CERTOCLAV MULTICONTROL

High pressure Laboratory Autoclave - Microprocessor controlled with fractionated venting, using steam for the treatment of material, laboratory processes e.g. sterilization.
As an aid in research and development

Electronically controlled, freely programmable steam sterilizer with fractionated venting system to be used as laboratory autoclave, in bacteriology as well as for material tests – with the exception of medical sterilization.

STANDARDS:

Low-voltage-directive 2006/95/EEC
The Certoclav pressure equipment is constructed according **Low-Voltage-Directive 2006/95/EEC.**

Electromagnetic Compatibility Directive
Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC.

GS-Certificate of Approval No. 58 41 011
of LGA-Testing and Certification Body for Product Safety, Nuremberg, Germany confirms the right to use the GS-Mark „Approved Safety".

Tested in accordance with:
EN61010-1:2001 (IEC 1010-1:2001) Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements
EN61010-2-040:2005 (IEC 1010-2-040:2005) Particular requirements for sterilizers and washer-disinfectors used to treat medical materials

Microbiological test certificate and air removal test by Österreichische Bundesstaatliche Bakteriologisch-Serologische Untersuchungsanstalt, Vienna (Federal Austrian Bacteriological and Serological Research Institute), Institute for Applied Hygiene, Graz (Institute of Applied Hygienic, Graz) and ANAWA, Munich.

The **CERTOCLAV** MultiControl is not suitable for sterilization of tight sealed bottles and loads with aggressive media. For porous loads the **CERTOCLAV** MultiControl can not be recommended. Smaller amounts of textiles with low density can be sterilized.

The usage of sterilization indicators is recommended.

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Guarantee: 2 year warranty

Congratulations to the purchase of a **CERTOCLAV** MultiControl.

The MultiControl is equipped with modern microprocessor controlled technology and eases the fast autoclaving in laboratory, offers with free option of time and temperature a wide range of application even in quality control, material tests.
For documentation the data can be read out by a RS232 interface to a computer or printer.

The unit has been manufactured by modern methods and is checked from our quality control by 100 %. We give guarantee for 2 years on all parts which are not under wear and tear.

Attention: long time cycles cause much more wear and tear on gaskets, these parts are not under warranty. **Long term cycles cause a much higher wear** and tear and replacement may be necessary after 6 months of use. Stain in the chamber are due to tests performed.

As the unit is freely programmable we can only be liable for the errors concerning manufacturing not including programmes, which can be freely defined by yourself.

Some programmes have been predefined by us. These programmes have been evaluated and tested and can be used. We cannot take any responsibility for these programmes and cannot guarantee that they are free of errors as they can easily be changed after leaving our factory.

The **CERTOCLAV** MultiControl is a technical equipment and needs some knowledge on how to use it to get good and reliable results. Please read this handbook carefully to give you information about possibilities offered and operation. You will find the MultiControl convenient and easy to use and we hope that you like the way the unit is operating.
Should there any questions please do not hesitate to contact us by
Email: office@certoclav.com or by phone: +43 7229 689.

Please keep this handbook.

Have fun and success with your work!
Your CERTOCLAV TEAM

PART I: GETTING STARTED

List of items

Parts to be delivered with the MultiControl, please check:

MultiControl chamber with lid
MultiControl Control box (Serial number and version number on the back)
Instrument tray Aluminium with water level indicator, in SET version with wire basket.

In a poly bag:
Instruction booklet, Short instruction sheet; Envelope safety code, Warranty certificate
Cleaning needle for venting nozzle – placed on the steam release cock.

Should one of these parts be missing, please contact your dealer or call us directly.

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Set up and electrical supply

Set up is easy. Either put the MultiControl on a table or the floor, so that you get a convenient work height. The control box can be placed anywhere near the sterilization chamber.

Connect sterilization chamber and control box with each other:

Screw on thee green sensor cable to the black socket on the backside of the control box.

The heating cable (black, short) has to be connected to the socket in the sterilization chamber. IMPORTANT: CONNECT ONLY WITH AUTOCLAVE MULTICONTROL!

Connect the control box to the mains by plugging in the long black cable into any socket supplying 220 V-240 V ~ 50 Hz.

Switch on the control box to the „ON" position.
The switch will show a green light and after the display shows „INIT" the chamber temperature will be displayed.
If Error 8 is displayed check if the green sensor cable is properly connected (screwed into the socket).

Connect a tube/horse (inner diameter 10mm) on the steam release cock.

PART II: WORKING WITH THE MULTICONTROL

## Some technical aspects on sterilization

Sections of a sterilization cycle

A sterilization cycle starts by starting the programme and ends with opening. The cycle can be divided into several sections:

1. **Heating up:** In this section the water contained in the sterilization chamber will be heated up to the preset temperature (Sterilization temperature).

2. **Fractionating venting**: The MultiControl is equipped with a special fractionating system. Air removal is done by creating pressure differences over temperature differences of 6 °C starting at the preset sterilization temperature. The number of these fractionating steps can be set freely from 0 - 9 at the MultiControl. The higher the number of steps the better the air removal. Under normal circumstances 4 -5 steps are needed to remove more than 95 % of the air contained. At some sterilization processes air removal is not necessary, so this stage can be switched off by defining 0 (Zero) steps.

3. **Sterilization/Holding time:** Starts when sterilization temperature has been reached and air has been removed from the chamber (saturated steam atmosphere).

4. **Cooling down:** With solid instruments the chamber can be opened right at the end of the sterilization cycle after temperature has dropped and steam can be released freely, which also dries the instruments in the chamber. With glassware sterilized the temperature should be reduced slowly down to 80 °C and then the sterilization chamber could be opened. An acoustic signal is heard, when this temperature is reached and a green LED starts to blink. approx. 30 min.

   With liquids or media the temperature should drop below 70 °C before the sterilization chamber can be opened. The MultiControl gives an acoustic signal when reaching the temperature and the green LED „open" will permanently be lit.
   Please check the temperature indicator label on the chamber too.
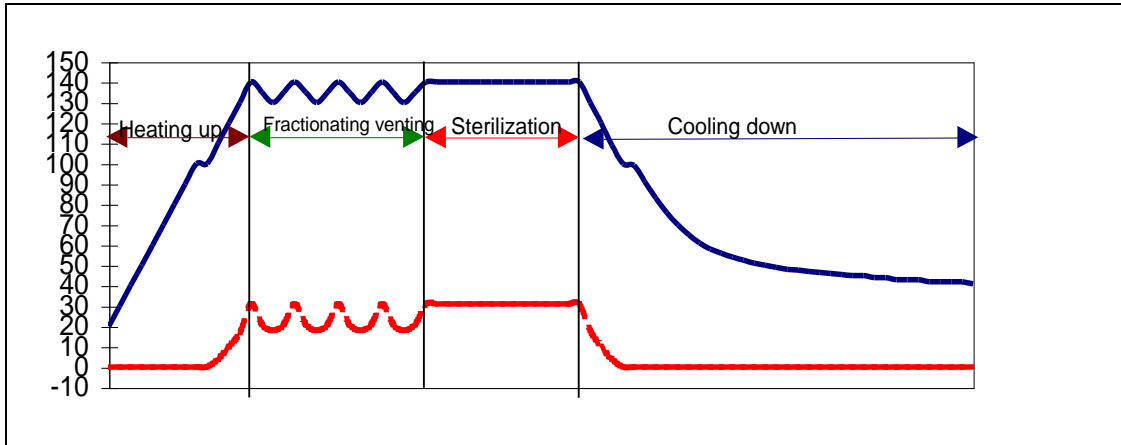
Parameters for input

Each part of the sterilization cycle can be adjusted to the needs with parameters. The display and input of these parameters is done according to the importance to the sterilization process not in chronological order.

   a) Sterilization temperature: This is the first parameter. The temperature needed can be inputted on one tenth of °C. The temperature tolerance band is defined to the temperature plus or minus equally.

   b) Time for sterilization: The time can be keyed in by one tenth of a minute (6 seconds), max. 9.999 minutes. Sterilization time is counted and starts when the tolerance band of the selected sterilization temperature is reached.

   c) Heat up time: If value of „0" is specified, heating will follow the physical „e-function" and is as fast as possible. To specify a longer time the minutes can be keyed in. In case this is specified the temperature will be reached according to a linear function within the specified time from the starting temperature.
   For a defined cooling time it is the parameter in a follow up programme in case the starting temperature is higher. The temperature drops within the specified time.
   Example: If you want to cool down in 120 minutes to 50 °C after having a sterilization cycle with 121 °C, then put in the parameter for a follow up programme. In the follow up programme put in a heat time of 120 minutes and a sterilization temperature of 50°C.The autoclave will cool down to 50 °C within 120 minutes.

   d) Number of fractionating steps: Necessary for removing the air from the sterilization chamber. The MultiControl is using a fractionating venting system, which is done with temperature differences. The number of fractionating steps can be keyed in as a parameter. Minimum is 0, maximum is 9 steps.

> **IMPORTANT:** If there are no or too few fractionating steps defined, then the air removal could be insufficient. The same happens in case the steam release cock is closed. The **Steam release cock has always to be open**. The steam release cock has a lead seal in open position. Only for long time cycles over 90 minutes e.g. material test, remove the lead seal and close the steam release cock on sterilization cycle to avoid cooking dry.

   e) Follow up programme: Is the number of a programme, which should start right at the end of a previous programme. „0" means, that the programme ends. If the number of the same programme is keyed in, there will be an endless slope (Material tests) and the cycle can only be interrupted by pressing the Start/Stop- Key.

Short time cycles

All sterilization cycles with time less than 90 minutes are short time cycles. The Steam release cock is open during the whole cycle. Steam escapes from steam release cock constantly.

> **IMPORTANT**: For Air removal and to get saturated steam the Steam release cock has to remain open. Ensure that the cock is open when starting a new cycle. Connect a tube – to avoid burning by hot steam.
> For closing the Steam release cock in case of a long time cycle remove the lead seal.

Long time cycles

All cycles over 90 minutes would be interrupted by an error message as steam escapes constantly through the sterilization valve. For these cycles the steam release cock can be closed, when reaching the sterilization. There is no escape anymore and long time cycles are possible. Air has been removed during the fractionating venting part of the cycle.

Fractionating venting System (Patent pend.)

When reaching the programme temperature at temperatures above 110 °C there will be an air removal stage, if the parameter for fractionating venting steps is not „0". As reference value for the number of fractionating steps 4 cycles at temperatures above 125 °C and 5 steps at temperatures between 110 °C and 125 °C have been proven to be sufficient.

The following LED´s are lit
1, 2 or 3 (according to programme)
4 "HEATING" (always during heating) and
5 "VENTING"

With 4 - 5 heating steps the temperature rises for 1,5 minutes and then decreases again. With each temperature rise a pressure rise occurs and the air is removed through the steam release cock. Some steam and water drops are escaping as well.

Time of the air removal stage:
Programme temperatures from 110 °C to 125 °C: 5 air removal steps =   16 minutes
Programme temperatures above 125 °C: 4 air removal steps =   13 minutes

With this fractionating venting saturated steam with less than 5 % of air is guaranteed.

By pressing the (**Time**)-key, the remaining time in minutes can be checked.

At programmes below 110°C an complete air removal is not possible due to physical reasons.

Combination of cycles

A combination of cycles is giving more flexibility and freedom in defining possible ways of automating complex cycles or securing the cycle.

Examples:

Heating up to a specified temperature, then heating within a specified time to a specified temperature and going back to a specific predefined temperature within a certain time. At the end this cycle can be repeated endlessly.

Media preparation: Heating and cooking the media, then reducing the temperature below 100 °C and immediately following a sterilization cycle. At the end of the sterilization the media is kept at a certain temperature to be used. If the media is forgotten in the sterilizer, it will be automatically kept at this temperature until it is removed.

Display of parameters/ Selection of programme

With activation of the key[1] PROGRAMM # all parameters of the selected programme will be displayed one after the other in the right display.
Pressing the number key of the programme changes to this programme. The display of parameters starts with sterilization temperature, followed by sterilization time, heat up time, number of fractionating cycles and the number of the programme to follow. All parameters, which are „0" with exception of sterilization temperature and time will not be displayed.

Input of parameters

Activation of the key PROGRAMM EINGABE ENTER will lead to the input mode of parameters of the selected programme.
More see at „*Input of individual programmes and checking of programme input*".

IT IS NOT POSSIBLE TO CONTROL THE MULTICONTROL THROUGH RS232 INTERFACE. IT IS A TX, LOGGING OUT ONLY.

A description of the interface you will find on page 11.

STARTING A STERILIZATION CYCLE

Loading and locking the CertoClav MultiControl

The Symbol [symbol] at the lid handle means open.

The Symbol [symbol] at the lid handle means locked.

The first run after unpacking or after having not used the **CERTOCLAV** just run the cycle with distilled water (no goods to be sterilized). Connect a tube on the steam release cock – caution from hot steam

Minimum 1 litre of distilled water (in case of demineralised water add 1/3 tape water) is filled in the sterilization chamber (the cone is used as a 1 litre mark). The MultiControl will detect errors, if there are less than 0.7 lt. or more than 2.5 lt. of water in the chamber for short time cycles. For long time cycles (above 91 minutes) a maximum of 3 lt. water is possible.

Put in instrument plate and loading in the chamber. Do not put larger goods to be sterilized on the bottom of the sterilization chamber. An exact temperature measurement is possible only if the water can freely circulate.

| **IMPORTANT:** | Do not heat up tight sealed bottles – they could burst! Chamber and lid are made from Aluminium-Alloy. Aggressive media would cause corrosion. |

With the cleaning needle stains at the Steam release cock should be removed after some cycles (from inside of lid). Otherwise air removal is not ensured.

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[1] Activ is a key, when the LED in the key lights after the key has pressed once. Pressing the key again indeactivates the key.

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Locking: Make sure, that the orange knob on the lid handle shows towards [icon] open.
The lid is put on the way, that the arrow mark on the lid is pointing to the mid of the handle. Then press lid on the chamber and turn clockwise until the handles are in line with each other.

Turn orange knob to [icon]. The locking mechanism fastens and the small steam release valve will be closed.

Set the red maximum indicator of the manometer (pressure gauge) to "0".

HINT: Connect a tube on the extension of the steam release cock to avoid burnings from hot steam.

Selection and start of a stored programme

Selection of a programme

ACTIVATE THE KEY "PROGRAMM #"
- LED lights
- Left display: shows the programme number selected. By pressing the number key 1-9 the programme can be selected.
- Right display: shows by turns the sterilization temperature, sterilization time, heat up time, fractionating venting steps and the number of the programme to follow.
  LED 1, 2 or 3 are lit according to the programme number.

Note: If the temperature field only shows "0" there is no programme stored.

Starting the selected programme

Press the "START"-key:

The MultiControl informs you through light signals about temperature in chamber and programme steps.

Acoustic signals for cycle end, error message and others are provided, which can be switched on or off global.
If none of the function keys are activated:

Acoustic signal off: press[2] "TIME" + "0"-Key
Acoustic signal on: press [2] "TIME" + "1"-Key

The pressure within the chamber can be read from the manometer (pressure gauge).The maximum indicator shows the highest pressure reached during the cycle. Therefore always set to "0" for start.

Run of a programme
The run of a programme follows the cycle as mentioned in the chapter „**Some technical aspects** on sterilization". The run will be controlled by the parameters and checked fully automatically.

End of cycle - OPENING
If the sterilization goods are needed urgent and there are neither glass nor liquids in the sterilizer the sterilizer chamber can be opened relatively quick:

Turn the orange knob to [icon] . Steam will escape with a loud hissing noise as the steam release valve is opened through the locking mechanism. Be carefully to avoid caution by hot steam.

When wrapped instruments are still wet take the insert out and leave it there to get dry. Remove the sterilized goods only after they are dry.

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[2] The "TIME"-Key pressed down and then the 2nd key pressed in addition.

IMPORTANT:
Remove the lid only when the manometer shows "0".
When sterilizing glass wait until the temperature is below 80°C and LED 8 "OPEN" is flashing and an
acoustic signal, a high double sound for 2 seconds can be heard (at 138°C approx . 35 minutes
after cycle end, - depending on the loading and room temperature).

For liquids or packed or wrapped goods wait until temperature has dropped to 70°C, the LED 8
"OPEN" is lit and an acoustic signal, a high double sound of 2 seconds can be heard,
takes about 12 minutes more time. Pay attention to the temperature indicator on chamber.

PUTTING IN INDIVIDUAL PROGRAMMES AND CHECKING THEM

Putting in programme parameters

(At programmes 1, 2 and 0 not working)

PROGRAMM
EINGABE
ENTER

If security code is active: the display shows **S 0000**– please key in your safety code within 5 seconds.

If no security code stored the display shows the parameters.
Now the parameters can be keyed in according to the following table:

Programm #	Temperature °C/Minutes	**Zero-values are not displayed**	
3	**1 1 5. 0**	Sterilization temperature in °C	(LED 4 is on)
3		Sterilization temperature in minutes	(LED 6 is on)
3	**H 1 0 0**	Heating time in min. („0" is heating after natural curve, e-function)	(LED 6 is on)
3	**F 5**	Number of Fractionated Venting steps (0-9)	(LED 5 is on)
3	**P 6**	Number of the programme to follow (none=0)	(LED 7 is on)

With ⏎ an input is confirmed and pressing it again gives the next parameter. **C** clears an input
before it has been confirmed by pressing ⏎ .

At time-input the numbers up to 999 are shown with a decimal point automatically. To change the figure behind the
To key in a „decimal point" press the key ZEIT TIME (Time) (possible up to 999,9 minutes) and change the figure.
Input of a time above 1000 minutes do not allow a decimal minute.
For Input of temperature the decimal point can be changed with the TIME-key, e.g. 125,5°C.

Long time cycles
All cycles with sterilization time of more than 90 minutes are detected automatically as long time
cycles. Tolerances are twice as high and therefore up to 3 litres of water can be used.

Cycle Counter
The MultiControl records all correctly operated cycles in programme „0".

These can be read off as follows:

First press keys "Programm", it lights up.

PROGRAMM
#

Sum of ALL programme cycles:
Press „0" the left display shows: "00"
the right display shows the number of correct completed cycles
For review of more than 999 cycles the left display will be used to.

Number of cycles for EACH programme:
After pressing "0", press the number key of the programmes (1-9) you can see all completed cycles of
this programmes.

To leave the **Cycle Counter press „Q"** and switch off.

Safety precaution

Security against unwanted change of programme parameters – safety code

To secure programmes against unwanted changes a 4-digit security code can be put in [3].
To come in the input mode by pressing the key „Programm Eingabe Enter" the security code will be asked for. Only after the input of security code the sterilization temperature will be displayed.

After pressing the key "Programm Eingabe Enter" in the left display an „S" and in the right display „0000" appears. If there is no attempt in keying in a security code within the next 5 seconds, then it will be assumed, that the security code is wrong.

Finish the input by pressing the key „Q". 2 x.

If the code is wrong or was not put in within 5 seconds only the word „Sorry" appears and the MultiControl returns to its basic state (display temperature).

If no security code is stored the first parameter (temperature) is shown on the display.

Security against faulty cycles
Please make sure that the steam release cock is open (=sealed) and steam can escape through the venting nozzle inside of the steam release cock.
Input of required fractionated venting steps, minimum 4 or 5 (below 125°C).
Clean the nozzle with the cleaning needle regularly (once a day)!

The usage of sterilization indicators is recommended.

Safety devices

Locking mechanism and steam release valve in the lid handle
Against opening under pressure and to avoid a pressure build up should the unit not closed

correct. By turning the orange knob to the steam release valve will be released and steam escapes. As long as the unit is not securely locked, the steam release valve remains open and so prevents any build up of pressure.

Pressure control valve (Sterilization valve)
If pressure will exceed the highest working pressure of 2,7 bar by max. 10 % this pressure control valve will operate.

Safety valve
Should the pressure control fail to work the safety valve opens at a pressure of 3,6 – 4 bar, (and will close automatically after operation). Should this occur the pressure control valve has to be replaced as it is defect.

Overpressure safety release on the rim of chamber
At the chamber rim, left side of handle there is a small recess. At a pressure of 4,7 bar the lid gasket will be squeezed out through this recess and destroyed.

IMPORTANT: In this case **Unit has to be sent to our factory for checking.**

Hint: If steam escapes on the outer side of the lid under normal operation, then the gasket is
- incorrectly fitted
- or old and worn and has to be replaced (see „*Inserting the gasket*")

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[3] Only one person should be capable to change the security code. The security code can be past on to all others and can be changed in regular intervalls. (Change of security code please see enclosed letter)

Safety hints

Sterilisation chamber and control box should be operated in accordance with this manual only. Keep this manual on a place which is reachable to all users.

Only operate MultiControl chamber and MultiControl control unit together. The control box has to be connected to a chamber Certoclav MultiControl only.

Operate the MultiControl with distilled water (if demineralised add tape water) only – never dry.
Water charge for short time cycles:1 Litre (minimum 0,7 litre, max. 2,5 litres, Cone = 1-litre-mark).
Water charge for long time cycles: maximum 3 litres

Never load tight sealed bottles for heating up, there is no pressure compensation.

No aggressive media (e.g. saline solution) - it causes corrosion on the Aluminium alloy.

Do not transport the MultiControl when filled.

Do not operate the MultiControl in hazardous environment, i.e. where danger of explosion.

The casing of the appliance can reach temperatures above 80°C even when operated in accordance with this manual. Do not touch heat surface, if necessary use cloves. Check indicator label.

Do not release steam in direction of persons- caution of burning. Use a household or garden-hose to release hot steam from the steam release cock into a sink.

When sterilizing glass or liquids, do no open the sterilizer or let steam escape immediately. wait until the temperature dropped down at room temperature to 80°C/70°C (danger of delay in boiling).
The flashing of LED 8 "OPEN" and an acoustic signal, a high double sound of 2 seconds, gives the signal for opening .

Interface RS 232 PRINTER + RECORDER – Data transfer

Transfer of data is from start to end of programme or programme series. Transfer every 60 seconds to the RS 232 Interface. On request this parameter can be changed to the needs of the customer. Please contact the manufacturer by email: office@certoclav.com for the authority code and instructions.

SETTINGS OF RS232 INTERFACE (BNC PLUG):

Interface	serial
Baud	9600
Data bit	8
Parity	none
Stop bit	1
Line feed	automatic

One set of data has 7 numerical fields.
A set of data: "1234..1234..1234..1234.1234.1234.1234\r\n"
1234   means a figure of four digits
.   marks a blank space
\r\n new line
Printer recommendation: Epson LX-300+

Position	Name	Datas
1	Seconds	all seconds from start
2	Nominal temperature	Nominal temperature of MultiControl
3	Real temperature	Real temperature of MultiControl
4	P-Part	Certoclav internal value P (control)
5	I-Part	Certoclav internal value I (control)
6	D-Part	Certoclav internal value D (control)
7	PWM	Certoclav internal value PWM (controller output for Triac)

The MultiControl is sending on TX only. The intern contact RX and Handshake-lines are not active.
When starting a new programme or programme series the seconds will be set to Zero.

DATA OF RECORDER CONNECTION:
1 canal available,
DC
Interface: 10mV/° C
BNC plug (1 pin)

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MAINTENANCE / REPLACEMENTS / SERVICING

Chamber and lid

For **CLEANING** the appliance wipe inside and outside with a damp cloth. Never immerse the lid and chamber of the unit in water. Before start of cleaning or disinfection plug off mains cable and make sure that appliance has cooled down.

For **DISINFECTION** of surface disinfection liquids with following substances are suitable:
ethanol, propyl alcohol, Isopropyl alcohol, glutaraldehyde, quaternary ammonium compounds.
Please follow the application notes of the manufacturer for the cleaning and disinfection detergents.

Not using distilled water will cause discolouration, respect. with increasing build up of lime scale the control accuracy of the sterilizing process may be reduced. The venting nozzle inside of the steam release cock could be blocked too. Clean the blocked venting nozzle with the cleaning needle. The venting nozzle should be cleaned regularly.
Always use distilled water or demineralised water with tape water added .
In case of any severe calcification run one complete cycle with 1 litre of vinegar and afterwards 1 cycle with distilled water without loading.

Aggressive media such as saline solutions and various types of culture cause corrosion. These must therefore always be sterilized in closed containers, but never in tight sealed glass containers (no pressure compensation).
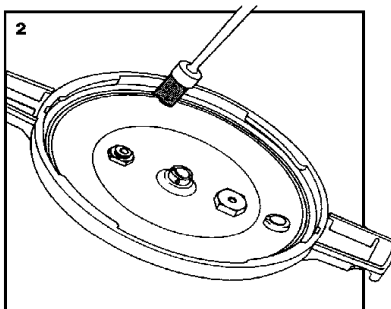Long time cycles cause higher wear and tear on rubber parts, therefore replacement of gaskets can be necessary after 6 months use. These parts not under warranty!

It is recommended to have an inspection of the autoclave by a Certoclav representative or the manufacturer in an interval of 2 – 3 years.

REPLACEMENT OF THE GASKET – please see drawing below:
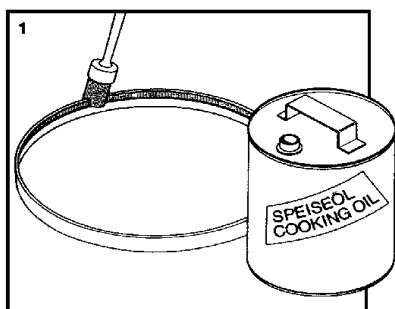
1 Apply cooking oil to the new gasket 2 Clean and oil groove
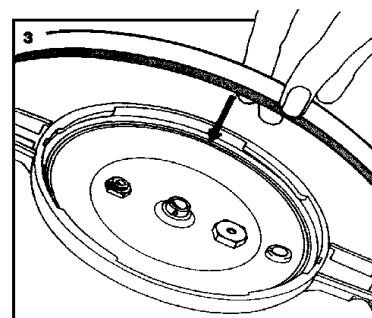
3 Press gasket into groove ribbed side pointing downward (letters show to the middle of the lid)

Control box

If necessary, wipe the unit with a damp (never wet) cloth. Use soft cloth to dry off.
Repairs must only be carried out by the manufacturer or an authorized agent.

In the event of damage to the outer casing, damaged cables and/or programme faults (see chapter „WHAT TO DO WHEN...."") contact your dealer/distributor, importer or manufacturer regarding the relevant procedures (email: office@certoclav.com).

PART III: CALCULATION OF TIME

Total Cycle times

A complete cycle consists of:

Heat up time:	**5-9 min**utes – depends on loading and heat source
Venting cycle:	12 minutes up to 17 minutes
Sterilization time:	depends on application, loading and selected temperature

Cooling down and
drying: With solid instruments lid can be **opened immediately** when manometer
shows pressure zero.
Glassware after approx. **30 min at 80°C.**
Liquids after approx. **40 min at 70°C**.

Equilibrium Times
In case liquids should be sterilized, the time the liquid needs to reach the sterilization temperature, should be added to sterilization time.

Size of largest container	Maximum	Minimum
10 ml	1 min	20 sec
100 ml	5 min	2 min
200 ml	8 min	5 min
500 ml	20 min	10 min

Times are approximate times and vary according to container type and form.
With sensitive liquids size of containers should be approximately the same.

PART IV: EXAMPLES AND STANDARD SETTING

Heating up phase and cooling down period may vary considerably, as they depend on the quantity and material of the goods to be sterilized respect on the quantity of water used. The starting temperature has to be taken into consideration for the heating up process and additionally for the cooling down process the room temperature is a factor.

In programmes 3 - 9 the temperature and sterilization time is freely eligible.

Programme 1: fix stored - Temperature 138°C/ Time 5 min
Programme 1: 138°C = 2,6 bar:

1. Heating up time with start temperature 20°C:	approx.	9 Minutes
2. Fractionated venting (Pat.pend.):		13 Minutes
3. Sterilization temperature 138°C:		5 Minutes
4. Cool down to 80°C:	approx.	35 Minutes

Programme 2: fix stored - Temperature   125°C/ Time 15 min
Programme 2: 125°C = 1,4 bar: heat sensitive material.

1. Heating up time with start temperature 20°C:	approx.	8 Minutes
2. Fractionated venting (Pat.pend.):		17 Minutes
3. Sterilization temperature 125°C:		15 Minutes
4. Cool down to 80°C:	approx.	30 Minutes

Programme 3: Example for Liquids: 115°C/20 min.
Stored Parameter: Temperature 115°C, sterilization time 20 minutes.

Programmes 4, 5, 6, 7: Example for Preparation of agar

With the MultiControl it is possible to prepare agar in that way that cooking and sterilizing is made in one process. According to the instructions of the manufacturer Aqua Dest will be stirred with agar powder by means of a magnetic stirrer until the powder is completely dissolved.

The manufacturer requires that agar must be cooked for 1 min., then sterilized for 15 min. at 121°C and should have a processing temperature of 50°C.

In the MultiControl four programmes are defined:

Programme 4:   with 103°C (secure cooking) for 1 minute, heating time H = 0 (as fast as possible), fractionating steps F = 0 (none) and number of programme to follow P = 5

Programme 5:   Cooling down to 90 °C; 90 °C, 0 min, H = 0, F = 0, P = 0

Programme 6:   Immediately afterwards sterilization with 121°C (1-2 °C tolerance) Time: 15 minutes, H = 0, F = 5 (below 125°C) and number of programme to follow P = 7

Programme 7:   Heat retention phase at 50°C, (50°C, 60 min, H = 0; cooling down acc. natural e-function, F = 0 and number of programme to follow P = 7.
Thus leaving an endless loop, agar will be kept at processing temperature and even if it will be „forgotten" nothing will happen to it.

Programmes 7, 8, 9: Example for Material test

Requirement: The temperature of 110°C should be reached as soon as possible.
Followed by a constant rise of temperature from 110°C to 135°C within an hour and after that the temperature should be decreased again to 110°C within an hour.
This cycle should run for 48 hours with a short break and then be continued.

The following 3 programmes are defined in the MultiControl:

Programme 7:   Fast rise to 110°C, temperature: 110°C, time: 0 min, H = 0, F = 0, P = 8

Programme 8:   Rise to 135°C in 60 min. temperature: 135°C, time: 0 min., H 60 min, F = 0, follow up programme P = 9

Programme 9:   Fall to 110°C in 60 min. temperature: 110°C, time: 0 min, H = 60, F = 0, follow up programme P = 8. Thus resulting in an endless loop of the programme run.

For a material test of this duration, the steam release cock should be closed in order no steam/air will escape (no sterilization!). In the event the escape of air is intended, the cock may remain open until the second programme is reached (# 8) then close cock.

The test may be interrupted at any time by pressing the [START STOP]-key. **Prior to opening release pressure** by turning the orange knob to „open". Caution – hot steam escapes.

Then key in [PROGRAMM #] + "7" and again [START STOP].

These are only some examples.

PART V: ERROR MESSAGES

What to do when ...

In the event of an operating error or programme malfunction, the cycle is automatically interrupted. A temporary power failure during the venting or sterilization phase, during which the temperature remains within the given tolerance will not cause disruption. As soon as power is restored again, the cycle continues to its completion, i.e. cycle time remaining open at the time of power failure will run off. Tolerances are different during different cycle sections.

The MultiControl Control box indicates a break in the cycle in three ways
  1) **Optical:** Diode 9 - Error blinks
  2) **Acoustic** warning (if switched on, see page 20): high pitched, intermittent tone signal, which stops after 20 sec. or after pressing key „Q"
  3) **Optical**: Error message at display. „Er" plus a number (Er = Error)

IMPORTANT: IN THE EVENT OF AN ERROR MESSAGE THE CYCLE IS NOT COMPLETED CORRECT!

Proceed as follows:
1) Check for source of fault with the help of the table below

2) If necessary check remainder of cycle time by pressing the „TIME" key (particularly in the case of material testing programmes where it is not essential to repeat the whole cycle.)

3) **Confirm error message with "Q** The alarm is then switched off and the error message at the display disappears. Programme number and appliance temperature appear once more at the display. This does not apply in case of an Er 08 message when the sensor is not properly connected.
4) Correct the fault according the instructions and re-start cycle. Switch off unit and after 5 seconds switch on again.

Notice: Re-start is possible only if the appliance temperature is at least 10°C below the sterilization temperature.
Without confirmation with „Q" the error message will be shown again when switched on.
The same happens when the plug was pulled out only, not switched off the unit.

ERROR MESSAGE (number 1 at first place means an error caused by power failure or pulling out the plug from unit still switched on)

Er 01 or 11:   Temperature during heating up phase rises too slowly (is too low)

Er 02 or 12:   Temperature during heating up phase rises too fast (is too high)

Er 03 or 13:   Temperature during fractionated venting phase is too low (below tolerance)

Er 04 or 14:   Temperature during fractionated venting phase is too high (above tolerance)

Er 05 or 15:   Sterilization temperature is too low

Er 06 or 16:   Sterilization temperature is too high (heating does not stop)

Er 07 or 17:   Appliance temperature too high for start of programme

Er 08:   Temperature registering outside range, sensor is not connected properly or defect

Er 09:   Faults in the electronics

ER 01 OR 11   **TEMPERATURE RISES TOO SLOWLY**

1. START OF THE CYCLE IMMDIATE RIGHT AFTER FILLING IN COLD WATER
(The temperature of the chamber yet still sinks)

Confirm error message with "Q" Re-start after approx. 30 seconds.

2. HEATING CABLE (BLACK) NOT CONNECTED PROPERLY
Check connections

3. LID NOT LOCKED SECURELY

Check whether handles are correctly aligned and orange knob stands on [▯] .
If yes – correct and
confirm error-message with "Q"
Check that appliance temperature is at least 10°C below programme temperature.

For re-start press [START STOP]-key

Observe, if any steam (water drops) is escaping between chamber and lid.
Should the MultiControl again display "Er 01" , the appliance has to be opened to explore further reasons for the malfunction.
Notice: If glass ware is loaded wait until the temperature is below 80°C .

In order to stop the acoustic signal immediately press "Q".

– Turn orange knob to [↕▯] „open".
– When black indicator of pressure gauge shows "0" , turn lid anticlockwise until it comes to a stop and remove it.
Notice: NEVER use force for opening the unit!

4. LID GASKET FITTED INCORRECT OR DEFECTIVE or STEAM RELEASE VALVE DEFECTIVE
(Steam escapes between chamber and lid).

Confirm error message with "Q"
Check whether gasket properly fits (correct mounted?) or is defect.
(See: „MAINTENANCE/REPLACEMENTS/SERVICING" - Change of gasket, Illustr. 3).
Pull out gasket and after having oiled the groove in the lid, replace by a new gasket.
In case the steam release valve is brittle it has to be replaced. (Art. 1250242)

5. TOO MUCH WATER OR TOO GREAT A LOAD IN THE CHAMBER:
Correct capacity: 1 litre (minimum 0.7, maximum 2.5 litres). The amount of 1 litre just covers the cone when the sterilization chamber is not loaded. Long-term cycles (over 90 minutes) can be operated with a maximum of 3 litres

Too great a load: only in case of extreme overload
Confirm error message with „Q".
Pour away excess water. If necessary reduce sterilizing load.
Check, if appliance temperature is at least 10 °C below programme temperature.

For re-start press [START STOP]-key

6. HEATING FAULT (CHAMBER STAYS COLD)
Chamber and control box should be checked. The heating coil is pressed on the bottom of the chamber, the complete chamber with heating has to be replaced in case it is defect (e.g. short circuit).
Confirm error message with "Q"
Open and empty unit.
Contact your dealer/distributor, importer or manufacturer regarding the appropriate procedures.

ER 02 OR 12   TEMPERATURE RISES TOO FAST

1. NOT ENOUGH WATER IN THE CHAMBER

Confirm error message with "Q"

Turn orange knob to [icon] „OPEN"
IMPORTANT: If glass ware loaded wait until appliance temperature is below 80°C.

When black indicator of pressure gauge shows "0" , turn lid anticlockwise until it comes to a stop and remove it. **IMPORTANT**: NEVER use force for opening!

Fill up with distilled water. The cone serves as 1-litre-indicator and should be covered without loading in the CertoClav.

Place lid on top and lock the chamber.
Check that the appliance temperature is at least 10 °C below programme temperature.

Re-start by pressing [START STOP] -key.

2. STERILIZATION CHAMBER IS HEAVILY CALCAREOUS – INACCURATE MEASURING
(Caused when filled in tape water and not distilled water)

Open acc. procedure 1. Empty the chamber complete.
Run one complete cycle with programme no. 2 putting in 1 Litre of white vinegar,
followed by a complete cycle programme no. 1 with distilled water ONLY, without loading.

3. VENTING NOZZLE COVERED WITH LIME
Remove with the cleaning needle all lime form the venting nozzle inside of the steam release cock. The venting nozzle can be reached from inside of the lid.

ER 03 OR 13   TEMPERATURE DURING FRACTIONATED VENTING PHASE IS TOO LOW (BELOW TOLERANCE).

ER 04 OR 14   TEMPERATURE DURING FRACTIONATED VENTING PHASE IS TOO HIGH (ABOVE TOLERANCE).

1. VENTING NOZZLE BLOCKED
With non-sufficient venting performance of the nozzle and a small load in the chamber it comes to an over swing of the controller above or under the tolerance.

Repair: Clean venting nozzle with attached cleaning needle. The venting nozzle is mounted inside of the steam release cock and can be reached from the inside of the lid.

ER 05 OR 15   STERILIZATION TEMPERATURE TOO LOW

ER 06 OR 16   STERILIZATION TEMPERATURE TOO HIGH

This message is displayed when the programme temperature falls by more than 2 °C during the sterilization phase (up to 110°C by more than 4°C).

1. BOILING DRY

Caused if programme time is to long, water has evaporated and escaped complete.

In case of long-time-cycles check and note down time. If necessary re-start the cycle or repeat with the steam release cock being closed manually after the steam fractionating section. Remove the seal for closing the steam release cock.

Repair: Confirm error message with "Q"

Turn orange knob to ⬍▯ „open". Caution: hot steam escapes.
IMPORTANT: If glass ware loaded wait until temperature is below 80°C,
                         liquids below 70°C.

Fill with necessary quantity of water for remainder of programme time (for less than 90 minutes max. 2.5 litres for longer than 90 minutes max. 3 litres).

Put lid on to chamber and turn orange knob to ▯ „closed".

Set programme for the remaining time (see "*input of individual programmes and checking of stored programmes* ").

Re-start by pressing [START STOP] -key

2. TO HIGH HEATING TIL ERROR MESSAGE

Check the cold appliance whether:
it starts with heating after switching on, but without pressing the „START" key
or whether the temperature rises and LED for heating <u>does not</u> lighten.
If this occurs the control box needs a repair. Possible fault: TRIAK.

ER 07 OR 17   TEMPERATURE TOO HIGH FOR RE START

Re-starting a programme is only possible, when the appliance temperature is at least 10 °C below the programme temperature.
These 10°C are necessary to check the heating rate respect. to proof the quantity of load complete.

Notice: Lowest programme temperature: Room temperature + 10°C

**ER 08 OR 18   GREEN SENSOR CABLE
                              (NO EXACT MEASUREMENT OF TEMPERATURE POSSIBLE)**

1. SENSOR NOT OR INCORRECTLY CONNECTED
    IMPORTANT: The sensor **must only be attached or removed when** the unit **is <u>switched off</u>**.

    Repair: Switch off main switch (green) at the rear of the control box.
    Put in the sensor in the socket and turn till tight. Switch on mains
    Check if appliance temperature is 10°C below programme temperature.

    Then re-start: Press [PROGRAMM #] + Number key 1-9 + [START STOP] -key in sequence

2. DAMAGED SENSOR
    In case of visible damage of the cable it is necessary to return the MultiControl chamber only. If not visible fault please send both - control box and MultiControl.
    Never hang the sensor in the chamber and put on the lid, it will squeeze the sensor cable.

    Repair: Allow the appliance to cool down to room temperature, open it and empty it.

3. POOR CONTACT BEWEEN SENSOR AND BOTTOM
    It is possible that the screws on the metal clip at the bottom of the chamber has been loosed and a poor contact will cause wrong temperature data. The green sensor cable could be slipped out of the place (never pull on the green cable!).

    Repair: After cooling down open and empty the chamber. Screw off the black base and examine the screws on the metal clip and the tight contact of the sensor cable.

4. ELEKTRONIC DEFECT
    This error message may disappear when confirming with „Q" or by switching unit off and on again. Wait at least 5 sec. between these two steps. Repair see 2.

ER 09 OR 19   FAULT IN THE ELECTRONICS
    This error message may disappear when confirming with „Q" or by switching the unit off and on again.

    Repair: Switch the appliance off and on again. Wait at least 5 sec. Between these two steps.
    If the message comes again send the MultiControl for examination. Contact your dealer or the manufacturer for proceeding.

CERTOCLAV MULTICONTROL

PART VI: INDEX
Technical data / Service- and display elements

Operation data:

Lowest programme temperature:	10°C above room temperature, minimum 0°C
Highest programme temperature:	140°C
Authorised ambient temperature:	-10°...+40°C
Capacity of appliance chamber:	12 L or 18 L
Maximum load:	9 kg with max. 3 L water of it
Max. programme time:	Short-time operation 90 min. Long-time operating unlimited – notice water charge .
Water-level indicator:	Short-time: 0,75 - 1,5 L, Long-time 1,5 - 3,0 L.
Accuracy range:	Programme 1: +2°C -0°C, Programmes 2-9. +/-1°C
Tolerance:	Heating phase +/-5°C
	Fractionating +/-2,5°C (only possible above 110°C)
	Temperatures below 110°C: +/- 4°C
	above 110°C: +/- 2°C
Authorised operation time:	100%
Automatic fractionated venting:	Variable for all programmes above 110°C between 0 and 9 fractionation steps
Venting capacity:	>95% when correctly adjusted!
Maximum operating pressure:	2,7 bar
Tested at pressure of:	4,1 bar
Chamber constructed acc.:	Low-voltage-directive 2006/95/EC
Nominal voltage:	230V ~10% 50 Hz
Power input:	Control box: 5,5 W, Heating: 1900 W
Rate of interference suppression:	N
Connector for recorder (BNC plug 1 pin):	10mV/°C
Computer interface (BNC plug 1 pin):	Serial RS 232 (Attached appliances must be in accordance with standards)

Labels

Directive 2002/96/EC (WEEE):
The supplier will take the supplied commodity back on the expense of the customer after use completion and ensure best available treatment, recovery and recycling according to the laws duly.

HINT: See instructions

HINT: „HOT SURFACE"

THE CE-MARK CONFIRMS THE CONFORMITY OF THIS APPLIANCE WITH LOW VOLTAGE DIRECTIVE 2006/95/EC + EMC 2004/108/EC.

Control unit

1. LED-LIGHTS

1 🟢 PROGRAMM 01: 138°C/ 5 MINUTEN – FIXPROGRAMM 1
2 🟢 PROGRAMM 02: 125°C/ 15 MINUTEN – FIXPROGRAMM 2
3 🟢 PROGRAMM 03-09
4 🟢 HEIZUNG / HEATING / °C (LIGHTS DURING HEATING PHASE)
5 🟢 FRAKT.ENTLÜFTUNG / VENTING
6 🟢 STERILISATION / MINUTEN
7 🟢 ZYKLUS ENDE / CYCLE END
8 🟢 ÖFFNEN / OPEN
9 🟢 FEHLER / ERROR
10 🟢 PROGRAMM 0: ZYKLEN-ZÄHLER / CYCLES COUNTER

2. OPERATING ELEMENTS –KEYS

„Programme #"
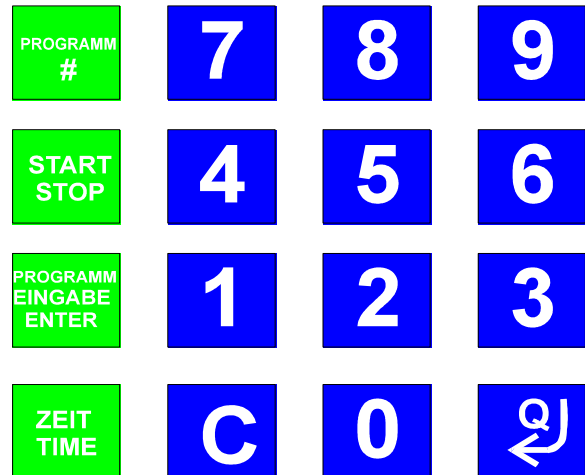Level of programme selection and display of programme-parameter

„Start"
Starts selected programme or stops running programme.

„Programm Eingabe Enter" Level for typing in programmes

„Time"
Indicates during heating - time passed,
Sterilization - time until end, when pressed again time passed.

At basic level for on/off for acoustic message on1 / off 0.

Key „C"	deletes individual inputs when typing in a parameter
Key „Q"	confirms an error message or an input
Digits 0-9	choose programme by the number or to key in numbers of a parameter.

THERE ARE 4 LEVELS OF OPERATING STATE:

1. Basic level: None of the three keys below is activ (No LED lights up)
        In this level the acoustic error-message can be switched on or off:
        Key "TIME" + 0 = off, Key "TIME" + 1 = on. See page 8.

2. Level: „Programm #":   LED lights up in the key-
                                     additional the programme number has to be selected

3. Level: „Start":   Programme runs

4. Level: „Programm   Programme changing modus
                   Eingabe Enter": P-LED lights up

CERTOCLAV MULTICONTROL

V11.

Ersatzteile/Spare Parts

1	1250334	Manometer mit Schleppzeiger	Manometer with maximum indicator
2	1250320	Druckbegrenzungsventil	Pressure control valve
3	1250433	Ventildichtung	Gasket for valve
4	1250208	Abdampfhahn komplett mit Entlüftungsdüse neu	Steam release cock complete with venting nozzle new
6	1250235	Deckelgriff mit Verriegelung, Schraube und Mutter	Lid handle with lock, screw and nut
7	1250242	Abdampfventil	Steam release valve
8	1250237	Griff mit Schraube für Gerätekammer	Handle with screw for chamber
9	1251324	Sockel mit Steckdose	Base with socket
10	1250408	Dichtung für Sockel	Gasket for base
11	1240374	Wasserstand-Kegel	Water level cone
12	1260404	Deckeldichtung Silikon 24 cm	Lid gasket Silicon 24 cm
13	1250194	Mutter für Manometer	Nut for manometer
14	1250236	Deckelgriff mit Schraube und Mutter	Lid handle with screw + nut
15	1250451	Dichtung für Manometer	Gasket for manometer
16	1250310	Sicherheitsventil mit 0-Ring	Safety valve with 0-ring
17	1250360	Sensorkabel (grün) mit Sensor	Sensor cable (green) with sensor
18	1250335	Bimetall-Sicherung	Bimetal fuse
19	1250356	Kabelsatz für MultiControl	Cable set for MultiControl
20		Nicht mehr seit Oktober 2003	Without since October 2003
21	1250366	Dichtung für Sensorkabel	Gasket for sensor cable
22	1250370	Steuerung MultiControl	Control unit MultiControl
	1250380	Reinigungsnadel für Düse	Needle for cleaning venting nozzle

WE RECOMMEND THE CERTOCLAV SERVICE SET **ART. No.: 1250499**.
It contains all spares which are under wear and tear and have to be replaced.
(Lid gasket 1260404, Gasket for Manometer + Steam release cock 1250451,
Gasket for valve 1250433, Steam release valve 1250242)

Use original Certoclav spare parts only for repairs!

It is recommended to send the unit for inspection to your dealer or the manufacturer at an interval of 2 – 3 years.

Find **list of distributors** under: www.certoclav.com

CERTOCLAV Sterilizer GmbH
Georg Grinninger-Str. 37
A-4050 Traun/AUSTRIA
Tel.: +43 7229 689-0
Fax: +43 7229 689-20
Email: office@certoclav.com
www.certoclav.com