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MELAG

User Manual

Autoclave

Vacu*quick*®14-B

as of software version 2.3



Dear Doctor!

Thank you very much for the trust which you have shown by purchasing this autoclave.
For over 55 years now, MELAG — a medium-sized family-owned and -operated company — has specialized in the production of sterilization equipment for medical practice. During this period, MELAG has succeeded in becoming a leading manufacturer of sterilization equipment. More than 400,000 MELAG units sold throughout the world testify to the exceptional quality of our sterilizers - which are manufactured exclusively in Germany.

As all other MELAG products, this autoclave was manufactured and tested according to strict quality criteria. Before placing this unit into operation, please read this User Manual carefully. The long-term functional effectiveness and the preservation of the value of your autoclave will depend on careful preparation of instruments before sterilization, and on proper care of the unit.

The staff and management of MELAG

CE 0124

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To ensure the functional effectiveness of this unit and to preserve its value:
1. Prepare the instruments to be sterilized carefully
2. Take proper care of the autoclave
3. Use only pure distilled or demineralised water

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1 Description of the unit

1.1 Views of the unit

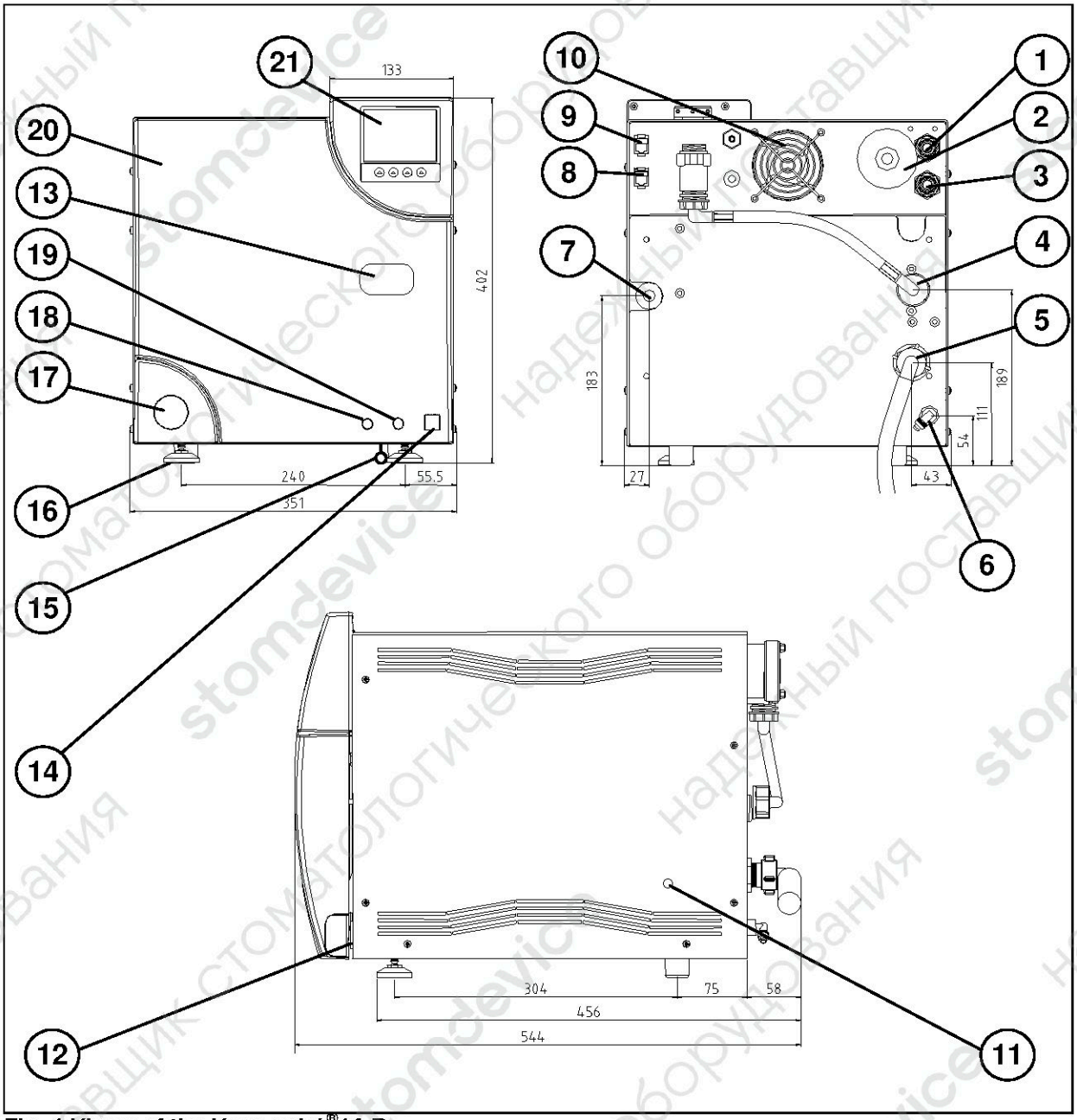


Fig. 1 Views of the Vacu*quick*®14-B

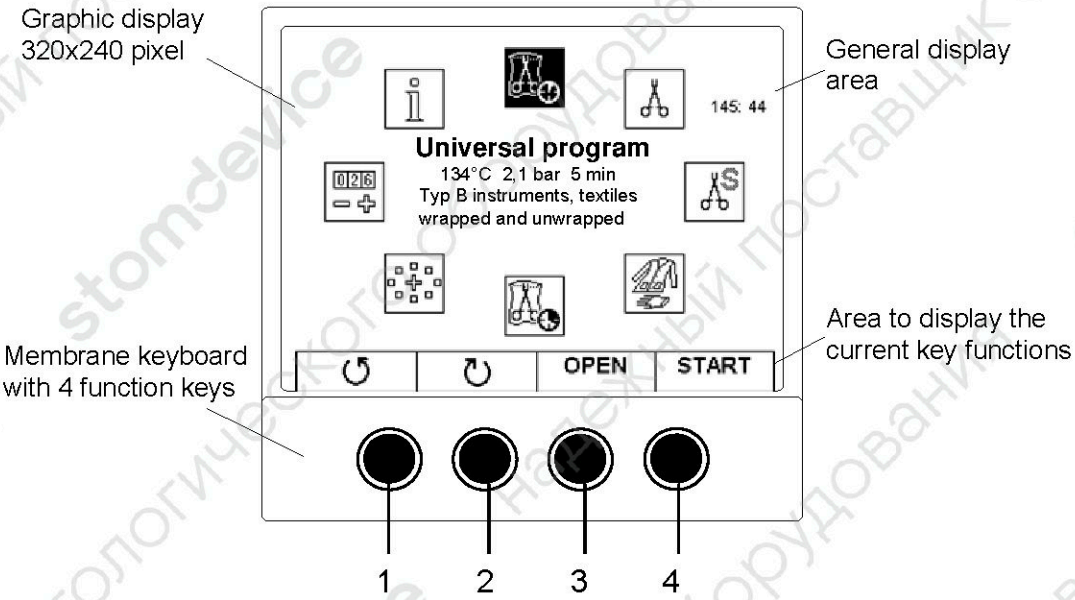
1 Safety valve casing
2 Sterile filter
3 Safety valve chamber
4 Cooling water inlet (3/4" external thread)
5 Cooling water inlet (3/4" external thread)
6 Purified water inlet (Swivel connection for 6x1 pipe, alternatively straight)
7 Mains power cable
8 Ethernet 3 (data connection)
9 Ethernet 2 (data connection)
10 Ventilator
11 Opening to start the vacuum pump
12 Power switch
13 Cover for opening in emergency cases
14 Ethernet 1 (data connection) *1)
15 Manual door opener
16 Adjustable front feet
17 Pressure gauge for pressure display of the double casing steam generator *1)
18 Reset button overheating protection *1)
19 Reset button motor circuit breaker *1)
20 Door (left-side hinge)
21 Control and display panel

*1) accessible at front panel if door is open

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1.2 Control panel



Control and display panel Vacu*quick*®14-B

The Vacu*quick*®14-B is basically controlled by means of the 4 function keys 1-4. The keys have been designed at „soft keys“, and their function depends on the current operating status of the Vacu*quick*®14-B. The current function is indicated directly above the relevant key on the display. In the above example:

Key 1: Program selection left turn (anti-clockwise)
Key 2: Program selection right turn (clockwise)
Key 3: Door opening, inactive function for Vacu*quick*®14-B (when pressed, a message indicates that the door be opened manually)
Key 4: Program - Start

1.3 Performance features of this autoclave

1.3.1 Fractionating pulsed vacuum procedure

A fractionating pulsed vacuum method involved the repeated evacuation of the sterilization chamber, alternating with the introduction of steam in order to ensure the necessary penetration of the items undergoing sterilization with superheated steam.
This means that even demanding sterilization tasks, involving for example sterilization of intricate instruments or large amounts of textiles, can be completed quickly and reliably.
Steam penetration can be demonstrated using the established Bowie&Dick Test or the Helix Test (Hollow A – equivalent to EN 867-5). The autoclave includes a special test program for this purpose.

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1.3.2 Programs for sterilization

The Vacu*quick*® 14-B includes 5 sterilization programs:

Program name	Sterilization temperature	Sterilization time	Program type acc. to EN13060
„Universal Program“	134°C	5 min	Type B
„Quick Program B“	134°C	3 min 30 sec	Type B for unwrapped items/ single wrapped items max. 1,5 kg
„Quick Program S“	134°C	3 min 30 sec	Type S only for unwrapped items
„Gentle Program“	121°C	20 min	Type B
„Prion Program“	134°C	20 min	Type B

For additional information on the application of the sterilization programs, please refer to section 4.4.

The user can at any time perform additional functional checks of the autoclave by running the Bowie & Dick Test for steam penetration, and the Vacuum Test for leak testing.

1.3.3 Double casing steam generation

The generation of steam by a double casing steam generator surrounding the sterilization chamber proper makes it possible to sterilise large loads of instruments or textiles in a very short time. It is not necessary to have any pauses between the sterilization runs, and overheating in the sterilization chamber is impossible.

1.3.4 One-way system/ Conductivity measurement/ Automatic water supply

The Vacu*quick*®14-B operates with a reliable one-way system, in which all the water from sterilization, including any contained impurities, is completely eliminated and purified water used for the next program run.
An integrated conductivity measurement system monitors the quality of the purified water.
For frequent operations, the demand for purified water can be met by a water purifier, e.g. MELA*dem*®47 or MELA*dem*® 40, which can be directly connected to the autoclave.
Provided the instruments to be sterilized are then also prepared carefully, stains on the load and soiling of the autoclave itself can be prevented.

1.3.5 Electronic monitoring system (EN13060)

The microprocessor in the Vacu*quick*®14-B makes it possible to monitor pressure, temperature and time continuously during a program by Electronic Parameter Control. The overall operating time can then be optimised according to the load and the temperature of the autoclave.
The process assessment and monitoring system in the program control compares current process parameters with standard process data and monitors the process relative to limit values for temperatures, times and pressures. This makes it possible to identify faults as they occur, and provides quality assurance for the sterilization and disinfection processes.

1.3.6 Vacuum drying

Vacuum drying ensures the best possible drying results for packed utensils.

1.3.7 Pre-heating

By means of the double casing steam generation principle, the temperature of the autoclave chamber is maintained at the same level permanently. This reduces the duration of cycles and improves the drying results.

1.3.8 Documentation

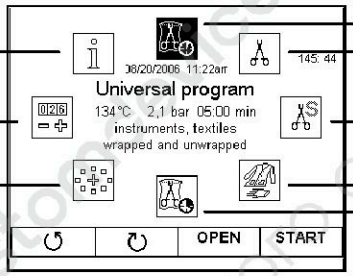
The dynamic administration of the protocol memory of the electronic control permanently stores up to 100 protocols (at least 40) of the last programs.
For effective documentation and for subsequent checking of the completed program, the protocols can be stored permanently on the MELA*flash* CF-Card via the internal slot, directly upon completion of the program or subsequently.

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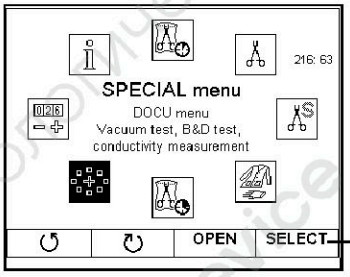
1.4 Overview menu structure Vacu*quick*®14-B

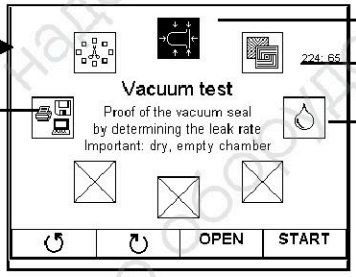
MAIN menu	Selection and start of the sterilization programs; access to the menus SPECIAL, SETUP and INFO



- Universal program
- Quick program B
- Quick program S
- Gentle program
- Prion program

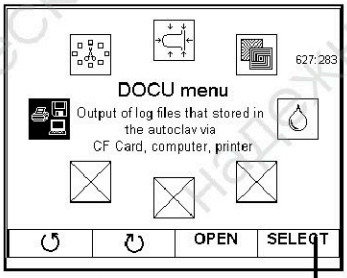
SPECIAL menu	Selection of the test programs; access to DOKU menu

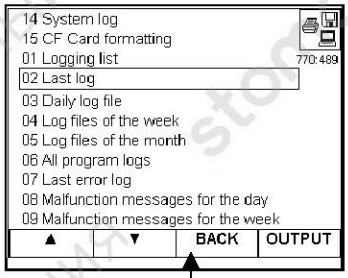




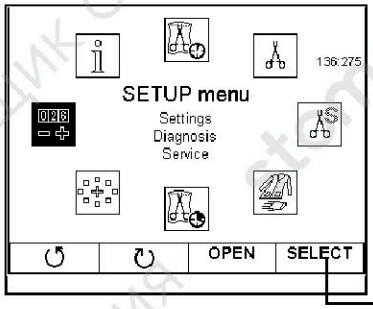
- Vacuum test
- Bowie & Dick test
- Conductivity meas.

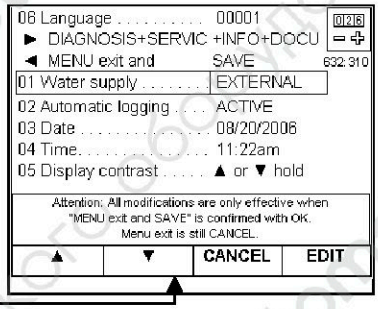
DOKU menu	Options for protocol output



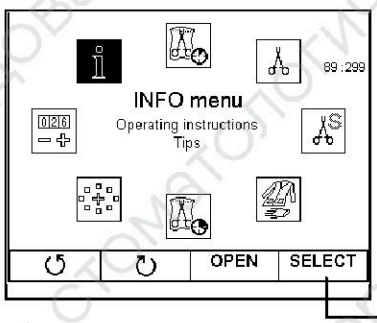


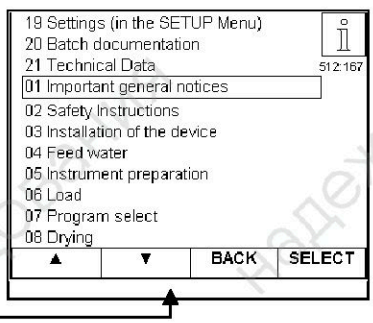
SETUP menu	Basic settings of the autoclave (date, time…) ; access to SERVICE menu





INFO menu	Information and help on autoclave operation





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2 Installation

When setting-up and installing the autoclave, please consult the separate instructions leaflet „Installing the Vacu*quick*®14-B".

2.1 Setting up the autoclave

The autoclave should be set up in a dry place which is protected against dust (air humidity :30-60%; ambient temperature: 16-26°C)
The base should be stable, and able to support the weight of the appliance (see 9.2).
The space required by the autoclave is indicated by its external dimensions (see section: 1.1) a minimum additional space of 10 cm should be allowed on either side and above the autoclave in order to ensure that heat can escape.
The electrical power supply should be a separate 230V AC circuit with a 16 A fuse and an RCCD (30mA).
The autoclave can be supplied with purified water manually from an external storage container (MELAG Art.-No. 244) or automatically by direct supply of demineralised water from the water purification systems MELA*dem*® 47 or MELA*dem*® 40. Please note that if the external storage container is mounted, the maximum level difference between the location of the Vacu*quick*®14-B and the storage container may not exceed 1.5 m.

2.2 Transport ribbons

Take the autoclave out of the packaging by means of the transport ribbons. The ribbons themselves are each removed by undoing the two retaining screws, which must then be screwed firmly back in place without washers.
By using a hex key to open the door mechanically via the cover Emergency
door opening (see *Figure 1*) or by electrical means. In order to open the door electrically, turn on the appliance with the power switch (see *Figure 1*)., if the appliance is switched off. Now, remove the protective wrapping from the trays and take out the accessories from the autoclave, if any.

2.3 Levelling the autoclave

In order to ensure that proper operation (complete draining of the condensate in the autoclave chamber), the appliance must be **clearly** higher at the front than at the back. The autoclave should first be installed in a horizontal position (check this at the chamber flange with a spirit level) and then the front feet should be extended by giving them at least 3 turns.

2.4 Cooling water inlet connection

The connection for the cooling water inlet at the back of the appliance is connected to the mains water supply using the pressure pipe supplied (see Fig. 3). Make sure that the washers are fitted correctly.
In order to avoid water damage in the event of leaks, we also recommend the installation of a leak detector („Water-stop", MELAG-Art.-No.:1056).

2.5 Cooling water outlet connection

The connection for the cooling water outlet at the back of the appliance is connected to the drainage system of the building by means of the outlet pipe supplied (textile-reinforced transparent pipe, DN16). It is important that the pipe should have a **steady downward gradient, without twists and kinks**.
When connecting to an existing sink outflow, the use of the double-chamber trap supplied helps to reduce noise due to water discharging.
When connecting to a separate outflow pipe NW40, a wall-mounted trap should be used (MELAG Art.-No. 37410, see page 9, Fig. 3).

2.6 Connection of the feed water storage container

If the autoclave is to be supplied with distilled or demineralised water from a storage container (see Fig. 3) then this will be drawn up through the suction pipe. The one end of the pipe is attached to the inlet at the rear of the autoclave, either directly or by means of the swivel connection. The pipe is then fed into the water storage container until its other end with the suction filter reaches the bottom.
If you use the MELAG storage container (MELAG Art.-No.: 244) you will find the necessary instructions on the label. This container has a volume of 11.5 litres, enough for an average of 25 sterilization cycles with full loads. At first operation, approx. 1.5 litres of purified water are automatically taken from the storage container in order to fill the empty double casing steam generator. Both for first and daily operation, we recommend ensuring appropriate storage of purified water. Low-cost supply of distilled water can be ensured with your own distillation appliance MELA*desti*®65.

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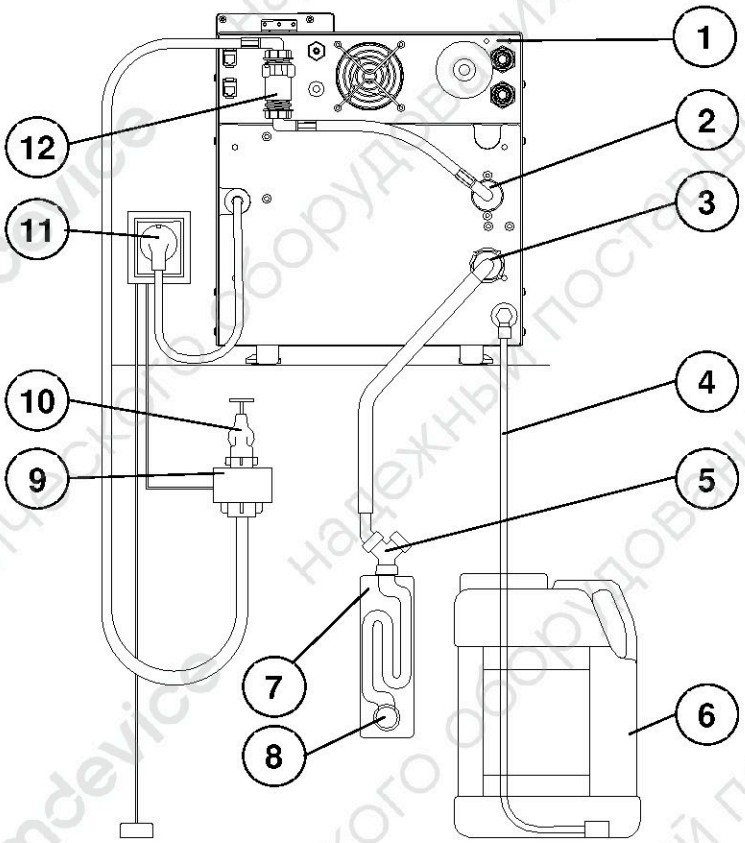


Fig. 3 Typical installation of the Vacu*quick*®14-B with storage container for distilled/demineralised water, with a wall-mounted trap

1 Rear view Vacu*quick*®14-B
2 Cooling water inlet pipe (pressure pipe)
3 Cooling water outlet pipe DN16
4 Feed water intake with filter
5 Y-junction with non-return valve (included in (6))
6 Storage container for distilled or demineralised water (MELAG Art.-No. : 244)
7 Wall- mounted trap (MELAG- Art.- No.: 37410)
8 Wall outlet (NW 40)
9 Leak detector with stop valve and sensor (MELAG Art.-No.: 1056)
10 Water stop cock with safety combination in accordance with DIN 1717 (MELAG Art.-No.: 37310)
11 Power connection
12 Backflow impediment (EN 1717)

2.7 Connection of a water purification system (option)

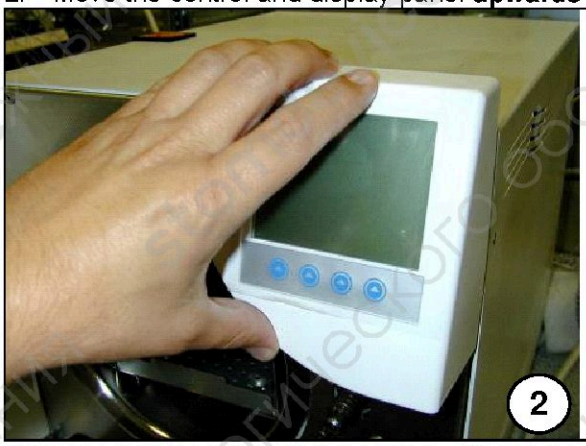
The autoclave can be connected directly to a water purification unit which provides the demineralised or distilled water required (see page 35, Fig. 4). Instead of connecting the feed water inlet to a storage container, it is simply connected directly to the water purification unit.
The reverse-osmosis systems MELA*dem*®47 and MELA*dem*®40 are ideally suited to provide the quantity and quality of water needed for the Vacu*quick*®14-B.
Detailed instructions on the installation of these water purification units are provided in their User Manuals.
When connecting water purification systems from other manufacturers it is very important to ensure that they are able to provide sufficient amounts of water at the required purity. You are generally advised to consult MELAG first.

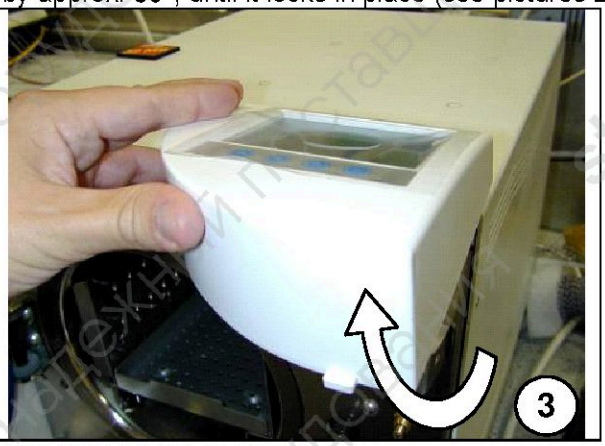
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2.8 Installing the MELA*flash* CF-Card (option)

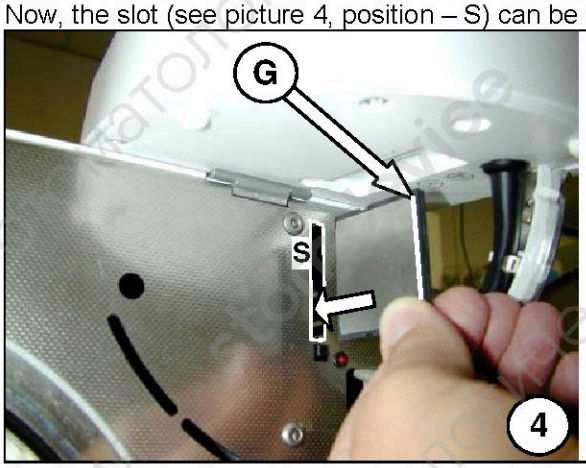
For documentation purposes (permanent storage of the program protocols), the MELA*flash* CF-Card can be installed in the internal slot (see picture 4, position - S – behind the display casing). Please proceed as follows:

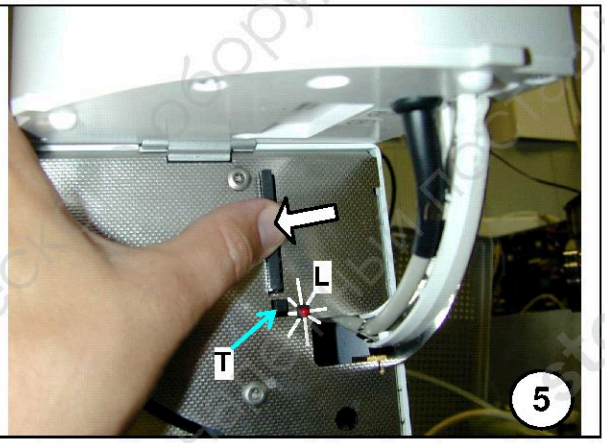
1. Open door.
2. Move the control and display panel **upwards** by approx. **90°**, until it locks in place (see pictures 2 and 3).





Now, the slot (see picture 4, position – S) can be accessed for the CF-Card.





3. The CF-Card must be inserted in the slot (**see picture 4**) with the **tangible edge (see picture 4, position - G) to the left** and pressed inside until it has **connected (red lamp -L- lightens up briefly – picture 5) (see arrow - picture 5)**. Do not press in the card violently; check the correct position of the card and insert it carefully in the slot again.
4. Next, move the control and display panel down again.
5. For removal of the CF-Card, repeat steps 1. / 2. and press the button (see picture 5, position – **T**).

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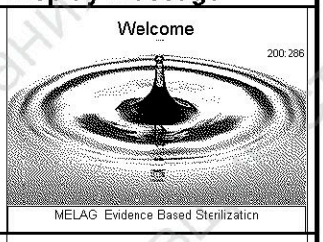
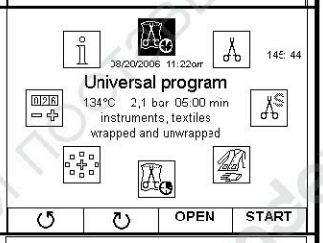
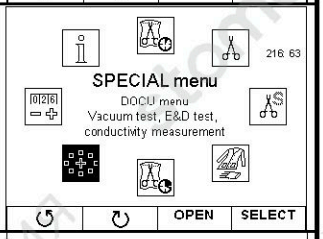
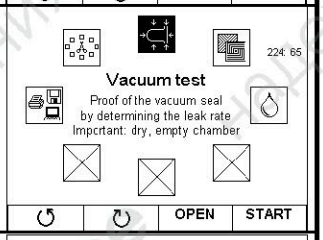
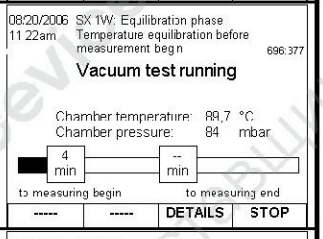
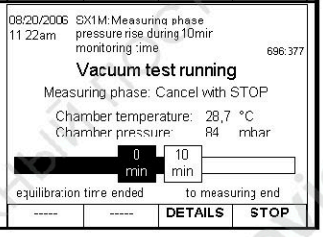
3 Initial start-up

3.1 Setting Immediate log output „Yes“ (option)

If the MELA*flash* CF-Card is used and you desire an immediate output of the protocols (recommended), the option „Immediate log output Yes“ must be set in the SETUP menu (see Section *6.4.2*).

3.2 Vacuum test

In order to check the operation of the autoclave in the course of the initial start-up, after long periods without being used, or after moves, as well as periodically during routine use, a vacuum test should be carried out to check for leaks. The vacuum test should be carried out as follows, preferably on the cold autoclave:

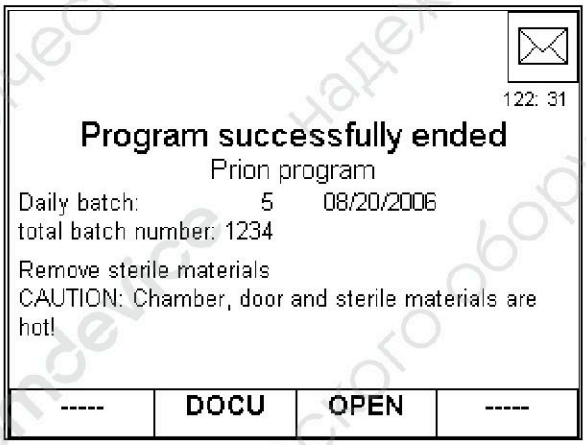
Operation/ Explanations	Display message
Turn on the Vacu*quick*®14-B with the power switch (Fig.1 pos. 12). While the initialisation window „Welcome“ is displayed, the software is initialised and the components of the appliance are checked.	
Next, the MAIN menu appears on the display for program selection. The double casing steam generator is filled automatically.	
Select the SPECIAL menu with the function keys	
Select the SPECIAL menu by pressing the button „SELECT“ The program „Vacuum test“ has already been selected in the SPECIAL menu.	
Start the vacuum test by pressing the button „START“ The chamber is evacuated to the vacuum test pressure. When the evacuation pressure has been reached, the equalisation period of 5 min begins	
Upon termination of the equalisation period, the pressure increase is measured over a measuring time of 10 min.	

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Operation/ Explanations	Display message
At the end of the measuring time, a check message shows the leakage rate Upon opening of the door and selection of the icon „Back“ you return to the MAIN menu from the SPECIAL menu	

3.3 Test run

In order to check the operation of the autoclave under realistic conditions, a test run should be carried out with the „Universal Program'' and a relevant load. After loading the autoclave and selecting the program with the function keys in the program menu, sterilization is started by pressing the „START“ button. If the program runs correctly, the following message will appear on the display (see Section: 4.6).



3.4 Installation protocol

As documentation that the autoclave has been set-up properly, an installation protocol should be produced by an authorised person and a copy sent to MELAG. This is important in the event that you wish to make claims under warranty provisions.

3.5 Safety instructions

- Warning! After inserting or removing the CF-Card, put the display back in a vertical position. If the appliance is used while the display is in the upwards position, the electronic components may be destroyed! Never disengage the CF-Card during read/write access to the CF-Card. Use only the original MELAG CF-Cards MELA*flash*. MELAG accepts no liability for interruptions, loss of data or other resulting damage if other CF-Cards are used.
- When opening the door, particularly after interrupting the drying process, residual steam can escape from the autoclave chamber.
- After opening the door, do not touch any metal surfaces - these will be hot! Danger of burns. Always use the tray lifter to remove hot trays, or wear suitable hand protectors when taking out other items
- In order to prevent water damage, we recommend installing a water leak detector in the cooling water inlet of the autoclave, and if a water purification unit MELA*dem*® 40 or MELA*dem*® 47 is connected, we recommend installation in the latter's water inlet (see installation details).
- If you intend to install a water purification unit from another manufacturer, then consult MELAG before you do so.
- The appliance is not suitable for sterilising liquids.
- Under current VDE regulations, this appliance is not suited for use in areas where there are risks of explosion.
- The appliance may only be serviced and repaired by MELAG or by its authorised representatives (specialist dealers or customer services) using only original parts and following service instructions.
- Before opening the housing always disconnect from the mains power supply!
- Warning! When the appliance has been switched off, the double casing steam generator continues to be under pressure for some time. Check visually at the pressure gauge!
- In order to ensure effective sterilization with the autoclave, observe the instructions in this User Manual, and in particular ensure that the loading of the autoclave is appropriate for the program selected.

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- The appliance is intended for use outside the patient environment (radius of 1.5 metres around the treatment location).

4 Instructions for all sterilization procedures

4.1 External supplies

4.1.1 Cooling water and purified feed water

The autoclave automatically monitors the availability of cooling water and purified water, as well as the quality of the distilled / demineralised water before starting a program.
In order to allow an immediate program start and to avoid error reports or interruptions of programs (see Sections: and 7.4) :

- Before the first sterilization at the start of the working day, check that the water supply is turned on (stop cock).
- If purified water is manually drawn from a storage container, check the water level, and if necessary fill up with purified water of appropriate quality (see Section: 8.3.2)
- If the feed water is drawn automatically from a MELA*dem*®47 water purifier, check that its water supply is turned on in good time (at least an hour before starting a program), if the water supply has been turned off over night, for example.

4.1.2 Mains supply

Switch on the power using the switch on the front of the autoclave (bottom right). When the initialisation has been successful (approx. 10 s), the display shows the MAIN menu for program selection, when the door is closed. When the door is open, a message is displayed requesting that the door be closed.

4.2 Loading the autoclave

It is of crucial importance for effective sterilization and good drying that the autoclave is loaded properly:
Please, follow the following basic instructions when loading the autoclave:

Tray rack
Normally, the autoclave should be used in conjunction with a tray rack, since this ensures optimised steam penetration and drying. In exceptional cases and after consultation with your specialist dealer or with MELAG (e.g. when using sterilization containers from other manufacturers), the tray rack can be removed and the container can be placed directly in the autoclave chamber.

Trays
Trays for objects which are to be sterilized must be perforated, in order to allow condensate to run away. MELAG-trays are recommended. We advise you not to use trays or dishes without perforations due to the less favourable drying results.

Enclosed sterilization containers
Enclosed sterilization containers must be perforated on at least one side (preferably underneath) or must have valves, in order to ensure that steam can penetrate and condensate can run out. All MELAG-sterilization containers meet these requirements by perforations on two sides in the lid and the bottom and filter-cloth-inlays.
Sterilization containers which only have perforations on the top are not recommended due to the less favourable drying results.
If sterilization containers are stacked in the autoclave, it is important to ensure that the perforations are not blocked.

Transparent sterilization packaging
If you use transparent sterilization packaging such as MELA*fol*®, then the items should if possible be stood vertically on the tray. They should never be laid flat one on top of the other.
If seals split open during sterilization, it may be necessary to increase the length of the sealing impulse or to use a double seal and the instruments must be sterilized again in a new wrapping.

Multiple wrapping
The fractionating pulsed vacuum method allows the use of multiple wrapping.

Maximum loads
Loads should not exceed the prescribed limits (see 9.2).

Mixed loads
If mixed loads of textiles and instruments are to be sterilized, then as far as possible the textiles should be above the instruments and direct contact with the instruments should be avoided.

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Inclusion of textiles and instruments in the same sterilization container is not desirable.
Textiles should never come into direct contact with the walls of the chamber.
If different types of packaging are included in a load, then:

- Instruments and sterilization containers should be placed at the bottom
- Transparent sterilization and paper packaging should be placed at the top (exception: at the bottom if combined with textiles)

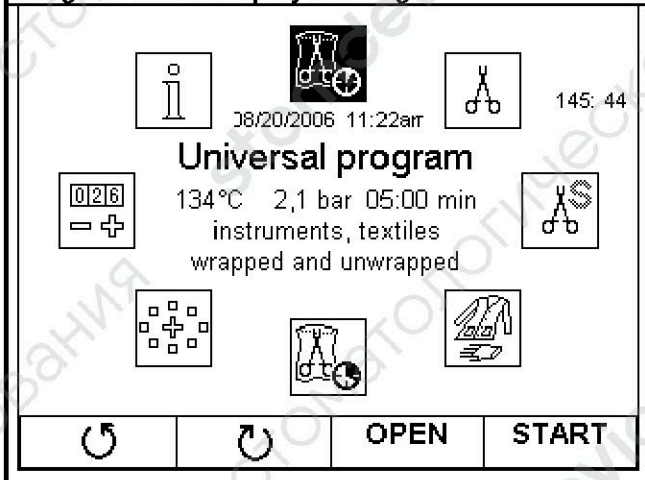
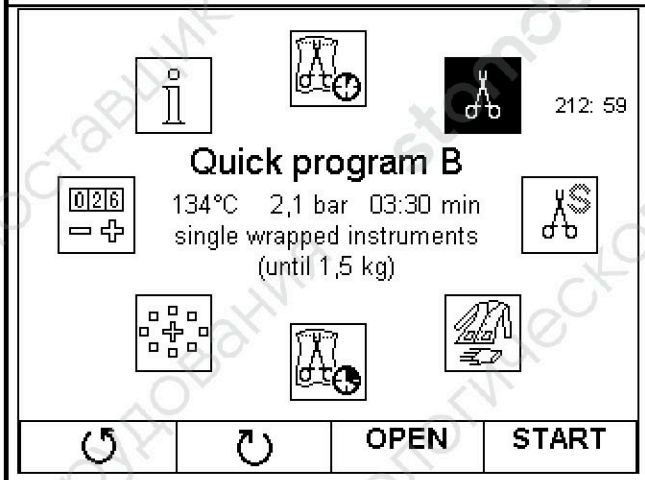
Liquids
The appliance is not suitable for sterilising liquids!
Suitability for sterilization
Relevant information provided by manufacturers of instruments and textiles about sterilization should be strictly observed.

4.3 Closing the door

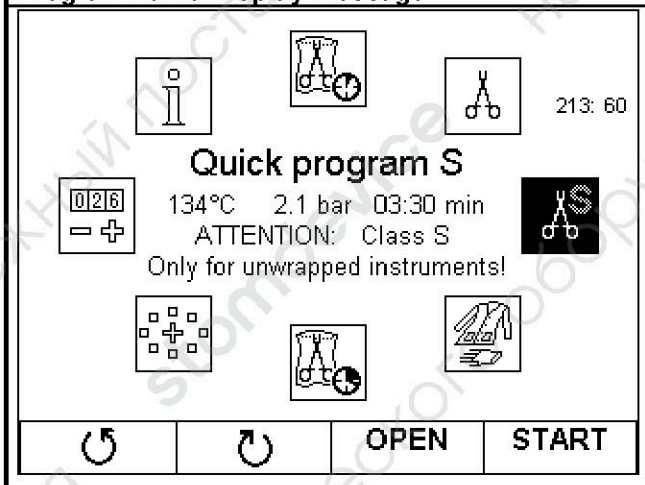
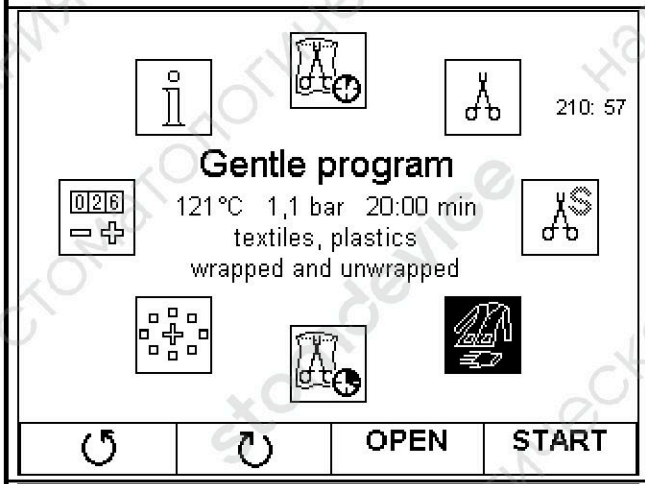
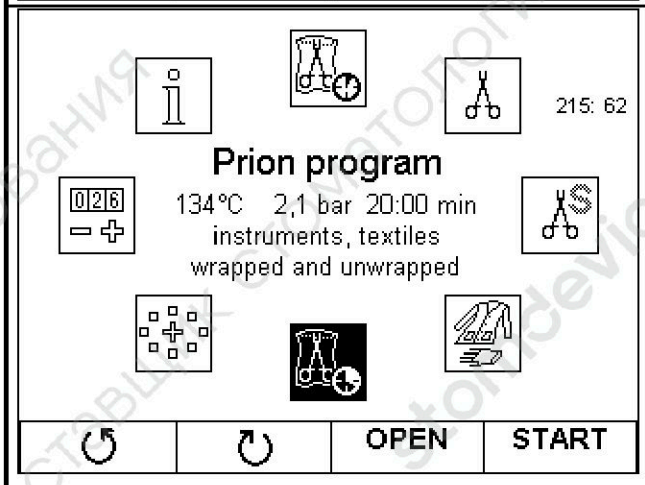
Close the door firmly by turning its lock grip. As soon as the door is closed, the display shows the MAIN menu for program selection.

4.4 Program selection

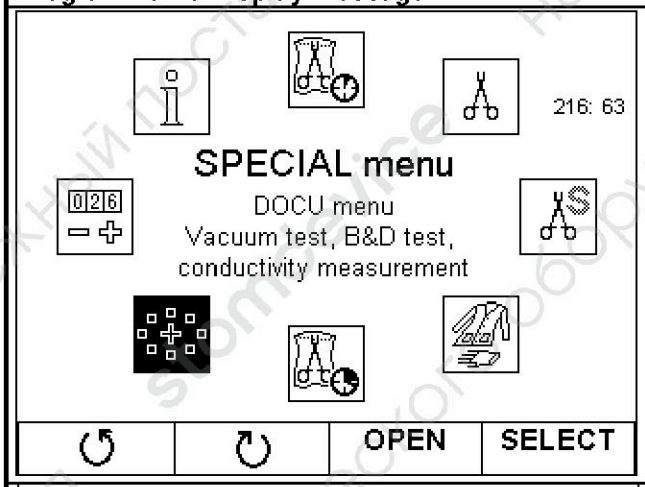
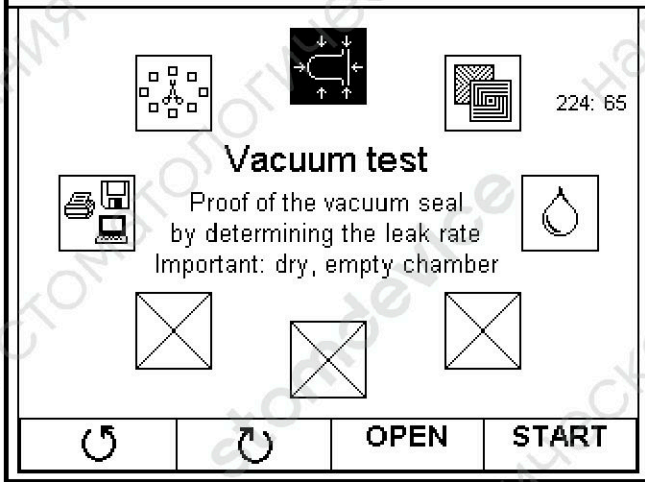
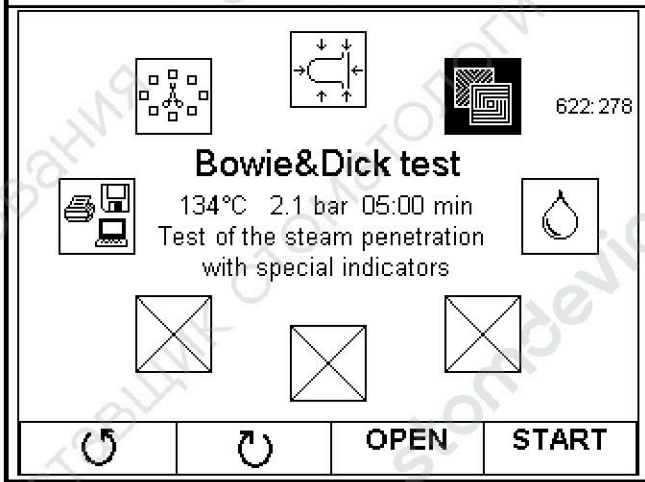
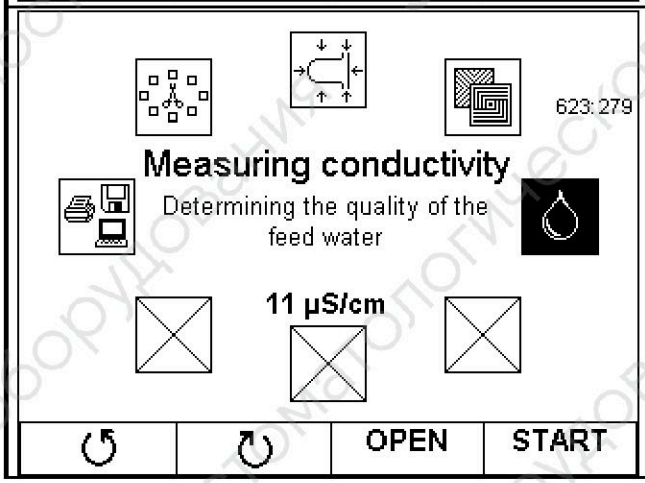
A program should be selected which is appropriate for the physical properties of the items being sterilized (and in particular their heat resistance) and the type of packaging (if any part of the load is wrapped, then either the „Universal Program", the „Prion program" or the „Gentle Program" must be used).
By pressing the function keys, it is possible to review the display of the following programs for selection:

Program name/Display message	Parameter/Application
	**Universal Program** at 134°C, 2 bar, and a sterilization time of 5 min for sterilization of all types of wrapped items, in particular instruments or mixed loads (wrapped/unwrapped), e.g. for long intricate hollow instruments („Hollow A" acc. to EN 13060, 1 ≤ L/D ≤ 750 and L ≤ 1500 mm for one-sided open bodies or 2 ≤ L/D ≤ 1500 and L ≤ 3000 mm for double-sided open bodies (does not correspond to the hollow body B) L … hollow body length D … hollow body diameter
	**Quick Program B** at 134°C, 2 bar and a sterilization time of 3.30 min for sterilization of unwrapped items, instruments or textiles for rapid re-use (interrupt drying manually if required), e.g. for long intricate hollow instruments („Hollow A" acc. to EN 13060).

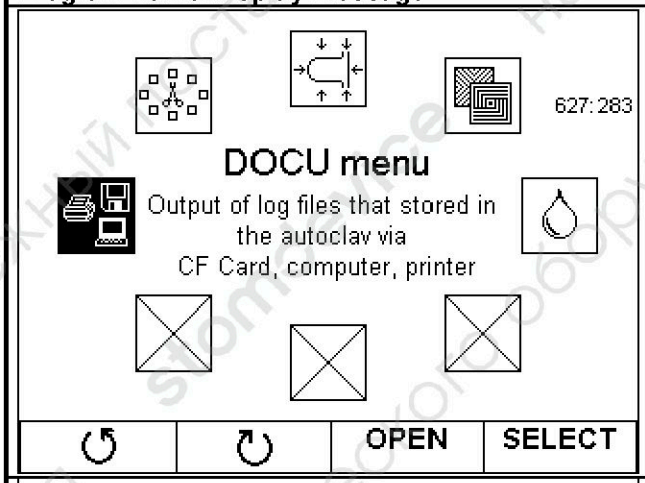
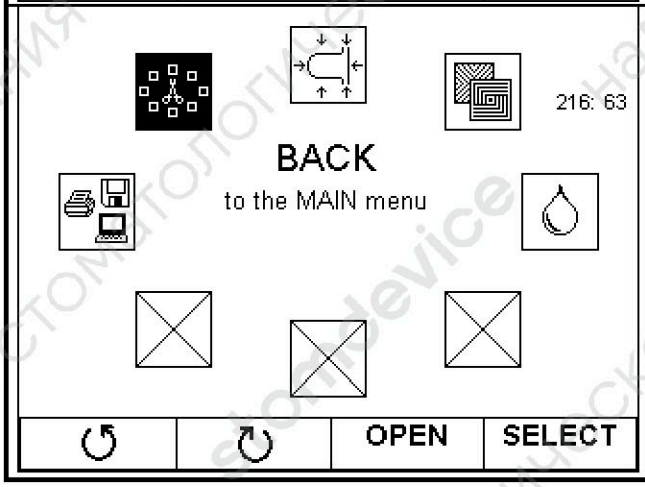
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Program name/Display message	Parameter/Application
	**Quick Program S** at 134°C, 2 bar and a sterilization time of 3.30 min for sterilization of **only unwrapped instruments** for rapid re-use (interrupt drying manually if required). For simple solid instruments or simple hollow instruments („Hollow B" acc. to EN 13060, 1 ≤ L/D ≤ 5 and L ≤ 5 mm for one-sided open bodies or 2 ≤ L/D ≤ 10 and D ≥ 5 for a double-sided open body) L ... hollow body length D ... hollow body diameter
	**Gentle Program** at 121°C, 1 bar and a sterilization time of 20 min for sterilization of all types of wrapped items, in particular larger amounts of textiles or thermo labile materials (plastics, rubber) or mixed loads (wrapped/unwrapped), also suitable for long intricate hollow instruments („Hollow A" acc. to EN 13060).
	**Prion Program** (a special Universal Program) at 134°C, 2 bar, and with sterilization time extended to 20 min, for sterilization of wrapped items, especially instruments or mixed loads (wrapped/unwrapped). This program is recommended for sterilization of instruments used in situations in which the danger of infection by pathologically modified proteins is suspected (Creutzfeld-Jacob; BSE), also for long intricate hollow instruments („Hollow A" acc. to EN 13060).

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Program name/Display message	Parameter/Application
	**SPECIAL menu** This menu contains all the programs used for checking the technical functions of the autoclave. You access this menu by pressing the „SELECT“ button (see following displays).
	**Vacuum test** Program Used to check the autoclave for leaks (proof of the vacuum seal by determining the leak rate), from a cold start
	**Bowie&Dick Test Program** at 134°C, 2 bar and a sterilization time of 3.30 min Used to check the operation of the autoclave (test of the steam penetration with special indicators)
	**Conductivity measurement** used to determine the quality of the purified water used for sterilization.

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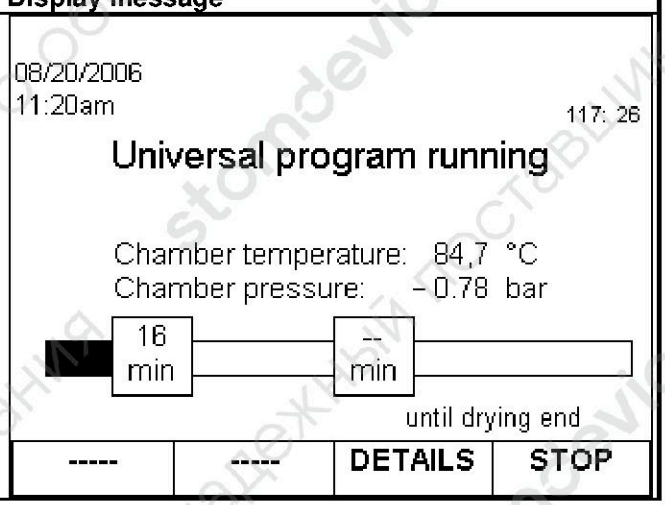
Program name/Display message	Parameter/Application
	**DOKU Menu** is used to set the options for protocol output
	Back to MAIN menu

4.5 Program start

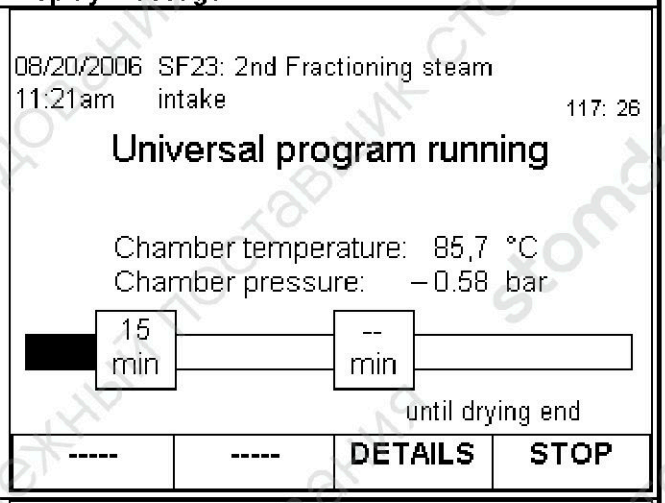
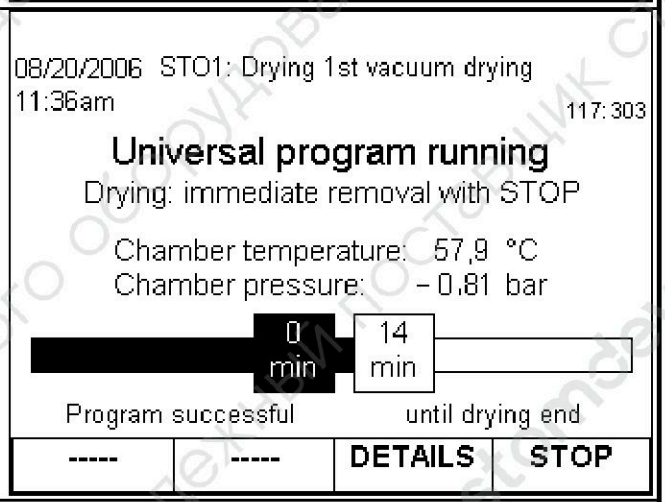
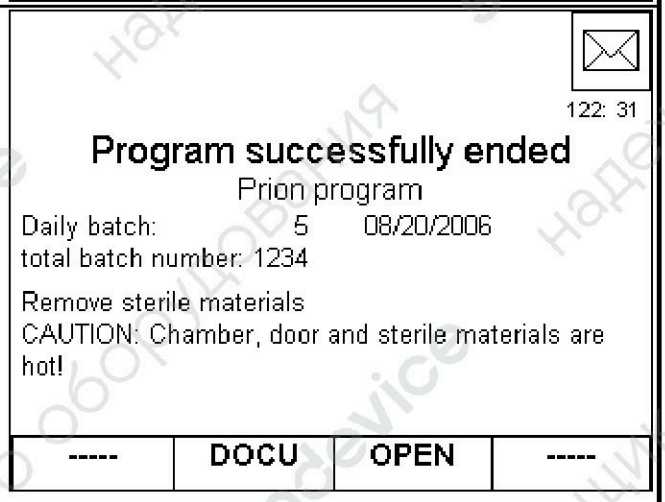
Press the "START" button to start the selected program. Once the program is started, the purified water is checked, including a conductivity measurement.
At the start of the „Quick Program S“, there will be an additional message „Warning: Only unwrapped instruments“ with a security enquiry for confirmation of this message.

4.6 Program progress

After starting the program, it will then progress automatically. The display shows the current program status as follows:

Program status	Display message
Evacuation phase covering several cycles : Evacuation (removal of air) until the appropriate evacuation pressure is reached, followed by steam introduction up to slightly above atmospheric pressure. Display of temperature and pressure in the chamber and time until end of sterilization. Note: By shortly pressing the „DETAILS“ button, additional information on the program status can be displayed. (This information is faded out again by pressing the button a second time for a longer period).	

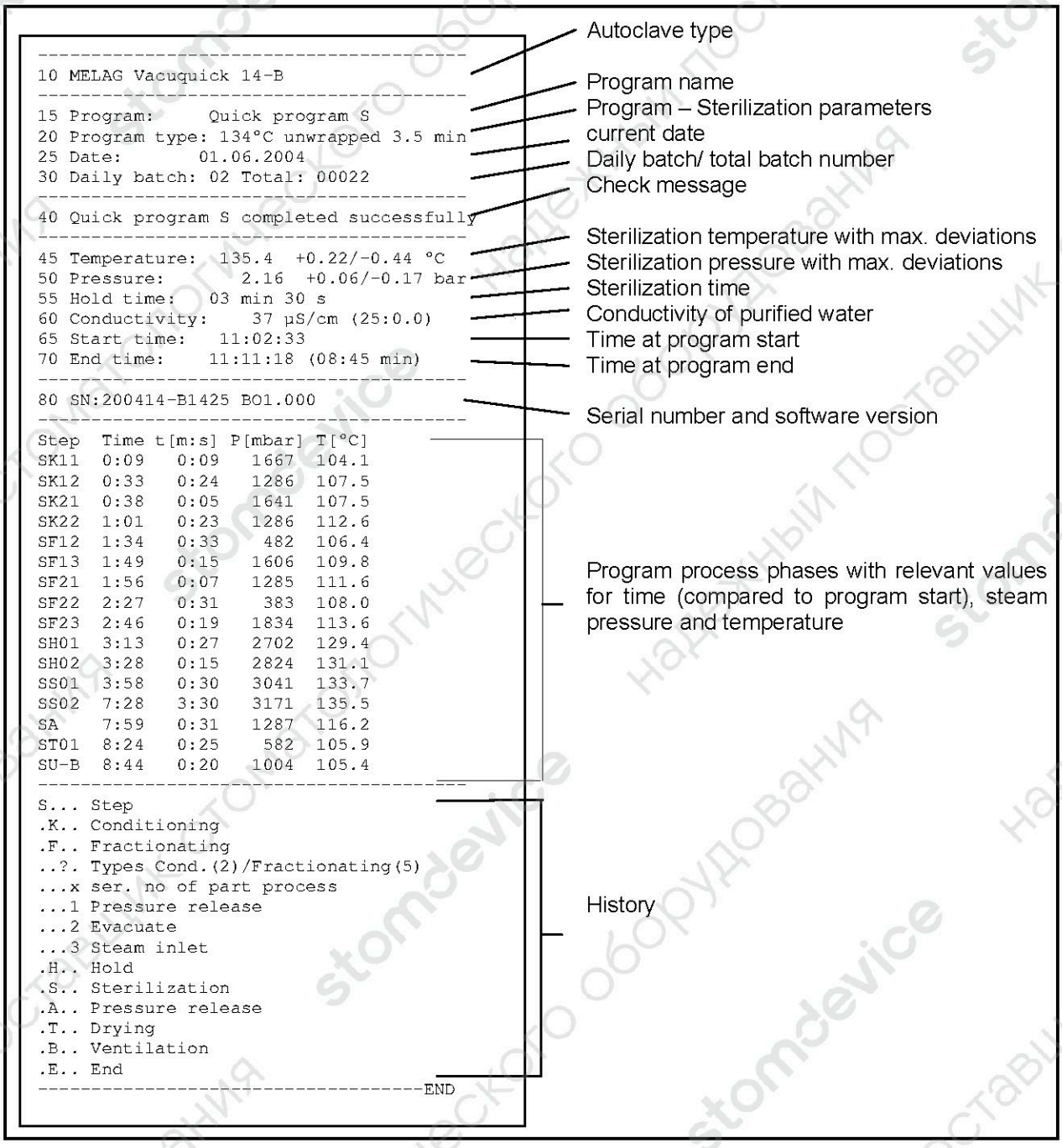
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Program status	Display message
Sterilization phase When the sterilization parameters Pressure and Temperature have been reached, the sterilization phase proper starts upon completion of the sterilization time. Display of temperature and pressure in the chamber and time until end of sterilization.	
Drying phase After pressure release the drying phase begins. At this point it is possible to stop the program without this leading to a fault being reported, since the sterilization itself is now completed. Except in the case of the „Quick Programs S or B", please wait until drying is completed. Display of temperature and pressure in the chamber and time until end of drying process.	
Program end After ventilation of the chamber the program is completed. When Immediate log output „Yes" has been set and the MELA*flash* CF-Card is installed, the protocol is stored on the CF-Card. By pressing the „LOG" button, a shortened protocol is shown on the display. After the door has automatically unlocked the door can be opened to remove the sterilized objects.	

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4.7 Protocol print-out

For each program cycle, a protocol is stored in the protocol memory of the Vacu*quick*®14-B. If the MELA*flash* CF-Card is installed and the option „Immediate log output „Yes“ has been set (in the SETUP menu), this protocol is automatically copied to the MELA*flash* CF-Card upon completion of the program. Use the DOKU menu to copy protocols to the MELA*flash* CF-Card subsequently. Use a PC to view/print out the protocols subsequently.
Protocol print-outs contain the following information:



4.8 Removing the sterilized items

Nach dem Öffnen der Tür kann das Sterilgut entnommen werden.
Warning! Danger of burns! Do not touch the hot chamber or the dear without protective gloves. Use the MELAG tray lifter (securely fixed on the inner part of the door) or suitable hand protection when removing the trays.

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4.9 Sterile storage

After removing wrapped sterile items, the wrapping should be checked for any signs of damage. If the wrapping is defective (e.g. split seals), repeat the sterilization of the relevant items. In case of repeat sterilization, the items to be sterilized must be wrapped again!
It is important for sterile storage that the items have been properly dried. The Vacu*quick*®14-B provides very good drying if the program has not been interrupted before its completion and the autoclave has been properly loaded (see Section 4.2). Directly after sterilization there may still be residual condensation on the items or the container. However, heat transfer from the sterilized objects can evaporate this after the sterilization process has been completed. The German industrial standard DIN 58953 Part 7 Section 7 contains the following comment about residual moisture on paper wrapping or transparent sterilization paper after sterilization: "...small amounts of water on the wrapping are unproblematic, provided they have evaporated within 30 minutes after removal from the steam steriliser....."
Wrapped sterilized objects should be stored in a place where they are **protected from dust** (e.g. instrument cupboard). Given proper storage, DIN 58953 Part 8 states a maximum storage period of six months for sterilized objects (e.g. transparent sterilization packaging).

4.10 Sterilization frequency / pauses

After completing or terminating the drying phase, the autoclave can be reloaded and started immediately. No pauses in operation are necessary.

4.11 Manual termination of program

4.11.1 Termination of sterilization

A program can be terminated prematurely at any time by pressing the „STOP" button and confirming the security inquiry. If the program is interrupted before it has arrived at the program step „Drying", the items are considered **non-sterile** and an error report is displayed.
Warning! Depending on the previous status of the appliance, steam may be released, when the door of the autoclave is opened.

4.11.2 Terminate drying

A program can be terminated at any time after starting of the program step „Drying". Since the sterilization proper has been completed, the items are sterilized at this point. Drying is crucial for sterile storage. Depending on when the drying phase was terminated, in particular in the case of wrapped sterile items, insufficient drying must be expected. We therefore recommend that you do not interrupt the drying process for wrapped items in the „Universal Program", the „Prion Program" and the „Gentle Program".
With the "Quick Program" it may be desirable to interrupt the drying program so that items can be used again. The unwrapped instruments are removed upon termination of the program and will dry as they are cooling down.
Warning! Depending on the previous status of the appliance, steam may be released, when the door of the autoclave is opened.

4.12 Reaction to warning and error reports

The Vacu*quick*®14-B has a number of safety features and an extensive integrated control and monitoring system, in order to ensure the greatest possible level of safety for the sterilization process, and to eliminate risks for the patients and operators.
Various aspects of the operation of the appliance, such as pressure and temperature sensors are automatically checked when the autoclave is switched on.
Other preconditions for secure running of the program such as availability of the operating means in sufficient quantity and quality are checked as a condition for program start, so that the program will not start if these conditions are not fulfilled.
A successful program start is followed in the next stages by the monitoring of all parameters of relevance for the sterilization.
In addition to messages, warning or error reports on the display, an error protocol is displayed in case of program interruptions.

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4.13 Operational pauses

During operation, when the appliance is switched on, the door ought to be closed during operational pauses in order so save energy and to maintain the temperature of the double casing steam generator between sterilization cycles.
In the event of longer breaks (over night, weekend, holidays) turn off the power switch and leave the door ajar in order to protect the door seal and prevent premature wear or gluing. Turn off the cooling water inlet and, if any, the water inlet of a water purification unit.

5 Closing down / Transport / Reinstallation

When closing down and transporting the autoclave you should proceed as follows:

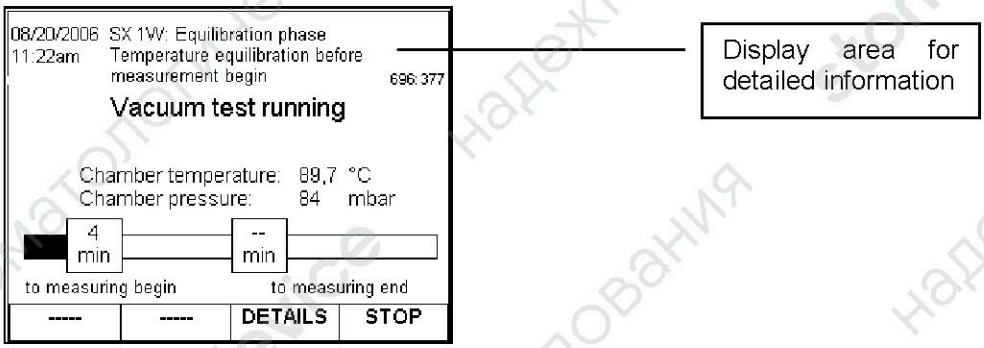
- Switch off the power.
- Disconnect from the mains power supply; allow the autoclave to cool down.
- Turn off cooling water inlet and purified water inlet (in the case of automatic water supply)
- Disconnect pipes at rear of autoclave.
- If transporting the autoclave with trays and tray rack assemblies in place, then protect the inside surface of the door by including a sheet of foam or similar material.

Warning! To avoid damage use the original packaging when transporting the autoclave.
If the appliance may be exposed to frost in transit then follow the relevant service instructions!

6 Special functions

6.1 DETAIL feature

Upon starting of a program, additional information on the current program can be displayed by pressing the „DETAIL“ button briefly.



This information is faded out when you press the „DETAIL" button again for longer.

6.2 Selecting extra drying

The standard drying times for the various programs provide adequate drying if the autoclave has been loaded correctly (see Section 4.2). Nevertheless, with certain loads residual moisture may remain. By selecting the „Extra drying" feature, the drying time can be extended by 50%. To do this, press the „START“ button (for more than 1 second) prior to starting a program, until the display shows the symbol for the selected extra drying feature



above the button. Then, the selected program can be started with an extended drying time. The feature „Extra drying” is only active for one program start. If the extra drying has been activated by accident, it can be deactivated by pressing one of the function keys.

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6.3 Protocols / Batch documentation

In order to document the sterilization programs, the processor memory of the autoclave stores approx. 100 programs depending on the protocol size.
These protocols can be stored on the MELA*flash* CF-Card immediately or later via the internal slot (accessible when the display is turned upwards). The protocols can then be printed out or archived using a PC.
We recommend setting the option „Immediate log output Yes“, since the automatic storage of the protocol to the CF-Card at the end of a program stores the current (Windows) file attributes Date and Time at the time of program end. If the protocols are stored later, the file attributes Date and Time all would be identical (corresponding to the current time/date when storing them).
If the protocol memory of the Vacu*quick*®14-B is full, the following message is displayed: „Warning Protocol memory full“ with an option to delete the protocol memory and the option to first store the protocols on the CF-Card (via the DOKU menu).

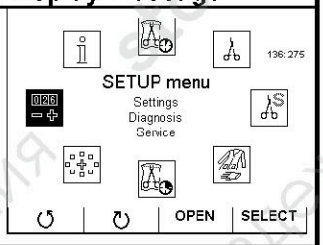
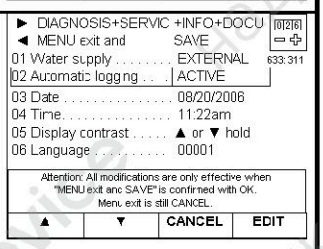
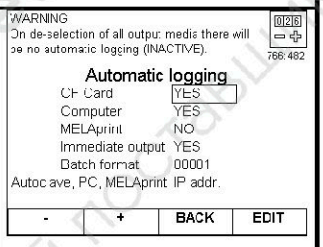
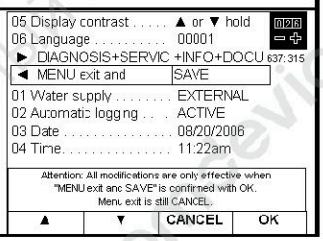
6.4 Protocol output

6.4.1 Installing/ removing the MELA*flash* CF-Card

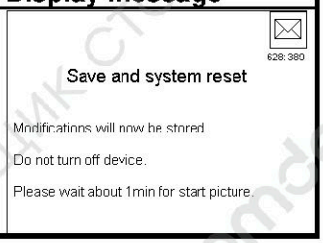
Installation: See 2.8
Removal: Below the slot, you will find a button to remove the MELA*flash* CF-Card and a checking display if you want to access the storage medium.
For removal of the MELA*flash* CF-Card, press the button and pull the card out of the slot.
Warning! Move the display down again after having inserted or removed the MELA*flash* CF-Card. If the appliance is used while the display is in the upwards position, the electronic components may be destroyed! Never disengage the MELA*flash* CF-Card during read/write access to the MELA*flash* CF-Card. Use only the original MELAG MELA*flash* CF-Cards. MELAG accepts no liability for interruptions, loss of data or other resulting damage if other MELA*flash* CF-Cards are used.

6.4.2 Immediate log output Yes/No

For automatic protocol output to the CF-Card at program end, the option „Immediate log output'' must be set to „Yes'' in the SETUP menu. Proceed as follows:

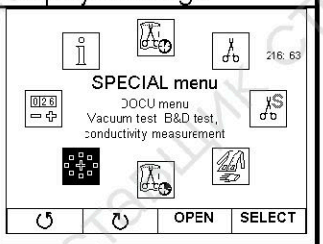
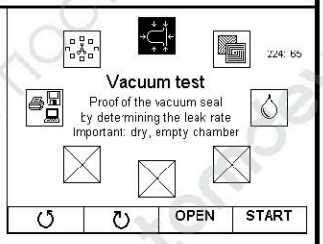
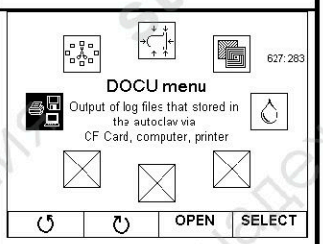
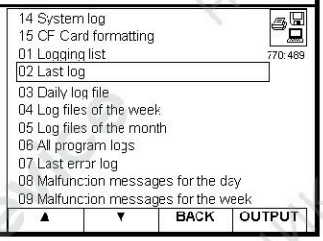
Operation/ Explanations	Display message
Select the SETUP menu in the MAIN menu with the function keys. Select the SETUP menu by pressing the button „SELECT“.	
Select the menu option “Automatic logging” with the function keys. And activate the point by pressing the „EDIT“ button. The current selection is shown inverted. When the Info-Display appears push the key CONTINUE to get into the setting menu	
Press one of the arrow keys to choose the output medias and “Immediate output YES”. Press EDIT to change the settings. Save and leave the menu by pressing BACK.	
Finally, highlight „MENU exit and SAVE“ with the function keys and confirm the modification by pressing „OK“.	

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Operation/ Explanations	Display message
During the corresponding window display, the performed modifications are stored permanently.	

6.4.3 Subsequent output of stored protocols

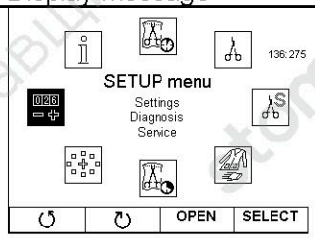
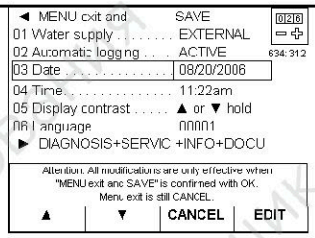
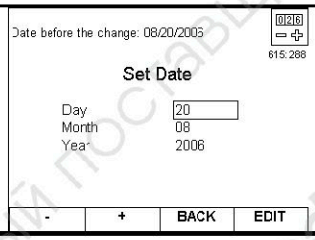
Via the DOCU menu, you can subsequently store protocols from the internal memory to the MELA*flash* CF-Card.
Proceed as follows:

Operation/ Explanations	Display message
Select the SPECIAL menu in the MAIN menu with the function keys. Select the SPECIAL menu by pressing the button „SELECT“.	
Select the DOCU menu with the function keys.	
Select the DOCU menu by pressing the button „SELECT“.	
Now use the function keys to select the desired protocol types/groups and press the „OUTPUT“ button to store them on the CF-Card.	

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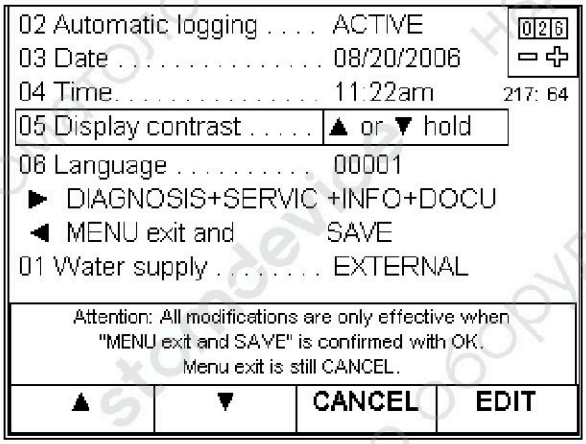
6.5 Setting date and time

Use the SETUP menu to set the date and time if necessary (e.g. winter time/summer time) as follows:

Operation/ Explanations	Display message
Select the SETUP menu in the MAIN menu with the function keys. Select the SETUP menu by pressing the button „SELECT“.	
Select the menu option Date or Time with the function keys and activate it by pressing the „EDIT” button Now use the function keys and „EDIT“ or „OK“ to set the desired date (see also the procedure for setting the immediate log output described earlier).	
Press “BACK” and terminate the SETUP menu by pressing „exit and SAVE“.	

6.6 Contrast setting

In order to set the display contrast, select „Display contrast“ in the SETUP menu.

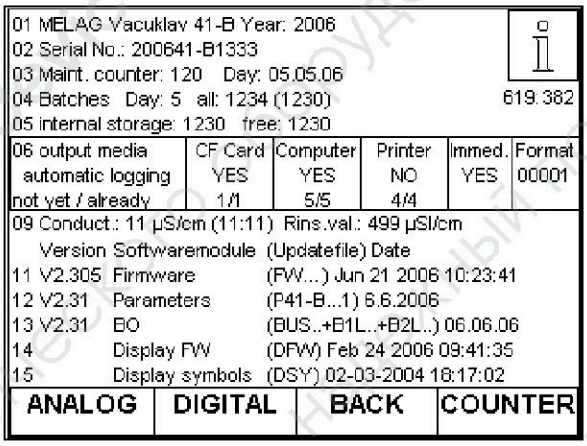


Increase or decrease the display contrast by pressing the function keys (for a longer time). Store the desired contrast setting permanently by exiting the SETUP menu via „exit and SAVE“.

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6.7 Counter status

In the INFO menu, the counter status and other current technical data of the Vacu*quick*®14-B can be queried and viewed on the display. Select the menu option „Technical data“ in the INFO menu. The following information is displayed:



6.8 Program modifications

The standard programs are designed to meet most practical operational needs (sub-atmospheric pulsing, heating, sterilization, pressure release, drying, and ventilation) and to display the parameters of most interest (pressure, temperature, time).
The operator is responsible for ensuring that the autoclave is not overloaded, and that the load is arranged properly to ensure good drying.
The standard option „Extra drying" serves to influence the program progress.
Other program modifications are possible in individual cases (and within the warranty of sterilization effectiveness), but should only be carried out by authorised personnel. Please consult your specialist dealer or MELAG.

6.9 Acoustic signals

The Vacu*quick*®14-B is equipped with acoustic signalling. Below, we have listed the various signals and their significance:

Signal	Significance
1 x very short (0.1 s)	Confirmation of button activation (the button’s electrical contact)
1 x long (0.5s)	Warning or message is displayed
2 x long	Door open (repeated every 30 s)
3 x long	„Warning Program termination“ or „Termination completed“
5 x long	Program completed successfully
10 x long	Error

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7 Operational errors / Malfunctions

7.1 What to do if the autoclave malfunctions

If the autoclave does not seem to be working properly (e.g. poor drying, warnings, or error reports) then follow these instructions in order to exclude possible operational errors.
Following these instructions continue to work with the autoclave. If the malfunction occurs repeatedly then contact our dealer, and authorised MELAG customer service or contact MELAG directly. You should describe the problem precisely and include the works number of your appliance.

7.2 Malfunctions without display messages

7.2.1 No display

After switching on the autoclave, the display should first show the initialisation window and next the MAIN menu or, if the door is open, the message „Please close door“ should appear.
If there is no display: Check:
Is the cable plugged into the mains?
Is the mains supply OK? (if necessary check with another appliance).

7.2.2 Poor drying

Good drying depends only on the correct operation of the autoclave, but also on the way the autoclave is installed and loaded. If drying is not satisfactory:

- Check the correct installation of the autoclave. If necessary, turn the feet of the appliance so that it is higher at the front than at the back.
- Check that the condensate backflow is not blocked by dropped instruments, filter paper, etc. on the chamber floor.
- Check that the maximum load has not been exceeded (particularly for textiles), that the autoclave has been loaded properly for optimum drying (no direct contact with the walls of the pressure chamber), and that the appropriate tray-rack assembly has been used (see Section 4.2).
- Start with „Extra drying'' (see Section: 6.2)

7.3 Warning messages

In order to maintain proper operation of the autoclave, warning messages and appropriate operating instructions are displayed via the process monitoring, where needed. Below please find some of the messages listed.

Event	Warning message	Cause / Remedy
	Warning 231 No CF-Card in the slot Required, when Immediate log output =YES	„Immediate log output Yes“ has been set in the SETUP menu and the CF-Card is not installed. Install CF-Card or set „Immediate log output No“ in the SETUP menu.
	Warning 239 No more directory entries possible	The maximum number of approx. 500 entries (protocols) has been reached on the MELA*flash* CF-Card: Store protocols externally (on a PC), next delete protocols or store in a separate directory
E 63	**WW12**: Conductivity insufficient Start no longer possible! Fill in new feed water or exchange mixed bed resin of MELA*dem*®. Next, check conductivity or start again.	The conductivity of the feed water determined automatically during a program cycle when filling the appliance again, exceeds 65 µS/cm. The program completes its cycle, however. The message then appears at termination of the program. When water is supplied from water purification units: MELA*dem*®40: Renew mixed bed resin MELA*dem*®40: Renew mixed bed resin, complete servicing of the unit, where needed

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Event	Warning message	Cause / Remedy
E 65	**WW13**: Conductivity insufficient Operator measurement: Start no longer possible! Fill in new feed water or exchange mixed bed resin of MELA*dem*®. Check by means of conductivity measurement or start again.	See WW12 , due to manual measurement, message appears in SPECIAL menu, however
E 72	**WW14**: Conductivity poor! Operator measurement: Feed water quality reduced. Please ensure good quality ASAP! The autoclave can still be started, but not if the poor quality is maintained.	See WW15 , due to manual measurement, message appears in SPECIAL menu, however
E 73	**WW15**: Conductivity poor. Do you still want the program to continue for now? Improve quality ASAP! (Warning message in START menu)	The conductivity of the feed water determined automatically during program start, exceeds 40 µS/cm. When water is supplied from water purification unit: MELA*dem*®40: Renew mixed bed resin MELA*dem*®40: Renew mixed bed resin, complete servicing of the unit, where needed
E 74	**WW16**: Conductivity poor Feed water is still transported for now by pressing QUITT. Improve quality ASAP! (Warning message in STANDBY)	See WW15, message is displayed in STANDBY menu, however
E 75	**WW17**: Conductivity poor Feed water quality reduced. Fill in new feed water ASAP or exchange cartridge of MELA*dem*®! The autoclave can still be started, but not if the poor quality is maintained.	See WW15, due to conductivity measurement during the program cycle, message is displayed at termination of program, however
E 76	**WW21**: Rinsing value poor Automatic cleansing not performed or insufficient. If this warning is repeated, please inform Service!	The double casing steam generator was not rinsed successfully. Therefore, the rinsing value has exceeded a limit value. Fill up storage container to max.
E 192	**WA2** > Rinsing required Please fill up the feed water tank with demineralised water for maintenance rinsing!	This message is displayed at longer intervals, if the water supply has been set to „Internal“, depending on the sterilization frequency and water quality (conductivity). The double casing steam generator is then automatically drained fully during the following program cycle. The storage container must be filled up completely for the subsequent new filling.
E 67	**WW22**: Rinsing value insufficient Have the preconditions for rinsing really been met? If the rinsing process continues to be ignored, spots may form and the appliance be worn down rapidly.	See WW21 „Rinsing value poor“. The rinsing value has exceeded another limit value
	FD 218: Protocol already existing You tried to overwrite an existing protocol with this name (write protected). Empty data carrier and OUTPUT again.	When protocols are automatically stored on the CF-Card or are subsequently stored manually in the DOKU menu, this error report is displayed if a protocol with the same name already exists. Empty CF-Card (copy existing protocols to different data carrier).
E 181	**W-AT** > Display too hot Please keep door closed!	The display temperature has exceeded a limit value. Do not use the autoclave while the display is turned upwards. Avoid direct sun on the display. Ensure sufficient ventilation space when installing the appliance.

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Event	Warning message	Cause / Remedy
E 134	**WV3** > Vacuum performance reduced (area 3)	This message appears at termination of a program when the evacuation times exceed a limit value. This may be caused by reduced performance of the pump system or by leakage. Carry out vacuum test, inform Service
E 129	**WE3** > Steam inlet speed reduced! Possible causes: > Voltage of power mains supply too low when loaded > Reduced heater performance > Steam valve entry too small (area 3)	This message appears at termination of a program when the steam inlet times until reaching the appropriate value above atmospheric pressure exceed a limit value. Voltage at mains power supply too low when loaded. Door seal defective, steam escapes

7.4 Error reports

If the process monitoring shows deviations or if components are defective and hence do not ensure secure operation/ sterilization security of the autoclave, error reports are shown on the display.
Error reports are generally displayed, showing the „Error number" and the applicable „Error designation". In the case of operating errors, operating instructions are shown in addition.
Error reports may occur without a program start (when the power is switched on or soon after), or during a program.
If errors are reported during a program cycle, the program is terminated in addition to the error report; depending on the pressure conditions, either when the error occurred coinciding with an automatic pressure release including the pressure release from the double casing steam generator, or when the chamber is ventilated. As soon as the program has been interrupted, the error report must be confirmed by pressing „QUITT" and „OPEN" at the same time. If a program has been prematurely terminated in this way the autoclave load must always be regarded as being **not sterilized**; repeat the sterilization in this case.
An interruption protocol is automatically stored in the internal protocol memory.
If the option „Immediate log output Yes" has been set, the interruption protocol is automatically stored on the MELA*flash* CF-Card.
The following list shows some of the error reports, their cause and possible remedies.

Event	Warning message	Cause / Remedy
E 61	**FW11** > no feed water supply	While feed pump is running, the measurement turbine does not register supply or insufficient supply. In the case of manual water supply: Suction tube bent, suction filter obstructed or not submersed in water In case of supply from a Mela*dem*®: Check water inlet cock, check availability of water If air suction is running and the double casing steam generator is under pressure: Switch off appliance and cool down until pressure equals „0"
E 64	**FW12**: Conductivity insufficient	Message appears together with program start, if the maximum allowed conductivity is exceeded. The program start is interrupted. Usually, a corresponding warning message appears in STANDBY
E 103	**FB1** > Ventilation monitoring time	Monitoring time for ventilation was exceeded Sterile filter clogged, if empty sterilization runs properly without sterile filter, install new sterile filter
	FDXU > Error in door system, occurred in the automatic or manual door process, if no plausible switch positions (door contacts 1 and 2) are registered	No plausible contact positions of the door contact switch 1 (activated by door) and of the door contact switch 2 (activated by contact bolt) Check whether door contact bolt has been caught in the front panel or whether the door contact switch is still mounted securely in the front panel.
E 110	**FRM2**: Monitoring time temperature regulation	Message appears in STANDBY, if the preheating temperature of the double casing steam generator is not reached within the monitoring time. Press reset button of the overheating protection button (see Fig. 1) at the front panel

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Event	Warning message	Cause / Remedy
E 113	**FUN1** > Power failure	The error report appears when the appliance is turned on in case of earlier power failure during a running program. Do not turn off the appliance at the power switch if the program is still running Check the mains power supply installation, connect the appliance to a separate power source.
E 125	**FV0** > Vacuum performance (minimum pressure) insufficient	The error report appears at each evacuation in the program cycle and at vacuum test, if the monitoring time until reaching the minimum pressure has run out. Check appliance for major leakage (e.g.: door not sealed properly) Pump may be blocked (long standstill) : Press motor circuit breaker (see Fig. 1) and use screw driver in the opening at the right hand side of the appliance to disconnect pump (first disconnect from power mains supply).
E 124	**FV5** > Vacuum performance (limiting pressure) insufficient	The error report appears at each evacuation in the program cycle and at vacuum test, if the monitoring time until reaching the limiting pressure has run out. Leakage at door, clean seal or pump blocked (see FV0)
E 135	**FW40** > No cooling water! The vacuum pump is not supplied with cooling water. Please ensure sufficient water supply! Open water cock or water stop, check connections and tubing.	The measurement turbine for monitoring/measuring the cooling water quantity does not register cooling water inlet. Follow instructions on display.
E 180	**FD14 >** Door lock (14-B, 13-B) Move the hand wheel in order to release the contact bolt. In future, please do not use the hand wheel after locking the door!	The monitoring time for door opening was exceeded. This may be due to the door contact bolt having been caught, if you tried to turn the lock grip after starting the program.
E 187	**FA5** > Pressure release speed insufficient	The monitoring time for pressure release was exceeded. Water outlet tube bent Pressure release filter (internal) obstructed (maintenance needed)

8 Taking care of your autoclave

8.1 Preparation of instruments

MELAG - non-rusting materials

All parts of the Vacu*quick*®14-B coming onto contact with steam are made of non-rusting material: The autoclave chamber and its door are made of stainless steel, pipes carrying steam are made of Teflon, and threaded fittings and magnet valves are made of brass.

Drag-in rust

The use of non-rusting materials excludes the formation of rust as a result of the components of the autoclave. Where rust forms on the autoclave or the items to be sterilized, investigations have repeatedly shown that this rust has been brought in from other sources. It should be borne in mind that rust can form even on best quality stainless steel instruments, for example as a result of improper treatment with chemical cleaning agents or disinfectant during preparation for sterilization.

Preparations of items for sterilization

The example of drag-in rust shows how important it is to prepare items properly for sterilization, and particularly the following points:

Hand pieces and angles should be cleaned before the sterilization in accordance with the manufacturer's instructions and maintained (e.g. oiled).

The remaining instruments should be disinfected and cleaned immediately after use in accordance with BGV A1 with a disinfectant and/or cleaning solution. The solutions should be used in the correct concentration and care should be taken to observe the immersion times precisely!

It is advisable to make use of appropriate cleaning aids such as ultrasound cleaning units, maintenance equipment for hand pieces and contra-angles and cleaning and disinfecting systems.

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Cleaning the instruments before sterilization is very important in order to avoid introducing contamination which can separate from the instruments under steam pressure during sterilization and block filters, jets and valves of the autoclave. In particular, locks, joints and hinges should be thoroughly cleaned with a brush. Cleaning and disinfecting agents should be washed off the instruments thoroughly in running water, again with a brush. Residues of cleaning and disinfectant chemicals must not find their way into the autoclave, since they can lead to corrosion! Swill finally with demineralised water and then dry the instruments.
Turbines and transfer instruments should be oiled in accordance with manufacturer's instructions in order to ensure a long life for these components.

Brand-new instruments

The cleaning procedures described above are also necessary for brand-new instruments, since these often carry very small amounts of oil, fat and soiling from the manufacturing process.

Note: The instructions of the instrument manufacturers concerning first-time sterilization and re-sterilization should be followed carefully.

8.2 Rust formation = Drag-in rust

As already explained, the non-rusting materials used in the autoclave cannot cause rust formation in the autoclave!
Where rust forms this is „drag-in rust". This originates from instruments or other metal items carrying traces of rust, even though they are made of stainless steel, or which are made of normal steel but which have a damaged galvanic coating. Often, a single rusty instrument is enough to pass rust on to other instruments or to lead to drag-in rust on the other instruments or the autoclave. Drag-in rust settles on other instruments or autoclave parts in the form of film rust and results in corrosive damage. Drag-in rust must be removed from the affected instruments or from the autoclave and tray assembly using a mild commercial cleaning agent for stainless steel **free from chlorine**. Do not use steel wool, a wire brush or other abrasive cleaners! Spots can be removed with a damp, lint-free cloth or a cloth with surgical spirits or alcohol.

8.3 Taking care of the Vacu*quick*®14-B

8.3.1 Cleaning

The tray assembly and the autoclave chamber including the contact area of the door gasket and the door opening should be inspected thoroughly at least once a week for signs of damage or soiling. If necessary, wipe out the autoclave chamber using a **lint-free cloth** and surgical spirits. This involves withdrawing the trays and tray guide assembly. Stubborn spots can be removed using **small amounts** of a mild commercial steel cleaning agent (pH-levels from 5 to 8). Care must be taken to ensure that cleaning agent does not get into the pipes attached to the autoclave chamber. The cleaning agent must not contain chlorine and should not be alkaline. Do not use abrasive cleaning pads, steel wool, or brushes.
Inspect the door seal every week for signs of damage and soiling, and if necessary clean it with a mild commercial liquid cleaning agent (pH-levels from 5 to 8) or with surgical spirits.
The nut of the door lock (right side) and the door hinges (left side) must be regularly lubricated with silicone grease, in order to ensure that the door can easily be locked and unlocked, without unnecessary wear.
The outer parts of the autoclave can be cleaned with a mild commercial cleaning agent or with surgical spirits.
If the purified water is not provided manually but is stored in a container then this should be inspected every time it is refilled to make sure it is clean. If necessary it should be cleaned before refilling.

8.3.2 Use of purified water

Quality requirements

For steam sterilization it is necessary to use high quality distilled or demineralised water.
The water used should at least comply with the specifications in accordance with the EN-standard 13060, Appendix C listed in the table below.
For the operation of the Vacu*quick*®14-B , however, battery water in accordance with VDE 510 is sufficient, as long as the VDE specifications are strictly adhered to (conductivity on production ≤ 10 µS/cm*), when used ≤ 30 µS/cm*), pH-value identical with EN 285, evaporation residues analogous).

Where to purchase the water

Battery water in accordance VDE 510 is widely available in large drug stores, supermarkets and do-it-yourself stores at low prices. The necessary purity standards according to VDE 510 must be expressly detailed on the label, because with insufficiently pure water calcium scaling could form in the steam lines and valves, restricting the operation of the autoclave. Aggressive water (pH < 5 or > 7) can also lead to damage in the autoclave.

Formation of spots on instruments

The extent to which spots form on the instruments depends on the quality of the water used to produce the steam.

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Specifications for water quality in accordance with the EN standard 13060, Appendix C

Evaporation residue	≤	10	mg/l
Silicon oxide, SiO_2	≤	1	mg/l
Iron	≤	0.2	mg/l
Cadmium	≤	0.005	mg/l
Lead	≤	0.05	mg/l
Other heavy metals	≤	0.1	mg/l
Chlorides	≤	2	mg/l
Phosphates	≤	0.5	mg/l
Conductivity (at 20°C)	≤	15	µS/cm *)
pH-value	5 to 7		
Appearance	colourless; clean; without sediment		
Hardness	≤	0.02	mmol/l

*) µS/cm = micro-Siemens per centimetre

8.4 Checking the operation of the autoclave

8.4.1 Safety with automatic monitoring

The electronic parameter control means that all relevant parameters are constantly monitored a compared with standard process data, so that error reports can be made immediately. If a program is completed without problems then on its completion there is an „End" message. The print-out contains a corresponding report.
The operator of the autoclave can check the progress of the program at any time by means of the values shown on the display (or by means of the program protocols).

8.4.2 Batch control /Function checking

The Vacu*quick*®14-B has been developed and produced in line with the European EN standard 13060 and with its fractionating pulsed vacuum procedure meets all the strict requirements of the standard for „Class B" autoclaves.
The routine function and batch control of the „B" method is carried out with the process challenge device (PCD), the so-called „Helix" defined by EN 867-5:2001. The complete change of colour of the indicator means that the air has been fully evacuated from the sterilization chamber and that the sterilization parameters Pressure, Temperature and Time have been met sufficiently.
For this purpose, MELAG offers the process challenging device system MELA*control*®, which is delivered with a test body and 250 test strips (Art. no. 01080) or MELA*control*® PRO, which is delivered with 40 test strips (Art. no. 01075).

8.4.3 Periodical bacteriological testing (twice a year)

The German industrial standard DIN 58 946 Part 8 Section 3.2 recommends:
„Periodical testing shall be carried out at the place of installation, e.g. at 6 monthly intervals. They shall demonstrate that sterilization is carried out satisfactorily when the operating instruction for the small autoclave is followed."
Hygiene institutes and regional medical test centres can supply test spores on request and document the results of sterilization on a test form.

8.4.4 Maintenance recommendations

Regular maintenance of the autoclave is important if it is to have a long life and remain in good working order. MELAG recommends that the Vacu*quick*®14-B be serviced regularly by a trained technician in accordance with maintenance instructions for this autoclave. The annual service includes a visual inspection and a test of operational functions. As well as all essential components and electrical elements, parts are also inspected for wear and replaced as necessary.
A maintenance reminder appears on the display every 2 years or after 3000 program cycles.

Consult your dealer of the MELAG Customer Service if you have any questions relating to servicing and maintenance.

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9 Appendix

9.1 Installation examples

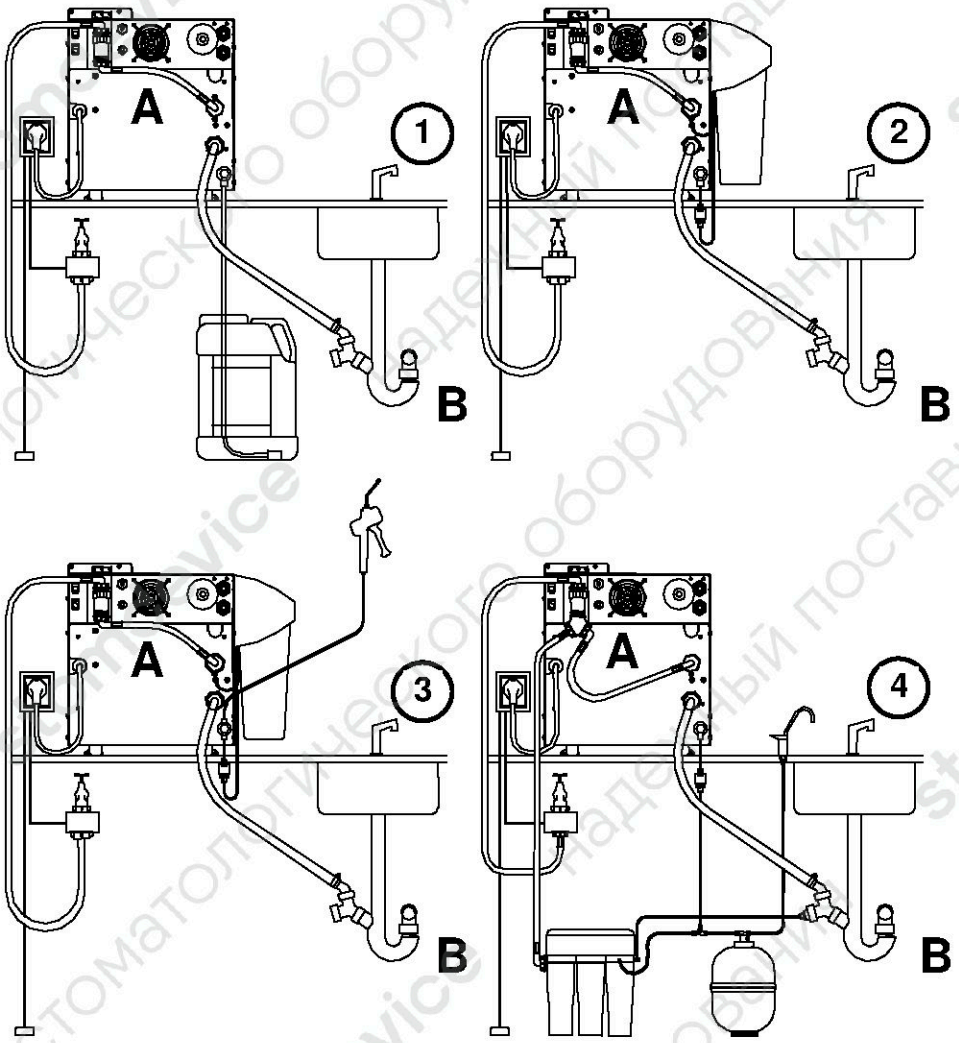


Fig. 4 Installation options for the Vacu*quick*®14-B (A) with double-chamber trap (B)*1)
*1) Alternatively, a separate outflow trap can be installed

Example 1
Rear view Vacu*quick*®14-B
Double-chamber trap
Storage container purified water
Leak detector (Art.-No. 01056) with stop valve (option), recommended when connecting the autoclave in a domestic environment

Example 2
Rear view Vacu*quick*®14-B
Double-chamber trap
MELA*dem*®40 (option)
Leak detector (Art.-No. 01056) with stop valve (option), recommended when connecting the autoclave in a domestic environment

Example 3
Rear view Vacu*quick*®14-B
Double-chamber trap
Leak detector (Art.-No. 01056) with stop valve (option), recommended when connecting the autoclave in a domestic environment
MELA*dem*®40 (option)
MELA*jet*® (option)

Example 4
Rear view Vacu*quick*®14-B
Double-chamber trap
Leak detector (Art.-No. 01056) with stop valve (option), recommended when connecting the autoclave in a domestic environment
MELA*dem*®47 (option)

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9.2 Technical data

Vacu*quick*®14-B	Program :				
	Quick - S	Quick - B	Universal	Gentle	Prion
Pre-heating time (one-off heating of the double casing steam generator) see **	5 min	5 min	5 min	4 min	5 min
Sterilization time	3:30 min	3:30 min	5 min	20 min	20 min
Temperature range**	134-138°C	134-138°C	134-138°C	121-125°C	134-138°C
Pressure range	2.1 bar	2.1 bar	2.1 bar	1.1 bar	2.1 bar
Operation time without drying: -fully loaded (4kg)	9 min	11 min with max. 1.5 kg	16:00 min	32 min	33:00 min
Operation time without drying: -partially loaded (0.5kg)	07:10 min	10:50 min	13:40 min	28:00 min	29:30 min
Drying	2 min	2 min	15 min	15 min	15 min
Feed water max	350 ml	550 ml	670 ml	660 ml	780 ml
Feed water min	170 ml	270 ml	360 ml	340 ml	470 ml
Cooling water max	5 Liter	9,1 Liter	17,5 Liter	17,4 Liter	17,8 Liter
Cooling water min	3,2 Liter	5,2 Liter	12,4 Liter	12,3 Liter	13,5 Liter
Energy consumption max	300 Wh	500 Wh	680 Wh	590 Wh	880 Wh
Energy consumption min	160 Wh	240 Wh	420 Wh	390 Wh	610 Wh
Energy consumption until one-off heating for relevant temperature range	180 Wh			130 Wh	
Weight (unloaded)	41 kg				
Chamber volume	5.7 litre				
Maximum load	4 kg instruments or 0.7 kg textiles				
Sterilization space (diameter x depth)	18 cm x 23 cm				
Outer dimensions (WxDxH)	35 cm x 57 cm x40 cm				
Loading options	The tray mount of the Vacu*quick*®14-B (Art. no.: 40013) can be stocked as follows: max. 4 trays 14 x 19 x 2.5 cm (WxDxH, Art. no.: 00140) max. 2 MELAG sterilization containers 17K (Art. no.: 01171) max. 3 MELAG sterilization containers 15K (Art. no.: 01151) 1 MELAG sterilization container 17R (Art. no.: 00174)				
Mains supply	230 V AC, 13 A, 50 Hz				
Rating	2900 W; 16 A fuses, circuit breaker 30 mA				
Purified water	Distilled or demineralised water in accordance with VDE 0510				
Cooling water	Potable water				
Heat emission max	1.047 kW or 3.769 MJ/h				
Heat emission min	0.235 kW or 0.845 MJ/h				
Loudness	69 dB				

The above operating and consumption values are average values and depend on the installation conditions (e.g. fluctuations in power supply, temperature of cooling water).

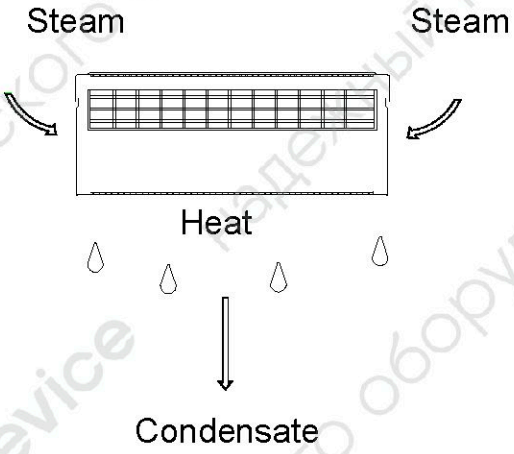
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9.3 Instructions on drying

The Vacu*quick*®14-B provides very good drying standards for sterilized items. Particularly difficult drying tasks (e.g. double wrapping) can also be dried to very good standards with the help of the feature „Extra drying“. Please read the following sections, which may help you to optimise your drying results.

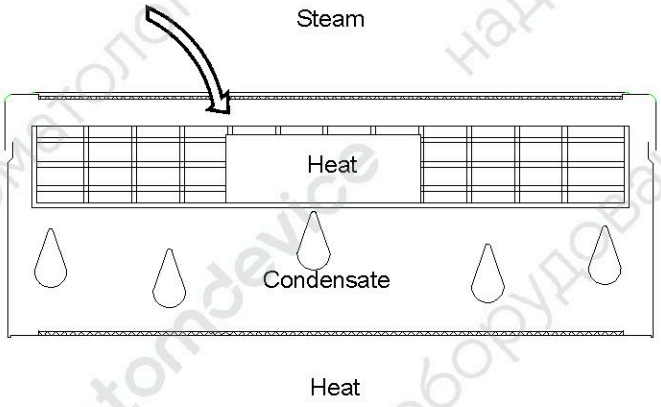
9.3.1 Drying in sterilization containers

In the autoclave steam is produced by heating water. The steam transfers heat to the instruments and sterilization container and warms these. This leads to steam condensing on the instruments and containers.



Formation of condensation on the sterilization container

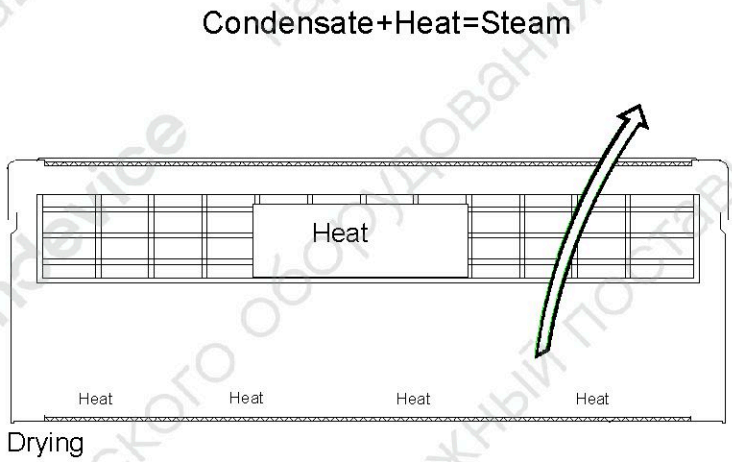
The steam also heats the objects contained in the sterilization containers. Condensate forms on the objects being sterilized, and some of the condensate drops to the bottom of the sterilization container.



Formation of condensation on sterilized objects

After sterilization, during the drying phase, all the condensation must evaporate from the sterilization container and from the sterilized items themselves. This is achieved by the transfer to the condensate of heat stored in the walls of the sterilization container and in the sterilized items themselves. It is preferable that the sterilization container be made of aluminium, as this metal stores and conducts heat well, ensuring faster drying than other materials.

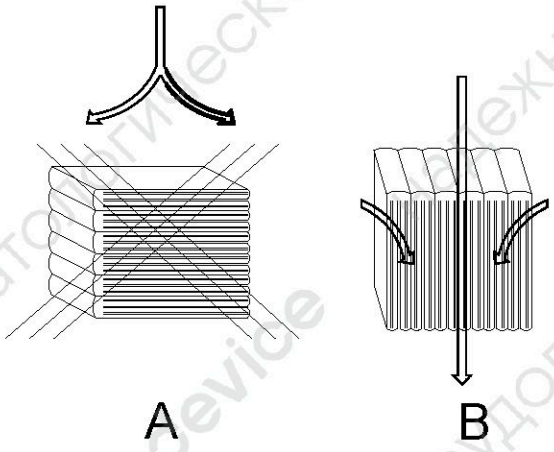
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For good drying it is essential that surplus heat be transferred to the objects which have been sterilized. In addition, the condensate must be led out of the sterilization containers. The container floors have channels and the lid has an arched filter area.

9.3.2 Textiles

When preparing textiles for treatment in the autoclave, care must be taken that the folds in the textiles are arranged in parallel, and that the items are packed side-by-side. This vertical configuration ensures that channels can form between the textile folds for the air to flow out and steam to flow in. Do not stack textiles on top of each other as this hinders the penetration of steam into the packages of textiles.



9.3.3 Loading textiles properly

When loading sterilization containers with textile items, care should be taken to ensure that they retain their vertical orientation, but that the items are not „squashed" together. This would prevent the formation of flow channels for air and steam. If the packages of textiles cannot be kept upright, then it might be advisable to wrap them in sterilization paper.
The textiles must not touch the sides or the base of the sterilization container, since they might become saturated with condensate.
For good drying results, the textiles should also be as dry as possible when they are placed in the autoclave. The heat stored in the chamber and sterilization container may not otherwise be sufficient to evaporate both the moisture and condensate.

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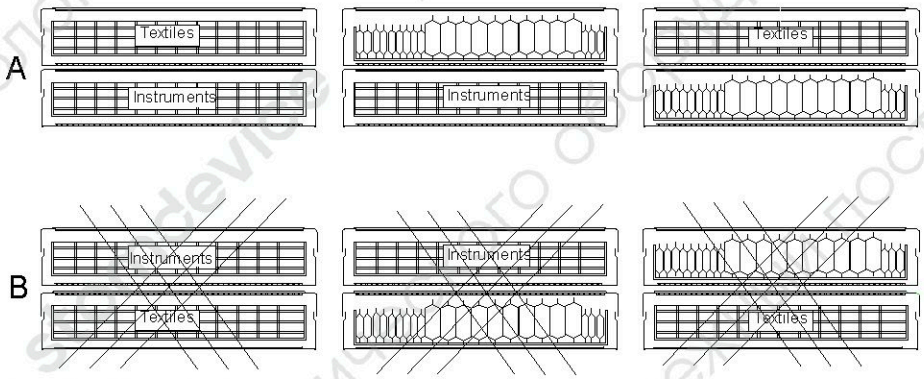
9.3.4 Instruments

Where appropriate, instruments should be disassembled before placing them in the autoclave, as this will improve the drying results.
The use of lubricants (such as instrument oil) should be avoided unless absolutely necessary. Prior confirmation should be obtained from the manufacturer of such agents that they are in fact suitable for steam sterilization. Substances which are hydrophobic or impenetrable for steam can not only lead to poor drying results, but may also mean that the steam sterilization is unsuccessful, since not only the instruments are protected but also micro-organisms.

9.3.5 Loading the autoclave

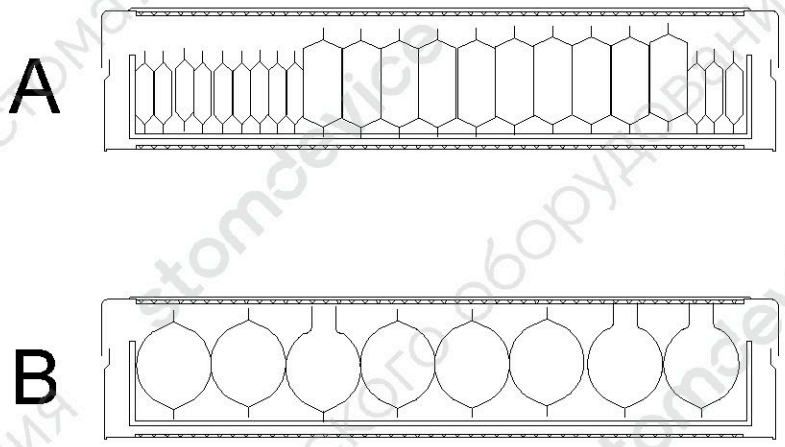
Textiles and instruments should not be sterilized together in one sterilization container. Textiles and instruments in separate sterilization containers should as far as possible not be sterilized in the same load. However, where this is unavoidable for economic or other reasons, the following rules should be observed:

Instruments and sterilization containers should be placed at the bottom
Textiles should always be placed at the top
Transparent sterilization and paper packaging should be placed at the top (exception: at the bottom if combined with textiles)



Loading the autoclave

9.3.6 Loading containers with soft sterilization packing material

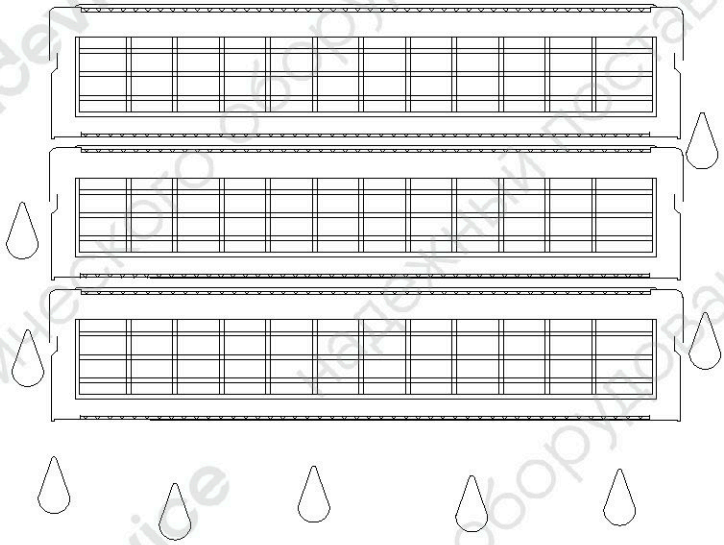


„Soft“ sterilization packages such as paper bags or transparent sterilization packages can be sterilized either in sterilization containers or sterilization baskets. To enable better drying, arrange such soft sterilization packages side-by-side and close to each other. This allows condensation to run off the packages, while at the same time preventing them from expanded excessively, and possibly bursting at the seams.
Packing „soft“ sterilization packages in sterilization containers

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9.3.7 Stacking sterilization containers

When arranging sterilization containers, care should be taken that drops of condensate do not wet items being sterilized beneath, but can flow away to the base of the chamber. The best arrangement is a stack of sterilization containers of the same size, so that condensate can flow down the sides.



Stacked sterilization containers

9.3.8 Removing the sterilized items

Immediately after the sterilization process, some condensate may remain on the sterilized items. However, heat transfer from the sterilized objects can evaporate this after the sterilization process has been completed.
The German standard DIN 58953 Part 7 Section 7 comments on residual moisture on paper bags or transparent sterilization paper after sterilization:

„...Small amounts of water on the surface of packages do not represent a cause for concern if they dry completely within thirty minutes after removal from a steam sterilization system....“

9.3.9 Improving the drying

The drying can be improved by the following measures:

- Arranging transparent sterilization and paper packing vertically
- Selecting the feature „Extra drying"
- Extending the drying times (please consult your MELAG customer service)

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