

Maintenance instructions

Euroklav[®] 23 VS+, 29 VS+

Euroklav[®] 23 V-S, 29 V-S

Steam sterilizer

EN

This device is to be maintained exclusively by a qualified service technician trained by MELAG and working in accordance with the valid directives.

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General guidelines

Please note the following:

- Repair work is not part of the maintenance.
- Comply with the sequence prescribed in the maintenance instructions to ensure safe working.

Maintenance intervals

Maintenance is to be performed after every 1000 cycles or after 24 months at the latest. If the device is freely accessible, the maintenance takes around 2 hours plus test run and possible work not included in the regular maintenance plan.

Safety instructions



When carrying out maintenance work at the device, comply with the following safety instructions as well as those contained in subsequent chapters. Failure to comply with the safety instructions can result in injury or damage to the device.

- Its maintenance may be performed only by authorised technicians.
- Before opening the device, switch off at the power switch and remove the plug.
- Comply with the relevant safety regulations during operation of an electrical appliance without housing parts. These actions must be performed by a qualified electrician (in accordance with VDE 0105-100 or IEC 60050).
- Some components of the control electronics and other components remain live even after the power switch has been switched off or in idle state. Switch off the device at the power switch and remove the cable before touching the live parts.
- Determine the absence of voltage at all poles.
- When working on or in the device, watch out for sharp edges and wear protective gloves to avoid cuts.

Note on complaints

If reasons for complaints are found during maintenance, these must be reported directly and immediately to MELAG.

Reasons for complaints can be:

- repeated occurrence of the same malfunction message despite remedial measures
- unidentifiable performance impairments

Complaints must be reported to MELAG Customer Service by email (hotline@melag.de) or by telephone (+49 (0)30 75 79 110), quoting the serial number of the device.

Tools/resources

Contents of the maintenance set (art. no. ME70036)

Article	Qty	Art. no.
Sterile filter	1	ME20160
Bulkhead plate seal	1	ME20090
Sliding grease for door locks, cartridge 1.5 g	1	ME24365
Seal for pressure release filter sieve insert (green flat seal) (up to serial number 201923V-S1400, 201929V-S1122)	1	ME35111
Seal, sieve insert for pressure release filter I & II (from serial number 201923V-S1401, 201929V-S1123)	1	ME21944
Spatula	1	--

Optionally required articles

Article	Qty	Art. no.
Water filter for internal water drain hose	1	ME30820
Seal for wastewater hose	1	ME52400
Spring loaded safety valve (3 bar)	1	ME20944
Chamber filter (vacuum)	1	ME38150
Filter with condensate return	1	ME34011
Door gasket	1	ME58512
Door mirror (inner door panel)	1	ME22000
Door lock slider	1	ME70231
Sieve insert for pressure release filter (from serial number 201923V-S1400, 201929V-S1122)	2	ME35110
Sieve insert for pressure release filter I & II (from serial number 201923V-S1401, 201929V-S1123)	2	ME21945
PUR hose (black) 6/4 mm (10 m)	1	ME28820

Tools

- Spring gauge
- Hand vacuum cleaner
- Cleaning cloth
- Rubbing alcohol or Spirit
- Indicator system according to EN 867-5
- Threadlocker Loctite 272
- Standard tool set
- Repair tool receptacles (art. no. ME21916)

Additionally applicable documents

The following maintenance record is a part of these maintenance instructions.

- Maintenance record (doc. WP_23VS+_29VS+_23VS_29VS_EN, rev. 4)
- Manufacturer's recommendation for electrical test during initial commissioning, after maintenance or repair (doc. ME_001-16)
- Manufacturer's recommendation for regular safety inspection - MELAG pressure devices (doc. ME_003-16)
- Manufacturer's recommendation for renewed performance qualification after replacing components (doc. ME_004-20)
- Instructions for removing the door cover (doc. AS_013-13)
- Instructions for replacing the lock slider (doc. AS_007-07)
- Instructions for replacing in the door lock (doc. AS_006-07)
- Fitting the door seal (doc. IA_01-01)
- Instructions for setting the door contact pressure (doc. JA_002-13)
- Resetting the maintenance counter (doc. PW_D_23B_23S_23VS_24B_24V_25C_29S_29VS_30B_31B)
- Instructions for use for spring loaded safety valves (doc. BA_FSV_common)
- Blade receptacles: Handling and repairing (doc. AS_017-18)

1 Preparations

1.1 Performing the vacuum test

- ▶ If possible, the user should run the program **Vacuum test** in a cold state in order to document the starting state without any loss of time. Alternatively, the **Vacuum test** can also be started by the technician when starting the maintenance.

1.2 Outputting the logs

1. All logs, including the malfunction logs and system and status logs are to be outputted for diagnosis purposes.
2. Evaluate the logs to detect any maintenance-relevant malfunctions.
3. Save the outputted logs.

1.3 Checking the software version

! PLEASE NOTE

It may be necessary to revalidate the device after performing a software update.

- ▶ Check whether the current software version requires an update with a MELAG recommended software update.

1.4 Checking the function of the float switch

- ▶ In **Diagnosis > DIN: Digital inputs > E6: Feed water, float**, check the float switches to ensure that they are switching correctly.

1.5 Emptying the internal storage tank

- ▶ Empty the internal storage tank on both sides.

1.6 Cleaning the internal storage tank

- ▶ Clean the internal storage tank with spirit or alcohol.

2 Water treatment unit

2.1 Maintenance

If a water treatment unit exists and is connected, maintain this as well.

1. Before maintenance of the water treatment unit, ask the user about any irregularities or problems with the unit. Insufficient conductivity and resulting more frequent replacement of the mixed-bed resin cartridge, frequently low feed water or high water consumption indicate a fault.
2. Maintain the water treatment unit in accordance with its user manual/test report.
3. In the event of problems during operation, rectify the malfunction with the aid of the water treatment unit test protocol.

2.2 Checking the inlet hose

Check the inlet hose for feed water for leaks, crushing, kinks and age-related embrittlement or swelling as follows:

1. Dismantle the inlet hose at the device.
2. Pull off the union nut.
3. Shorten the dismantled inlet hose by approx. 5 mm if it has swollen.
4. Fit the union nut on the inlet hose.
5. Fit the inlet hose at the device.

Replace the inlet hose for feed water (art. no. ME28820, not included in the maintenance set) at the latest after six years.

PLEASE NOTE: MELAG recommends that the date of the last replacement be noted on the hoses or in the device immediately, to ensure that the following replacement is carried out in good time. Notify the operator if the inlet hose is not replaced after six years.

2.3 Checking the outlet hose (if present)

1. Replace the outlet hose seal (art. no. ME52400) and, if present, retighten the hose clamps.
2. Check the outlet hose for leaks.
3. Check the outlet hose to ensure that it is kink-free and continuously falling (without rising or bagging).

3 Working in accordance with the “Manufacturer's recommendation for regular safety inspection” on MELAG pressure devices

- ▶ Carry out the work as described in the separate document “Manufacturer's recommendation for regular safety inspection - MELAG pressure devices”.
- ▶ Check the date of the last replacement of the spring-loaded safety valve and replace the spring-loaded safety valve (art. no. ME20944, not included in the maintenance set) if necessary, see “Operating instructions for spring-loaded safety valves”. The replacement interval amounts to two years.

PLEASE NOTE

MELAG recommends that the date of the last replacement be noted on the valve or in the device, to ensure that the following replacement is carried out in due time.

4 Static check / functionality

1. Open the door.

WARNING

Danger of electric shock from live components!

In order to perform the following maintenance steps, it is necessary to remove the housing parts.

- Switch off the device power switch and disconnect the power plug.
- Determine the absence of voltage on all poles.

2. Remove housing parts.

4.1 Checking the sterilization chamber, chamber filter and tray mount

1. Check the sterilization chamber and tray mount for soiling / flash rust.
2. Check the chamber filter (art. no. ME38150, not included in the maintenance set) and “Filter with condensate return” (art. no. ME34011, not included in the maintenance set) for soiling; clean or replace if necessary.

Should soiling or flash rust be found, inform the service personnel of the need for weekly in-house maintenance. Remove any soiling in the sterilization chamber and on accessories with spirit or cleaning alcohol. Use chlorine- and vinegar-free cleaning agents only. Use a polishing cloth or sponge if necessary.

PLEASE NOTE

Soiling in the sterilization chamber and its accessories should be cleaned within the scope of the weekly inspection by the customer/user and is not necessarily a part of maintenance.

4.2 Pressure release filter

1. Open the pressure release filter and, depending on the type, replace the seal with the suitable seals – green flat seal (art. no. ME35111) or O-ring (art. no. ME21944).
2. Check the sieve insert, depending on the type (art. no. ME35110 or ME21945, not included in the maintenance set) for soiling; clean it and replace it if necessary. The sieve insert is at the back, below the sterilization chamber. To remove the sieve insert, it may be necessary to remove the rear panel of the device and unscrew the cap nut.

PLEASE NOTE

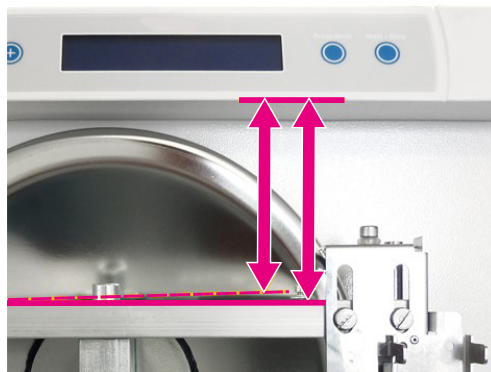
A small amount of water may come out.

4.3 Replacing the water filter for internal water drain hoses

- If the water drains only slowly or not at all when emptying the internal water tank, replace the relevant water filter (art. no. ME30820, not included in the maintenance set) for the internal water drain hose.

4.4 Checking the door hinges for play

1. Remove the door cover, see separate instructions “Instructions for removing the door panel”.
2. With the door slightly ajar (setting without plastic casing), measure the distance between the right upper edge of the door bar and display lower edge in its “hanging” and “lifted” state. The difference should amount to max. 3 mm. Replace wearing parts if necessary, see also “Manufacturer's recommendation for regular safety inspection - MELAG pressure devices”.



4.5 Checking/replacing the lock slider and locking bolt

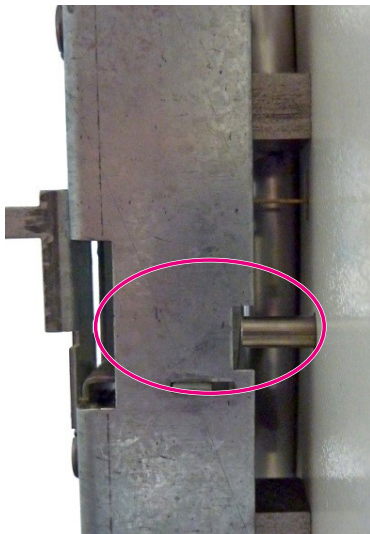
PLEASE NOTE

Only applies to devices built up to and including 2006.

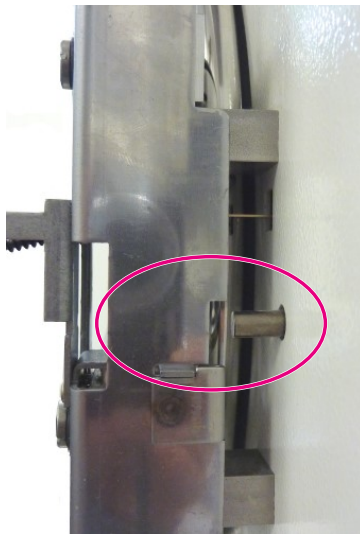
1. Check steam sterilizers built up to and including 2006 to see whether the current version of the locking slider and the locking bolt is present (see figure). If this is not the case, it is necessary to retrofit to the current version (art. no. ME70231, not included in the maintenance set) and to replace the inner door panel (pos. a / art. no. ME22000, not included in the maintenance set), see “Instructions for replacing the lock slider”.

2. Finally lubricate with MELAG grease (art. no. ME24365). A spatula for applying the grease is included in the maintenance set.

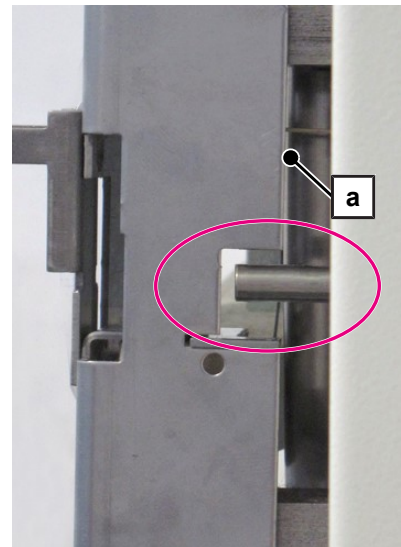
obsolete version



interim version

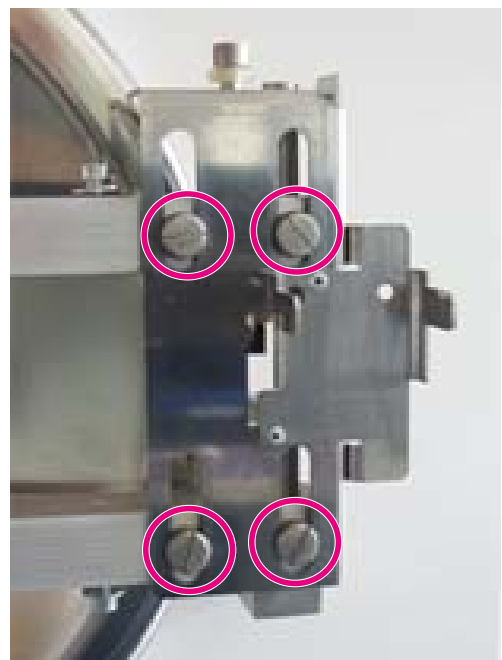


current version



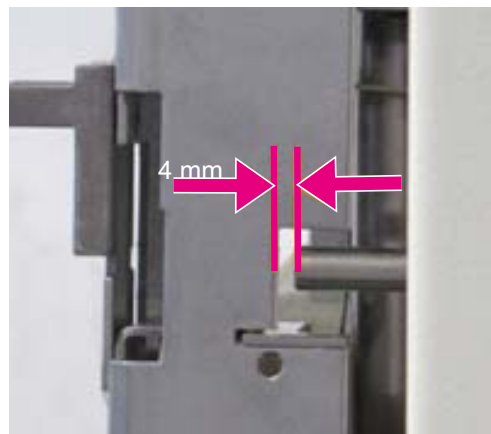
4.6 Checking the door lock slider

- Check the door lock for wear/defects and grease the locking bolts with MELAG grease (art. no. ME24365). A spatula for applying the grease is included in the maintenance set. Replace defective or damaged parts. Check the four fastening screws to ensure that they are firmly seated.



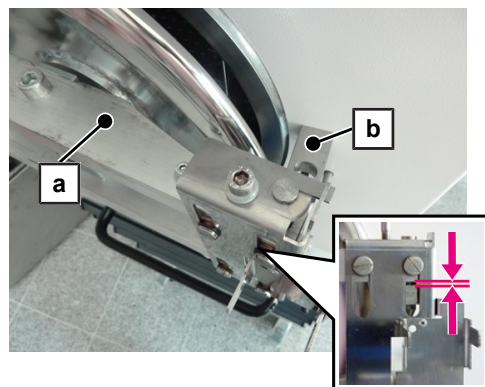
4.7 Checking the electrical door locking mechanism

- ▶ The distance between the door lock slider and the locking pin must be 4 ± 1 mm (see separate set of instructions "Instructions for replacing the door lock" in the section "Adjusting the door lock").



4.8 Checking the distance of door bar – locking block

- ▶ The distance between the lower edge of the door bar (pos. a) and the upper edge of the locking block (pos. b) must be min. 0.5 mm and max. 1.5 mm (see "Instructions for replacing the lock slider").



4.9 Checking the snap rings of the door hinge bolts

The door hinge pins on the top and bottom must be secured against unintentional sliding with snap rings.

- ▶ Check that the snap rings on the top and bottom are in place.

4.10 Checking the door seal

1. Refit the door panel.
2. Check the door seal for damages and clean it with a mild, commercially-available fluid cleaning agent. If necessary, exchange the door seal (art. no. ME58512, not included in the maintenance set), see the separate set of instructions "Fitting the door seal".
3. Clean the sealing groove of the round blank with a mild, commercially-available fluid cleaning agent (pH value 5-8) or spirit. Do not use a cleaning agent which could damage the surface of the round blank.

4.11 Checking the contact pressure of the door

- ▶ Check the contact pressure of the door and adjust if necessary (see separate set of instructions "Instructions for setting the door contact pressure").

4.12 Checking the tubular heating element

1. Remove the cover over the tubular heating element in the sterilization chamber and clean it.
2. Clean the sterilization chamber under the tubular heating element.
3. Replace the seal on the cover plate (art. no. ME20090).
4. Check whether the front fixing clamp of the tubular heating element can move a little. If necessary, loosen the nuts slightly and lock them again so that the tubular heating element can expand forwards during heating.

4.13 Checking the sensor on the capillary tube regulator

- ▶ Check the sensors of the capillary tube regulators for correct position at the tubular heater. The sensors are correctly mounted if their strain reliefs (5 mm at the end) project from the guide tubes.

! PLEASE NOTE

Both capillary tube regulators must protrude equidistantly.

4.14 Replacing the sterile filter

- ▶ Replace the sterile filter (art. no. ME20160).

4.15 Checking all electrical cable connections

NOTICE

Risk of damage to the device!

Failure to comply with these safety instructions can result in damage or can compromise safety.

- The cables may not be permitted to come into contact with any of the parts which could become hot during operation, e.g. the sterilization chamber.

1. Check all cable connections for stability, damage and correct installation.
2. If necessary, tighten and correct their installation. The cables may not be permitted to come into contact with any of the parts which could become hot during operation (e.g. the sterilization chamber).
3. Check the control electronics for stability and damage.
4. Check the stability of the plug connections, the fuses and the connections of the overheating protection.
5. Check all cable connections, especially the power conducting flat plug connections outlined in the following section, for stability:
 - Power switch
 - Mains fuse
 - Supply voltage on the control electronics of the electrical control
 - Outputs tubular heating element (ACOUT1), preheater (ACOUT2) on the control electronics
 - Connecting plug of the tubular heating element
 - Overheat protection switch tubular heating element
 - Overheat protection switch preheater
 - Rectifier plug screw fittings on the solenoid valves

4.16 Checking all hoses

1. Check all hoses in the device for damage or abrasion following vibration. Check that they are all in the correct position.
2. Check for limescale or water residue in the device. These are indications of leaks in the hose connections.
3. Check all hose screw connections for stability. Tighten any loose hose screw connections by hand and then with an open-end wrench for max. ½ revolution.

4.17 Checking the device alignment

- ▶ Check the device alignment as follows: Starting with the device in a level position and proceeding from the chamber sealing surface, the front device feet of the Euroklav 23V-S/23 VS+ must be unscrewed by five rotations and the Euroklav 29V-S/29 VS+ by three rotations. This ensures that the residual water / condensate in the sterilization chamber can drain off.

4.18 Cleaning the device interior

1. Encrusted water stains and limescale residues indicate leaks. Find and remedy the leaks. Remove water stains and limescale residues in order to recognise leaks (new deposits will form) during the next maintenance.
2. Free the steam sterilizer interior of dust, e.g. with a vacuum cleaner or a damp cloth. The vacuum pump and the cooling slots of the base plate must remain clean in order to ensure the long-term performance of the device.

5 Function check

5.1 Checking/adjusting the door contact switch

1. Insert the mains plug of the steam sterilizer into the socket and switch on at the mains switch.
2. In **Diagnosis**, navigate to **DIN: Digital inputs E1: Door-contact closed**. There, the clearance from the switching of the door contact switch (display indicator **E1: Door-contact closed**) to the lower stop of the lock slider must be 1-2 mm.

5.2 Program run of vacuum test

1. Run the program **Vacuum test** with a cold device and compare the results with the vacuum test already performed.
2. During the test run, listen for unusual noises (especially during evacuation, e.g. loose parts rattling when vibrating or unusual noises from the vacuum pump). Should unusual noises be heard from the vacuum pump, the pump may need to be replaced.
3. Attach the log printout. Note the leakage rate and evacuation time from the log printout and record it in the maintenance record.
4. The max. evacuation time for the Euroklav 23V-S/23 VS+ is 3:40 min and for the Euroklav 29V-S/29 VS+ 3:00 min. If this time is exceeded, check the device for leaks and wear of the vacuum pump.
5. The recommended leakage rate is below 0.8 mbar/min. If this value is slightly exceeded, but is still below 1.0 mbar/min, this is only acceptable if the type 5 indicator has successfully changed colour during the Quick-Program, which is to be carried out subsequently. In this case, the customer must be informed; should the leakage deteriorate, it must be repaired.
6. If the leakage rate exceeds 1.0 mbar/min or the indicator test is not successful, then the device must be checked for leaks and the function of the valves.
7. Seal any leaks with a threadlocker Loctite 272 (if all else fails, use a Teflon strip).

5.3 Quick-Program run with type 5 indicator in accordance with EN ISO 11140-1

1. Carry out a test run of the Quick-Program with type 5 indicator and, if possible, with an unpacked load. To save time, it is possible to interrupt the drying phase after 2 min.
2. With a connection (via siphon) to the wastewater system: Check the correct installation of the water outlet hose during the test run.
3. Perform an acoustic check for unusual noises during the test run, e.g. the banging of loose components upon the vibration of the vacuum pump.
4. Attach the log printout of the program run to the maintenance record.
5. Attach the indicator strip to the separate maintenance record.

6 Electrical test in accordance with EN 50678 (VDE 0701) or national standard

1. Replace the device covers.
2. After closing the device, perform an electrical test according to EN 50678 (VDE 0701). Comply with the applicable national specifications.
3. The measuring device to be used for these tests must be subject to regular checks and calibration in accordance with VDE 0413 or EN 61557.

! PLEASE NOTE

For more information, see "Manufacturer's recommendation for electrical test during initial commissioning, after maintenance or repair".

7 Resetting the maintenance counter

- ▶ Reset the maintenance counter in accordance with separate instructions after concluding the work.

PLEASE NOTE: Complete and sign the maintenance record as evidence of proper maintenance. Observe the information in the maintenance record.