

Operating Manual

english

Elmasolvex SE

Watch / small parts cleaning machine



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1**General**

The present Operating Instructions are part of the delivered equipment. They must be ready for use at any time and remain with the unit in case of resale.

We reserve the right to carry out technical modifications on the unit due to advanced development.

An operating manual cannot take account of every conceivable use. An operating manual cannot take account of every possible use. Contact your dealer or the manufacturer for further information or in the event of problems which are not covered or not sufficiently covered in this operating manual

2**Important safety instructions****Strictly observe the following before start-up**

Read through this manual carefully before use and only use this cleaning machine in accordance with the instructions included here. In addition to the instructions in this operating manual, also observe the country-specific safety regulations.

Exclusion of liability

The manufacturer shall not accept any liability in the event of injuries to persons, damage to the machine or product to be cleaned which has been caused by improper use contrary to the instructions in this operating manual.

The owner shall be responsible for the instruction of the operating personnel.

2.1**Notes for using this manual****2.1.1****Information signs / symbols in the manual / on the machine**

This symbol warns about the risk of injury from electricity.



This symbol warns about the risk of injury from flammable substances.



This symbol warns that a potentially explosive atmosphere can occur in the indicated area.



This symbol warns about injuries from hot surfaces and liquids.



This symbol provides a general warning about the risk of injury.



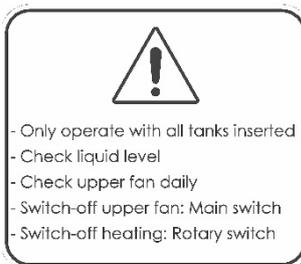
This symbol prohibits the use of any kind of ignition source in this area.



This symbol indicates a risk of property damage.



This symbol indicates supplementary information.



Information sticker on the cleaning machine with brief instructions to be observed:

Only operate with all 4 media tanks

Check fill levels of the media tanks

Check top case fan daily before start cleaning

Switch off cleaning machine / fan at the main switch (e.g. after finishing work, Emergency Stop)

Heater can be interrupted at the *STEP TIME* rotary knob

2.1.2

Signal words in this manual

- Danger** The "Danger" signal word warns about severe injuries with risk of fatal injury.
- Warning** The "Warning" signal word warns about severe injuries.
- Caution** The "Caution" signal word warns about slight to medium injuries.
- Attention** The "Attention" signal word warns about property damage.

2.2

Safety instructions for use of the machine

First, strictly make yourself familiar with the safety instructions before start-up.

A summary of the safety instructions can be found here. These are shown again in this operating manual before the respective handling instructions.

- User** The machine must only be operated by trained personnel in accordance with this operating manual.
- Intended use** This watch cleaning machine is exclusively intended for cleaning mechanical precision parts such as dismantled and not dismantled watch movements using solvent and aqueous solution based cleaning and rinsing media (*see Chapter 7*). The flammable media used must also satisfy the conditions of flashpoint ≥ 23 °C and ignition temperature ≥ 200 °C. Flammable liquids can be used as cleaning and rinsing media under compliance with the indicated conditions.
- Air change in installation area** In the case of intended use of flammable solvent-based media, 4 air changes¹⁾ per hour and per cleaning machine using technical ventilation measures must be guaranteed for the explosion-safe operation of the cleaning machine(s).
¹⁾ must be realized by correctly designed technical ventilation installed on the building side (e.g. suitable exhaust air blower into the open air)
- Ambient conditions** It is not permitted to operate the machine in an environment with potentially explosive atmosphere of flammable gases, vapors or dusts
- Ambient temperature** The permitted ambient temperature is +5 to 30 °C.

Exhaust air equipment	<p>Suitable exhaust air equipment can optionally be connected to the exhaust air pipe on the rear side of the cleaning machine (see <i>Chap. 4.2</i>) to prevent unpleasant odors.</p> <p>This outlet on the cleaning machine and the outlet for any connected exhaust air equipment must be freely accessible for the purpose of air circulation.</p>
Fan inlets in the case of inspection for damage	<p>The fan inlets in the case must be freely accessible.</p> <p>Examine the machine and mains power cable for transport damage. Do not start up the machine in the event of detected damage.</p>
Mains power connection	<p>For safety reasons, the machine must only be connected to a grounded socket in accordance with the regulations. The technical details of the nameplate must match the available connection conditions, particularly mains voltage and connected load.</p>
Prevention of electrical accidents	<p>Keep the installation area, case and controls dry. Protect against ingress of moisture. Unplug the mains plug during filling, maintenance and care of the machine, suspicion that liquid has penetrated, operating faults and after use.</p> <p>The machine must only be opened by qualified electricians.</p>
Disconnect machine from the mains in the event of faults	<p>Always unplug the mains plug in the event of machine malfunctions.</p>
Media	<p>Only permitted media (cleaning / rinsing solutions) (see <i>Chapter 7</i>) must be used in this cleaning machine.</p>
Media tank	<p>The cleaning machine must only be operated using the original media tank included in the scope of delivery with the correct filling (see <i>Chapter 3.11</i>).</p> <p>The cleaning machine must not continue to be operated in the event of damaged media tanks (glass breakage).</p>
Fire and explosion hazard	<p>Ignitable solvent vapors can escape in the case of improper operation and during replacement of the cleaning and rinsing media.</p> <p>Smoking and open ignition sources in the machine surroundings, particularly in the immediate vicinity of the zone marked with the appropriate danger symbol are therefore prohibited.</p> <p>The mains plug must be unplugged immediately in the event of escaped / spilled solvents. Solvent residues must be removed using a dry and non-abrasive cloth.</p> <p>Do not store any solvent container in the immediate surroundings of the cleaning machine (minimum clearance 3 m). Maximum one day solvent requirement is permitted to be kept in the same room.</p>
Rotating parts	<p>Risk of injury! Rotating parts! Do not grip the cleaning basket / movement holder.</p>
Hot surfaces	<p>Depending on the operating time of the cleaning machine, surfaces, particularly the drying chamber, rotation motor and shaft in the drive unit can become very hot (max. approx.</p>

	65 °C). These areas are marked with the warning stickers intended for them.
Cleaning basket movement holder	Only the Elma cleaning basket or Elma movement holder is permitted to be used to prevent damage to the cleaning machine and product to be cleaned. Loading with parts to be cleaned, max. 60 grams. Ensure even balanced loading for fast rotations around the axis of the cleaning basket / movement holder. Pay attention when inserting the cleaning basket / movement holder that it is attached correctly. In the case of critical loading, reduce the speed to prevent unbalance and strong oscillations.
Parameter settings	The operator is responsible for the correct parameter setting. The manufacturer shall not accept any liability in the event of damage to the items to be cleaned or to the machine.
Switch off machine after the end of the work	Switch off the machine at the main switch after the end of the work.

3

Product description

The Elmasolvex SE cleaning machine is a manual cleaning machine for cleaning watch movements and other mechanical precision parts with aqueous solution and solvent based cleaning and rinsing media.

Solvent cleaning for media with flashpoint ≥ 23 °C,
e.g.: Elma WF pro – 3x Elma suprol pro – drying.

Semi-aqueous combination process:

e.g. Elma 1:9 – deionized water – 2x Elma suprol pro – drying.

With innovative product characteristics, the Elmasolvex SE cleaning machine provides a high standard of cleanliness with certified compliance with the EU regulations for machine and explosion safety for cleaning with flammable solvents (see *Declaration of conformity, Chapter 3.5*).

3.1

How it works

After manual preselection of the time and speed per process step, the drive unit with the cleaning basket / movement holder is moved one after the other into the different positions (cleaning / rinsing, spinning, drying).

The drive unit and control panel can be engaged in 3 vertical (cleaning / rinsing position – spinning position – change position) and 5 horizontal positions (above media tanks and drying chamber).

The covers of the media tanks can be placed in the receptacles provided for them in the base during the respective use of the media tanks.

3.2 Product features

- Solvent-based, water-free 4-stage cleaning and rinsing, also with flammable solvents for intended operation in accordance with the relevant EU safety regulations. Safety concept tested by TÜV Rheinland
- Cleaning and rinsing 3 times
- Gentle drying with hot air fan, supported if necessary by previous spinning up to 1200 rpm
- Discharge of the solvent vapors via exhaust air connection possible
- Suitable for solvents with flashpoint ≥ 23 °C and ignition temperature ≥ 200 °C

3.3 Scope of delivery

- Elmasolvex SE watch cleaning machine
- Detachable mains cable
- Operating manual

3.4 Optional accessories

- Elma cleaning basket including 3 basket inserts
- Miniature basket
- Movement holder for dismantled watch movements and PCBs

3.5

CE conformity

This small parts cleaning machine fulfils the CE marking criteria in relation to the Machinery Directive 2006/42/EC, the EMC Directive 2004/108/EC and the ATEX Directive 94/9/EC.

EU-Konformitätserklärung Declaration of conformity / Déclaration de conformité CE Dichiarazione di conformità CE / Confirmacion CE	
Wir / We / Nous / Noi / Nosotros: <div style="text-align: center; margin: 10px 0;">  </div> <p style="text-align: center; margin: 0;"> Elma Schmidbauer GmbH Gottlieb-Daimler-Str. 17 78224 Singen / Hohentwiel Deutschland / Germany / Allemagne / Germania / Alemania </p>	
erklären in alleiniger Verantwortung, daß das Produkt <i>declare under our sole responsibility that the product / déclarons sous notre seule responsabilité que le produit</i> <i>dichiariamo sotto la nostra unica responsabilità che il prodotto / declaramos bajo la responsabilidad única que el producto</i>	
Bezeichnung Typ / type / tipo:	(Uhren-)Kleinteile-Reinigungsmaschine Elmasolvex SE (1xxxxx056 – 1xxxxx127)
auf das sich diese Erklärung bezieht, mit den Bestimmungen der folgenden EG-Richtlinie(n) und Norm(en) oder normativen Dokument(en) übereinstimmt: <i>to which this declaration relates, is in conformity with the provisions of following EC-Directive(s) and standard(s) or normative document(s):</i> <i>auquel se réfère cette déclaration, est conforme aux dispositions de la (des) directive(s) CE et à la (aux) norme(s) ou document(s) normatif(s) suivants:</i> <i>a cui si riferisce la presente dichiarazione, è conforme alle disposizioni della/e seguente/i direttiva/e e norma/e CE o al/ai seguente/i documento/i dispositivo/i:</i> <i>al que se refiere la presente declaración cumple con las disposiciones de la(s) siguientes directiva(s) comunitaria(s) y norma(s) o con lo(s) documento(s) normativo(s):</i>	
Richtlinie: <i>directive / direttiva / directiva:</i> - harmonized standards*:	2006 / 42 / EG (EC / CE) - Maschinenrichtlinie <i>machinery / machines / macchine / máquinas</i> EN ISO 12100; EN ISO 13849-1; EN 1127-1 Abschnitte 1-5; 6.1-6.4; 7
Richtlinie: <i>directive / direttiva / directiva:</i> - harmonized standards*:	2014 / 30 / EU (EC / CE) – EMV-Richtlinie <i>EMC / CEM</i> EN 61326-1
Richtlinie: <i>directive / direttiva / directiva:</i>	2011 / 65 / EU (EC / CE) – RoHS-Richtlinie <i>RoHS</i>
Für die Explosionssicherheit kamen folgende Normen zur Anwendung, die folgende Einschränkungen erfordern: / The safety against explosion is based on the following standards requiring the following restrictions: - harmonized Standards*: EN 60079-0; EN 13463-1: T3 (solvents with ignition temp. >=200°C only); EN 13463-5; EN 1127-1 Sections 1-5.6.1-6.4, 7; For solvents with flashpoint >=23°C only - non-harmonized Standards*: EN 60079-10-1; Technical ventilation >= 4 air exchanges/h per device required for the installation room	
Zusätzlich gegeben / Additionally tested: Sicherheitskonzept in Anlehnung an / safety concept according to / concept de sécurité en référence à: 2014 / 34 / EU - ATEX-Richtlinie / ATEX directive	
Die Dokumentation wurde bei der benannten Stelle 0035 (TÜV Rheinland) unter der Nummer 557/Ex-Ab 2020/13 hinterlegt.	
* Der verwendete Normenstand entspricht dem Stand der Ausfertigung der Konformitätserklärung.	
Name und Anschrift der Person, die bevollmächtigt ist, die relevanten technischen Unterlagen zusammenzustellen: Name and address of the person authorised to compile the relevant technical documentation: Nom et adresse de la personne autorisée pour l'inventaire des documents techniques: Nome e indirizzo della persona autorizzata a costituire la documentazione tecnica pertinente: Nombre y dirección de la persona autorizada para recopilar la documentación relevante: Michaela Beinroth Gottlieb-Daimler-Str. 17, 78224 Singen www.elma-ultrasonic.com	<div style="text-align: right; margin-right: 20px;">  </div> Singen, den 26.10.2016 COO Thomas G. Neher Geschäftsführer / Chief Operations Officer

3.6

Technical Data

Mechanics	
Machine external dimensions W/D/H (mm)	502 / 516 / 657
Weight including media tanks (kg)	19.0
Hot air dryer connection (DN)	75 (passive)
Volume of the 4 media tanks (l)	0.6
Electronics	
Mains voltage variant (V~ / Hz)	230 / 50
Mains voltage variant (V~ / Hz)	115 / 60
Mains voltage variant (V~ / Hz)	100 / 50 / 60
Max. total power consumption (W)	260
Power consumption in standby (W)	10
Speed range in cleaning / rinsing basket position (rpm)	visually adjustable
Speed range in spinning basket position freely adjustable up to max. (rpm)	1200
Permissible ambient temperature (°C)	5 - 30
Cleaning basket accessories	
Individual basket internal dimensions D/H (approx. mm)	64 / 12
Number of individual baskets in the basket holder (pcs.)	3
Max. complete loading weight (approx. g)	60.0
Movement holder accessories	
Load quantity (movements / PCBs)	6
Max. complete loading weight (approx. g)	60.0
Max. movements / PCBs diameter (mm)	< 28
Max. movements / PCBs thickness (mm)	< 8

3.7

Front side of the cleaning machine

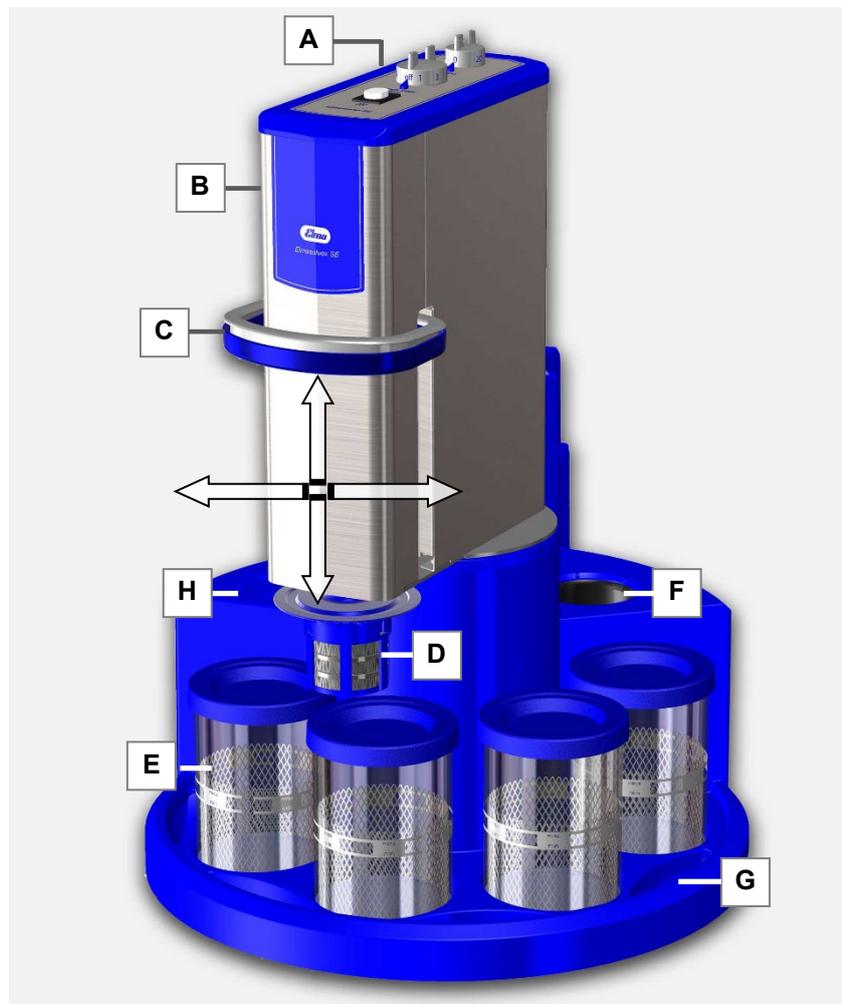


Fig. 3.7. View of front side

- A Control panel** for setting the time per process step and speed and for switching on the hot air fan in the drying chamber (for description, see *Chapter 3.10*).
- B Control panel and drive unit** with cleaning basket / movement holder, can be moved horizontally and vertically.
- C Operating handle** with lock for manual positioning of the control panel and drive unit (for description, see *Chapter 3.8*).
- D Cleaning basket (optional)** (for description, see *Chapter 6.2*)
The cleaning basket or movement holder is attached to the mounting on the drive shaft using a bayonet connection (for description, see *Chapter 6.2*).
- E Media tank** with level mark, wave breaker and rubber seal (for description, see *Chapter 3.11*).
- F Drying chamber** with hot air fan
- G Storage** for covers of the media tanks
- H Storage area** for second cleaning basket / movement holder

3.8 Operating handle of the control panel and drive unit

Using the operating handle, the drive unit with the cleaning basket / movement holder is moved manually to the various working positions.

The operating handle consists of 2 parts, the fixed (blue color) bottom part and the movable (silver color) top part.

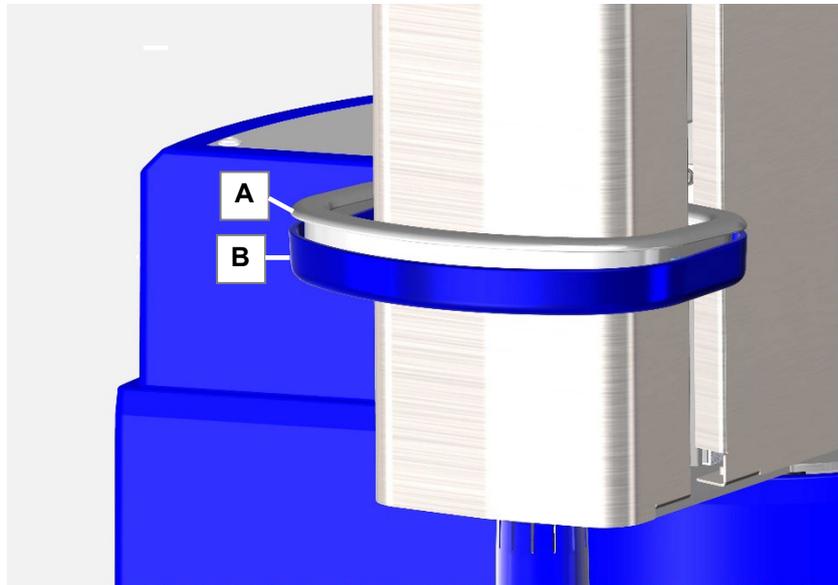


Fig. 3.8.1. Locked operating handle

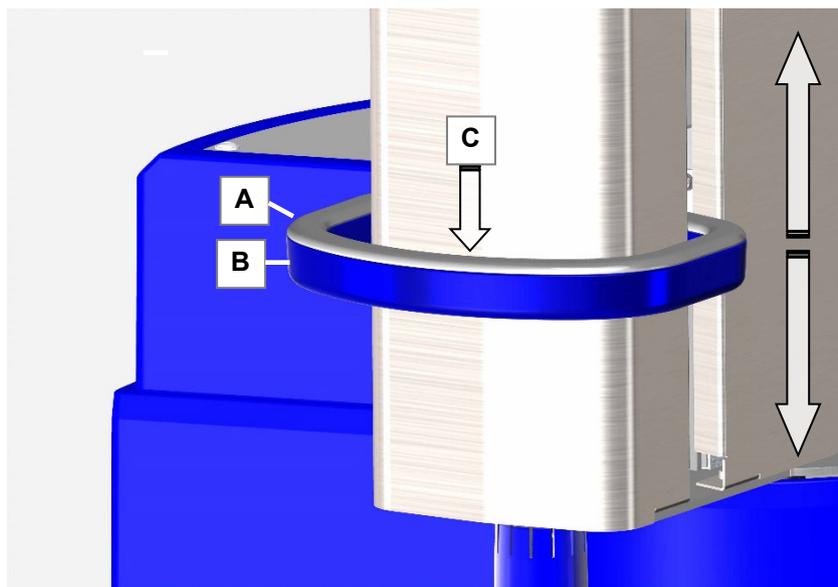


Fig. 3.8.2. Unlocked operating handle (by pressing clamp together)

- A Movable clamp** of the operating handle
- B Fixed clamp** of the operating handle

3 vertical positions of the drive unit

The drive unit with the cleaning basket / movement holder can be engaged in 3 (vertical) height positions:

- Top position (over the media tanks):
Change position for cleaning basket / movement holder (Fig. 3.8.3).
- Middle position (in the media tank – above the cleaning / rinsing liquid): Spinning position (Fig. 3.8.4).
- Bottom position: (in the media tank – in the cleaning / rinsing liquid cleaning / rinsing position (Fig. 3.8.5).

The operating handle must be unlocked in each case for the vertical adjustment.

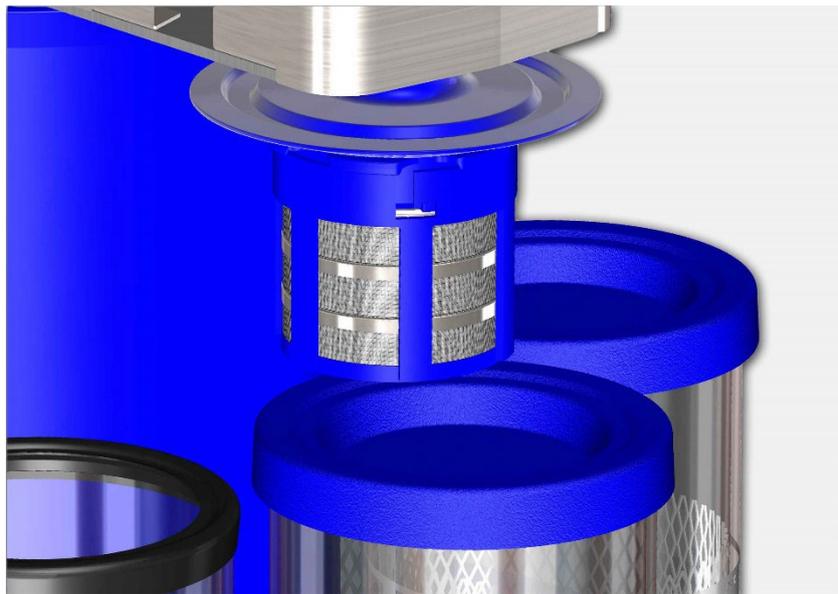


Fig. 3.8.3. Change position (top position)

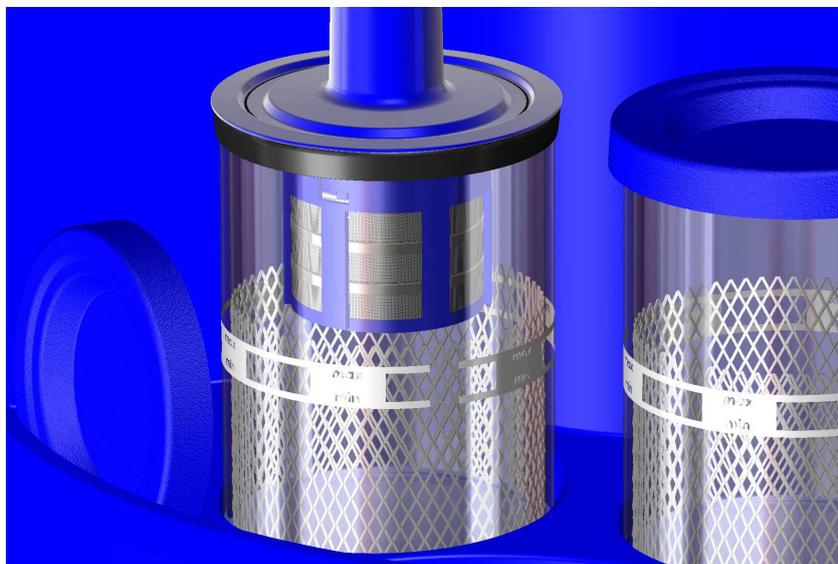


Fig. 3.8.4. Spinning position (middle position)

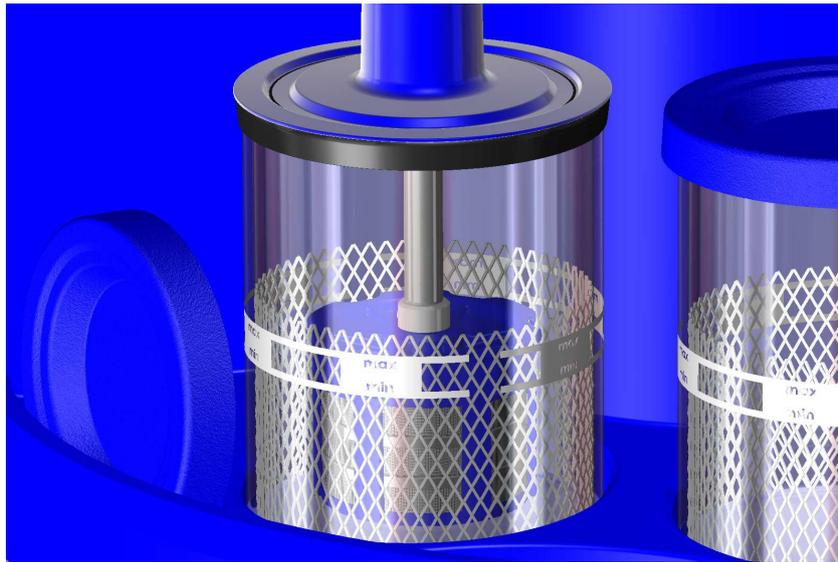


Fig. 3.8.5. Cleaning / rinsing position (bottom position)

5 horizontal positions

The drive unit with the cleaning basket / movement holder can be engaged in 5 (horizontal) transverse positions above the media tanks and the drying chamber.

The operating handle does not have to be unlocked for the horizontal adjustment.

Handling the operating handle

For unlocking and raising / lowering the drive unit, the operating handle must be grasped and pressed on the moving top part (*Fig. 3.8.2.C arrow direction*).

Push the drive unit in the required direction after unlocking.

Reduce the pressure on the movable clamp after approx. 20 mm distance. In this way, the drive unit can engage again in the next horizontal position.

Hold the operating handle (without pressing the movable clamp) until the drive unit noticeably engages in the required position and is thus locked.

3.9

Rear side of the cleaning machine

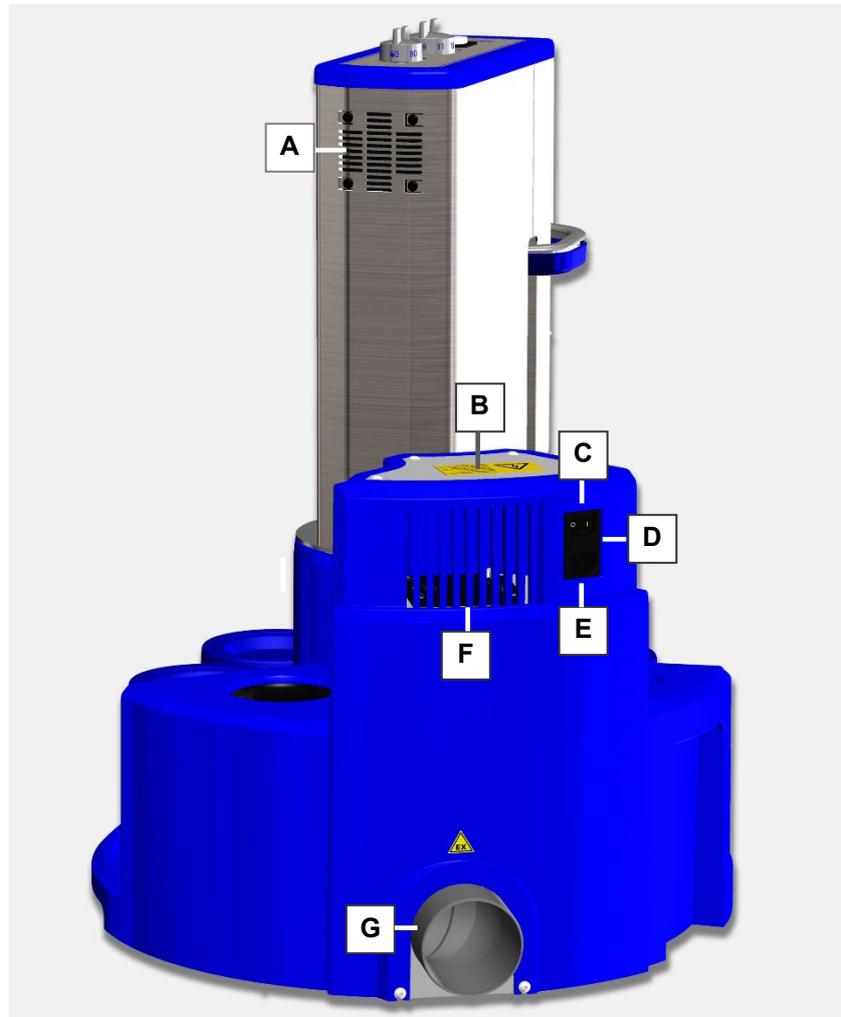


Fig. 3.9.1. Rear view

- A Intake opening for fan** for venting the drive unit. The fan grill must not be covered in order to guarantee free air circulation.
- B Maintenance opening for fan** (relevant for maintenance – for description, see *Chapter 8.3.3*).
- C Main switch**, for switching the cleaning machine on and off.
- D Slot for fuse**
- E Mains power connection for mains cable** (scope of delivery)
- F Intake opening for hot air fan** of the drying chamber
Attention! The fan grill must not be covered in order to guarantee free air circulation.
- G Exhaust air pipe of the drying chamber** (Ø 75 mm), for connection of an exhaust air tube (max. 3 m length; do not use any finned tube, no backpressure – ideal: slight vacuum).

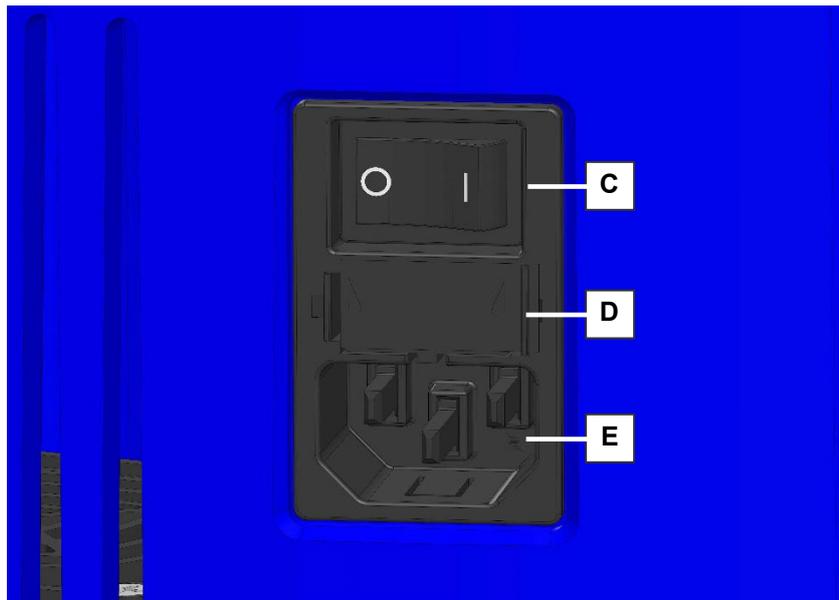


Fig. 3.9.2. Detail view of main switch, fuse, mains power connection

3.10

Functions of the control panel

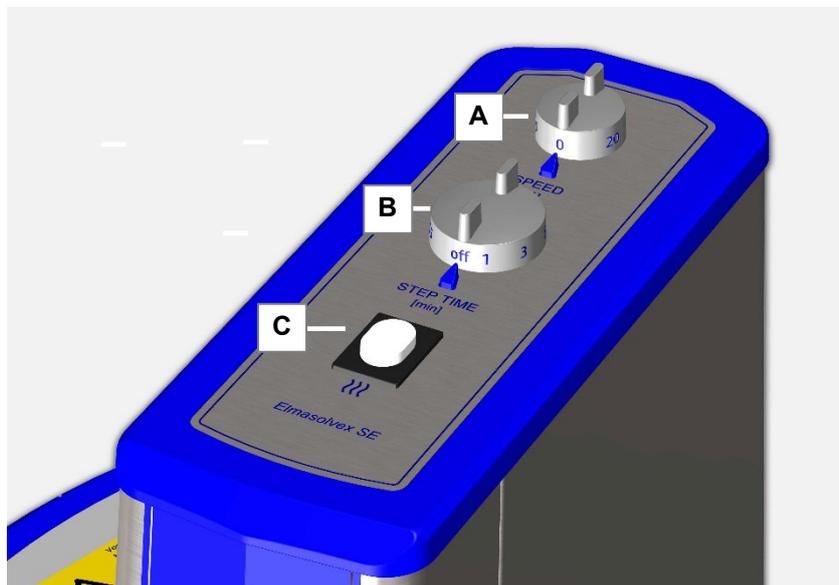


Fig. 3.10. View of control panel

- A** *SPEED* rotary knob for continuous adjustment of the rotation speed (0 – 100 %)
- B** *STEP TIME* rotary knob for time preselection (in minutes per process step, with signal after expiry of the specified time)
- C** Button for switching on the hot air fan in the drying chamber. This function can be activated if a time preselection (B) has previously been set.

For switching off before expiry of the specified time preselection: Turn back the *STEP TIME* rotary knob to the *off* position.

3.11

Media tank

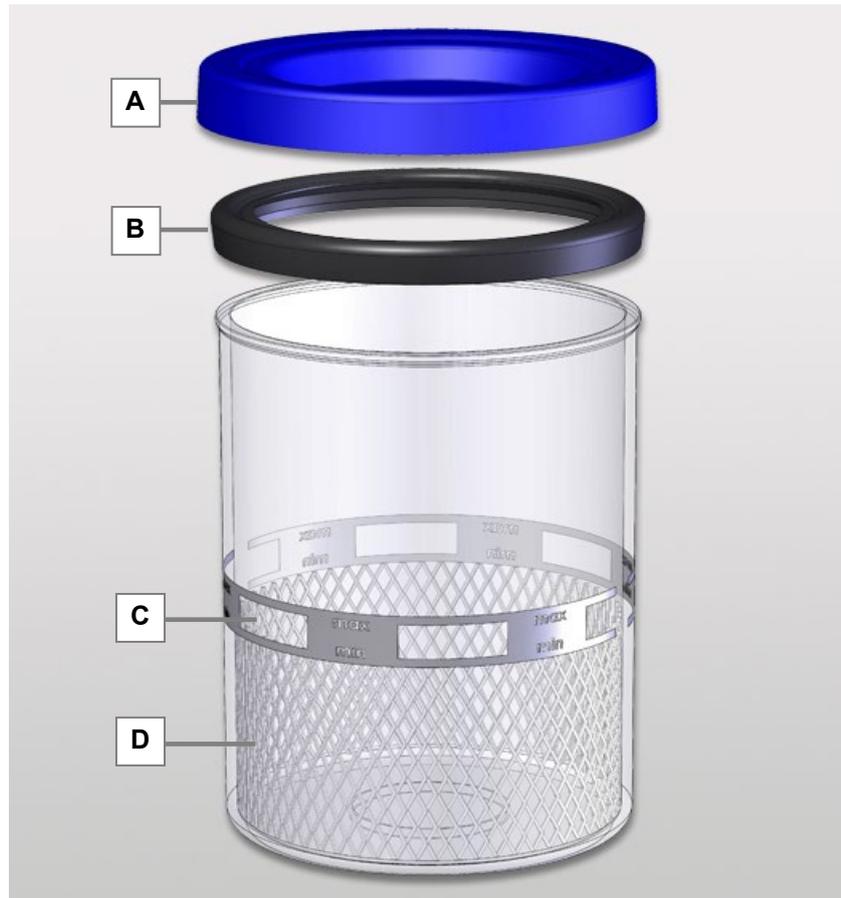


Fig. 3.11. Complete media tank

- A Plastic cover** for closure of the media tank (when not in use by cleaning basket / movement holder).
 - B Profile ring** as edge protection and for sealing.
 - C Fill level marking** the fill level of the medium should be between *min* and *max* in the inspection window.
 - D "Wave breaker"** for prevention of foaming of the medium and for more intensive cleaning action due to more effective counter flow effect of the medium.
- Attention!** Must not be removed to protect the glass against objects.

4

Before the initial commissioning

4.1

Unpacking and installing the cleaning machine

- Packaging** Keep the packaging for possible service purposes. Any disposal must be made in accordance with the applicable disposal regulations. You can also send the packaging back to the manufacturer or supplier.

Inspection for transport damage

Inspect the cleaning machine for possible transport damage before the first start-up. The cleaning machine must not be put into operation in the case of recognizable damage. Contact your supplier and the carrier.

Installation surface

Place the cleaning machine for operation on a stable, level, dry base which is resistant to the cleaning liquid. A smooth installation surface is required to be able to rotate the cleaning machine when changing the cleaning liquid.

Removing transport locks

Remove the foam transport locks and keep these if necessary.



Danger of electric shock due to ingress of liquid!

Protect the cleaning machine against the ingress of moisture.

The interior of the cleaning machine is protected against dripping moisture from outside (IP class 20).

However, keep the installation surface and the case dry to prevent electrical accidents and damage to the cleaning machine.

Ambient conditions

Provide sufficient ventilation at the location of the cleaning machine.

In the case of intended use of flammable solvent-based media, 4 air changes¹⁾ per hour and per cleaning machine using technical ventilation measures must be guaranteed for the explosion-safe operation of the cleaning machine(s).

¹⁾ must be realized by correctly designed technical ventilation installed on the building side (e.g. suitable exhaust air blower into the open air).

The following additional requirements must be met for safe operation of this cleaning machine:

- Permitted ambient temperature in operation: + 5 - + 30 °C
- Permitted relative humidity in operation: max. 80 %
- The surroundings must not have high dust levels



Fire and explosion hazard!

Ignitable vapors of the cleaning and rinsing media can escape in the case of improper operation without exhaust air tube and when changing the cleaning liquids.

Smoking and open ignition sources are prohibited in the machine surroundings.

4.2**Exhaust air equipment (optional) for solvent vapors**

The optional exhaust air equipment described below can be attached to the drying chamber exhaust air pipe (*Abb. 3.9.1.G*) to prevent unpleasant odors.



Observe the local health and safety regulations concerning unpleasant odors from solvents at the workplace.



Attention! Explosion hazard / deflagration in the immediate area of the ventilation outlets of the cleaning machine and / or the outlets of any connected exhaust air equipment.

Keep all kinds of ignition sources away from the immediate danger zone.

Prevent ignition sparks from electrostatic discharge!

Drying chamber exhaust air tube

Option 1:

An appropriate pipe (\varnothing 75 mm / max. 3 m length) for venting, ideally with access to the open air, must be attached to the exhaust air pipe of the drying chamber (*Fig. 3.9.E*). Passive ventilation (no backpressure) is intended due to the discharging air flow.

Attention! A finned tube is not suitable as dangerous concentration of condensate can deposit in the fins.

Option 2:

Connection to an available extractor on the building side (flow rate limit 30 m³/h).



Danger of damage to the machine. The end of the exhaust air tube must be freely accessible in a ventilated area and must not be immersed in water.

5 Initial commissioning

5.1 Connecting cleaning machine to mains power supply

Required grid conditions Connecting mains cable

The connection conditions must match the information on the nameplate.

Connect the mains cable (included in scope of delivery).

The cleaning machine must only be connected to a grounded power socket.

The mains plug must only be connected to an easily accessible power socket as it is considered as a disconnecter!

5.2 Filling media tank

Positions of the media tanks

Fill the media tanks with the cleaning and rinsing media intended for them (*see Chapter 7*).

The individual media tanks must be filled with cleaning or rinsing solution according to the position in the cleaning machine (*Fig. 5.2*).

Media tank in position #1: **Cleaning medium**

Media tank in position #2: **Rinsing medium**

Media tank in position #3: **Rinsing medium**

Media tank in position #4: **Rinsing medium**

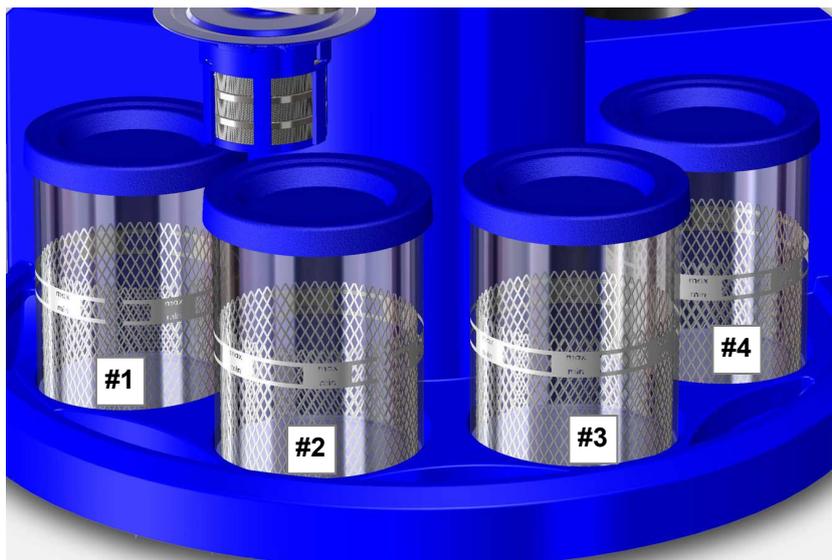


Fig. 5.2. View of the positions of the media tanks

Only use permitted operating materials.



Only permitted materials must be used for safety reasons and to prevent machine damage.

Observe the instructions for recommended operating materials and restrictions for operating materials (see *Chapter 7*).

Fire and explosion hazard!

When handling flammable materials, observe the applicable safety regulations according to the safety data sheet of the respective solvent.

Keep all kinds of ignition sources away.

Prevent ignition sparks from electrostatic discharge. Discharge possible electrostatic charges (body charge) before you handle flammable materials by touching any grounded equipment: e.g. water tap, metal surface of the case of the cleaning machine or use ESD protection equipment (ESD armband).

If liquid escapes while replacing the media tank, this must only be removed using a dry cloth (to prevent electrostatic charging).

Procedure

It is best to fill the media tanks in sequence. Start with the media tank #1 (*Fig. 5.2.#1*):

Fill the media tank with the appropriate media up to the marking (*Fig. 3.11.C*). Further information for selection of the suitable cleaning and rinsing solution can be found in *Chapter 7*.

Pay attention to the correct positioning of the media tanks in the recesses provided for them in the base of the cleaning machine.

Close the media tanks when not in use with the covers provided for them.

**ATTENTION**

The fill level of the medium must be within the marking for proper operation of the cleaning machine and optimum cleaning result (Fig. 3.11.C).

Too low fill level (below the Min. marking) causes unsatisfactory cleaning results.

Overfilling (above the Max. marking) results in the liquid sloshing out of the media tank.

**CAUTION**

Danger of injury from rotating parts!

For proper use of the cleaning machine, all 4 media tanks must be placed in the positions provided for them in the cleaning machine.

Only start the cleaning program if all media tanks are correctly filled and placed at the positions intended for them.

6 Daily cleaning operation

6.1 Checking fill levels of the media tanks

Check the fill levels of the media tanks and fill these up to the required fill level if necessary (Fig. 3.11).

6.2 Loading cleaning basket (optional)

The cleaning basket is intended for cleaning dismantled watch movements and precision parts.

**ATTENTION**

Note the following instructions before operation of the cleaning basket in order to prevent damage to the product to be cleaned and cleaning machine.

Only use the original Elma cleaning basket.

The maximum load weight of the cleaning basket with cleaning parts is 60 g.

Pay attention to symmetrical loading to prevent unbalance.



Removing cleaning basket

The cleaning basket is connected to the cleaning machine by the basket holder (Fig. 6.2.1.C) using bayonet connection over the mounting (Fig. 6.2.1.A).

Hold the mounting (Fig. 6.2.1.A) firmly with one hand, then first press the cleaning basket slightly upwards (Fig. 6.2.1.-1) and then turn it anticlockwise (Fig. 6.2.1.-2) out of the locking elements (Fig. 6.2.1.B).

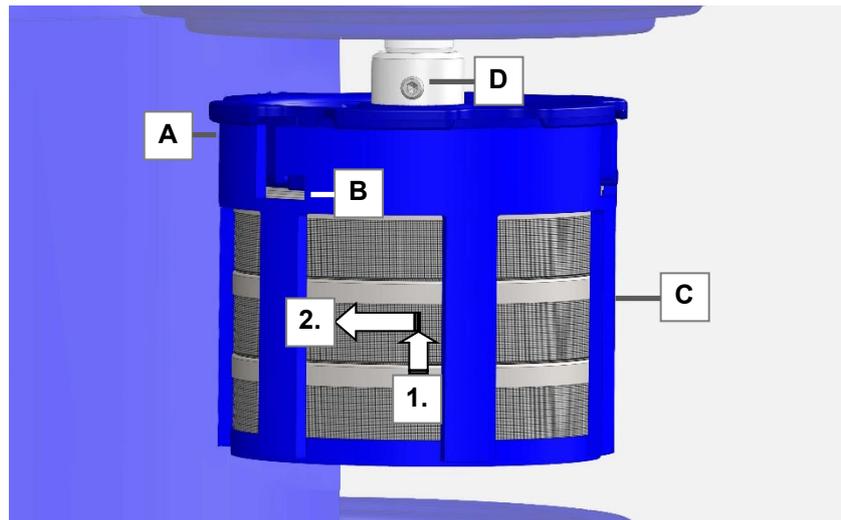


Fig. 6.2.1. Basket holder attached

- A** **Mounting** for cleaning basket and movement holder. During removal of the cleaning basket, the mounting remains screwed to the drive shaft using a grub screw (Fig. 6.2.1.B.).
- B** **Locking mechanism** is a part of the mounting. The cleaning basket engages in the recesses provided for this in the locking mechanism (bayonet connection).
- C** **Basket holder** is used for holding the basket inserts.
- D** **Grub screw** for fastening the mounting to the drive shaft. Correct fastening must be checked regularly (see *Chapter Maintenance 8.2.1*).

Removing basket inserts

Now remove the individual basket inserts for loading from the basket holder.

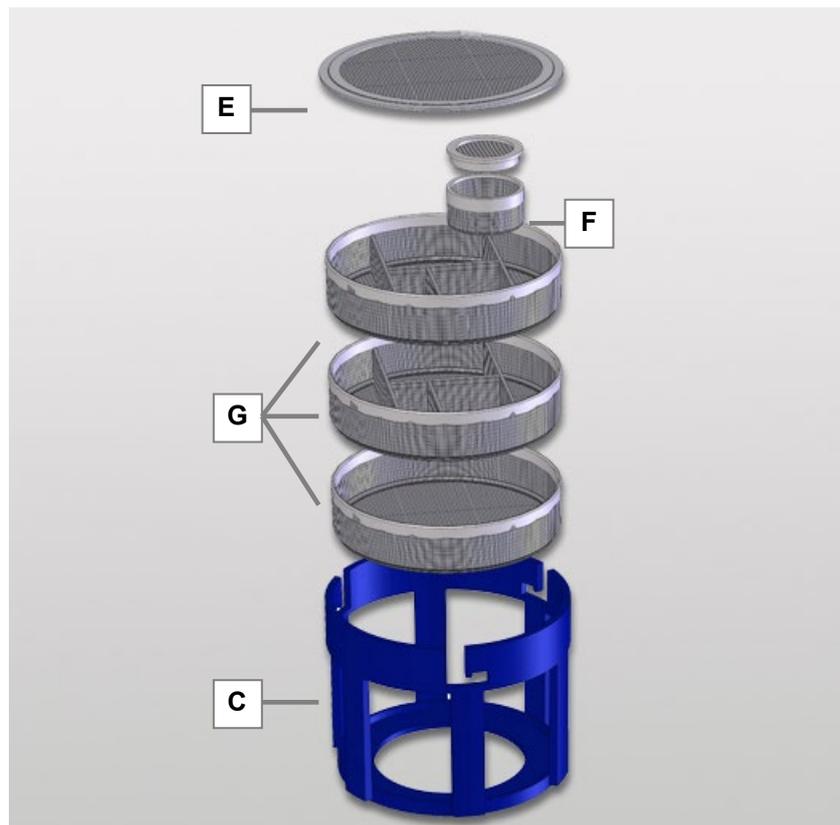


Fig. 6.2.2. Basket holder with basket inserts

Loading basket inserts

The basket inserts (Fig. 6.2.2.G) and the optional miniature basket (Fig. 6.2.2.F) are designed differently for accommodation of the various watch parts. Pay attention during the loading that sensitive parts are placed with appropriate care in the suitable basket compartments.

Loading cleaning basket

Stack the loaded basket inserts back into the basket holder (Fig. 6.2.2.C).



ATTENTION

All basket inserts must strictly be placed in the basket holder to be able to securely attach the cleaning basket to the mounting again. In doing so, it is not important whether all basket inserts are loaded.

Always place the sieve lid (Fig. 6.2.2.E) in the top position!

Fastening cleaning basket in the mounting

Now fasten the cleaning basket in the mounting of the cleaning machine again (Fig. 6.2.1.A).

Ensure that the cleaning basket is correctly locked in the locking mechanism (Fig. 6.2.1.B).

Ensure that the holder is correctly screwed to the drive shafts (Fig. 6.2.1.D).

6.3

Loading movement holder (optional)

The movement holder is intended for cleaning dismantled watch movements and PCBs.



Note the following instructions before operation of the movement holder in order to prevent damage to the product to be cleaned and cleaning machine.

Only use the original Elma movement holder.



Removing movement holder

The movement holder (*Fig. 6.3.1.C*) is connected to the cleaning machine using bayonet connection at the mounting (*Fig. 6.3.1.A*).

Hold the mounting (*Fig. 6.3.1.A*) firmly with one hand, then first press the movement holder slightly upwards *and then turn it anticlockwise* out of the locking elements (*Fig. 6.3.1.B*).

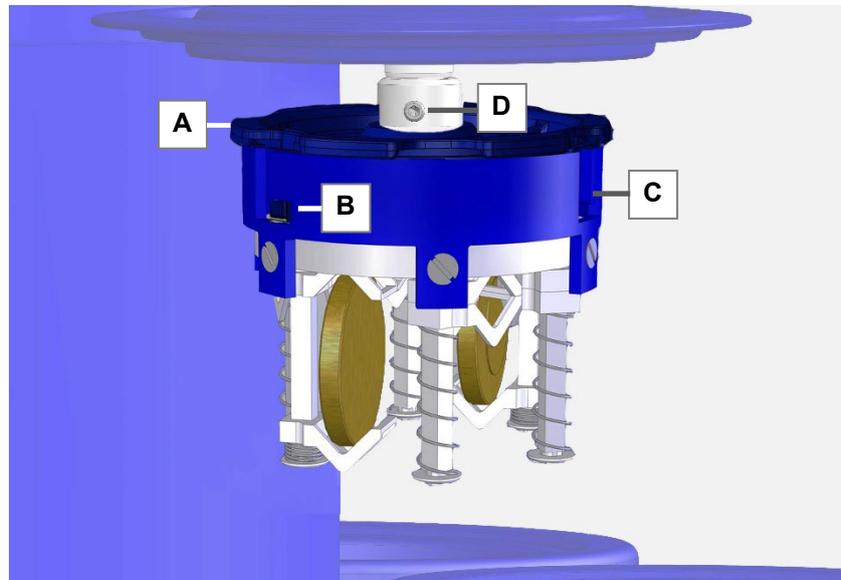


Fig. 6.3.1. Movement holder attached

- A Mounting** for cleaning basket and movement holder.
During removal of the movement holder, the mounting remains screwed to the drive shaft using a grub screw (*Fig. 6.3.1.D*).
- B Locking mechanism** is a part of the mounting. The movement holder engages in the recesses provided for this in the locking mechanism (bayonet connection).
- C Movement holder**
- D Grub screw** for fastening the mounting to the drive shaft.
Correct fastening must be checked regularly (see *Chapter Maintenance 8.2.1*).

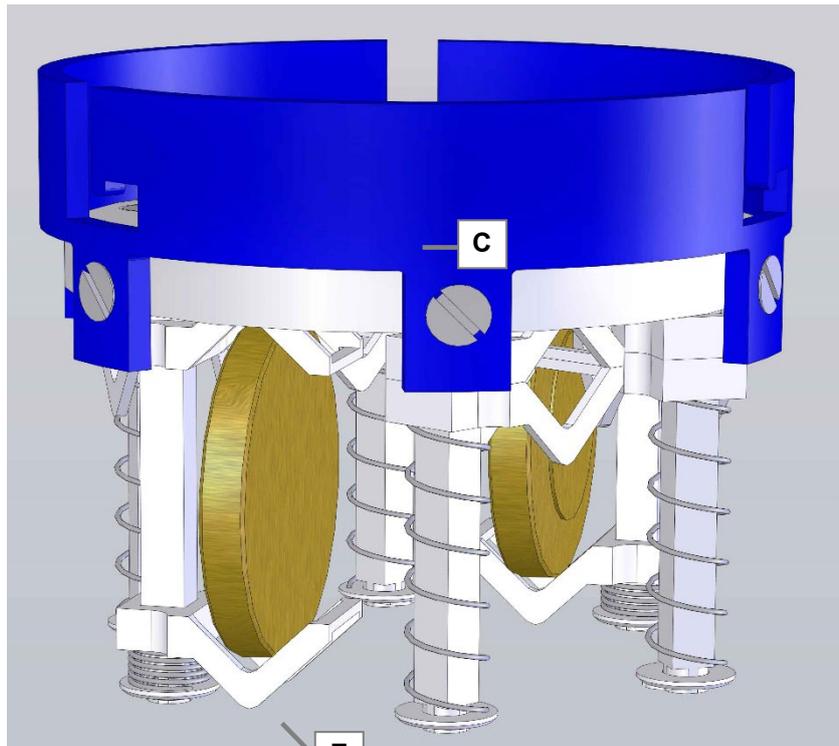


Fig. 6.3.2. Movement holder **E** with clamped parts (simplified display).

Loading retaining clips



Pull the retaining clips (*Fig. 6.3.2.E.*) apart and clamp the movement or PCB.

Note the following instructions (and in *Chapter 3.6. Technical Data*) before loading the movement holder in order to prevent damage to the product to be cleaned and cleaning machine:

The maximum load weight of the movement holder with cleaning parts is 60 grams.

Also note the maximum capacity of the retaining clips.

Pay attention to even loading to avoid unbalance and vibrations.

Also, secure difficult to clamp parts with, for example, a suitable solvent-resistant rubber band.

Fastening movement holder in the mounting

Now fasten the movement holder in the mounting of the cleaning machine again (*Fig. 6.3.1.A*).

Ensure that the movement holder is correctly locked in the locking mechanism (*Fig. 6.3.1.B*).

Ensure that the holder is correctly screwed to the drive shafts (*Fig. 6.2.1.D*).

6.4 Switching on cleaning machine

Switching on main switch



Switch on the cleaning machine at the main switch (Fig. 3.9.1/2.C). The internal fan is started.

Fire and explosion hazard!

The function of the fan is relevant for safety.

Check the top fan (Fig. 3.9.1.A) daily before starting work for function (air flow must be recognizable)!

The cleaning machine must not be operated if the fan is defective.

Contact your authorized dealer or the Service Centre.

6.5 Starting cleaning process



The cleaning basket / movement holder must be moved manually into the appropriate position for the respective process steps.

The process steps for each media tank are

- cleaning / rinsing
- spinning.

The drying in the process chamber is a single process step.

The required parameters for the time (*STEP TIME*) and the speed (*SPEED*) must be set manually before each process step.

The button must also be pressed for the drying step.

The settings can be changed at any time during the execution.

For switching off before expiry of the specified time preselection: Turn back the *STEP TIME* rotary knob to the *off* position.



CAUTION

Risk of injury! Moving and (fast) rotating parts during the program execution:

Horizontal and vertical transport movement of the swivel arm with cleaning basket / movement holder.

Rotating cleaning basket / movement holder.

Never reach into the cleaning basket / movement holder and its action range during the program execution.

Only start the cleaning program if all media tanks are correctly filled and placed with cover at the positions intended for them.

Only remove the cover of the respective media tank shortly before operation and place it in the storage place provided for it for the duration of the operation (Fig. 3.7.G).

Putting cleaning basket / movement holder in cleaning position

Using the operating handle, first move the drive unit with the cleaning basket / movement holder horizontally up to the engaging point over the media tank #1 (Fig. 5.2.).

The movable clamp of the operating handle does not need to be pressed and unlocked for this.

Press the operating handle (see *Chapter 3.8*) and move the drive unit to the lowest position of the media tank. In doing so, the cleaning basket / movement holder should be completely immersed in the medium.

Now release the operating handle.

Preselecting time and speed

Set the required time for the process step (*STEP TIME*) and the speed (*SPEED*) at the respective rotary knobs (*Fig. 3.10.A/B*).



Note the recommendations in *Chapter 6.6.1* as orientation aid for these settings.

The cleaning machine now starts for the specified time.

A signal sounds after expiry of the specified time.

Spinning position

Now push the drive unit into the spinning position (cleaning basket / movement holder over the medium) (*Fig. 3.8.4*) and set the required parameters (cleaning time and intensity) for this.

A signal sounds after expiry of the specified time.

Change position

Now push the drive unit into the change position (cleaning basket / movement holder over the media tank) (*Fig. 3.8.3*) and the move the drive unit over the next media tank.

Rinsing

Proceed in the same way for the 3 rinsing steps in the media tanks #2 - #4.

Drying

In addition to the settings for the time and the speed, also press the button for the heater.

The heater switch indicates from its illumination that the hot air fan in the drying chamber is activated.



ATTENTION

Note in relation to the parts to be cleaned that the rotation speed in the drying chamber must never be too high. Note the instructions in the settings recommendations (*Chapter 6.6.1*).



For switching off before expiry of the specified time preselection: Turn back the *STEP TIME* rotary knob to the *off* position.

6.6

End of the cleaning program

After the last process step (drying chamber), move the drive unit back to the starting position (over media tank #3).

Removing cleaning basket / movement holder

You can now remove the cleaning basket / movement holder from the mounting (see *Chapter 6.3*).



CAUTION

Depending on the retention time in the drying chamber, the cleaning basket / movement holder can still be hot immediately after the program end.

Let the cleaning basket / movement holder cool down for a few minutes in the end position or use suitable gloves for holding it.



However, as a cooling down phase is performed in the drying chamber after the hot air drying, the cleaning basket / movement holder is already cooled down slightly.

6.6.1

Setting recommendations

Attention! The parameters listed above are recommended for operation with cleaning basket. For operation with movement holder reduce the parameters, particularly with regard to the centrifugal forces that are to be expected depending on the loading weight. The operator is responsible for the correct parameter setting. The manufacturer shall not accept any liability in the event of damage to the items to be cleaned or to the machine.

Media tank #1	Parameters	Rotation
Cleaning	Speed	35%
	Step Time	5 min
Spinning	Speed	90%
	Step Time	2 min
Media tank #2	Parameters	Rotation
Cleaning	Speed	35%
	Step Time	3 min
Spinning	Speed	90%
	Step Time	2 min
Media tank #3	Parameters	Rotation
Cleaning	Speed	35%
	Step Time	3 min
Spinning	Speed	90%
	Step Time	2 min
Media tank #4	Parameters	Rotation
Cleaning	Speed	35%
	Step Time	3 min
Spinning	Speed	90%
	Step Time	2 min
Drying chamber	Parameters	Rotation
Drying	Speed	30%
	Step Time	6 min

6.7**Interrupting / cancelling cleaning**

Risk of injury from rotating cleaning basket / movement holder!
 Never reach into the rotating cleaning basket / movement holder!
 If required, cancel the cleaning program using the procedure described in this chapter.

Cancellation / interruption of the cleaning program

If the cleaning program has to be interrupted or cancelled for any reason, turn the rotary switch for the time (*STEP TIME*) manually to the *off* position.

6.8**After completion of the work****Switch off the main switch
Covers on media tanks**

Switch off the cleaning machine at the main switch (*Fig. 3.9.1/2.C*) after completion of the work.
 Cover the media tanks with the covers provided for them.

7**Media (cleaning / rinsing solutions)**

Fire and explosion hazard!
 When handling flammable materials, observe the applicable safety regulations according to the safety data sheet of the respective solvent.

Maximum one day's requirement of the solvents used is permitted to be stored in the surroundings of the cleaning machine at a minimum distance of 3 m from the cleaning machine.

**Media-contacting surfaces in the machine**

Only media in vapor and liquid form which are compatible with the materials used in this cleaning machine of the cleaning baskets, the seals and the media tanks come into consideration for any application.

The materials of the parts coming into contact with the media are specified below:

- Media tank: borosilicate glass
- Media tank cover: PP
- Sealing ring: FPM
- Grille in the media tank: stainless steel 1.4301

Observe the information concerning this in the safety data sheet of the medium / solvent.

Safety instructions

Also observe the safety instructions (e.g. goggles, gloves, risk and safety statements) specified by the manufacturer or supplier for handling the cleaning and rinsing media used.

In the case of doubt, contact the manufacturer or supplier.

Exclusion of liability All damage caused by non-observance of the limitations specified in Chapter 7.2 *is excluded from the liability for defects of the manufacturer.*

7.1 Recommended media

Elma provides suitable solvent and aqueous based cleaning and rinsing media and solvent-based relubrication media for final relubrication from its own development and manufacture. Ask your dealer about these.

7.1.1 Solvent-based (water-free) media

for cleaning "elma wf pro"

Water-free, solvent-based cleaning step for mechanical watch work. Cold cleaner for removal of residues of resinified oils and for brightening (deoxidization) of non-ferrous metal and stainless-steel surfaces.

for rinsing "elma suprol pro"

Residue-free solvent-based rinsing solution in watch cleaning machines after previous water-free cleaning step.

Also water-repellent after aqueous cleaning (e.g. with "elma cleaning concentrate 1:9" or "elma chronoclean") and aqueous rinsing (e.g. with distilled water).

for lubrication "elma unimix"

Lubricant solution for relubrication of water-free cleaned and rinsed watches and precision parts.



ATTENTION

The machine is always suitable for cleaning and rinsing media which are based on aliphatic C9-C11 hydrocarbons and alkoxy compounds meeting the flashpoint limitation $FP \geq 23 \text{ }^\circ\text{C}$ and have an ignition temperature $\geq 200 \text{ }^\circ\text{C}$.

The upper limit of the boiling range of rinsing media should not exceed $170 \text{ }^\circ\text{C}$ for successful drying (only use volatile rinsing media).

7.1.2 Aqueous media (cleaning concentrates)

for cleaning "elma RED 1:9"

Aqueous cleaning step for dismantled watches in the rotation and oscillation process. Resinified residues and traces of rust are removed. Alloys containing brass and copper and precious metal alloys are brightened.

Other aqueous cleaning concentrates for precision parts and assemblies can be found in the cleaner range on the manufacturer's website (see *Chapter 12*).

7.2 Limitations for media

7.2.1 Flammable, solvent-based media



DANGER

Among the most flammable, solvent-based media, those with a flashpoint greater than or equal (\geq) to 23 °C and an ignition temperature greater than or equal (\geq) to 200 °C are permitted in the machine. Therefore, note the flashpoint and ignition temperature specifications in the safety data sheet of your intended cleaning and rinsing media.

7.2.2 Non-flammable, solvent-based media



ATTENTION

In the case of intended permanent use with fluorinated, non-flammable solvents (e.g. epilamination), seals made of the fluoroplastic elastomers FPM, FFPM may have to be replaced previously (see above materials).

Use with chlorinated or brominated solvents is not recommended; these require checking on request in advance and possibly the replacement of seals.

7.2.3 Aqueous based media

This cleaning machine is not designed for foaming cleaning media. It has only limited suitable drying for rinsing water wetted parts.

Therefore, solvent-based rinsing is recommended as last rinsing step. There are no other limitations caused by the cleaning machine.

7.2.4 Environmental hazard from media

Environmental compatibility



The solvent-based cleaning and rinsing media based on hydrocarbons are not water-miscible and mostly hazardous for the environment. Also note the markings with warnings and pictograms and the information in the safety data sheet of your intended cleaning and rinsing media. This is applicable to a smaller extent for solvent-based media based on alkoxy compounds.

The environment-related markings mentioned above must also be observed for aqueous based cleaning media, particularly for their disposal.

The instructions for occupational health and safety in the respective data sheets must be observed for all cleaning media. "elma wf pro" is classified as environmentally hazardous according to R51 and R53 and therefore has an environmental hazard pictogram while "elma suprol pro" and "elma unimix" are only classified with R52 and R53 and therefore do not have any environmental hazard pictogram.



8 Care and maintenance tasks

To be performed by the user.



DANGER

Always unplug the mains plug before care and maintenance work.

Order the required components and consumable materials from your dealer in good time.

8.1 Daily tasks

8.1.1 Check function of the fan

Specified interval Daily before starting cleaning!

Inspection criteria Air flow at the ventilation slots in the drive unit (Fig. 3.9.1.A).

Action Make sensory check of the air flow.

The cleaning machine must not be operated if the fan is defective.

Contact your authorized dealer or the Service Centre.



DANGER

Fire and explosion hazard!

The function of the fan is relevant for safety.

8.1.2 Fill level check of the media tanks

Recommended interval Before every start of any cleaning program
Inspection criteria

Visually inspect whether the fill level of the different media tanks is in the range between the min and max markings (Fig. 3.11.C).

Action Adjust the fill level accordingly if required.



CAUTION

Refilling the media tanks must only be carried out when the cleaning machine is switched off.

8.2 Weekly tasks

8.2.1 Check fastening of the mounting

Recommended interval Weekly
Inspection criteria

Check whether the mounting of the cleaning basket / movement holder (Fig. 8.2.1.A) is correctly fastened to the drive shaft.

Action If necessary, tighten the grub screw (*Fig. 8.2.1.B*) using a 2 mm Allen key.

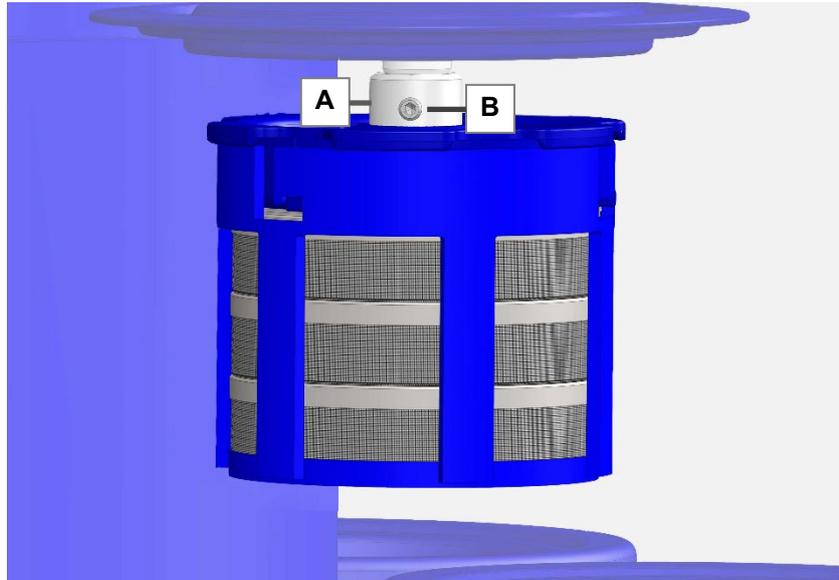


Fig. 8.2.1. Fastening of the mounting

8.3 Continuous actions

8.3.1 Change of cleaning and rinsing media

Recommended interval After view (visual inspection of the cleaning and rinsing media in the opened media tanks) and/or in the event of diminishing cleaning result.

Inspection criteria If the media in the media tank seem to be increasingly contaminated or the watch parts after cleaning no longer appear to be clean, the media must be changed.

Only use permitted operating materials. Only permitted media (cleaning / rinsing media) are permitted to be used for safety reasons and to prevent machine damage.

Observe the instructions for recommended media and limitations for unsuitable / not permissible media (*Chapter 8*).



Fire and explosion hazard!

Observe the applicable safety regulations for handling solvents.

Keep all kinds of ignition sources away.

Prevent ignition sparks from electrostatic discharge. Discharge possible electrostatic charges (body charge) before you handle flammable media by touching any grounded equipment: e.g. water tap, metal surface of the case of the cleaning machine or use ESD protection equipment (ESD armband).

Procedure Remove the relevant media tank from the cleaning machine.



The media tank must not be removed during running cleaning programs.

Drain the relevant media tank and clean if necessary.

Checking media tank

Also examine the media tank for possible damage / glass breakage and the seal for correct seating.

Disposal of used media



Used media must be disposed of in accordance with the regulations. No disposal via the sewer system! Dispose of the used media in accordance with the national disposal regulations for the media (see safety data sheet).

8.3.2

Removal of passed over materials

Recommended interval

As required

Inspection criteria

Visually inspect the surfaces of the cleaning machine, particularly the placement surfaces of the media tanks, for entrained material residues.

In the case of larger media accumulations in a certain area, check the media tank for glass breakage and the profile seal on the media tank for damage.

Action

Remove the residues with a dry, non-abrasive cleaning cloth.

8.3.3

Replacement of the filter mat

Recommended interval

As required.

Inspection criteria

Reduced drying result and particle residues on cleaning parts and/or on cleaning basket / movement holder after the drying.

Order number

Maintenance kit filter mat + fan grille Art. No. 104 9007

Only use the original seal of the manufacturer to prevent impairment of the machine function.

Procedure

Disconnect the mains plug first.

Undo the four Allen screws of the maintenance cover (*Fig. 8.3.3.1.A*) using an Allen key.

Remove the fan grille (*Fig. 8.3.3.2.B*) from the fastening at the cable connector and remove it from the cleaning machine.

Remove the used filter mat (*Fig. 8.3.3.2.C*).

If required, clean the plastic fins on the cleaning machine using a dry cloth.

Attach the new filter mat to the fan grille (the fan grille from the maintenance kit is provided for reserve purposes in case the fan grill has been damaged during removal).

Secure the maintenance cover with the 4 Allen screws.

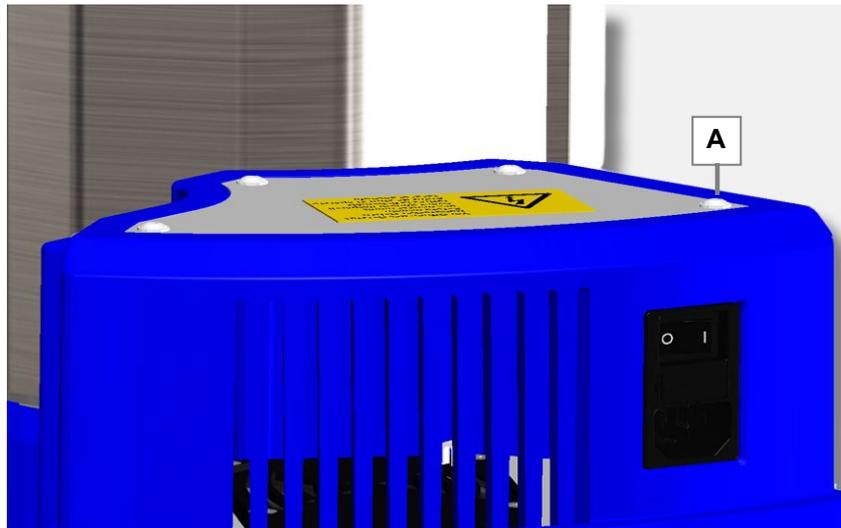


Fig. 8.3.3.1. Opening service cover

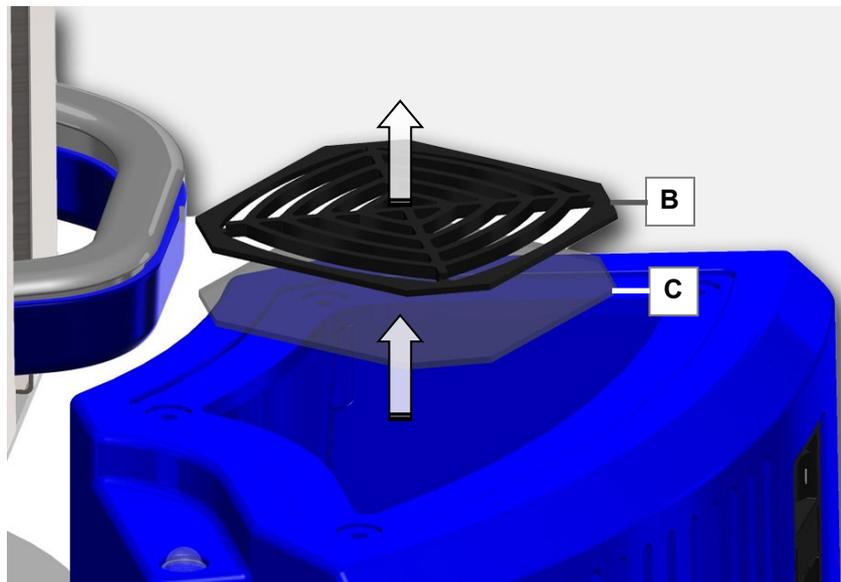


Fig. 8.3.3.2. Removing filter mat

Disposal



Dispose of the used filter mat in accordance with the local regulations for this.

9

Maintenance tasks

Must only be performed by authorized service point.



The manufacturer shall not accept any liability for personal injuries and property damage resulting from maintenance not having been performed or not carried out properly.

Maintenance task Check of the overtemperature protection

Interval Every 5 years

Procedure Hand over the cleaning machine to an authorized service point for the purpose of this servicing.

Components relevant for safety		
Name	Art. No.	Figure
Overtemperature protection of the heater	105 2572	
Fan, drive unit	105 8762	
Fan, drying chamber 100-230 V	104 9463	
Media tank profile seal	105 2559	

Components relevant for function (check and replace if necessary)	
Name	Art. No.
Vertical and horizontal locking of the control panel and drive unit	diverse
Rotation shaft bearing	diverse

10 Operating faults

A list of the possible faults and the procedures for fault clearance can be found in *Chapter 10.1*.

If any fault cannot be rectified using the measures specified in the troubleshooting, contact the dealer or manufacturer immediately.

10.1 Operating faults

Fault	Fault clearance
Cleaning machine cannot be started or stops.	Check the following possibilities: <ul style="list-style-type: none"> • Disconnect cleaning machine from the mains power supply. Then check fuse(s) (<i>Fig. 3.9.1/2 D</i>) for mains cable; replace if necessary • Switch off cleaning machine and restart. Contact Service if the fault persists.
Timer (<i>STEP TIME</i>) does not run	Check the following possibilities: <ul style="list-style-type: none"> • Disconnect cleaning machine from the mains power supply. Then check fuse(s) (<i>Fig. 3.9.1/2 D</i>) for mains cable; replace if necessary • Switch off cleaning machine and restart. Contact Service if the fault persists.
Speed (<i>SPEED</i>) can no longer be adjusted	Check the following possibilities: <ul style="list-style-type: none"> • Disconnect cleaning machine from the mains power supply. Then check fuse(s) (<i>Fig. 3.9.1/2 D</i>) for mains cable; replace if necessary • Switch off cleaning machine and restart. Contact Service if the fault persists.
Indicator lamp in the heater button does not light	Check the following possibilities: <ul style="list-style-type: none"> • Disconnect cleaning machine from the mains power supply. Then check fuse(s) (<i>Fig. 3.9.1/2 D</i>) for mains cable; replace if necessary • Switch off cleaning machine and restart. Contact Service if the fault persists.
Parts do not become dry	<ul style="list-style-type: none"> • Replace filter in the fan (<i>Chapter 8.3.3</i>) • Contact Service if the fault persists.
Internal fan does not function (no fan noise, no air flow)	Shut down operation – contact Service!

10.2

Fault clearance by user

The manufacturer shall accept no liability for damage caused by unauthorized interventions on the cleaning machine.



DANGER

Risk of electric shock from parts carrying mains voltage in the interior of the cleaning machine!

The machine must only be opened by trained, skilled personnel. Always unplug the mains plug before opening the cleaning machine.



CAUTION

Risk of injury from sharp edges in the cleaning machine and from moving / rotating components (e.g. toothed belts).



CAUTION

Risk of injury from hot surfaces!

Surfaces, the drives and heater can still be hot immediately after operation of the cleaning machine.

10.3

Repairs



DANGER

For safety reasons, repairs must only be performed by service centers which have been authorized by the manufacturer.

The manufacturer shall accept no liability for damage caused by unauthorized and incorrect interventions on the cleaning machine.

Opening must only be performed by authorized qualified electricians

Risk of electric shock from parts carrying mains voltage in the interior of the cleaning machine!

Always unplug the mains plug before opening the cleaning machine.



DANGER

The manufacturer shall accept no liability for damage caused by unauthorized interventions on the cleaning machine.



CAUTION

Risk of injury from sharp edges in the cleaning machine and from moving / rotating components (e.g. toothed belts).



CAUTION

Risk of injury from hot surfaces!

The surfaces of the hot air case and the PTC heating element can still be very hot (up to approx. 165 °C) immediately after operation of the cleaning machine.

Contact the supplier or manufacturer in the case of cleaning machine faults which cannot be rectified using the instructions for fault clearance in this operating manual.

If any return to a service center is required:

- use the original packaging to prevent transport damage.
- enclose as specific as possible description of the fault.

11

Decommissioning and disposal



The machine components can be supplied to electronics and metal recycling for disposal. The manufacturer also accepts old components for disposal.

Dispose of used cleaning and rinsing media in accordance with the applicable national regulations.

12

Manufacturer address / contact address

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