flexible temperature sensor. Equalization of the operating saturated steam overpressure to the atmospheric pressure is performed through controlled cooling to the temperature in the zone 55 to 65 °C (in dependence on the load). After reaching this zone the time starts to be counted down, during which the spontaneous cooling-down to the temperature of 50 °C and keeping the load temperature on the temperature value of min. 50 °C takes place. During this holding phase the cycle can be interrupted and the load removed and considered as sterilized.

Caution:

The temperature drop is more rapid with this program than with the program P1. In any case do not use this program for sterilization of solutions in closed bottles and solutions inclinable to boiling over.

6.5 P5 UNWRAPPED INSTRUMENTS 134

Sterilization program for unwrapped compact nonporous items (e.g. metal instruments, empty glass bottles etc.) at the sterilization temperature and time of 134 °C/10 min with subsequent rapid drop of the saturated water steam pressure in the sterilization chamber and a controlled cooling.

Use this program for a quick preheating of the sterilizer and for rinsing pipes in case some vessel with solution bursts or some solution boils over the container and the solution enters the piping of the sterilizer (e.g. due to the use of wrong vessels, selection of wrong program etc.)

! **From the viewpoint of secondary contamination of the sterilized material this program can be used with following limitations:**

- the sterilized **unwrapped** material shall be used immediately without being stored or transported. In other cases, when the sterilized material must be protected with a suitable wrapping, this program shall not be used.
- if the in this way sterilized **unwrapped** material is **stored**, it shall be considered only as a disinfected one.

Caution:

The temperature drop is more rapid with this program than with other programs. In any case do not sterilize any solutions with this program. There would occur a rapid boiling-up of the solution that means not only the loss of the solution but also putting the sterilizer out of operation.

6.6 P6 DECONTAMINATION 134

Decontamination program for unwrapped compact nonporous items (e.g. metal instruments, empty glass bottles etc.) and solutions at the temperature and time of 134 °C/ 60 min.

The solution temperature is not detected with the flexible sensor.

Equalization of the operating saturated steam overpressure to the atmospheric pressure is performed through controlled cooling to the temperature in the zone 70 to 80 °C (in dependence on the load).

Caution:

The temperature drop is more rapid with this program than with the programs P1, P2, P3 and P4. In any case do not use this program for sterilization of solutions in closed bottles and solutions inclinable to boiling over.

6.7 P7 SPECIAL – MODIFIED PROGRAM P1

P7 Special – modified program P1 is a program with the same characteristic course as the program P1 Solutions, only here the operator can change the temperature and time of the sterilization exposure within the specified limits, see par. 8.6.15.

Specified limit for the change of the sterilization exposure time is **1 to 60 min.**

Specified limit for the change of the sterilization exposure temperature is **103 to 134 °C.**

For installing the program with a different course serves the chip card that is programmed by the manufacturer according to the user's wishes.

The chip card manipulation is described in par. 8.6.16 and 8.6.17.

The program data of the special program are saved permanently in the unit's memory until overwritten by other data.

6.8 P8 SPECIAL – MODIFIED PROGRAM P2

P8 Special – modified program P2 is a program with the same characteristic course as the program P2 Agars cooling-down 121, only here the operator can change the temperature and time of the sterilization exposure within the specified limits, see par. 8.6.15.

Specified limit for the change of the sterilization exposure time is **1 to 60 min.**

Specified limit for the change of the sterilization exposure temperature is **103 to 134 °C.**

For installing the program with a different course serves the chip card that is programmed by the manufacturer according to the user's wishes. The chip card manipulation is described in par. 8.6.16 and 8.6.17.

The program data of the special program are saved permanently in the unit's memory until overwritten by other data.

6.9 P9 SPECIAL – MODIFIED PROGRAM P4

P9 Special – modified program P4 is a program with the same characteristic course as the program P4 Temperature cycle, only here the operator can change the temperature and time of the sterilization exposure within the specified limits, see par. 8.6.15.

Specified limit for the change of the sterilization exposure time is **1 to 60 min.**

Specified limit for the change of the sterilization exposure temperature is **103 to 134 °C.**

For installing the program with a different course serves the chip card that is programmed by the manufacturer according to the user's wishes. The chip card manipulation is described in par. 8.6.16 and 8.6.17.

The program data of the special program are saved permanently in the unit's memory until overwritten by other data.

6.10 P10 SPECIAL – MODIFIED PROGRAM P6

P10 Special – modified program P6 is a program with the same characteristic course as the program P6 Decontamination 134, only here the operator can change the temperature and time of the sterilization exposure within the specified limits, see par. 8.6.15.

Specified limit for the change of the sterilization exposure time is **1 to 60 min.**

Specified limit for the change of the sterilization exposure temperature is **103 to 134 °C.**

For installing the program with a different course serves the chip card that is programmed by the manufacturer according to the user's wishes. The chip card manipulation is described in par. 8.6.16 and 8.6.17.

The program data of the special program are saved permanently in the unit's memory until overwritten by other data.

Note:

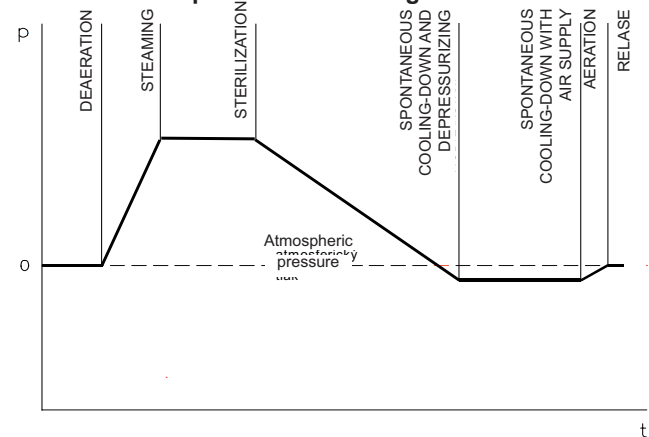
Upon the customer's request, sterilization cycle with Fo parameter can be activated (see Annex B to the Instructions).

6.11 P11 SERVICE

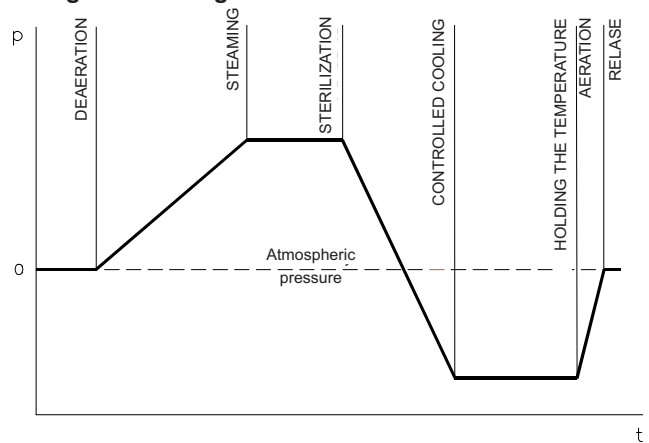
This program enables to enter the service mode.

6.12 COURSES OF OPERATING CYCLES

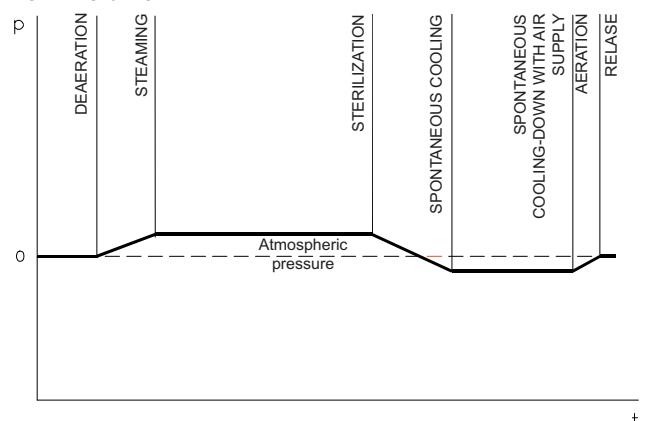
P1 Solutions – spontaneous cooling-down 121



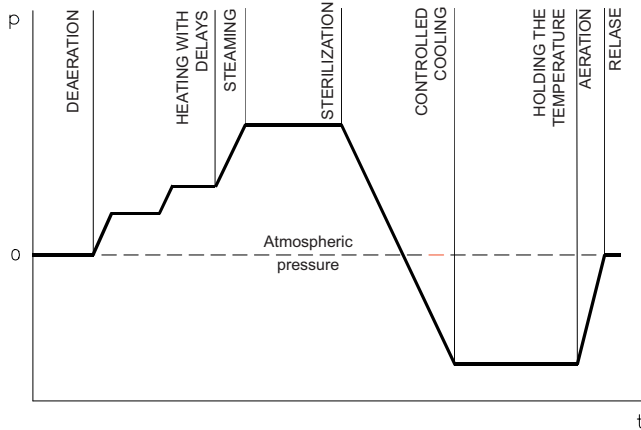
P2 Agars – cooling-down 121



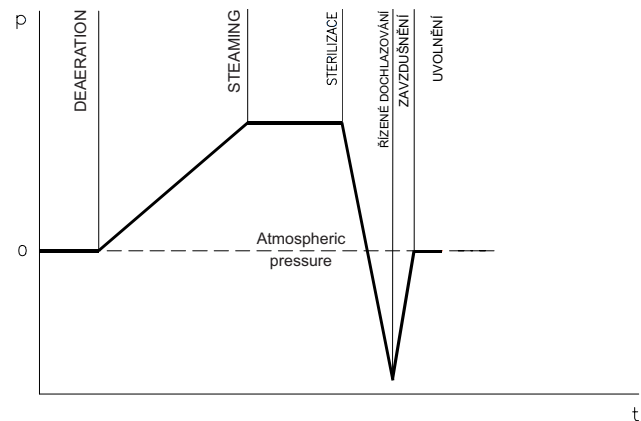
P3 Arnold 102



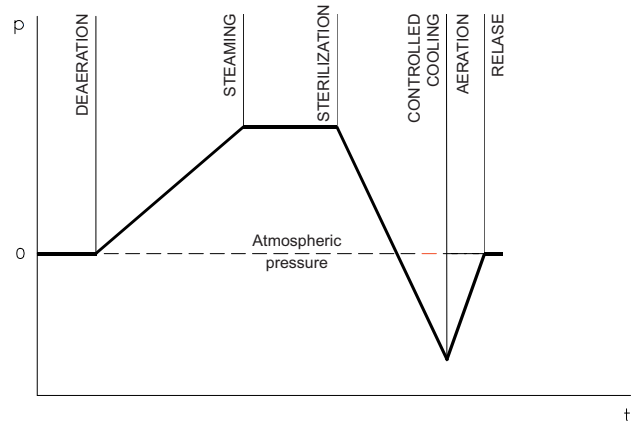
P4 Temperature cycle 100/121/60



P5 Unwrapped instruments 134



P6 Decontamination 134



7 PREPARATION OF THE STERILIZER FOR USE

7.1 TRANSPORT AND STORAGE OF A NEW STERILIZER

After the transport keep the sterilizer in the original transport packing from manufacturer. Avoid impacts of the packed sterilizer against walls and other barriers. Till the time of unpacking store the sterilizer at a dry protected place with the ambient temperature of min. 5 °C.

After the transport keep the sterilizer in the original transport packing from manufacturer. Avoid impacts of the packed sterilizer against walls and other barriers. Till the time of unpacking store the sterilizer at a dry protected place with the ambient temperature of min. 5 °C.

7.2 UNPACKING THE NEW STERILIZER

For unpacking the sterilizer the tools used in a common household are suitable. Keep the packing for an eventual transport to another workplace or for storing. Keep the packing, anyway, during the whole warranty period, so that you can send the sterilizer for an eventual reclamation.

7.3 SAFE DISPOSAL OF THE PACKING

For the disposal of the packing material proceed as described in chapter 14.

7.4 INSTALLATION

The sterilizer is transported in vertical position by catching it by the bottom edges on the sides of the device. The first putting into operation may be performed only by an authorized person. It is necessary to perform the automatic watering according to par. 8.6.13, and the storing of calibrations, so that from the sterilizer installation date the time for the message “Service inspection” starts to be counted.

Precaution:

Sterilizer is equipment in which water steam is generated. The steam then condenses, which entails the necessity of pressure equalization in the sterilization chamber and in the waste vessel of the sterilizer to the ambient atmospheric pressure. It is, therefore, natural that some gaseous and liquid humidity gets out of the sterilizer to its neighbourhood after the sterilization chamber door is opened in case of an interrupted programme termination or in case of use of a programme with a short time of drying, and from the overflow hoses in the back part of the sterilizer in case of an intense use or defect. Therefore, no equipment which lacks water-resistant properties may be positioned below the sterilizer.

The sterilizer shall be placed on a hard leakproof horizontal floor, on a stable desk or another stable base. The rear

edge of the upper and side cover must be placed minimally 10 cm from the wall because of the air flow coming out of the sterilizer. Minimum distance of the unit's side walls from the walls is 30 mm (with respect to a sufficient access of cooling air and an increased width of the device when opening the door). Minimum distance of the unit's upper side from the wall is 150 mm (because of cleaning the drain tank).

Caution:

The carrying capacity of the desk, the sterilizer is placed on, shall be at least 125 kg. An electric socket shall be within the reach of the sterilizer mains cord. For starting the sterilizer ca. 7 l of supply water shall be prepared (distilled water is recommended) in a canister.

Requirements on operational media see chapter 12.

7.5 ARRANGEMENTS BEFORE THE USE

There is the sterilizer equipment placed in the sterilization chamber and wrapped in a plastic cover. Do not forget to remove these items immediately after placing the sterilizer on its working place. When opening the sterilization chamber proceed according to chapter 8.1.

8 OPERATING THE STERILIZER

The description of chapter 5.1 Indicating and operating elements is used in this chapter.

8.1 BASIC OPERATION

8.1.1 TOUCH-DISPLAY

The touch display **19** serves for communication and control of the sterilizer. All necessary information is shown on the display. The required function is selected by finger touch on the field represented as a button. The display reacts on a slight touch, it is not dimensioned for a high press.



- You could cause a damage to the display by pressing it too much!

8.1.2 STAND-BY MODE AND OPERATING MODE

After connecting the mains cord **25** to the el. socket the sterilizer is in the so called **stand-by mode** – the sterilizer does not perform any function, the consumption of el. energy is insignificant. If the sterilizer does not start to operate within 5 minutes, the illumination of the touch-display **19** goes off. The illumination goes on after touching the display **19** at any place. The touch-display **19** is active and after touching the display **19** at any place the sterilizer gets to the **operating mode**.

In the operating mode you can select a program, start the program and break the program, perform service operations accessible to the operator, open and close the door. The field "Switch off" serves for transition from the operating mode to the stand-by mode.

8.1.3 STERILIZATION CHAMBER DOOR

The door **2** is unblocked after touching the appropriate field on the display **19**. The projection **3** enables to catch the door with fingers and open it.

Check whether the sealing **4** is fixed properly – the sealing **4** shall not be pulled out of the groove in the door plate **2**, the automatic control would evaluate this condition as an insufficient closing of the door **2**.

When closing the door **2** let them ajar at first and then press the door **2** for min. **4** sec so that it can be closed and secured automatically.

If the sterilizer is in the stand-by mode, we recommend to leave the door **2** ajar so that the sealing **4** is not bruised unnecessarily.

8.1.4 MANIPULATING THE GOODS

Unload the hot dishes **11** with the material by means of the holder **10**, which is the standard equipment of the sterilizer. The dishes **11** are slid into the wire cage **9** located in the sterilization chamber.

Insert the flexible sensor into the vessel with the solution whose temperature is at most the same as the temperature of other solutions in vessels sterilized together. If the flexible sensor is not submerged into the solution properly, it will sense only the temperature of the sterilization medium and the temperature changes in the solution will be delayed behind the values on the sensor.

Use of the sterilization chamber space is described in chapter 11.3.



Warning:

After the end of the program the inner surface of the door **2** and the chamber jacket **1** are hot, be careful when unloading the sterilized goods, danger of burns! Use the unloading holder **10** or gloves!

8.1.5 PUMPING THE SUPPLY WATER

The sterilizer needs supply water for generating the steam. When pumping water into the internal tank of the sterilizer proceed as follows:

- Insert the connector of the hose for pumping, which is the standard equipment, into the quick coupler **12** for pumping the supply water. This quick coupler is marked with "IN".
- Put the loose end of the hose to the vessel with supply water, the recommended amount is 7 l.
- Start the pumping by touching the field "Fill water" on the display **19**. You can start the pumping any time while the door **2** is open, overfilling of the sterilizer is not possible.
- After finishing the pumping release the hose connector by depressing the button on the quick coupler **12**.
- Data on the water quality see chapter 12.1.

Warning:

During the pumping be careful that the end of the hose is submerged in the water properly. Never start a "dry" pumping, which could destroy the pump.

Caution:

Using the supply water with worse parameters than those described in this manual can reduce the service life of the

unit or limit the parameters guaranteed by the manufacturer considerably. It can cause a canceling of warranty by the manufacturer.

8.1.6 DISCHARGING THE USED WATER

During the operation used water is collected inside the sterilizer in the drain tank **16** and it must be discharged as follows:

- Put the loose end of the discharge hose, which is the standard equipment, to the tank destined for drain.
- Put the quick coupler of the discharge hose on the connector for discharging the drain water **13**. This connector is marked with "OUT". The used water starts to run out immediately. Maximum quantity of the water is 7 l. You can discharge the used water any time while the door **2** is open.

8.1.7 BY-PASSING OF THE LIQUID FROM THE STERILIZATION CHAMBER

If (during the program for solutions) an excessive amount of solution escapes from a vessel into the space of the sterilization chamber **1** (e.g. because of bottle bursting or boiling-up of the solution etc.), there will be such an amount of liquid accumulate in the sterilization chamber that the sterilizer forbids to open the door **2**.

In this case it is necessary to discharge the liquid from the sterilization chamber into the drain tank **16**. Proceed as follows:

- Remove the cover **17** of the drain tank **16** and, through its hole, draw the water by means of a small vessel so that the water level is at least 1 cm from the bottom of the drain tank **16**.
- Cover the drain tank **16** with the cover **17**.
- Start the same cycle, par. 8.3.3.
- After reaching the temperature of at least 100 °C in the sterilization chamber **1** break the cycle, chapter 8.4. You can also let the cycle run till the end, in that case the procedure is longer.
- After the automatic break open the door **2**, check the load, after removing the load event. clean the sterilization chamber **1**.
- As soon as possible, the chamber still being warm, start the program P5 Unwrapped instruments 134 with the sterilization chamber empty – the sterilizer will be cleaned out.

8.2 PREPARATION OF THE LOAD TO BE STERILIZED

When saturated water steam enters the chamber, condensation of the steam on the loaded goods takes place. Yet, a residual air and other non-condensable gases restrain an ideal transfer of thermal energy from the steam onto the goods being sterilized.

Removal of the mentioned gases and securing satisfactory drying of the sterilized load are very important. The sterilized material plays an important role in this case.

Decisive parameters co-acting during sterilization:

- Quantity of heat supplied into the sterilized load, i.e. the temperature rise, weight and specific heat of the loaded material.
- Flow resistance, i.e. the factor influencing the speed of air removal from the sterilizer load.
- Uneven distribution of moisture due to condensate dropping down during sterilization of massive items.

8.2.1 SOLUTIONS

Solutions shall be filled in vessels that can endure the sterilization temperature.

The vessels, bottles shall be open. The only exceptions are laboratory bottles SIMAX meeting the requirements of ISO 4796 with PP-stopper with a thread GL 45 and a pour-out ring, which can be closed during the sterilization.

Some solutions boil-up during the preparatory phase of the heating-up, therefore these solutions shall be filled only up to 60 % of the maximum bottle volume.

Insert the flexible sensor into the vessel with the solution whose temperature is at most the same as the temperature of other solutions in vessels sterilized together, so that it is at least by 20 mm submerged in the sterilized medium.

The sterilization exposure itself is started after reaching the sterilization temperature in the bottle. If the flexible sensor is not submerged in the solution properly, it will sense only the temperature of the sterilization medium and the temperature changes in the solution will be delayed behind values on the sensor, the sterilization will be insufficient and during the cooling phase after the sterilization exposure the solution temperature will be higher than the temperature on the sensor. The temperature in the reference bottle shall not be higher than the temperature in the load (e.g. exchanging the reference bottle or its content after each sterilization). The reference bottle is a bottle with the same volume and the same solution as the bottles to be sterilized. The reference bottle is not supplied with the sterilizer.

In case of sterilization in small bottles it is possible to use a bottle of a suitable larger volume as a reference bottle so that the temperature sensor can be inserted. The reference bottle shall be placed in the bottom part of the sterilization chamber (theoretically the coolest part).

The maximum amount of solution for one load is 6 l.

Caution:

When sterilizing solutions the flexible sensor shall be submerged in the reference bottle for the reasons of a perfect sterilization and for keeping the safety regulations when unloading the bottles with the solution.

8.2.2 DISH-SHAPED ITEMS

Turn the dish-shaped or spoon-shaped items with their mouth down. Distribute the dishes equally in the sterilization chamber. Do not insert the dishes one into another, because it is difficult to separate them after the sterilization because of the steam condensation. In any case do not insert pieces of textile between the dishes. Textile is a porous material unsuitable for sterilization in this sterilizer.

Before the sterilization the material shall be cleaned and dried in an appropriate way.

The recommended load of metal material is 7.5 kg.
Maximum mass of metal material for one load is 10 kg.

8.2.3 BOTTLES

Empty bottles are recommended to be sterilized with their bottoms up using the program with 121 °C. Otherwise the condensate accumulated during sterilization at the bottom of the empty bottle cools down very quickly during the drying in vacuum. Consequently a heavy heat stress arises in the glass, which could cause cracking of the bottle bottom. Never put a large surface of the bottle on a metal support. Before the sterilization the material shall be cleaned and dried in an appropriate way.

The recommended load of glass material is 7.5 kg. Maximum mass of glass material for one load is 10 kg.

8.2.4 INSTRUMENTS

When heating heavy instruments a large quantity of condensate arises on their surface, which is dropping down and humidifies the other goods being located in the lower part of the sterilization chamber. Therefore it is advantageous to locate heavy instruments on the lower dish or tray. The quantity of condensate is substantially dependent on the character and weight of the instrument itself.

Before the sterilization the material shall be cleaned and dried in an appropriate way.

The recommended load of metal material is 7.5 kg.
Maximum mass of metal material for one load is 10 kg.

8.2.5 MATERIAL TO BE DECONTAMINATED

With the decontamination cycle a slight boiling-up of solutions during the equalization of the operating overpressure of the saturated water steam to the atmospheric pressure after the sterilization exposure is supposed. Use flat dishes for collecting the run-over solution, fill the vessels for solutions to be decontaminated only up to 50 % of their volume.

We recommend to use a special decontamination vessel, which is supplied as an optional equipment (chapter 11.2).

8.2.6 LOADS OF SPECIAL MATERIAL

Vessels with covers or other containers without open outlets can get deformed due to the alternation of steam pressure and vacuum, or they can be non-sterile. Such objects are not suitable for steam sterilization.

8.3 DAILY PUTTING INTO OPERATION

Initial state:

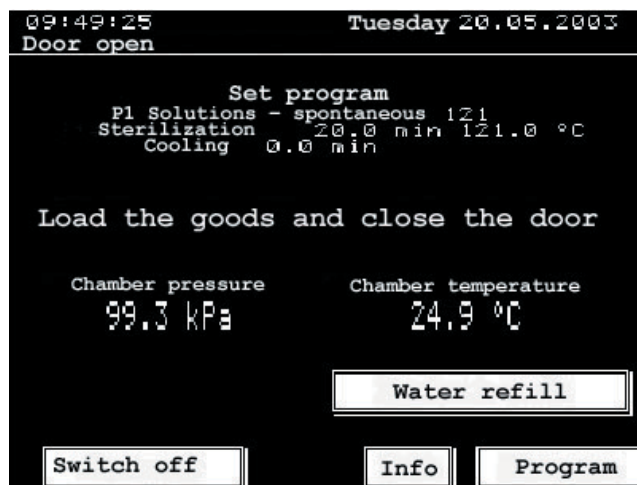
- Mains cord 25 is connected to the el. socket;
- Door 2 open;
- Stand-by mode;

The display 19 shows:



8.3.1 CHANGING TO THE OPERATING MODE

Touch the display 19 at any place. After entering the operating mode the display 19 shows:

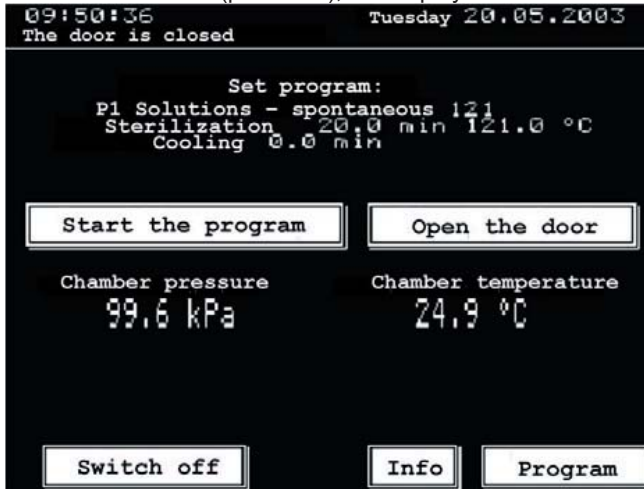


8.3.2 PREPARATION FOR STARTING THE CYCLE

Load the goods to be sterilized into the chamber 1 according to chapter 8.2.

8.3.3 STARTING THE CYCLE

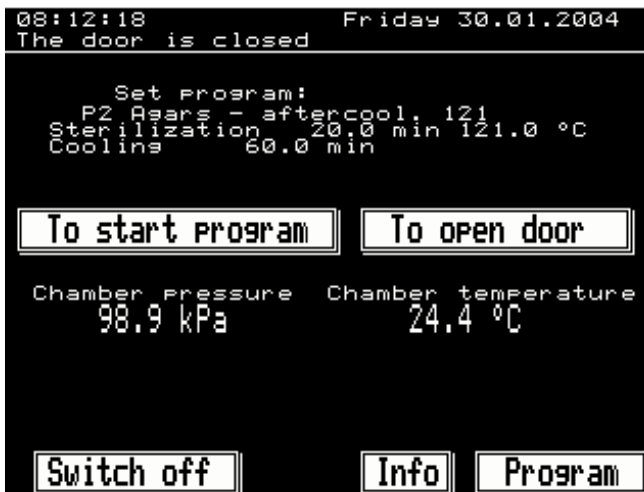
- Close the door 2 (par. 8.1.3), the display 19 shows:



- After touching the field "Program" the display 19 shows the list of programs, mark the required program by means of arrows:



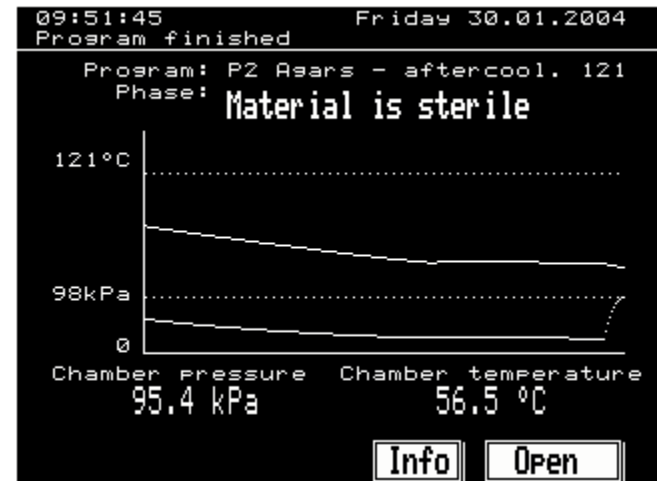
- Confirm the marking by touching the field "Confirm". Following data are shown:



- Start the selected program by touching the field „Program start“. Data on the running program are shown on the display.



- After the end of the program information on the program performance is shown on the display. Touching the right or left side of the described chart it is possible to shift with it:



- You can open the door and unload the sterilized material.

8.4 PROGRAM BREAK

If it is necessary to break the program for any reason, it could be done any time during the sterilization cycle. The break is protected by a code and is carried out in following way:

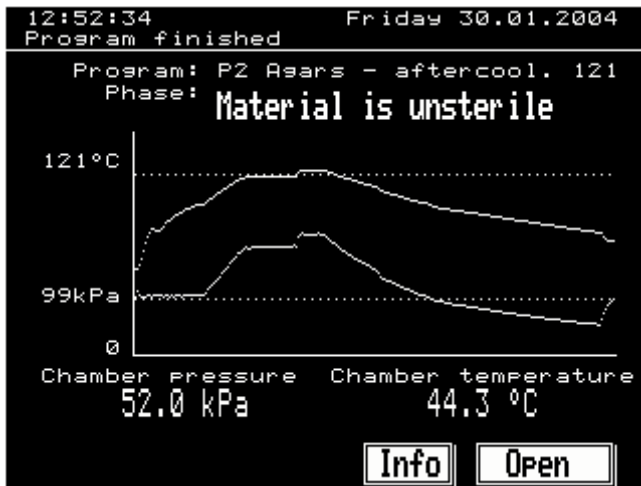
- Activate the field "Break" by touching it. The display 19 shows:



- Enter the number code by means of the numerical keyboard. In case the code entering is not started within ca. 10 sec, the menu is canceled automatically. There is a code: 0 preset in the sterilizer. After entering the right code confirm it by touching the field ↵. The program is broken. Further operation is performed automatically.
- The code can be changed in the service program according to par. 8.6.6.

After breaking the operating cycle the load cools down to the safe temperature for opening the sterilization chamber door and the chamber pressure is equalized with the atmospheric pressure.

After the end of the interruption the display 19 shows:



Then the door 2 can be opened and the chamber 1 unloaded.

Warning:

In this case the load cannot be considered sterile.

8.5 CONNECTION TO PC AND PRINTER

A PC or a printer can be connected to the sterilizer, by means of which

- protocol
- protocol with graphical record of pressure and temperature course

- protocol with digital record of pressure and temperature course can be printed.

The printer has its own Operating instructions, which shall be studied properly before using the device.

The connector **23** for connecting the PC or printer is placed in the rear wall of the sterilizer.

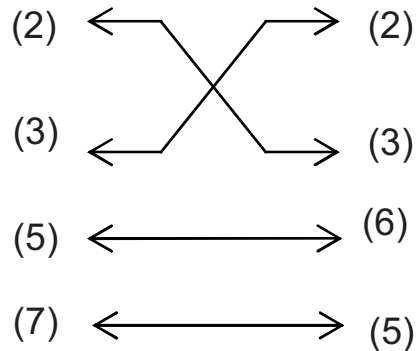
Select the type of printing by means of the program **P11 Service** according to par. 8.6.8.

Some printout samples see chapter 17.2.

The sterilizer supports the print to Megatron DPT-6333 printer in a Printer Archives or Procedures Documentation programmes. The communication interface RS232 of 9600Bd, 8 bits, no parity, and RTS/CTS flow control are used for all cases.

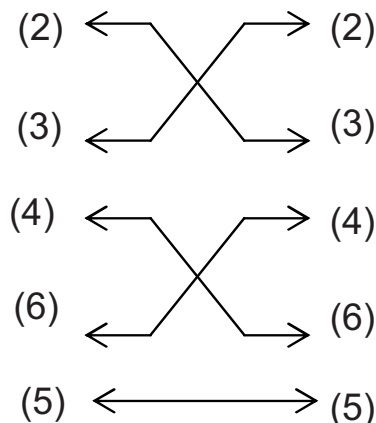
Connection of the print cable to the printer:

Canon-25M x Canon-9F



Connection of the print cable to PC

Canon-9F x Canon-9F



8.6 FUNCTION, SERVICES AND SETTING THE PROGRAM P11 SERVICE

To understand the communication with the sterilizer by means of the touch-display **19** study the sterilizer operating described in chapters 8.1 and 8.3.

After selecting the program P11 Service (the same procedure as in par. 8.3.3) following data are shown on the display **19**:



By means of the arrows select the appropriate service function, service or setting. Confirm the selection by touching the field “Confirm”.

8.6.1 EXTENDED SERVICE SETTINGS

These service settings can be activated only by an authorized person.

8.6.2 LANGUAGE VERSION

This service serves for selecting the language for communication with the sterilizer. After selection and confirmation “Language version” the screen with language menu is displayed. Mark the selected language by means of the arrows and confirm by touching the field “Confirm”. The language is changed immediately. End of the program and return to the basic program P11 Service are performed by touching the field “Back”.

8.6.3 DATE AND TIME

This service enables to set the actual time and date. After selection and confirmation “Date and time” the data on date and time together with numerical keyboard are shown on the display. Touch the number you wish to change, the number becomes active, and then enter a new number by means of the keyboard, then confirm the selection by touching ↵. End of the program and return to the basic program P11 Service are performed by touching the field “Back”.

8.6.4 DISPLAY CONTRAST

This service enables to set the contrast of the touch-display. After selection and confirmation “Display contrast” the contrast shown in percents can be changed by means of the arrows. Store the set contrast by means of the field

“Confirm”. Then the return to the basic program P11 Service follows automatically. If the contrast is not changed or the setting confirmed within 5 sec, the contrast will be set to the initial value and the return to the basic program P11 Service is performed.

The display contrast can also be changed without selecting the function “Display contrast”, i.e. with any display. If you wish to increase the contrast, touch two places at the same time – the upper right corner and the middle part under the upper display side. If you wish to reduce the contrast, touch the upper left corner and the middle part under the upper display side.

8.6.5 DISPLAY DEPOLARIZATION

This service enables to “clean” the display of undesirable images. After the activation of this service the data on the display are erased and then shown on the display again. The menu of the basic program P11 Service is shown at the same time.

8.6.6 BREAK CODE

This service enables to change the code that is required for program breaking. The code is entered by means of the numerical keyboard and confirmed with the field ↵. Return to the basic program P11 Service is performed at the same time. A 1- to 6-digit-code can be entered.

8.6.7 RECORDING THE DATA TO PC

At present the data recording to PC is being prepared.

8.6.8 PRINTING MODE

This service enables to select the required form of the document (protocol) printed with the connected printer or the program PrinterArchiv, which is an independent product. The time interval of printing the record of the pressure and temperature course is 10 sec. Various forms of the printout are shown in chapter 8.5.

After confirming this service a menu is displayed, by means of which, after selecting and confirming, following functions can be selected:

- „Automatic protocol printing “ – a protocol is printed automatically after the program end with the following preset directives. For printing from the service mode see par. 8.6.9;
- “Print graph” – printout of protocol with graphical record of pressure and temperature course;
- “Print values” - printout of protocol with digital record of pressure and temperature course;
- Text Output – text data format for the PrinterArchiver and Procedures Documentation software; not intended for a printer.

Return to the menu of the program P11 Service is performed by touching the field “Back”.

8.6.9 PRINTING THE LATEST PROTOCOL

This service enables an additional printout of the latest program protocol, where the selections “Print graph” and “Print values” are used, see par. 8.6.8.

8.6.10 AUTOMATIC START OF A CYCLE

This service enables to start the selected program at a certain moment, event. to repeat it every day or week. There shall be the sufficient supply of water in the sterilizer, see par. 8.1.5. Load the material to be sterilized and close the door of the sterilization chamber. After the activation "Automatic start" the program menu and time selection function are shown. Select the program with arrows and confirm it first and then select the time selection function with arrows and confirm it again. Enter the time of the program start in the same way as described in par. 8.6.3. Select the way of repeating the program through the field with the variable text "Once", "Once a week" and "Daily".

8.6.11 AUTOMATIC DOOR OPENING

After the activation by touching the field "Confirm" "Automatic door opening" the door lock is released automatically after the end of the program. By means of the field "Confirm" also the reverse function is carried out, i.e. door opening is forbidden.

8.6.12 UNINTERRUPTED PREHEATING

After the activation by touching the field "Confirm" "Uninterrupted preheating" the sterilizer is being preheated in the operating mode for an unlimited time. In case this function is not activated, the sterilizer will be preheated for 1 hour, then it gets in the stand-by mode automatically.

8.6.13 AUTOMATIC WATERING

After the activation by touching the field "Confirm" "Automatic watering" an automatic process is started that secures a perfect watering of steam generator pump. There shall be no material to be sterilized placed in the sterilization chamber and the sterilization chamber door shall be closed. This process shall be performed when putting the sterilizer into operation with the internal tank of supply water being filled.

8.6.14 AUTOMATIC DEWATERING

When activating "Automatic dewatering" by touching the field "Confirm", an automatic process that ensures the water discharge from the steam generator and from the piping is started. Before starting this operation the internal tank of supply water shall be emptied completely by means of the discharge hose and the connector **14** (see fig. in chapter 5.1). The used water shall be discharged from the drain tank **16** (par. 8.1.6).

There shall be no material to be sterilized placed in the sterilization chamber and the sterilization chamber door shall be closed. After the end of this automatic operation unscrew the plug of the inner pipe of the heat exchanger **21** and let the liquid flow out. Then screw the plug again. This procedure is recommended in case of a long-term putting the sterilizer out of operation or before transporting it. In case of danger of exposing the sterilizer to an ambient temperature lower than 0 °C also the water from the steam generator shall be discharged by an authorized person.

8.6.15 CHANGE OF PROGRAM PARAMETERS

The programs, the sterilization temperature and time of which can be changed, are listed in chapter 6. After the activation of this service the menu with all programs is shown. Select the program by means of arrows and confirm it. Step by step, according to sterilizer's commands, set the sterilization exposure time through the keyboard (enter the figures as in par. 8.6.3), confirm this value by means of ↵, then set the sterilization exposure temperature (enter the figure as in par. 8.6.3) and confirm it by means of ↵ again. Then mark the last line "Store settings" by means of the arrows and confirm by touching "Confirm". The sterilizer switches off the display illumination for a while and within 2 sec it is ready to start the work again.

8.6.16 RECORDING A PROGRAM TO A CHIP CARD

After the activation by touching "Confirm" "Recording program to card" select the program to be recorded to a chip card by means of arrows. Then insert the chip card into the chip card reader opening **22** with the chip turned down and confirm by touching "Confirm". If the process of data transfer from the sterilizer to the chip card is OK, a simple acoustic signal is heard after ca. 6 sec. If the data transfer is not OK (e.g. because of inserting the chip card not properly), a varying acoustic signal is heard. After finishing the data transfer remove the card from the opening. By touching the field "Back" you get to the menu "General service settings".

8.6.17 RESTORING A PROGRAM FROM A CHIP CARD

After the activation by touching "Confirm" "Restoring program from card" select one of the program positions P01 to P10 you wish to record the new program to. Then insert the chip card into the chip card reader opening **22** with the chip turned down and confirm by touching "Confirm". If the process of data transfer from the chip card to the sterilizer is OK, a simple acoustic signal is heard after ca. 2 sec. If the data transfer from the chip card to the sterilizer is not OK (e.g. because of inserting the chip card not properly), a varying acoustic signal is heard. After finishing the data transfer remove the card from the opening. Then mark the last line "Store settings" by means of the arrows and confirm by touching "Confirm". After switching on the illumination of the display **20** touch the field "Back" and get to the menu "General service settings".

8.6.18 AIR DETECTOR

It is not active in this sterilizer.

8.6.19 SILENT REGIMEN

This option switches off all acoustic signals.

8.7 INFORMATION

The display of information can be activated by touching the field "Info" on the touch-display **19**.

8.7.1 NUMBER OF CYCLES

Shows the number of all started programs.

8.7.2 JACKET TEMPERATURE

Shows the temperature of the sterilization chamber heating jacket in and the cooling-down circuit in °C. The heating jacket temperature is shown on the left and the cooling-down circuit temperature on the right.

8.7.3 CHAMBER TEMPERATURE

Shows the temperature in the sterilization chamber in °C. 2 or 4 values are displayed, if the program with the flexible sensor is selected. The upper ones are Mst temperatures – check and the lower ones are Slv temperatures – regulation. The temperatures of the fix sensor are on the left, on the right there are the temperatures of the flexible sensor, provided the respective program is selected.

8.7.4 CHAMBER PRESSURE

Shows the absolute pressure in the sterilization chamber in kPa. The upper one is the Mst pressure – check and the lower one is the Slv pressure – regulation.

8.7.5 STEAM GENERATOR WATER LEVEL

If there is water enough in the steam generator, „OK“ is indicated, otherwise „Refill“.

8.7.6 STEAM GENERATOR PRESSURE

If „No pressure“ is indicated, there is not the full pressure in the steam generator. If „Under pressure“ is indicated, there is the full pressure in the steam generator.

8.7.7 SUPPLY TANK

If there is water enough in the supply tank, „OK“ is indicated, otherwise „Refill“.

8.7.8 DRAIN TANK

If it is not necessary to discharge the drain water, „OK“ is indicated, otherwise „Full“.

8.7.9 BATTERY

The spare battery voltage is displayed. The minimum voltage, at which the warning report starts to be shown, is 2.7 V. In this case have the battery exchanged by an authorized person. Otherwise in case of a fall out loss or disconnecting from mains the information on the last sterilizer condition, the user's setting and the charge counter can get lost, or, in case a sterilization cycle is running, this cycle can be broken.

8.7.10 SERIAL NUMBER

The serial number of the sterilizer is displayed.

8.7.11 SERVICE INSPECTION

Shows the date in YY-MM-DD format and the number of batches after which the next service inspection must be carried out.

9 OPERATION FAILURES

The description of chapter 5.2 Indicating and operating elements is used in this chapter.

9.1 TECHNICAL SAFETY DEVICES

9.1.1 ERROR MESSAGES

In case of a failure the information on the failure condition and menu for approval of further operation of the sterilizer is shown on the display 19, an acoustic signal is heard and the display shows:



It is necessary to activate the field “Take cognizance” by touching it, then the numerical keyboard is displayed for entering the code. After entering the right code and its approval by touching the field ↵ the program is interrupted automatically.

The procedure is identical with the break of a running program by touching the field “Break” and subsequent entering the code.

In most cases the cause of the failure shall be removed by an authorized person.

Caution :

In this case the load shall not be considered sterile.

9.2 ELECTRIC ENERGY OUTAGE

If a short-time outage of electric energy occurs during the sterilization cycle and no surpassing of the observed parameters takes place, the sterilization cycle continues automatically after the restoration of the electric power supply. The automatics tests the keeping of all observed parameters. In case of a longer outage of electric energy an error is reported after restoration of electric power supply.

Caution:

In case of a longer outage of electric energy, when the sterilization parameters are not kept, the load shall not be considered sterile.

10 MAINTENANCE, CLEANING AND ATTENDANCE

The description of chapter 5.2 Indicating and operating elements is used in this chapter.

10.1 CLEANING

Disconnect the unit from the source of electric energy before cleaning. Clean the unit only in cold state.

Following parts of the sterilizer are to be cleaned:

- Sterilization chamber **1**;
- Sterilization chamber drain screen **5**;
- Functional surface of the door plate **2**;
- External covers of the sterilizer;
- Drain tank cover **17**;
- Drain tank **16**;
- Touch display **19**;
- Piping:

10.1.1 CLEANING THE STERILIZATION CHAMBER

Use non-aggressive cleaning agents for chromium or stainless steel without abrasive additives, that cannot cause a damage to the inner surface of the sterilization chamber (Ultrapur).

Check whether some residues of the cleaning agent did not remain behind the door sealing flap **4**.

There is a drain screen **5** inserted in the drain neck in the bottom part of the chamber (chapter 5.2). Slide this screen carefully upwards, wipe the dirt around the neck with a cloth carefully, so that it does not get in the drain hole. Wash the screen with a water stream. After cleaning the chamber slide the screen in the drain neck hole up to the stop.

Clean once in two weeks.

10.1.2 CLEANING THE DOOR PLATE

For cleaning of the functional door plate **2** use non-aggressive cleaning agents for chromium or stainless steel without abrasive additives, that cannot cause a damage to the surface of the door plate (Ultrapur). Clean once in two weeks.

10.1.3 CLEANING THE COVERS AND THE DISPLAY

For cleaning of stainless covers round the door plate and the rear cover of the sterilizer use non-aggressive cleaning agents for chromium or stainless steel without abrasive additives, that cannot cause a damage to the surface of the covers (Ultrapur). Wash the side and the upper cover with wet cloth with detergent without abrasive additives. Clean the display with cleaning agents for monitor screens or TV screens. Do not use water! If the water gets into the space behind the display there is a danger of functional damage to the electronic unit!

Clean once in two weeks.

10.1.4 CLEANING THE DRAIN TANK

After lifting off the cover **17** the drain tank **16** space can be seen. Wipe its walls with a cloth, in order to remove deposits. Finally wash the walls with drinking water and discharge the water into the drain (par. 8.1.6). Clean once a month.

10.1.5 CLEANING THE PIPING

When sterilizing solutions some impurities of boiled-up and evaporated solutions can deposit in the piping. Have the specified aggregates of the piping cleaned by an authorized person once a year.

Caution:

For cleaning the sterilizer no aggressive agents may be used. In case of any maintenance and cleaning the unit must be disconnected from the electric power supply!

10.2 SERVICE INSPECTIONS AND MAINTENANCE

For the reason of long service life and high operational reliability of the sterilizer we recommend to follow all cleaning and maintenance instructions.

It is necessary to carry out repeated inspections and to secure the operation ability of all safety devices. For the reason of operational safety, functional reliability and economy the keeper should have the sterilizer inspected by an authorized person once a year. The keeper receives a written report with the inspection results.



Caution:

The sterilizer is provided with parts that, after disconnecting from mains, set themselves into the position that makes the measurement of the isolation resistance of the whole device impossible.



Caution:

The sterilizer contains parts that could be damaged or destroyed when applying the direct-current voltage of 500 V.

10.2.1 WATER QUALITY

There is distilled water or water treated by demineralization or reverse osmosis required for the purposes of steam generating for steam sterilization. Check the water quality every month.

Evaluation of the water quality see data in chapter 12.1

10.2.2 HALF-YEAR INSPECTION

Once in a half-year the operator performs following procedures:

- visual check of the door sealing **4**, in case of a mechanical damage replacing by a new one
- exchange of the aeration antibacterial filter **15**.

10.2.3 ANNUAL INSPECTION

For the reason of operational safety, functional reliability and economy have the sterilizer inspected by an authorized person. A trouble-free operation depends considerably on

the state of all sensors, whose calibration shall be carried out every year.

During this inspection the automatic lock of the sterilization chamber is inspected from the viewpoint of the functional threads wear and of further fail-safe operation, all worn parts will be replaced by new ones, the lock function will be tested event. the lock adjusted.

The tightness of the tubing, state of hoses and screw joints shall be checked too. There shall be carried out the cleaning of the specified aggregates of the piping (heat exchanger 21).

Tipped units of pipe connections must be cleaned (heat exchanger 21) and pressure surge damper must be sludged.

Check valve control

In case of a control, or replacement of the check valve 18, please, proceed according to the local regulations.

The manufacturer recommends this control procedure:

Once a year, please, perform the retest of functionality of the check valve 18 of the sterilization chamber and the steam generator, which is accessible at the rear part of the sterilizer. The retest may be performed by the authorized person, or a person trained according to the appropriate local regulations.

During the control of the check valve 18 of the sterilization chamber and the generator, please, proceed as follows:

Put the sterilizer into the operation mode, see Art. 8.1.2.

Within 10 minutes after switching the sterilizer on, the steam generator has been pressurized. After expiration of this period, please, disconnect the sterilized from the electric network by unplugging the supply cable 25 from the electric socket. Rotate with the ring of the check valve 18 anticlockwise (with your hand protected with a glove against burning) so long as the valve spring will be lifted.

If the check valve is functional, the steam must start to blow off through it. Subsequently, please, rotate the ring into the original position so as to close the valve. Within this retest, please, observe the increased cautiousness! Steam starts to escape immediately and relatively steeply.

Electric parts revision

- Inspection of the electrical installation, especially the lead, terminal connections and protective terminal. It is checked the integrity of the conductor insulation (e.g. due to wearing through, burning etc.) and the firm connection of conductors in terminals.
- Protective connection resistance is $R < 0.1$ ohm. The lead resistance is not counted.



Caution:

After the lapse of one year or after the seven hundredth cycle since the last inspection the unit shows the warning "Service inspection" after the switching-on.

10.2.4 BATTERY EXCHANGE

The sterilizer is provided with a spare battery CR 2430 that shall be exchanged once in two years. The exchange will be carried out by an authorized person during the annual inspections.



Caution:

If the mains cord 25 is disconnected from energy supply, the durability of the spare battery becomes shorter.

10.3 REPAIRS

In case of occurrence of some failures or damage to the electric device, the pressure vessel or connected safety devices, the steam sterilizer must be put out of operation immediately and this fact must be reported to the head of the appropriate department or service.

For the repairs only original or by manufacturer approved spare parts may be used.

Hoses and their screw joints shall be taken only from the sterilizer manufacturer as spare parts and their mounting shall be carried out only by an authorized person.

The repairs and maintenance of the electric devices, pressure vessel or connected safety devices shall be carried out only by an authorized person.

10.4 REPORT INTO AN OPERATING BOOK OF A SANITARY INSTRUMENT

The authorized person makes a record into an operating book of a sanitary instrument:

- After installing the apparatus to the extent specified by the operating book of the sanitary instrument
- In the six month and annual inspections
- In case of changes in the apparatus
- In case of defects of the sterilizer.

11 ADDITIONAL MATERIAL AND CONSUMABLE ITEMS

The material can be ordered by means of the listed order codes.

11.1 MATERIAL SUPPLIED WITH THE DEVICE (STANDARD)

Materiál	Designation	Number of pieces
Base of the sterilization chamber built-in piece	V026885	1
Sterilization chamber built-in piece	0338075	4
Dish perforated 440 × 216 × 15	V028420	3
Unloading holder	S467465	1
Discharge hose	S461322	1
Pumping hose	S461323	1

11.2 ADDITIONAL MATERIAL (ADDITIVE)

Additional material	Designation	Number of pieces recommended
Chip card	0488061	
Air detector	R468559	1
Thermoprinter DPT-6333-V.24-WOPS	0338415	1
Source DSV-6333	0338417	1
Cable DKA-278	0338416	1
Thermopaper DPA-048-TR1	0721129	
Antibacterial filter	0755101	
Laboratory bottle 1000 ml, ISO 4796, PP- threaded stop GL 45		
Laboratory bottle 750 ml, ISO 4796, PP- threaded stop GL 45		
Laboratory bottle 500 ml, ISO 4796, PP- threaded stop GL 45		
Laboratory bottle 250 ml, ISO 4796, PP- threaded stop GL 45		

11.3 USE OF THE STERILIZATION CHAMBER SPACE

The optimum layout of the goods in the sterilization chamber is enabled by rearranging and inserting of dishes of various sizes (completely 3 pc in the standard equipment).

Possible combinations of filling the sterilization chamber:

- Standard equipment: base of the sterilization chamber built-in piece (1 pc) + Sterilization chamber built-in piece (1 pc)+ dish 440 x 216 x 15 (3 pcs);
- Base of the built-in piece (1 pc) with material;
- Decontamination container.

12 REQUIREMENTS ON OPERATING MEDIA

12.1 SUPPLY WATER

There is a distilled water (or fully demineralized water or water treated by reverse osmosis) required for the steam generating.

Recommendation:

We recommend to use only the distilled water because it usually contains a lower amount of non-condensable gases than the treated water usually does.

Recommended values for supply water are given below:

Additives	Condensate (steam)	Supply water (steam generator)
Residues after evaporation	≤ 1,0 mg/kg	≤ 10 mg/l
Silicium SiO ₂	≤ 0,1 mg/kg	≤ 1 mg/l
Ferrum	≤ 0,1 mg/kg	≤ 0,2 mg/l
Cadmium	≤ 0,005 mg/kg	≤ 0,005 mg/l
Plumbum	≤ 0,05 mg/kg	≤ 0,05 mg/l
Heavy metals besides ferrum, cadmium, plumbum	≤ 0,1 mg/kg	≤ 0,1 mg/l
Chlorides	≤ 0,1 mg/kg	≤ 2 mg/l
Phosphates	≤ 0,1 mg/kg	≤ 0,5 mg/l
Specific conductivity at 20 °C	≤ 3 µS/cm	≤ 15 µS/cm
PH value	5 až 7	5 až 7
Colour	colourless clear without sludges	colourless clear without sludges
Hardness	≤ 0,02 mmol/l	≤ 0,02 mmol/l

Caution:

Using the supply water with worse parameters than those described in this manual can reduce the service life of the unit or limit the parameters guaranteed by the manufacturer. It can cause a canceling of warranty by manufacturer.

12.2 ELECTRIC CONNECTION

The sterilizer requires only electric energy supply. The electric connection shall be checked before connecting the unit. The connection shall have the nominal voltage of 230 V, a protective wire and be dimensioned for 16 A. Connecting of the sterilizer to the mains is performed by plugging the mains cord plug **25** in the mains socket.

Caution:

The mains cord plug must be within the reach of the operator for the purpose of eventual emergency disconnecting the unit from the mains.

Recommendation:

We recommend to keep the mains cord connected to the mains, even if the sterilizer is not running, otherwise the spare battery is being discharged and its durability becomes shorter.

13 TRANSPORT AND STORAGE

13.1 TRANSPORT

- Discharge the sterilizer's fillings – the used water according to par. 8.1.6 and the distilled water by means of the discharge hose and the connector for discharging the distilled water 14.
- Start the automatic dewatering according to par. 8.6.14. The water from the sterilizer internal interconnection shall be pumped into the drain tank.
- Discharge the water from the drain tank according to par. 8.1.6.

- Disconnect the sterilizer from mains.
- The sterilizer is transported in vertical position by catching it by the bottom edges.

Caution:

Carrying the sterilizer by the bottom edge of the plastic cover is prohibited! The sterilizer may be transported only with empty supply tanks!

- Transport the sterilizer in the original package.

13.2 STORAGE

Before the storage an authorized person discharges the supply tanks and the piping of the sterilizer.

The sterilizer shall be put in its original package. The storage temperature shall not drop below 4 °C.

14 LIQUIDATION

14.1 PACKAGE

The package is made of wood, cardboard, paper and plastics.

- Wood - hand over to incinerating plant;
- Paper - hand over to recycling;
- Plastics - hand over to liquidation.

14.2 UNIT

The unit consists of 80 % steel, 5 % electric material, 10 % plastics and 5 % other materials. An ecological liquidation of the disassembled unit shall be carried out by an authorized person.

In case of the sterilizer liquidation it is necessary to preferably disassembly:

- battery;
- printed connections;
- image-forming display;
- electric supply cable;




Caution:

For member states of the European Union:

- A. Product, which the user stops using and which becomes for the user a useless and which is



marked with a label . The user shuts down it and notifies, in case of the Czech Republic, the manufacturer, in case of other member states of EU, the dealer. The mentioned product is not possible to be disposed to municipal refuse and it is a subject to a mode in accordance with local regulations on disposal of electric and electronic equipment, which conform to WEEE (Waste Electric and Electronic Equipment) Directive as amended. The dealer (in the Czech Republic it is the manufacturer) ensures necessary acts in accordance with the requirements of the local valid legislation in the field of waste (in the Czech Republic the law on waste No. 185/2001 Coll., as amended, and in accordance in the purchase agreement).

B. Technical requirements for storage and treatment of electric waste, which is performed by the processor of the product or of its part as the electric waste:

- 1) Place for collection and storage of electric waste is equipped with:
Hard surface, which is impermeable against the leakage of dangerous substances, cleaning aids, substances for absorption of leaked operating liquids, collecting means for incurred waste, device for dislocation of electric waste, in an appropriate way in terms of health and safety protection at work.
- 2) Place for treatment of electric waste is equipped with:
Appropriate equipment for determining the weight of the treated electric waste, hard surface, which is impermeable against the leakage of dangerous substances, appropriate containers for storage of incurred waste, appropriate storage space for disassembled construction units and parts.

Treatment of electric waste:

To group the removed and disassembled parts of the electric waste in accordance with the requirements


- of the local valid legislation in the field of waste.
- Position of the subject parts in the respective products are described in the Direction for use of the product. To apply only the technologies destined for treatment of electric waste, which ensure that it does not happen to a leakage of substances endangering the environment.

Preferentially demount from the waste:

- batteries and accumulators,
 - Printed connections of area larger than 10 cm²,
 - all the other liquids – especially oils,
 - Discharge lamps and fluorescent tubes – if they are a part of the lighting,
 - displays from fluid crystals in area larger than 100 cm²,
 - External electric cables.
- Parts, components and materials preferentially demounted from the electric waste according to the description to use or dispose in accordance with special legal regulations – local valid legislation in the field of waste.

For the countries outside of the European Union:



The mentioned-above described symbol  For proper disposal of electric and electronic equipment, please, ask for detailed information at your authorities or at the dealer of the device.

15 REGULATIONS AND STANDARDS

From the viewpoint of requirements on design and manufacturing of electrical appliances and pressure vessels this sterilizer fulfills all legal regulations, harmonized standards and recognized rules (see EU Conformity declaration that is an inseparable part of the documentation supplied along with each device) and is provided with all necessary safety, check and operation mechanisms.

16 GUARANTEE, SERVICE, AND OPERATING LIFE OF THE DEVICE

The guarantee period is indicated in the Certificate of Guarantee. The guarantee shall apply to the defects of material or workmanship under the conditions that:

- The product was installed and used in accordance with the Operating Instructions;
- The defect was not caused by incorrect maintenance, unqualified intervention into the device, or damage by external influences.

The guarantee shall not be applied to the natural wear and tear of the material and to the consumables, e.g. the door seal, materials for recording equipment, accumulators, etc.).

If a defect occurs, claim your right for a guarantee repair at the nearest service centre of MMM. Specify the name and type of the device, its production number and manifestation of the defect (error message, printer output).

If you meet the guarantee conditions, the service centre will, in its discretion, either repair the device or replace the defective part free of charge.

MMM guarantees that all technical documents and spare parts will be available for the period of 10 years from the introduction of the device to the market and a safe and functional operation of the device will thus be ensured for the said period.

After termination of the said period, MMM will be able to ensure a safe and functional operation of the device only upon a further contractual agreement.

In accordance with the EU Directive no. 85/374/EEC (the law no. 59/1998 Sb. in the Czech Republic), MMM shall be responsible for any potential damage caused by a defect of the device for the period of 10 years from the introduction of the device to the market.

17 SUPPLEMENT 1

17.1 LIST OF ERROR MESSAGES

17.1.1 WARNING MESSAGES

Warning: Mst – 11 – XXX* – XXX*
Low battery

Cause	Removal by	Action to perform
Spare battery discharged	Service	Battery exchange

Warning: Mst – 13 – XXX* – XXX*
Printer not respond

Cause	Removal by	Action to perform
Printer not connected	Operator	Connect the printer and set in on-line state or cancel the protocol printing

Warning: Mst – 19 – XXX* – XXX*
Faulty process

Cause	Removal by	Action to perform
The lately started process is unsatisfactory	Operator	New cycle to be performed

Warning: Mst – 20 – XXX* – XXX*
Service inspection

Cause	Removal by	Action to perform
One year or 700 cycles since the last service inspection	Service	Sterilizer inspection

Warning: Slv – 01 – XXX* – XXX*
Door error

Cause	Removal by	Action to perform
Specified underpressure cannot be achieved	Service	Check the switch B17, valves, piping, the cooler
Door cannot be closed	Service	Check the limit switches and door drive
Door cannot be opened	Service	Check the limit switches and door drive

Warning: Slv – 03 – XXX* – XXX*
Error watering

Cause	Removal by	Action to perform
Max. water level in the inner tank not achieved	Operator	Continue the operation, prepare 7 l of distilled water for further refilling
Water cannot be refilled	Service	Check the pump, piping

Warning: Slv – 04 – XXX* – XXX*
Low water level

Cause	Removal by	Action to perform
Water level in the inner tank below the min. level	Operator	Refill the supply water according to par. 8.1.5

Warning: Slv – 21 – XXX* – XXX*
Full drain tank

Cause	Removal by	Action to perform
Drain tank is full	Operator	Discharge the used water according to par. 8.1.6

Warning: Slv – 05 – XXX* – XXX*
Chamber flooded

Cause	Removal by	Action to perform
Excessive amount of liquid in the sterilization chamber	Operator	See par. 8.1.7

17.1.2 FAILURE MESSAGES

Error: Mst – 01 – XXX* – XXX* Unexpected step

Cause	Removal by	Action to perform
Automatics error	Operator	Start the cycle again
Non-standard course of sterilization cycle phase	Service	Check the process

Error: Mst – 02 – XXX* – XXX* Too short phase

Cause	Removal by	Action to perform
Automatics error	Operator	Start the cycle again
Non-standard course of sterilization cycle phase	Service	Check the process

Error: Mst – 03 – XXX* – XXX* Too long phase

Cause	Removal by	Action to perform
Automatics error	Operator	Start the cycle again
Non-standard course of sterilization cycle phase	Service	Check the process
Valve, heating or vacuum pump fault	Service	Check the valves, heating and vacuum pump

Error: Mst – 04 – XXX* – XXX* Low temperature

Cause	Removal by	Action to perform
Untightness	Operator	Perform the vacuum test. Start the cycle again
Air in the chamber	Service	Remove the untightness
Incorrect setting of sterilization cycle parameters	Service	Check the parameters
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Mst – 05 – XXX* – XXX* High temperature

Cause	Removal by	Action to perform
Untightness of the valve Y07	Service	Check, replace the valve
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Mst – 06 – XXX* – XXX* Power cut

Cause	Removal by	Action to perform
Fall-out of power supply during the operation	Operator	Start the cycle again

Error: Mst – 07 – XXX* – XXX* PT12 Disconnected

Cause	Removal by	Action to perform
Disconnected wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Mst – 08 – XXX* – XXX* PT12 Short-circuit

Cause	Removal by	Action to perform
Short-circuited wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Mst – 09 – XXX* – XXX* PE12 Disconnected

Cause	Removal by	Action to perform
Disconnected wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Mst – 10 – XXX* – XXX* PE12 Short-circuit

Cause	Removal by	Action to perform
Short-circuited wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Mst – 12 – XXX* – XXX* Slv – no response

Cause	Removal by	Action to perform
Automatics error	Operator	Wait for 10 s, start the cycle

Error: Mst – 14 – XXX* – XXX* PT32 Disconnected

Cause	Removal by	Action to perform
Disconnected wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Mst – 15 – XXX* – XXX* PT32 Short-circuit

Cause	Removal by	Action to perform
Short-circuited wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Mst – 16 – XXX* – XXX*
IIC communication error

Cause	Removal by	Action to perform
Communication error	Service	Check;
Chip card inserted not properly	Operator	See par. 8.6.16 and 8.6.17
Wrong chip card	Operator	See par. 8.6.16 and 8.6.17

Error: Mst – 17 – XXX* – XXX*
Faulty calibrations

Cause	Removal by	Action to perform
The program cannot be started because of a faulty calibration	Service	Sterilizer calibration

Error: Mst – 18 – XXX* – XXX*
Faulty program

Cause	Removal by	Action to perform
The program cannot be started because a faulty program has been selected	Operator	Select the program
The program cannot be started because a faulty program has been selected	Service	Program download

Error: Slv – 02 – XXX* – XXX*
Door unblocked

Cause	Removal by	Action to perform
The safety device registered improper closing of the door	Service	Adjust the door switches

Error: Slv – 06 – XXX* – XXX*
Generator interrupted

Cause	Removal by	Action to perform
Pump fault	Service	Check the pump

Error: Slv – 08 – XXX* – XXX*
Low temperature

Cause	Removal by	Action to perform
Air in the chamber	Service	Remove the untightness
Incorrect setting of sterilization cycle parameters	Service	Check the parameters
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Slv – 09 – XXX* – XXX*
High temperature

Cause	Removal by	Action to perform
Untightness of the valve Y07	Service	Check, exchange the valve
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Slv – 10 – XXX* – XXX*
PT11 Disconnected

Cause	Removal by	Action to perform
Disconnected wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Slv – 11 – XXX* – XXX*
PT11 Short-circuit

Cause	Removal by	Action to perform
Short-circuited wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Slv – 12 – XXX* – XXX*
PT31 Disconnected

Cause	Removal by	Action to perform
Disconnected wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Slv – 13 – XXX* – XXX*
PT31 Short-circuit

Cause	Removal by	Action to perform
Short-circuited wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Slv – 14 – XXX* – XXX*
PE11 Disconnected

Cause	Removal by	Action to perform
Disconnected wire of the temperature sensor	Service	Check, replace the sensor.
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration.

Error: Slv – 15 – XXX* – XXX*
PE11 Short-circuit

Cause	Removal by	Action to perform
Short-circuited wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

Error: Slv – 16 – XXX* – XXX*
PT21 Disconnected

Cause	Removal by	Action to perform
Disconnected wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

**Error: Slv – 17 – XXX* – XXX*
PT21 Short-circuit**

Cause	Removal by	Action to perform
Short-circuited wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

**Error: Slv – 18 – XXX* – XXX*
Error 24V**

Cause	Removal by	Action to perform
24V not connected	Service	Check the power supply board

**Error: Slv – 19 – XXX* – XXX*
PT41 Disconnected**

Cause	Removal by	Action to perform
Disconnected wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

**Error: Slv – 20 – XXX* – XXX*
PT41 Short-circuit**

Cause	Removal by	Action to perform
Short-circuited wire of the temperature sensor	Service	Check, replace the sensor
Inaccurate setting of pressure and temperature sensors	Service	Check, calibration

**Error: Slv – 22 – XXX* – XXX*
High conductivity**

Cause	Removal by	Action to perform
Exhausted cartridge in the water treatment equipment	Operator	Replace the cartridge for a new one
The water treatment equipment is not connected to the mains	Operator	Connect the equipment to the mains
The water treatment equipment is not connected to the water source	Operator	Open the drinking water inlet

* a three-digit-number providing the authorized person with the information about the cycle phase, during which the error occurs;

17.2 EXAMPLES OF PRINTED DOCUMENTS

Protocol

Protocol + graphical record

STERILAB
001220

STERILAB
001220

Set program:
P2 Asars - aftercool.
Start:
08:59 23.01.2004

Set program:
P2 Asars - aftercool. 12
Start:
08:59 23.01.2004

Steaming 1:
Pmin = 109.9 kPa
Pmax = 110.2 kPa

Steaming 1:
Pmin = 109.9 kPa
Pmax = 110.2 kPa

Steaming 2:
Pmin = 119.8 kPa
Pmax = 120.1 kPa

Steaming 2:
Pmin = 119.8 kPa
Pmax = 120.1 kPa

Start of sterilization:
T = 121.1 °C
P = 212.7 kPa
09:21 23.01.2004

Start of sterilization:
T = 121.1 °C
P = 212.7 kPa
09:21 23.01.2004

End of sterilization:
00:19:59
Tmin = 121.1 °C
Tmax = 122.1 °C
Pmin = 211.3 kPa
Pmax = 217.7 kPa

End of sterilization:
00:19:59
Tmin = 121.1 °C
Tmax = 122.1 °C
Pmin = 211.3 kPa
Pmax = 217.7 kPa

Start cooling:
T = 59.0 °C
P = 20.0 kPa

Start cooling:
T = 59.0 °C
P = 20.0 kPa

End cooling:
T = 51.3 °C
P = 14.8 kPa

End cooling:
T = 51.3 °C
P = 14.8 kPa

End:
11:33 23.01.2004

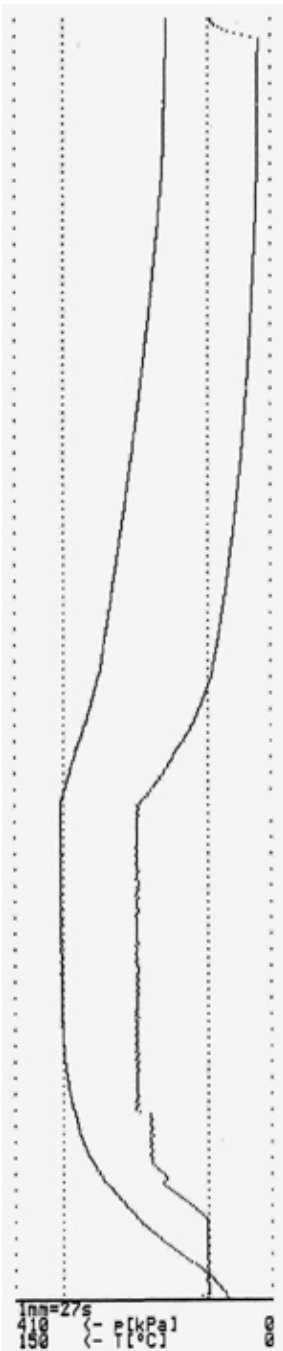
End:
11:33 23.01.2004

Charge:
000001

Charge:
000001

Sterile

Sterile



**STERILAB
001220**

Set Program:
2 Asars - aftercool. 12
Start:
08:59 23.01.2004

Steaming 1:
Pmin = 109.9 kPa
Pmax = 110.2 kPa

Steaming 2:
Pmin = 119.8 kPa
Pmax = 120.1 kPa

Start of sterilization:
T = 121.1 °C
P = 212.7 kPa
09:21 23.01.2004

End of sterilization:
00:19:59
Tmin = 121.1 °C
Tmax = 122.1 °C
Pmin = 211.3 kPa
Pmax = 217.7 kPa

Start cooling:
T = 59.0 °C
P = 20.0 kPa

End cooling:
T = 51.3 °C
P = 14.0 kPa

End:
11:33 23.01.2004

Charge:
000001

Sterile

Time	P [kPa]	T [°C]
00:00	110.2	121.1
00:01	110.2	121.1
00:02	110.2	121.1
00:03	110.2	121.1
00:04	110.2	121.1
00:05	110.2	121.1
00:06	110.2	121.1
00:07	110.2	121.1
00:08	110.2	121.1
00:09	110.2	121.1
00:10	110.2	121.1
00:11	110.2	121.1
00:12	110.2	121.1
00:13	110.2	121.1
00:14	110.2	121.1
00:15	110.2	121.1
00:16	110.2	121.1
00:17	110.2	121.1
00:18	110.2	121.1
00:19	110.2	121.1
00:20	110.2	121.1
00:21	110.2	121.1
00:22	110.2	121.1
00:23	110.2	121.1
00:24	110.2	121.1
00:25	110.2	121.1
00:26	110.2	121.1
00:27	110.2	121.1
00:28	110.2	121.1
00:29	110.2	121.1
00:30	110.2	121.1
00:31	110.2	121.1
00:32	110.2	121.1
00:33	110.2	121.1
00:34	110.2	121.1
00:35	110.2	121.1
00:36	110.2	121.1
00:37	110.2	121.1
00:38	110.2	121.1
00:39	110.2	121.1
00:40	110.2	121.1
00:41	110.2	121.1
00:42	110.2	121.1
00:43	110.2	121.1
00:44	110.2	121.1
00:45	110.2	121.1
00:46	110.2	121.1
00:47	110.2	121.1
00:48	110.2	121.1
00:49	110.2	121.1
00:50	110.2	121.1
00:51	110.2	121.1
00:52	110.2	121.1
00:53	110.2	121.1
00:54	110.2	121.1
00:55	110.2	121.1
00:56	110.2	121.1
00:57	110.2	121.1
00:58	110.2	121.1
00:59	110.2	121.1
01:00	110.2	121.1
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01:39	110.2	121.1
01:40	110.2	121.1
01:41	110.2	121.1
01:42	110.2	121.1
01:43	110.2	121.1
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02:59	110.2	121.1
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03:54	110.2	121.1
03:55	110.2	121.1
03:56	110.2	121.1
03:57	110.2	121.1
03:58	110.2	121.1
03:59	110.2	121.1
04:00	110.2	121.1

18 SUPPLEMENT 2

18.1 VALUES OF PROGRAM COURSES

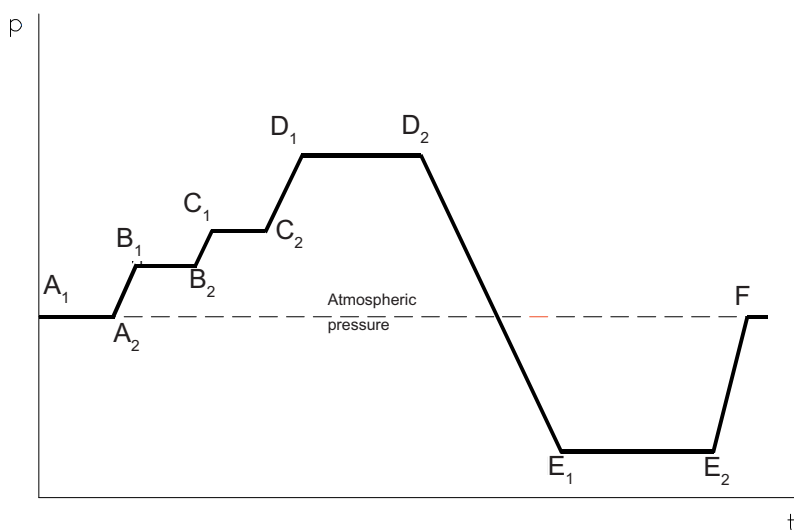
The following table represents pressure and temperature at significant points and important time intervals of individual programs. For better orientation also the graphical program course is shown.

The pressure is in absolute values in kPa.

Significant points / program	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Start A ₁	100	100	100	100	100	100	100	100	100	100
Gravitational deaeration pressure A ₁ – A ₂	100	100	100	100	100	100	100	100	100	100
1. steaming pressure B ₁ - B ₂	*	*	*	110	*	*	*	*	110	*
1. steaming delay B ₁ - B ₂	*	*	*	30 min	*	*	*	*	30 min	*
2. steaming pressure C ₁ - C ₂	*	*	*	120	*	*	*	*	120	*
2. steaming delay C ₁ - C ₂	*	*	*	10 min	*	*	*	*	10 min	*
Exposure pressure D ₁ – D ₂	210	210	110	210	310	310	čl. 6.7	čl. 6.8	čl. 6.9	čl. 6.10
Exposure temperature D ₁ – D ₂	121 °C	121 °C	102 °C	121 °C	134 °C	134 °C	čl. 6.7	čl. 6.8	čl. 6.9	čl. 6.10
Exposure time D ₁ – D ₂	20 min	20 min	30 min	20 min	10 min	60 min	čl. 6.7	čl. 6.8	čl. 6.9	čl. 6.10
Cooling pressure E ₁ – E ₂	90/95	20	90/95	20	20	30	90/95	20	20	30
Cooling-down / cooling temperature E ₂	70 °C	55-65 °C	70 °C	55-65 °C	*	70-80 °C	70 °C	55-65 °C	55-65 °C	70-80 °C
SC – spontaneous cooling-down CC – controlled cooling	SC	ŘD	SC	ŘD	ŘD	ŘD	SC	ŘD	ŘD	ŘD
Aeration pressure F	100	100	100	100	100	100	100	100	100	100

* Does not occur in this program.

Graph of the program course corresponding to the table of values



18.2 LIST OF TESTS FOR INDIVIDUAL PROGRAMS

Following tests are performed with the sterilizer:

Table of tests

Test / Program	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Dynamic changes of pressure	+	+	+	+	+	+	+	+	+	+
Temperature profile of the empty chamber	+	+	+	+	+	+	+	+	+	+
Temperature profile with unwrapped massive load					+	+				+
Temperature profile with 3 l of solution (3 x 1 l bottle)	+	+	+	+		+	+	+	+	+

+ Test performed;

BRIEF OPERATING INSTRUCTIONS

STERILAB



Initial state: **The sterilizer is connected to the el. energy source, it is in standby mode.**

1. Touch the touch-display of the sterilizer at any place.
2. Follow carefully the messages on the display and select the required function by touching with finger and confirm it by touching the field **CONTINUE**.
3. Put the material to be sterilized in the chamber.
4. Turn the door ajar and press it for 4 seconds, it will be closed automatically.
5. Select the program by touching the field **PROGRAM**, mark the program by means of arrows and confirm it by touching the field **CONTINUE**.
6. Start the program by touching the field **START THE PROGRAM**.
7. After the signal of the program end open the door by touching the field **OPEN THE DOOR**
8. Unload the sterilized material.
9. By touching the field **SWITCH OFF** set the sterilizer to the standby mode.



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in medical and laboratory
engineering

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