MELAG

Technical Manual

Autoclave

Vacuklav®23 B+
Vacuklav®31 B+

as of software version 4.06

For users and Service personnel

Please read the accompanying User Manual before you start operation of the autoclave. The instructions contain important safety precautions. Make sure to keep the Technical Manual together with the User Manual near the autoclave. The instructions are part of the product.

Foreword

This manual has been created for the autoclaves Vacuklav®23 B+ and Vacuklav®31 B+. They are identical except for their chamber depth and device depth.

The device name "autoclave" is used to designate the steam sterilizers Vacuklav®23 B+ and Vacuklav®31 B+.

You also receive a User Manual with the autoclave. It contains important safety instructions and information which you need to operate the autoclave. Read the User Manual completely through in proper sequence before beginning operation with the autoclave.

This Technical Manual includes declarations of conformity, suitability statements and recommendations, instructions for setting up, installing and initial start-up of the autoclave including installation record, extended technical information on the software and hardware and other technical data. The Technical Manual is meant for interested persons and service personnel.

Technical Manual Vacuklav®23 B+, Vacuklav®31 B+

MELAG Medical Technology Berlin

Valid for Vacuklav®23 B+, Vacuklav®31 B+
as of software version 4.06

1st Edition October 2007

Responsible for the contents: Engineering Department

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Germany

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Document: TH_2_GB_23B+_31B+.doc/Revision: 3 – 09/1528

Subject to technical changes

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Declaration of conformity

Vacuklav®23 B+

In accordance with the EC-guidelines for medical devices 93/42/EWG

Manufacturer:	MELAG oHG
Address:	Geneststraße 9 – 10 10829 Berlin
Country:	Germany
Product:	Steam sterilizer (autoclave)
Type of device:	Vacuklav®23 B+
Classification:	Class 2a

We herewith declare that the above designated product conforms to the following guideline:

Appendix I of the EC-guidelines for medical devices 93/42/EWG.

Notified body:	DEKRA Certification Services GmbH Handwerkstraße 15 70565 Stuttgart
No of registration:	50199-Z3-00

The cited medical device is designated with the CE sign since 25-09-2007.

Berlin, 12-03-2008

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General Management

MELAG
Evidence Based Sterilization

Quality – Made in Germany
www.melag.de

Declaration of conformity

Vacuklav®31 B+

In accordance with the EC-guidelines for medical devices 93/42/EWG

Manufacturer:	MELAG oHG
Address:	Geneststraße 9 – 10 10829 Berlin
Country:	Germany
Product:	Steam sterilizer (autoclave)
Type of device:	Vacuklav®31 B+
Classification:	Class 2a

We herewith declare that the above designated product conforms to the following guideline:

Appendix I of the EC-guidelines for medical devices 93/42/EWG.

Notified body:	DEKRA Certification Services GmbH Handwerkstraße 15 70565 Stuttgart
No of registration:	50199-Z3-00

The cited medical device is designated with the CE sign since 09-08-2007.

Berlin, 12-03-2008

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Declaration of conformity

Vacuklav®23 B+
Vacuklav®31 B+

Declaration of conformity according to EN 13060 for small steam sterilizers

Manufacturer:	MELAG oHG
Address:	Geneststraße 9 – 10 10829 Berlin
Country:	Germany
Product:	Steam sterilizer (autoclave)
Type of device:	Vacuklav®23 B+/ Vacuklav®31 B+
Classification:	Class 2a

We herewith declare that the above designated product conforms to the general requirements set forth in the EN13060 Standard and has successfully passed the

Type tests according to EN 13060

for fulfilling requirements on a device with

“Class B” – Sterilization programs (B-method)

Berlin, 12-03-2008

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Certificate of Suitability

Vacuklav®23 B+
Vacuklav®31 B+

According to the recommendations of the Commission for Hospital Hygiene and Infection Prevention at the Robert-Koch Institute (of April 2006)

Manufacturer:	MELAG oHG
Address:	Geneststraße 9 – 10 10829 Berlin
Country:	Germany
Product:	Steam sterilizer (autoclave)
Type of device:	Vacuklav®23 B+/ Vacuklav®31 B+
Classification:	Class 2a

We herewith declare, that the above designated sterilizer is suited for sterilization of

- **Solid instruments (wrapped and unwrapped)**
- **Porous goods (wrapped and unwrapped)**
- **Hollow bodies-instruments Type A (wrapped and unwrapped)**
- **Hollow bodies-instruments Type B (wrapped and unwrapped)**

Instructions on load quantities and loading variants are set forth in the User Manual and must be observed.
Be sure to observe the manufacturer's instructions for medical devices intended for sterilization according to DIN ISO 17664.

Berlin, 12-03-2008

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Suitable test body

Vacuklav®23 B+
Vacuklav®31 B+

According to the recommendations of the Commission for Hospital Hygiene and Infection Prevention at the Robert-Koch Institute (of April 2006)

Manufacturer:	MELAG oHG
Address:	Geneststraße 9 – 10 10829 Berlin
Country:	Germany
Product:	Steam sterilizer (autoclave)
Type of device:	Vacuklav®23 B+/ Vacuklav®31 B+
Classification:	Class 2a

We herewith declare that the following test system is suited for testing the above cited sterilizer:

Product:	**Helix-Test body system according to EN 867-5**
Type designation:	MELA*control*® / PRO

Berlin, 12-03-2008

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General Management

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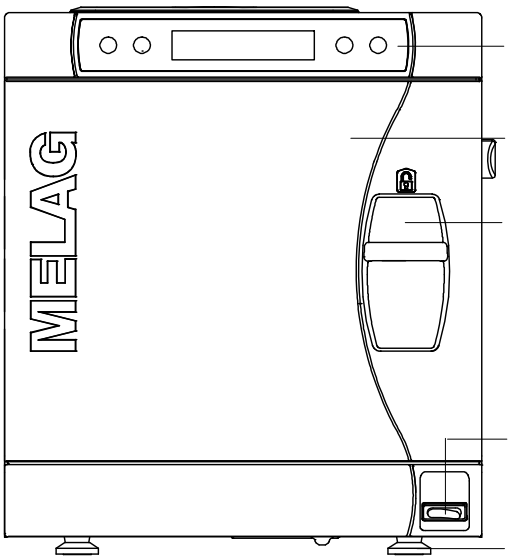
Device views

Front side



(1) Operating and display field

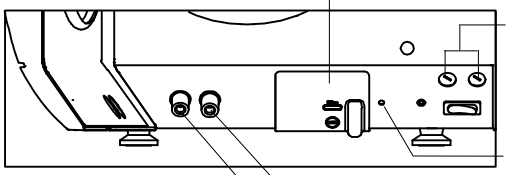
(2) Door (pivots opens to the left)

(3) Sliding closure grip

(4) Mains switch

(5) Front of the unit (adjustable)

Front side below with opened door



(6) Serial data and printer connection (RS232)

(7) Device fuses – 2x 16A/ gRI

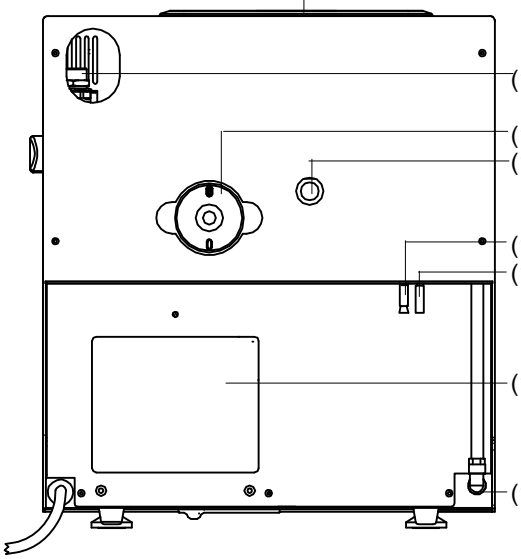
(8) Reset button for overheating protection

(9) Connection for emptying the storage tank – feed water

(10) Connection for emptying the storage tank – waste water

*hidden behind the white cover

Back side



(11) Tank cap

(12) Slot for optional upgrade with the safeguard combination EN 1717

(13) Sterile filter

(14) Safety valve

(15) One-way drain (optional)

(16) Emergency overflow hose

(17) Cooler

(18) Purified feed water inlet for MELA*dem*®, fast screw connection for hose ∅ 8 x1

Figure 1: Device views

Installation and setting up

Warning!

Please read the User Manual of the autoclave and the water treatment unit before setting up the autoclave.

The autoclave sterilizes on the basis of the fractionated pre-vacuum. A membraneous pump is used to create the especially deep vacuum. Thus the autoclave can be immediately put into operation without additional installation work, apart from providing the necessary power supply. For the optional connection of the one-way drain and an external water treatment unit please follow the water main and general information for the proper installation which must be observed when setting up the device.

Removal from the packaging

Unpack autoclave Lift the autoclave out of the carton with the carrying strap.

Remove carrying strap To remove the carrying strap, unscrew the four screws on each side of the housing. Retighten these screws firmly without the washers. Keep the carrying strap and the washers.

After switching on After switching on the autoclave and before initial start-up, open the door and remove the trays and the accessories from the chamber.

Space requirements

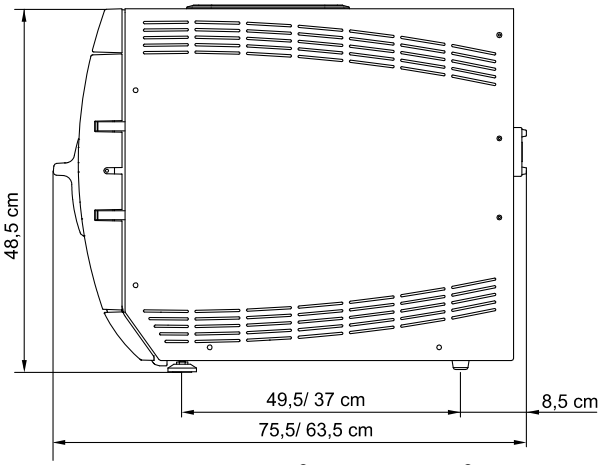


Figure 2: Dimensions Vacuklav®23 B+/ Vacuklav®31 B+

The space requirements for the autoclave corresponds to its dimensions plus at least 5 cm on the side and 10 cm at the back side. The autoclave should be freely accessible from above, for easy filling of the storage tank and to ensure proper ventilation.
The autoclave works with a cooler located at the rear of the device. The function and service life can be impaired if the heat dissipation over the cooler is restricted.

Therefore we do not recommend incorporating the autoclave; this is only possible if sufficient air circulation is ensured.

Dimensions of Vacuklav®23 B+/Vacuklav®31 B+

For →Feed water supply In case of external feed water supply there is additionally required space for the water treatment unit MELA*dem*®40 or MELA*dem*®47.

Installation surface

Flat and level Place the autoclave on a flat and level surface.

Load capacity The Vacuklav®23 B+ weighs without load and without feed water 50 kg.
The Vacuklav®31 B+ weighs without load and without feed water 45 kg.

Electrical connections

Power socket

220V - 240V, 50/60Hz,
separate fuse protection 16 A, protection from leakage current 30 mA.

connected load

as of software version 4.07	2100 W for VAcuklav®23 B+/31 B+
software version 4.06	2500 W for Vacuklav®23 B+, 2400 W for Vacuklav®31 B+

Power cable

The power cable is 1.35 m long.

Log printer MELAprint®42

If you want to connect a log printer to the autoclave, you need another socket for its power supply.

One-way drain

Wall drain or siphon drain

A wall drain, nominal DN40 or a siphon drain (sink drain) is required for the one-way drain.

Wastewater hose

In order to attach the autoclave to the effluent pipe, you can order an upgrade set (MELAG Art. No. 26695) from MELAG.
A wastewater connection is shown in Example 3 – MELAdem®47.

The drain must be located at least 30 cm beneath the autoclave and be installed dip-free with continuous descent.

Supply with feed water

Feed water One-way-system

Since the contamination of feed water in autoclaves using a water circulation system regularly leads to early damages to the autoclaves and instruments, the autoclave works in the gentle yet effective one-way water system.

This means that it uses fresh purified feed water for every sterilization run. For this purpose the autoclave gets the feed water either from the internal storage tank, which the practice team has refilled e.g. with distilled water from the MELA*dest*®65. Or it gets the feed water fully automatically from the water treatment unit MELA*dem*®40 or MELA*dem*®47.

Quality of feed water

The Quality of the →distilled or demineralized feed water for the steam generation must be at least VDE 0510.

Installation material

Additional material, that can be ordered	***MELAG Art. No.***
1 Water connection set for MELA*dem*®40	09033
1 Water connection set for MELA*dem*®47	09034
1 upgrade set for connection to the waste water via the one-way drain	26695
1 Surface-mounted siphon with double hose nozzle	37410
1 Double hose nozzle with anti-flooding flap for connection to an available siphon drain	37400
1 Water tap 3/4“ (with safeguard combination)	37310
1 Additional water tap with return flow inhibitor and pipe aerator (to attach to an available angle valve)	58130
1 Leak monitor (water stop) with shut-off valve and probe	01056
1 feed water filtre MELA*dem*®	48240
1 Safeguard combination, consisting of return flow inhibitor and pipe aerator according to EN 1717	48660

Installation examples

Example 1 – Standard scope of delivery

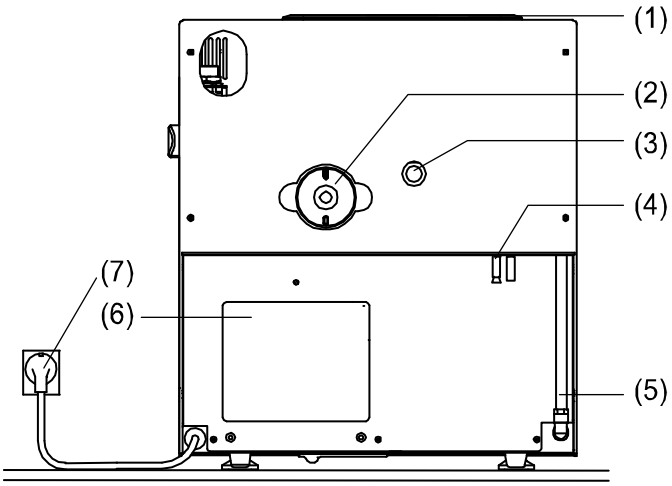


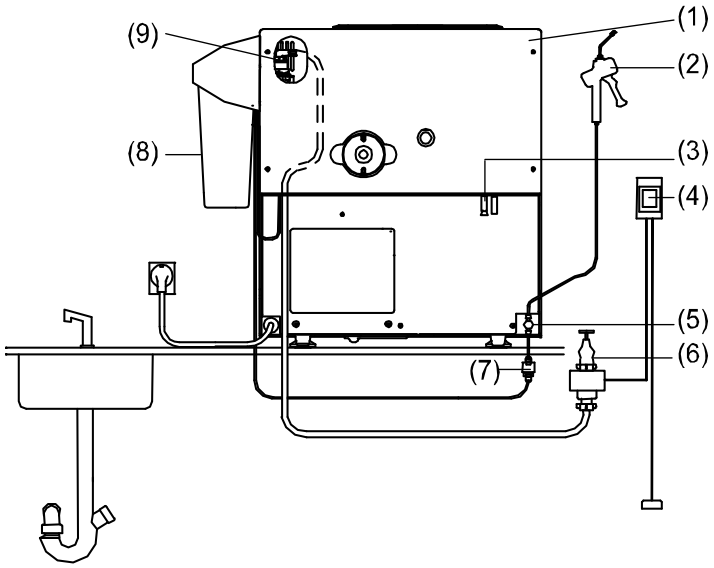
Figure 3: Direct feed water supply from the internal storage tank

Direct supply of →feed water from the internal storage tank
Wastewater is collected in the wastewater chamber of the storage tank
No water connection necessary

The autoclave is supplied with feed water directly over a hose from the internal storage tank. Thus no additional water connection is required aside from the power supply line. An integrated float-actuated level switch in the device notifies a lack of feed water. A program can be started only after water is refilled.
The used feed water (wastewater) is collected in the wastewater chamber of the internal storage tank and later drained off manually. A float-actuated level switch in the wastewater chamber also notifies that the wastewater chamber is full.

(1) Tank cap
(2) Sterile filter
(3) Safety valve
(4) One-way drain (optional)
(5) Purified feed water inlet
(6) Cooler
(7) Power cable

Example 2 – MELAdem®40



Supply of →feed water from the Ion exchanger MELAdem®40
Drain via the wastewater chamberof the internal storage tank

Connection of the ion exchanger MELA*dem*®40 with MELA*jet*®. The simplest installation is to connect the MELA*dem*®40 directly to the purified feed water inlet of the autoclave and thus generate demineralized water from normal tap water. The spray pistol MELA*jet*® is for the final rinsing of the instruments with demineralized water before sterilization.

Figure 4: Feed water-supply from the ion exchanger MELA*dem*®40

(1) Autoclave back view

(2) MELA*jet*® (MELAG Art.-Nr. 30300 – optional)

(3) One-way drain (optional)

(4) Leak monitor (water stop) with shut-off valve and probe (MELAG Art. No. 01056 – optional), recommended with fixed water connection

(5) Feedwater inlet fitting for hose ∅6x1

(6) Water tap (available on-site)

(7) Feedwater filter MELA*dem*®

(8) MELA*dem*®40

(9) Safeguard combination, consisting of a return flow inhibitor and pipe aerator according to EN 1717 – optional

without figure: T-piece for hose ∅6x1 (MELAG Art. No. 37451 – in scope of delivery)

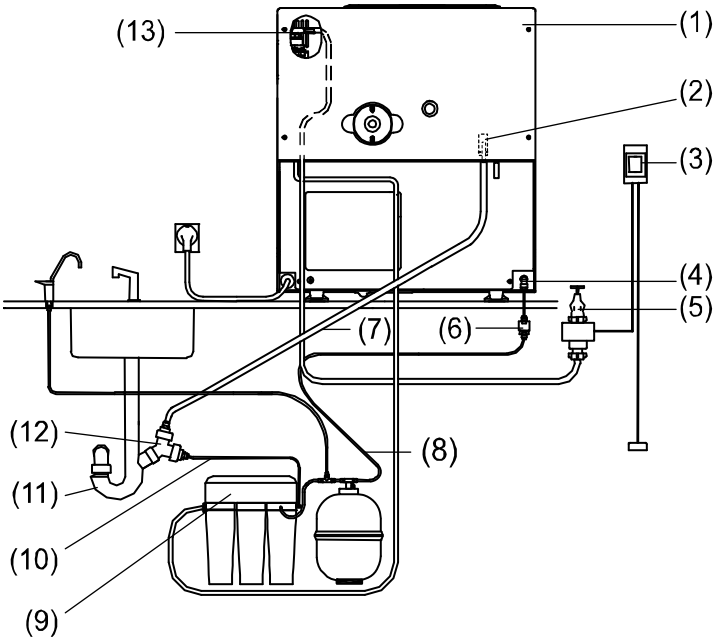
Before you upgrade from the standard version to one with a water treatment unit, empty both chambers of the internal storage tank!

To add on the safeguard combination EN 1717, first it is necessary to unscrew the back wall of the autoclave (1). The water inlet hose of the EN 1717 runs under the back cover of the device. After connecting up the fixture, remount the back cover on the device.
The device's feed water inlet fixtures (5) with ∅ 8x1 must be replaced by the feed water inlet fixtures with ∅ 6x1 (MELAG Art. No. 53461), likewise the two Cu-seals (MELAG Art. No. 42360). The water connection set contains both components.

In this example, the used feed water (wastewater) is collected in the wastewater chamber of the storage tank. The full wastewater chamber is manually emptied.

When the used feed water is automatically drained off over the one-way drain (see page 14, **Example 3 – MELAdem®47**) the use of the leak monitor (water stop) (4) with shut-off valve and probe is recommended for legal/insurance reasons, since the MELAdem®40 is continually under domestic water pressure.

Example 3 – MELAdem®47



Supply of →feed water from the reverse osmosis unit MELAdem®47 Drain via one-way drain and double-chamber wastewater trap

Connection of the reverse osmosis unit MELA*dem*®47, which can be directly attached to the purified feed water inlet of the autoclave. Other water treatment units with corresponding water quality can also be connected after consultation with MELAG.

Figure 5: Feed water-supply from the reverse osmosis unit MELA*dem*®47

(1) Autoclave back view

(2) One-way drain connection (included in upgrade set MELAG Art. No. 26695)

(3) Leak monitor with shut-off valve and probe (MELAG Art. No. 01056 – optional), recommended with fixed water connection

(4) Feed water inlet fitting for hose ∅6x1

(5) Waster tap (available on-site)

(6) Feedwater filter MELA*dem*®

(7) One-way drain hose DN15 (included in upgrade set MELAG Art. No. 26695)

(8) Inlet hose feed water

(9) MELA*dem*®47 with water storage container and tap for purified water

(10) Concentrate drain of MELA*dem*®47

(11) Double-chamber waste water trap (MELAG Art. No. 26635 – optional)

(12) Double hose nozzle with anti-flooding flap (MELAG Art. No. 37400 – optional)

(13) Safeguard combination, consisting of a return flow inhibitor and pipe aerator according to EN 1717 – optional

Before you upgrade from the standard version to one with a water treatment unit, empty both chambers of the internal storage tank!
To add on the safeguard combination EN 1717, first it is necessary to unscrew the back wall of the autoclave (1). The water inlet hose of the EN 1717 runs under the back cover of the device. After connecting up the fitting, remount the back cover on the device.
The device's feed water inlet fittings (4) with ∅ 8x1 must be replaced by the feed water inlet fittings with ∅ 6x1 (MELAG Art. No. 53461), likewise the two Cu-seals (MELAG Art. No. 42360). The water connection set contains both components.

In this example the wastewater draining is also automated. The waste water is collected in the water storage tank (waste water side) and flows through the one-way outflow hose (7) off. The one-way outflow hose is connected with the siphon via the double hoze nozzle (12). The use of the leak monitor (3) with shut-off valve and probe is recommended for legal/insurance reasons, since the MELA*dem*®47 is continually under domestic water pressure.

Record of installation and setting up

Please send to MELAG

MELAG Medical Technology
Geneststraße 7 – 10
10829 Berlin

Dear Madam/Sir,

within the scope of Quality Assurance we are obligated, in cooperation with you, the responsible specialist MELAG dealer, to install this MELAG autoclave at the operator's in accordance with good engineering practice and provide instructions in its use.
Please copy, fill out and sign this form and send it to us after the autoclave has been successfully installed.

The returned form is prerequisite for the MELAG factory warranty.

Device and installation data

We, hereinafter referred to as specialist MELAG dealer, have today installed, instructed the personnel and performed the initial start-up of the autoclave Vacuklav®23 B+/31 B+ as described below:

Specialist dealer (name, address, stamp) ……	Operator (name, address/ stamp) ……
E-mail-address for software update ……	E-mail-address for software update ……
Serial No. Vacuklav®23 B+/31 B+ ……	Remarks ……
Please place checkmark where applicable: **O** First installation **O** Subsequent installation	Date ……

The following persons were present during the instructions for use:

	Name, first name (please print in block letters)	Signature
From the practice/ clinic:	……	……..
	……	……
	……	……..
	……	……..

	Name, first name (please print in block letters)	Signature
Instructing technician:	……	……..
From the company:	……	……..

Executed work

Please confirm the respective points with a checkmark after completion of the described task.

Secure feed water supply (depending on installation variant)

- **O** Right feed water chamber of the internal storage tank filled up with feed water
- **O** Water treatment unit MELA*dem*®40 or MELA*dem*®47 set up according to installation instructions
- **O** In case of installing a water treatment unit : Autoclave was set in the user menu on „feed water-supply – extern“
- **O** It was pointed out that demineralized water with a minimum quality according to VDE 0510 must be used as feed water, and the items to be sterilized must be clean and free of cleanser and disinfectant residues

Install wastewater connection (depending on installation variant)

- **O** Wastewater is collected in the internal storage tank (no wastewater connection)
- **O** One-way drain connected to the existing siphon of the domestic water supply or the double-chamber wastewater trap from MELAG

Align the autoclave

For fault-free operation, the autoclave must be set up horizontally with the help of a water level located close to the sterilization-chamber flange. Then depending on the type of autoclave, the front feet of the unit must be unscrewed by about three or five rotations in order to give the autoclave a slight backwards tilt.

- **O** Vacuklav®23 B+: front feet of the unit screwed out 5 rotations
- **O** Vacuklav®31 B+: front feet of the unit screwed out 3 rotations

Conduct and record vacuum test with empty chamber and Universal-Program with 1.5 kg load (instruments)

- **O** Vacuumtest performed with empty cold chamber. Leakage rate: ……..mbar/min.
- **O** Universal-Program successfully executed with about 1.5 kg load (instruments)
- **O** A printout of the program cycle was created with the log printer MELA*print*®42 and pasted into lower fields provided for this purpose
- **O** No printer available – leakage rate and successful run of the Universal-Program were recorded in the fields provided for this purpose

Check the time setting, if necessary reset the time according to instructions in the User Manual

- **O** Time is correct or correctly reset

Reset service meter according to separate instructions

- **O** Service meter is reset
- **O** Service meter is not reset

Instructing the operating personnel and handing over the technical documentation

- **O** Operating personnel were instructed
- **O** User Manual was handed over
- **O** Technical Manual was handed over
- **O** Chamber certificate was handed over
- **O** MDD Certificate of Conformity was handed over
- **O** Warranty Certificate was handed over

The device was properly installed by the above named technician

- **O** without fault
- **O** with fault: ……..

Logs

Please paste and fold up logs here; if no printer is available, then enter leakage rate and successful completion of the Universal-Program

Vacuumtest	Universal-Program

Program modifications

The autoclave program cycles correspond to the practice-relevant requirements of fractionation, heating up, sterilization, pressure discharge, drying and ventilation with their parameters of pressure, temperature and time.

The standard functions of preheating and additional drying provide two options for influencing the program cycle.

Further changes to the program cycles are possible in individual cases and within the scope of the guaranteed sterilization efficiency, but can only be executed by authorised persons. Please consult your specialist dealer or contact MELAG.

Electromagnetic compatibility

Electromagnetic environment

Warning!

The autoclave is designed for operation in an environment as described below. The customer or user must ensure that the autoclave is operated in such an environment as here described.

The abbreviation HF is used for high frequency in the following tables.

Emitted interference measurements	***Compliance***	***Electromagnetic environment guideline***
HF emissions as per CISPR 11	Group 1	The autoclave uses HF energy exclusively for its internal function. Consequently, its HF emission is very slight, and it is unlikely that adjacent electronic instruments might be disturbed.
HF emissions as per CISPR 11	Class B	The autoclave is suited for use in all facilities including those containing living areas and those which are directly connected to a public supply system which likewise serves residential buildings.
Emissions of harmonics as per IEC 61000-3-2	Class A	
Emissions of voltage fluctuations / flickers as per IEC 61000-3-3	complies	

Interference immunity tests	***IEC 60601 test level***	***Compliance level***	***Electromagnetic environment guideline***
Electrostatic discharge (ESD) as per IEC 61000-4-2	±6kV contact discharge ±8kV air discharge	±6kV contact discharge ±8kV air discharge	Floors should be made of wood or concrete or laid with ceramic tiles. If the flooring is furnished with synthetic material, the relative humidity must be at least 30%.
Rapid transient electrical disturbances/ bursts as per IEC 61000-4-4	±2kV for mains cables ±1kV for input and output cables	±2kV for mains cables ±1kV for input and output cables	The quality of the supply voltage should correspond to a typical business or hospital environment.
Surges as per IEC 61000-4-5	±1kV push-pull voltage ±2kV common-mode voltage	±1kV push-pull voltage ±2kV common-mode voltage	The quality of the supply voltage should correspond to a typical business or hospital environment.
Voltage drops, short-term interruptions and fluctuations of the supply voltage as per IEC 61000-4-11	<5% U_T* (5% sag of the U_T) for ½ period <40% U_T* (60% sag of the U_T) for 5 periods <70% U_T* (30% sag of the U_T) for 25 periods <5% U_T* (95% sag of the U_T) for 5 s	<5% U_T* (95% sag of the U_T) for ½ period <40% U_T* (60% sag of the U_T) for 5 periods <70% U_T* (30% sag of the U_T) for 25 periods <5% U_T* (95% sag of the U_T) for 5 s	The quality of the supply voltage should correspond to a typical business or hospital environment. If the autoclave user demands continual functioning of the device even when there are interruptions in the energy supply, we recommend supplying the autoclave from an interruption-free power supply or a battery.
Magnetic fields with the supply frequency (50Hz) as per IEC 61000-4-8	3 A/m	3 A/m	Magnetic fields with the mains frequency should correspond to the typical values found in the business and hospital environment.
* U_T is the ac mains supply before the application of the test level			

Interference immunity tests	*IEC 60601 test level*	*Compliance level*	*Electromagnetic environment guideline*[*1]
conducted HF disturbances as per IEC 61000-4-6	3 Veff 150 kHz to 80 MHz	3 Veff	Portable and mobile radio equipment should not be placed closer to the autoclave (including hoses and pipes) than the recommended protective distance calculated according to the formula for the transmitting frequency. (see table below: **Recommended protective distances**) The field intensity of stationary radio transmitters should be less than the compliance level for all frequencies according to an on-site[*2] investigation[*3].
radiated HF disturbances as per IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	Disturbances are possible in the environment of devices bearing this symbol.
[*1] This guideline might not be applicable in all cases. The dispersion of electromagnetic magnitudes is influenced by the absorption and reflection of buildings, objects and people.			
[*2] The field intensity of stationary transmitters, such as e.g. base stations of radio telephones and mobile land radio devices, amateur radio stations, AM and FM radio broadcasting and TV transmitters are not able to be exactly theoretically determined beforehand. You should consider conducting a study of the location to determine the electromagnetic environment with respect to the stationary transmitters. If the measured field intensity at the location where the autoclave is to be used exceeds the above compliance level, then observe the autoclave carefully to verify its proper functioning. If unusual performance characteristics are observed, additional measures might be required, such as for instance modifying the alignment or finding another location for the autoclave.			
[3] Within the frequency range of 150 kHz to 80 MHz, the field intensity should be less than 3 V/m.			

Recommended protective distances

Between portable and mobile HF telecommunication devices and the autoclave

The autoclave is designed for operation in an electromagnetic environment in which the HF disturbances are monitored. The customer or the user of the autoclave can thus help to avoid electromagnetic disturbances by complying with the minimum distance required between portable and mobile HF telecommunication devices (transmitters) and the autoclave, depending on the power output of the communication device, as stated below.

For transmitters whose maximum nominal power is not specified in the following table, the recommended protective distance d in meters (m) can be determined by using the equation in the respective column, whereby P is the maximum nominal power of the transmitter in watt (W) according to the specifications of the transmitter manufacturer.

Nominal power of the transmitter [W]	*Protective distance depending on the transmitting frequency [m]*		
	150 kHz to 80 MHz	*80 MHz to 800 MHz**	*800 MHz to 2.5 GHz**
	$d = 1.2\sqrt{P}$	$d = 1.2\sqrt{P}$	$d = 2.3\sqrt{P}$
	d… recommended protective distance in meters P… maximum nominal power of the transmitter in watt according to information of the transmitter manufacturer		
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
* For 80 MHz and 800 MHz the higher frequency range applies			

Technical tables

Nominal value tolerances

	Universal-Pr.		Quick B		Prion-Pr.		Gentle-Pr.		Quick S		◄ means as in Universal- Pr	
Step	Press. P	Tolerance	P	Tol.		Tol.	P	Tol.	P	Tol.	*All values in mbar*	
1. F.	80	+ 50/- 20	◄	◄	◄	◄	◄	◄	**150**	◄	Evacuate	Fractionation
	1400	+ 50/- 30	◄	◄	◄	◄	◄	◄	◄	◄	Steam entry	
2. F.	180	+ 50/- 20	◄	◄	◄	◄	◄	◄	**250**	◄	Evacuate	
	1400	+ 50/- 30	◄	◄	◄	◄	◄	◄	◄	◄	Steam entry	
3. F.	180	+ 50/- 20	◄	◄	◄	◄	◄	◄	---	---	Evacuate	
	1400	+ 50/- 30	◄	◄	◄	◄	◄	◄	---	---	Steam entry	
	3050	+ 70/- 30	◄	◄	◄	◄	**2060**	◄	◄	◄	Heat up	
	3050	+ 70/- 30	◄	◄	◄	◄	**2060**	◄	◄	◄	Sterilization start	
	3160	+ 90/- 90	◄	◄	◄	◄	**2150**	◄	◄	◄	Sterilization	
	1200	+ 30/- 90	◄	◄	◄	◄	◄	◄	◄	◄	Pressure release	

Pressure-Time Charts

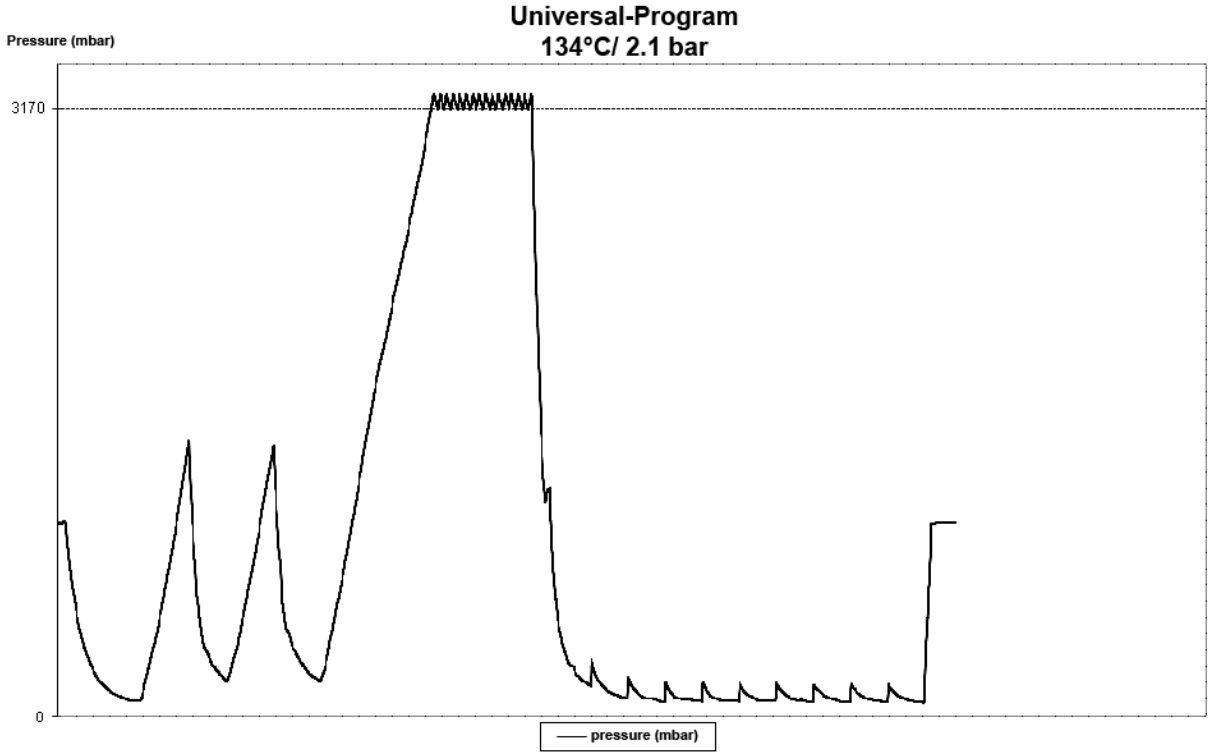


Figure 6: Pressure-Time chart for Universal-Program, 134 °C and 2.1 bar

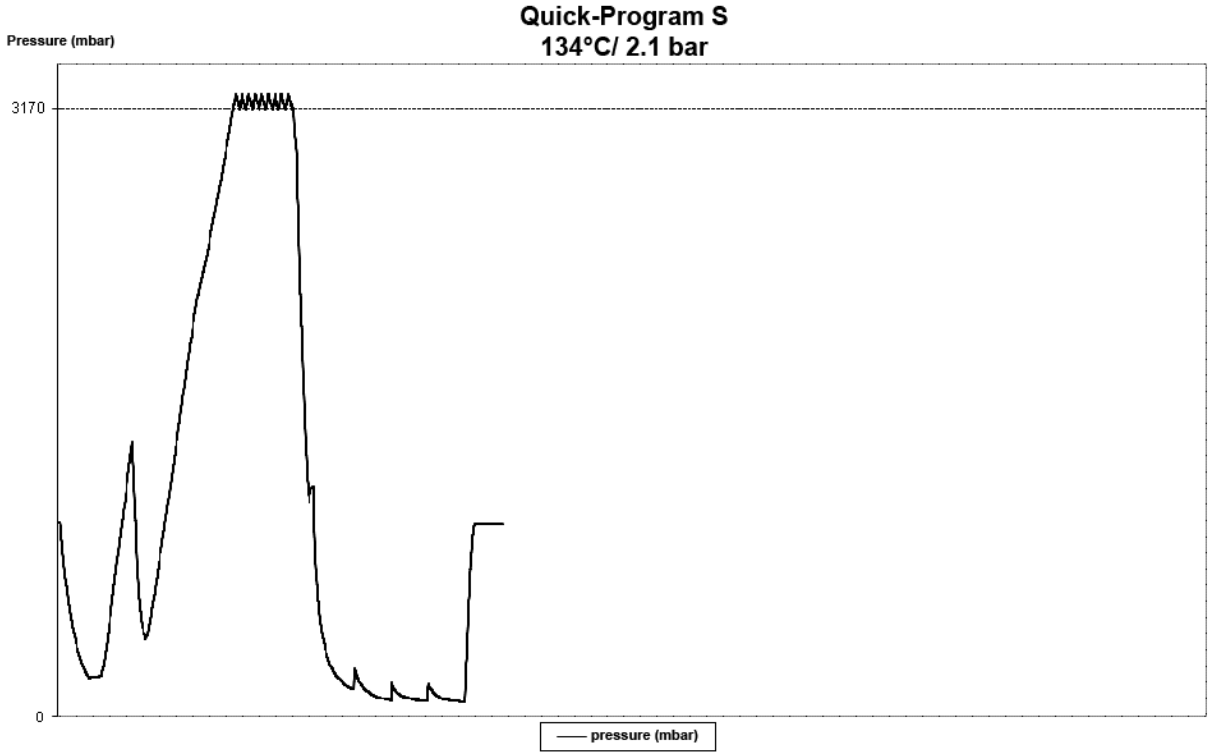


Figure 7: Pressure-Time chart for Quick-Program S, 134 °C and 2.1 bar

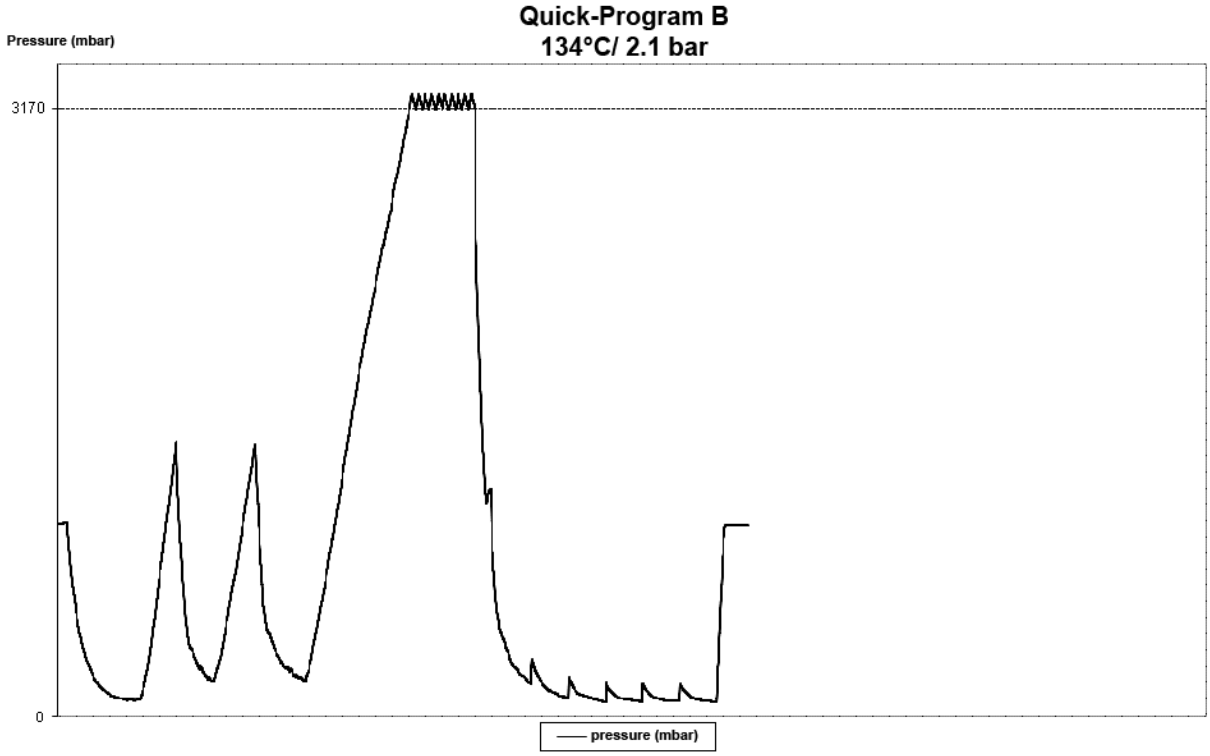


Figure 8: Pressure-Time chart for Quick-Program B, 134°C and 2.1 bar

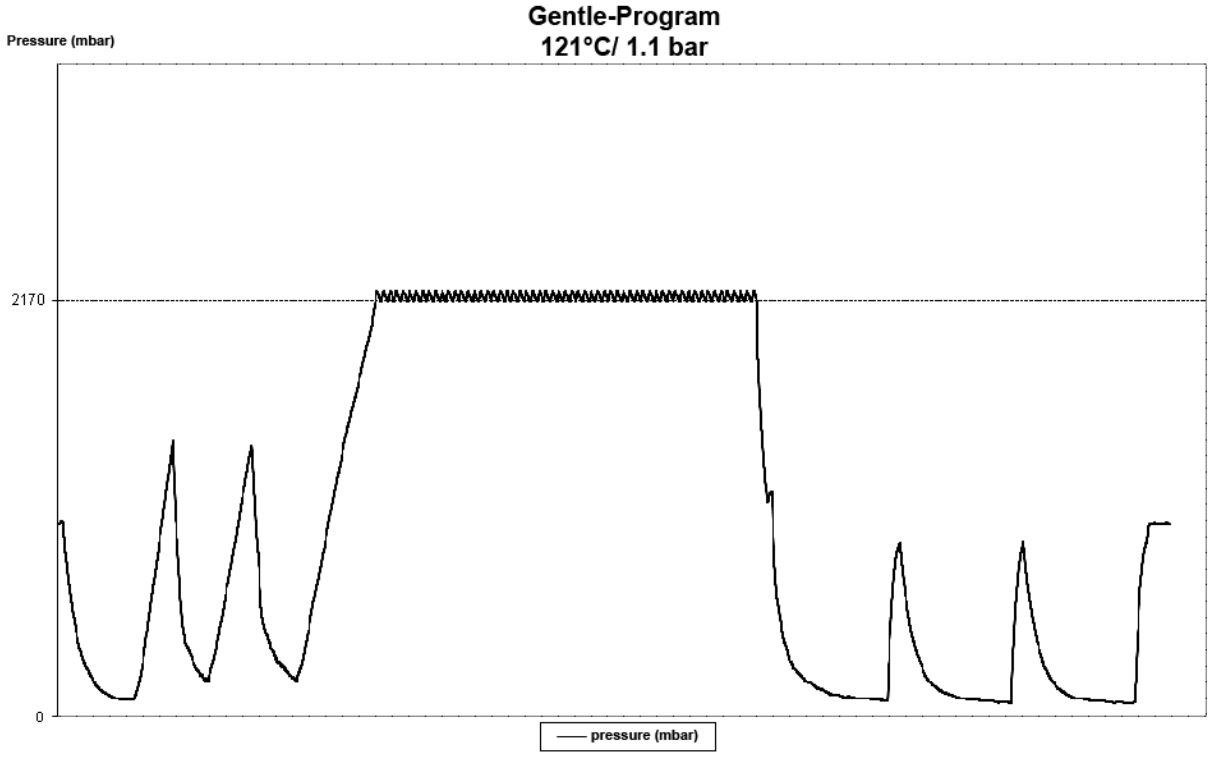


Figure 9: Pressure-Time chart for Gentle-Program, 121 °C and 1.1 bar

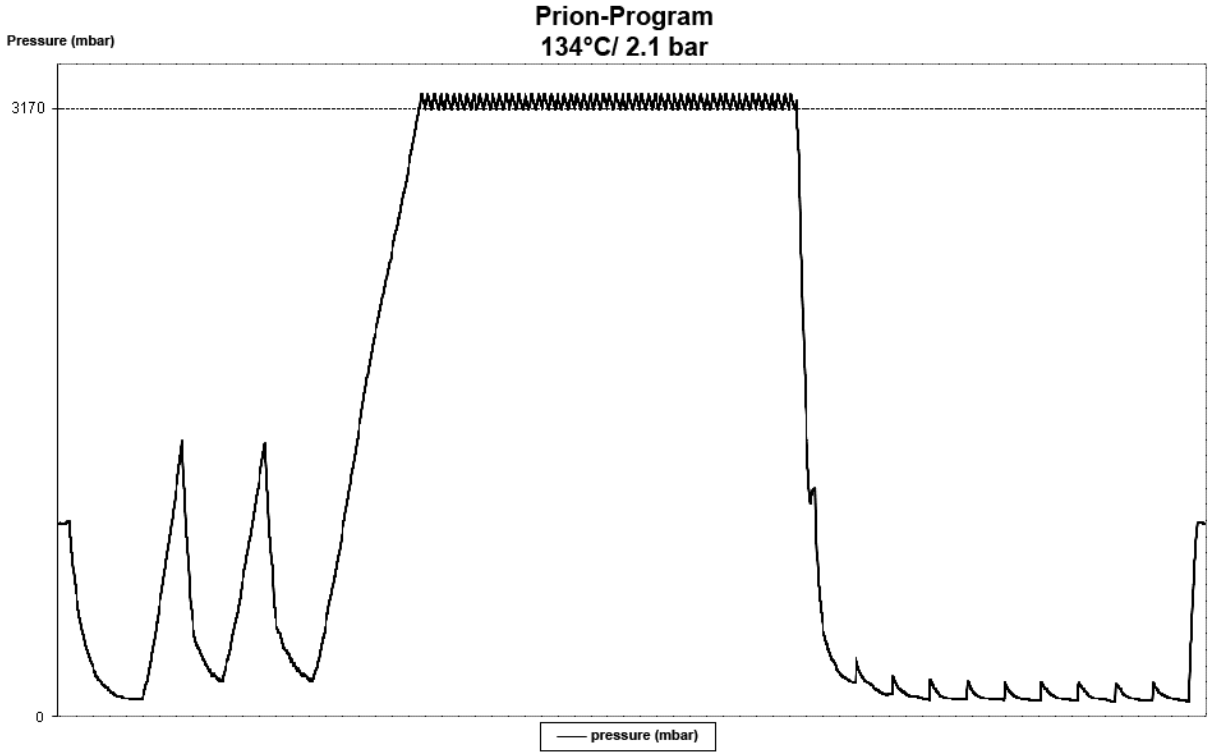


Figure 10: Pressure-Time chart for Prion-Program, 134 °C and 2.1 bar

Quality of the feed water

Residue on evaporation	≤	10	mg/L
Silicon, SiO2	≤	1	mg/L
Iron	≤	0.2	mg/L
Cadmium	≤	0.005	mg/L
Lead	≤	0.05	mg/L
Heavy metals except for those named above	≤	0.1	mg/L
Chlorides	≤	2	mg/L
Phosphate	≤	0.5	mg/L
ph value	5 – 7		
Colour	colourless, clear, without sediments		
Hardness	≤	0.02	mmol/L

Minimum requirements to the quality of the feed water following the EN 13060, Appendix C

Brief instructions

Emergency door opening in case of power failure

Warning!

Be absolutely sure that the autoclave is completely relieved from pressure:

- No steam may escape between the sterile filter and the reverse side of the autoclave
- The sliding closure grip must be easy to manipulate
- It must be easy to push back the door about 2 mm with only slight pressure
- Be sure to let the autoclave cool down. Metal parts such as door and chamber can be hot.

Non-observance can lead to severe burning and injuries.

If the door cannot be opened, for instance due to a power failure, observe the above safety instructions and proceed as follows:

- Switch the autoclave off at the mains switch (see page 9, **Figure 1/ (4)**) and pull the power plug from the wall socket.
- Take the delivered lever for emergency unlocking the door, and conduct it down in the slot between the plastic door and front plate of the autoclave to the height of the door handle, with the long side and curve pointing forwards.

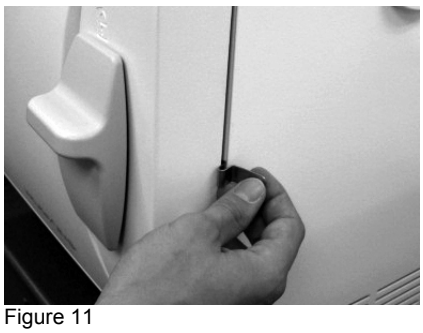


Figure 11

- On the left you can see how you can push the lever directly into the groove of the grey plastic covering on the inside door of the autoclave in order to reach the door lock.

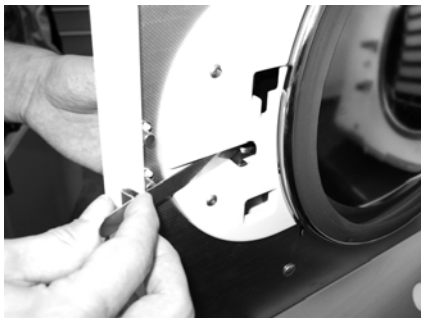


Figure 12

- When the lever is lying in the groove, pull the lever forward with your right hand. With the other hand, push the sliding- closure grip upwards.
- Now you can open the door.

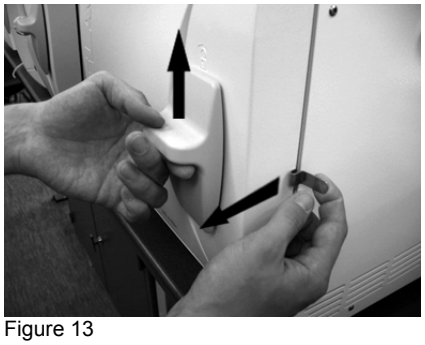


Figure 13

Replace device fuses

Device fuses are triggered

In the unlikely event that the device fuses (see page 9, **Figure 1 / (7)**) are triggered, replace them as follows:

- Switch the autoclave off at the mains switch (see p. 9, **Figure 1 /(7)**) and pull the power plug from the wall socket.
- Due to the power failure which occurs when the device fuses are triggered, you have to open the door with the help of the delivered lever for emergency unlocking the door. Follow the instructions on page 24, Emergency door opening in case of power failure.

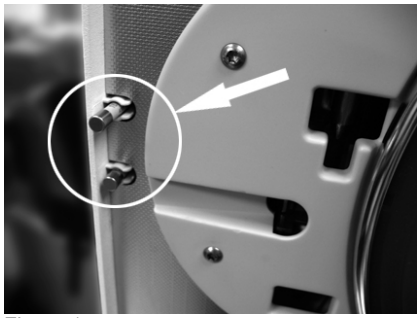
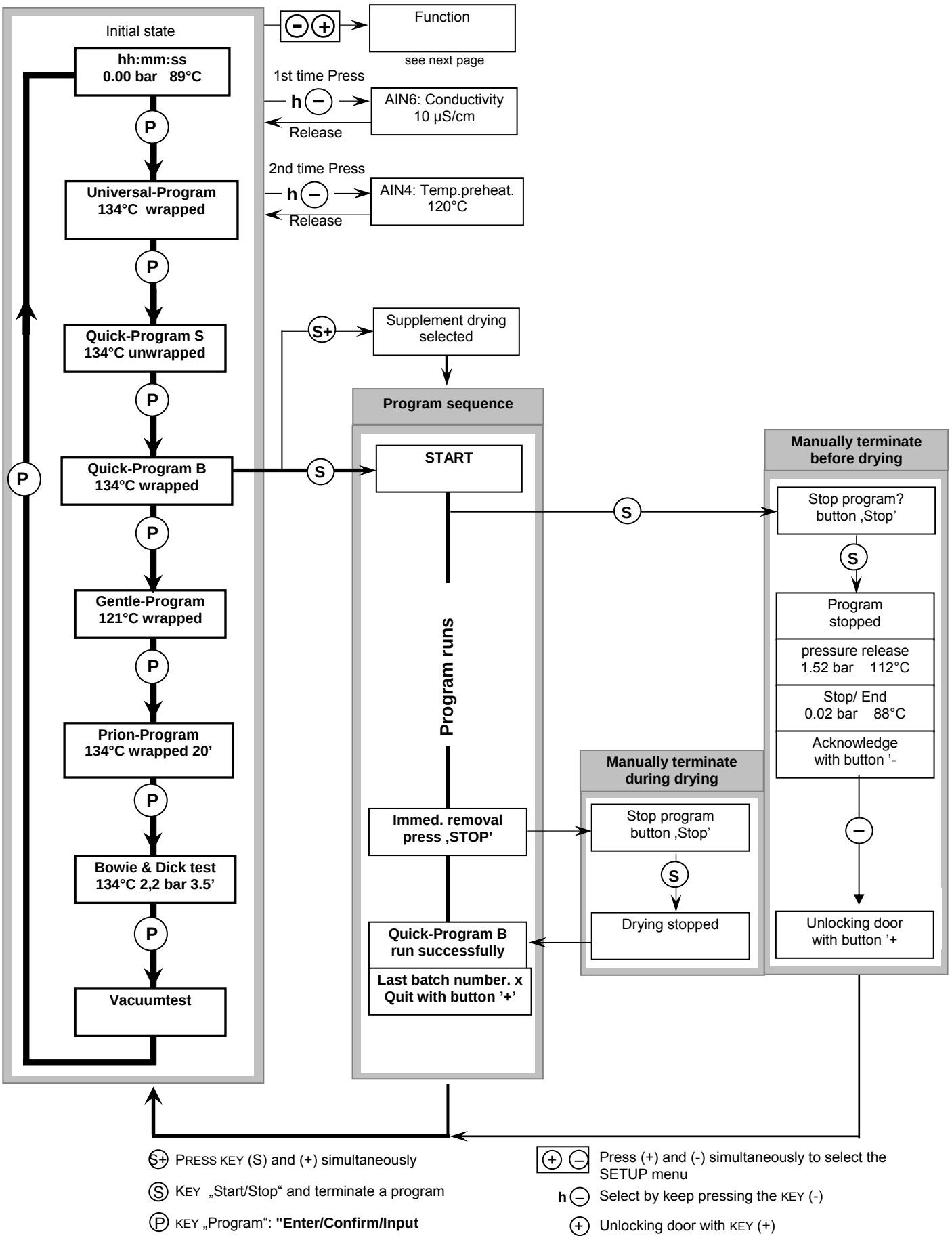


Figure 14

- Unscrew both screw caps of the fuse holder (page 9, **Figure 1// (7)**) at the lower front of the autoclaves with a screwdriver or a coin.
- There are two replacement fuses mounted on the inside of the autoclave door (see figure on the left). Pull out the defect fuses and insert the new fuses tightly into the fuse holder.
- Screw the caps of the fuse holders back on at the lower front of the autoclave.
- Reconnect the power plug of the autoclave to the socket and switch on the autoclave again at the mains switch.

If the fuses are triggered again, inform the MELAG customer service or the customer service of your specialist dealer.

Program overview : MAIN menu



Program overview: SETUP menu: Function