OPTIMAX®

Film Processor
Operation Manual

PROTEC® Medizintechnik GmbH & Co. KG
Lichtenberger Straße 35, D-71720 Oberstenfeld, Germany
Telephone: +49-7062-9255-0 e-mail: service@protec-med.com

Machine No.: 
Type: 
Date of Installation: 
Issued: 05-2006/3.4
Subject to technical alterations

English
EU-Declaration of Conformity

PROTEC® Medizintechnik declares, that the product

Description: OPTIMAX
Machine type: X-Ray-Film Processor
Model no. 117x-y-0000
   x is a number between 0 and 9, y is a number between 1 and 9

conforms to the following harmonized standards:

EMC: EN 50081 Part 1, 03/1993; EN 50082 Part 1, 03/1993

according to the regulations of:

• the Medical Device Directive 93/42/EEC “class 1”,
• the Low Voltage Directive 73/23/EEC and the
• EMC Directive 89/336/EG

PROTEC® Medizintechnik GmbH & Co. KG, Lichtenberger Straße 35, D-71720 Oberstenfeld, Germany

Supplementary Guidelines:

• DIMDI: DE / 0000042967
• WEEE: DE 55471807

Place and date of issue
Oberstenfeld, 23. Mai 2006, Jochen Krupp (Technical Manager Analogue Systems)
Introduction.......................................................................................................... 3
Technical Specifications ..................................................................................... 4
Safety Instructions ............................................................................................... 5
Installation ............................................................................................................ 6
Initial Operation .................................................................................................... 9

Operation
- Short overview and control panel ................................................................. 10
- Switching the machine on ............................................................................ 12
- Stand-by mode ............................................................................................. 12
- Bath temperature ......................................................................................... 12
- Display “Film feed” ........................................................................................ 12
- Manual pumping .......................................................................................... 12
- Anti-crystallisation function / Time replenishment ....................................... 12
- Automatic replenishment ............................................................................. 13
- Roll films and paper films ............................................................................ 13

Care
- Daily Care ................................................................................................... 14
- Weekly Care ................................................................................................ 14
- Thorough Cleaning ..................................................................................... 15

Maintenance / Disposal ...................................................................................... 16

Problems and Solutions
- Troubleshooting Film Defects ..................................................................... 19
- Troubleshooting Machine Errors ................................................................. 20

Accessories ........................................................................................................ 21

Service Manual as appendix, see page 23

Copyright
© 2004 by PROTEC® Medizintechnik. All rights reserved. Any reproduction, out of
the limitation by the copyright law, needs written authorization by PROTEC® Medizintechnik.

Information on Liability
This manual has been checked for correctness. The instructions and specifications
were correct at the time it was published. Future models may have modifications
without prior notice. PROTEC® Medizintechnik does not take responsibility for damage
caused direct or indirect by error, omission or non-conformity of the manual.

Caution (U.S.)
Federal Law restricts this device to sale by or on the order of a medical professional.

Introduction
The OPTIMAX® processor is a compact, automatic table-top processor. Due to the
precision roller transport system, both sheet and roller films can be processed. The
film materials are developed, fixed, rinsed and dried. The OPTIMAX® incorporates
an automatic film-registration and a Stand-by mode. The developing solutions are
temperature-regulated, circulated and automatically replenished.

This Operation Manual contains the most important instructions for installation, op-
eration and servicing of this machine. Please read the provided information carefully
to ensure reliable and satisfactory operation of your OPTIMAX®.
## Technical Specifications

**Film transport:** Continuous roller transport system

**Film formats:** In general: Sheet and roll films up to 35.8 cm (14.1") width; roll films with leader from 70 mm (2.8") width; smallest film format 10x10 cm (4x4").

Mammography Type 1171: For processing Mammography Films.

Graphic-Arts Type 1172: With cassette box (LxWxH) 35x13x12 cm (13.8x5.1x4.7") for processing roll films.

**Processing capacity:** 129 films 24x30 cm (10x12") per hour (standard model, film fed in crosswise)

**Process time:**
- Standard 90 s
- Mammography 135 s
- *Option 167 s

**Linear speed:**
- Standard 56 cm/min. (22 in/min)
- Mammography 37 cm/min (14.5 in/min)
- *Option 30 cm/min (11.8 in/min)

**Developer time:**
- Standard 25 s
- Mammography 37 s
- *Special 46 s

**Tank capacities:** Developer, fixer and washing 5 litres each (1.3 gal)

**Circulation system:** Developer and fixer are continuously circulated by a circulation pump

**Replenishment:** Automatic replenishment by film detection, in relation to film length

**Developer temperature:** Adjustable 28 - 37 °C (82.4 - 98.6 °F)

**Fixer temperature:** Adjusted to developer temperature by heat exchanger.

**Water connection:** Permissible water pressure 2 - 10 bar (29 - 145 psi), permissible water temperature 5 - 30 °C (41 - 86 °F).

**Water consumption:** 1.9 litres per minute (0.5 gal/min) when processing.

**Drain capacity:** 7 litres per minute (1.85 gal/min)

**Noise level:** Less than 58 dB(A).

**Heat emission:** Stand-by: 0.1 kJ/s Processing: 1.4 kJ/s

**Environmental conditions:**
1) Temperature 18- 40 °C (51.6 - 104 °F), ventilated room, room temperature should be lower than set bath temperature.
2) Relative humidity lower than 80% up to 31 °C (80 °F), linear decreasing to 50% at 40 °C (104 °F)
3) Height above sea level less than 2000 m (6666 ft.)
4) Indoor use

**Pollution degree:** 2
## Technical Specifications

<table>
<thead>
<tr>
<th>System protection:</th>
<th>IP 20</th>
</tr>
</thead>
</table>
| **Power source:**  | Electrical specifications are indicated on model nameplate.  
|                     | Type 117x-1-0000: 220 - 240 V~, 8.8 A, 50 Hz.  
|                     | Type 117x-2-0000: 220 - 240 V~, 8.8 A, 60 Hz.  
|                     | Machine tested for overvoltage category II according to IEC 1010 (EN 61010, VDE 0411)  
|                     | Type 117x-4-0000: 110 / 120 V~ ±10%, 15 A, 60 Hz. Machine tested for overvoltage category II according to UL 3101 and CSA 22.2-1010 |
| **Power consumption:** | Stand-by: 0.12 kWh  
|                     | Processing: 1.4 kWh |
| **Weight (processor):** | Empty 35 kg (77 lbs)  
|                     | Filled 50 kg (110 lbs) |
| **Dimensions (LxWxH):** | 77x59x42 (** 112) cm 30.3x23.2x16.5 (** 44.1)"
| **Floor space required:** | 0.45 m² (4.8 sqft) |

* Depending on machine type and used gears processors have different speeds.  
** Height incl. optional working table resp. base cabinet.

## Safety Instructions

To ensure the safe operation of this processor, installation and use should always conform to the instructions contained in this manual.

The developer and fixer chemicals used in the processor should be handled according to the manufacturer’s instructions. In general: Non-diluted chemicals are caustic. For this reason, chemicals should be handled very carefully. Avoid contact with skin, always wear protective clothing, gloves and glasses when handling the chemicals - for example, when mixing and refilling. Also when taking the racks out for cleaning or servicing. In case of chemicals getting into the eyes, rinse eyes immediately with cold, running water for approximately 15 minutes, and contact a doctor afterwards. Inhalation of chemicals can be dangerous to your health and should be avoided. For this reason, always ensure that the room in which the processor is installed is adequately ventilated.

Environmental regulations regarding the storage and disposal of waste chemicals should be obtained from the local water authorities and complied with.

Before opening the processor switch off the unit and unplug it from the electrical socket. Service and repairs must be performed by trained service technicians only. Use only manufacturers replacement parts.
Installation

1. Requirements for installation
   a. Fresh water connection: Stop cock with 3/4” outer-thread diameter (washing machine connection), Water pressure 2 - 10 bar (29 - 145 psi).
      Drainage connection: Plastic tube - inner diameter 50 mm (2”) or larger. A ventilated syphon which serves as odor preventor should be included in the planning. The drainage tubes should be installed with a fall of minimum 5 %. Local Water Authorities regulations should be complied with.
   b. Electrical connection: Fused wall socket with ground connection according to electrical data (see Technical Specification, page 5). It is also required to install a ground fault interrupt (with 25 A / 30 mA nominal error current).

    Electrical connections should be carried out according to regulations by an electrician.

2. Set up of processor
   Unpack the Processor. Remove cover and transport securing brackets on the sides of the roller racks. Remove roller racks - start with the dryer rack.
   In 220-240 V version the OPTIMAX® is delivered as a tabletop processor with a two part floorplate. If the machine is upgraded with the optional stand or cabinet, the small plastic strip has to be removed.
   In 110-120 V version the OPTIMAX® is delivered as a tabletop processor with a three part floorplate. If the machine is upgraded with the optional stand or cabinet, both small plastic strips and the metal plate have to be removed and a special main plate must be reconnected.

   Table-top installation
   In the event that the processor is to be installed on a work top or table, the adjustable feet should be levelled.

   Attention!
   Machine should not be installed on table-top without adjustable feet, as this would block the ventilation openings under the machine and cause overheating.

Installing on processor stand or base cabinet
   In the event that the processor is to be installed on the stand or cabinet (optional accessory), the processor will be mounted directly to it. Mount processor according to manual included with stand or cabinet (the adjustable feet inside the accessory bag are not required).

   Finally the processor needs to be levelled:
   Place level across the sidewalls of processor and adjust the leveling feet accordingly. Replace the racks into the processor and close the latches.
3. Connecting the processor

Water connection: Connect the water hose which comes out from the processor’s back to the fresh water supply.

All other hoses (see diagram page 8): Connect the enclosed hoses according to color system onto the front of the machine. Put hose clamps (enclosed in accessory bag) over hose end, before attaching to connection. Warm up hose end (with hot water or lighter) and push onto the respective connection. Finally push clamp over hose and connection.

Cut hoses to required length. Then integrate the stop cocks into the three drainage hoses in such a position, that they are easy to reach.

Connect the suction pipes to the hose ends for the replenishment tanks using hose clamps. Put suction pipes through cover opening into respective replenishment tanks and snap them in.

The overflow and drainage hoses from the developer and fixer should be guided into their respective collecting containers.

The overflow and the drainage of the water can either be guided into the drainage syphon or into respective collection containers.
**Installation**

**Hose connections**

**Danger of Overflow!**

*Use the included cable ties (accessory bag) to secure the hoses. Fix all hose ends which guide into syphon or collecting container, so that they do not drop into the liquid.*

**Very important:**

*The hose piping should be straight (without the hoses going up and down) with a constant fall. The hoses should be as short as possible and without bends and kinks. This is very important for the water overflow hose. Bad piping work will cause the machine to overflow!*  

*Inform yourself of the local water board regulations regarding drainage. These regulations may differ from information in this manual, but they should be complied with.*

*If the machine is installed table-top, ensure that the table is stable enough and does not wobble.*
Initial Operation

1. Test run

**Important!**
*Processor should not be run dry!*
*Upon commissioning and every refilling the pumps must be vented.*

a. Close the three drainage stop cocks and fill the tanks and replenishment containers with water. Open water inflow tap. Connect electrical socket and switch the machine on. Water now flows into water tank. The circulation pump activates. If fluid does not flow, an air lock may be present. Momentarily open the drain hose valves to ventilate the system.

b. Ventilation of the replenishment pump:
Set temperature dial to position “Manual pumping”. Keep dial to this position until no more air bubbles rise in the tanks.

c. Ventilation of the circulation pump:
If air is in the circulation pump, a loud running noise can be heard. Switch the machine off again. Open the stop cocks of the developer and fixer for five seconds and switch machine on again. Repeat this procedure until no more air bubbles are visible in the developer and fixer baths and until the circulation pump runs quietly.

d. Check all hose connections for leakage. Switch machine off and drain water out.

2. Fill processor with chemicals

Prepare chemicals inside the replenishment containers according to manufacturers instructions.

**Fill up processor manually**
By using a suitable container, pour chemicals into the respective tanks. First the fixer and then the developer. Caution: when filling, be sure that chemicals do no splash from one bath into another. When fixer solution is mixed with developer solution, the developer chemical is destroyed.

Snap each suction pipe into the respective cover of it’s replenishment container and close it carefully. Place containers under processor.

**Using replenishment pump**
Filling of processor can also be done by use of the replenishment pump (this takes much more time). Snap each suction pipe into the respective cover of it’s replenishment container and close it carefully. Place containers under processor. Now set temperature dial to “Manual pumping”. Keep dial in this position until tanks are filled. After 20 minutes this function stops automatically - to restart a cycle, turn dial to another position and return to “Manual pumping”. **Limitation:** The function may fill up tanks of developer and fixer to different levels. This may be due to different causes. If this happens, then use a suitable container to fill up the tanks completely.
Operation

Short overview and control panel

LED displays

- **Film feed**
  Wait with the next film until light goes off.

- **Power**
  When power is on the LED lights up.

- **Bath temperature**
  Flashes when temperature is not reached.

Temperature dial

Manual pumping

---

**Important!**

Safety function stops film transportation when cover is removed. Therefore keep cover placed on the machine when processing films.

*Only machines with cassette box:

When processing roll films in cassettes, pull approx. 10 cm of film out of the cassette and fold the corners. Place cassette into cassette box and feed film into the infeed. Notice that on processors with cassette box, the film switch is located in the middle of the infeed.
Operation

Attention:
Upon first operation and each refilling of a developer check the function of the circulation pump and vent the pump if required (see page 9).

Before use...
2. Open water tap.
3. Switch processor on.
4. Check liquid level in replenishment and drainage collecting containers.
5. Wait until the developer temperature is reached. If the temperature has not been reached, the bath temperature light is flashing.
6. Run cleaning films through processor.

Working procedure
7. Processing films:
   Open light protection cover. Important: Put film first on left side of feed tray and then feed in. During processing films please watch the display “Film Feed”. If this is lit, wait until it goes off again and an audible tone can be heard, before inserting the next film.

After work...
8. Switch processor off.
10. Open water-drainage stop cock and drain water out of the machine.

Do not place any object on the processor.
Stand-by mode
When no film is being processed, the machine switches to Stand-by. The chemicals remain at a constant temperature. The film transport and water inflow activate at intervals to avoid crystallization of the chemicals on the transport rollers. Entry of the next film is possible at any time.

Switching the machine on
The processor is switched on at the main power switch on the front side. After switching on, the water tank will be filled up and a replenishment cycle will be carried out. The developer will be heated up. Until the tempearture is reached the LED-display “Bath temperature” will be flashing. When the processor is ready and the bath temperature reached, a long signal tone can be heard.

Bath temperature
The processor heats up the chemicals automatically to the dial-set temperature. When this temperature is reached for the first time after switching on the machine, a long signal tone can be heard. This is also the case when the temperature is changed by the dial switch.

If the difference between actual and dial-set temperature is more than 1 °C, the bath temperature LED will flash. If a film has been fed in and the temperature is not reached, a warning sound will be heard.

Display “Film feed”
If films are fed into the processor without clearance one after an other, then this may cause a film jam. The light “Film feed” is on during feeding of a film. After the film has been fed in completely the light goes off. Additionally an audible tone indicates that the next film can be fed in.

Manual pumping
The function “Manual pumping” activates the replenishment pump and it pumps chemicals into the tanks in addition to automatic replenishment. Turn the dial to the position “Manual pumping” and chemicals will be pumped into the tanks. This function is only available during stand-by (no film in process). If the dial is left in this position, the pumping function is stopped automatically after 20 minutes. To restart a cycle turn dial to a temperature and return to “Manual pumping”.

Please note: Films cannot be processed when dial is set to “Manual pumping”. Also bath temperature is set automatical to 28 °C during “Manual pumping”. After ending the manual pumping the temperature must be set again by turning the dial. It takes some time until the temperature is reached (look at the bath temperature display).

Both chemical pumps - fixer and developer - are driven parallel by only one motor and therefore they operate in unison.

Anti-crystallisation function
During the stand-by mode, the film transport, the dryer ventilation, the dryer heater and the water inflow are activated every 20 minutes for a period of 20 seconds. This prevents the build-up of crystals on the rollers.
Time replenishment (Anti oxidation function, Flood replenishment)

During the stand-by, the developer chemicals are subject to change which causes their deterioration. By means of the time replenishment, a replenishment cycle is activated after 60 minutes without replenishment. The pump runs for 15 seconds. With this function, the quality of the developer chemicals are maintained even when standing idle for long periods.

Automatic replenishment

Depending on the processed amount of films the chemicals are replenished automatically. This is done by pumping chemicals from the replenishment containers. By means of the film-detection switch at the film feed tray, the surface of the processed films are calculated and after ~0,25 m² a replenishment cycle of 40 seconds duration is automatically activated. The replenishment quantity per cycle (at pump setting 100 %) amounts to 150 ml. The chart below shows the replenishment rate in ml per m² surface in reliance on film width and setting of the pump.

<table>
<thead>
<tr>
<th>Film width</th>
<th>Setting of replenishment pump*</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 cm</td>
<td>100%** (85 %)</td>
</tr>
<tr>
<td></td>
<td>600 ml/m²</td>
</tr>
<tr>
<td>24 cm</td>
<td>75 % (62 %)</td>
</tr>
<tr>
<td></td>
<td>450 ml/m²</td>
</tr>
<tr>
<td>18 cm</td>
<td>870 ml/m²</td>
</tr>
<tr>
<td></td>
<td>875 ml/m²</td>
</tr>
<tr>
<td></td>
<td>1150 ml/m²</td>
</tr>
</tbody>
</table>

*Setting at 50 Hz current resp. settings at 60 Hz current are in brackets

**Standard setting

Rollfilms and paper films

Rollfilms can be transported into the machine when a leader film (10x10 cm) is attached, that has been prepared with a chemical resistant adhesive tape.

Rollfilms without leader films and paper should be folded on the corners as per diagram displayed on the right.
Daily Care

Before use...
- Remove dirt and dust from film feed tray with soft, lint-free cloth.
- Run 2 - 3 cleaner films through processor to remove all accumulated dirt and dust from the rollers.
- Check the fluid level in the replenishment containers and if necessary refill.

After use...
- When work has been completed at the end of the day, drain water out of the machine. This avoids the growth of algae in the water.

Attention: To prevent damage to the processor, avoid liquid contact, except for designated areas such as the processor tanks. Use extreme care to prevent any liquid contact with the processor controls.

Weekly Care

The developer chemicals cause residue buildup in the machine. This residue has a negative effect on the developing process of the film material. For this reason the processor should be regularly cleaned. Proceed as follows:

1. Switch machine off and remove cover.
2. Loosen the securing latches (red, blue and beige) of the drive shafts of each roller rack at the right side.
3. Remove the roller-racks. First of all remove the large dryer-rack (beige). The racks are easier to remove and insert when they are slightly tilted. Use the grey drip catcher forms to ensure that no chemicals splash when being carried. Then remove the fixer (blue) and developer (red) racks in sequence.
4. Rinse all racks thoroughly under warm running water and then leave to drain off. It is advisable to use a soft sponge (do not use scouring-pad, as this would scratch the rollers) and remove any dirt from the rollers.
5. Replace the racks: Red = Developer, Blue = Fixer, Beige = Washing/Drying. Ensure that the racks are firmly installed and do not forget to close the securing latches on the drive shafts.
6. Replace machine cover and ensure it is securely closed.
7. Clean processor outer shell with damp cloth. Do not use aggressive cleaners or solvents.

Please note: When removing the Rinsing / Drying roller-rack, ensure that no water gets into the film dryer air channel.
Thorough Cleaning

Every three months (maybe earlier) a thorough cleaning is necessary, depending on the quantity of films processed. Tank cleaners are available for developer and water baths. The fixer bath is cleaned with water. When preparing chemical tank cleaners, follow manufacturers instructions explicitly.

How to proceed:

1. Switch the machine off and empty all tanks by opening the stop cocks.
2. Remove machine cover. When all tanks are emptied, close stop cocks again. Now fill the fixer tank with warm water. Prepare cleaner solutions for developer and water baths and fill into respective tanks.
3. Remove suction pipes from the replenishment containers and place them in a deep container filled with warm water. Attention: Do not add chemical cleaners here!
4. Close machine cover and switch machine on.
5. Start film transportation and keep running for 10 to 20 minutes. To start the film transport, place a film on the feed tray so that it activates the film switch but will not be pulled into the processor. During the operation with water, the installed roller racks will be cleaned.
6. Important: After completion of tank cleaning, the tank should be rinsed thoroughly with clean water. To do this, fill the machine with fresh water twice and each time, let the machine run for a 10 minute period. Empty the tanks and re-close the stop cocks.
7. Take out the roller-racks and rinse them thoroughly with running water. Remove remaining dirt from the rollers by using a sponge and clean thoroughly. Doing this, the rollers can be turned by turning the drive shaft. Remove the sheet metal covers from the dryer rack and clean the rack in warm water diluted with dishwashing soap, and rinse well after cleaning. Reinstall the roller-racks in the machine.
8. Refill the tanks with respective chemicals. To avoid accidental contamination, carefully refill the fixer tank first. If any fixer inadvertently spills in the developer tank, thoroughly clean the developer tank and then refill the developer tank. Replace the suction pipes into the replenishment containers. In certain circumstances the circulation system must be ventilated: see page 9, item 1c.
9. For quality check, process test films.

Before You Go on Holiday...

When the processor will remain off and unused for periods longer than 2 weeks, the processor tanks should be emptied. Immediately after draining the chemistry from the tanks, the drain valves should be closed and water should be added to each tank. Upon return and prior to use, the processor should be cleaned and filled with fresh chemistry.

Attention: Do not use alcohol containing solvents to clean the machine!

Colour changes in the containers are caused by the properties of the chemicals and no cause for concern!
## Maintenance / Disposal

### Maintenance Protocol

#### Installation

<table>
<thead>
<tr>
<th>Name:</th>
<th>Machine type:</th>
<th>Serial number:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technician:</td>
<td>Training:</td>
<td>by:</td>
</tr>
<tr>
<td>Telephone:</td>
<td>Date:</td>
<td>Guarantee until:</td>
</tr>
</tbody>
</table>

#### Parameters Set

<table>
<thead>
<tr>
<th>Developer temp.:</th>
<th>Dryer temp.:</th>
<th>Cycle time:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dev. reg. volume:</td>
<td>Dev. reg. volume:</td>
<td>Anti-oxidation:</td>
</tr>
<tr>
<td>Developer:</td>
<td>Fixer:</td>
<td>Film type:</td>
</tr>
<tr>
<td>Changed by:</td>
<td>Date:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Developer temp.:</th>
<th>Dryer temp.:</th>
<th>Cycle time:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dev. reg. volume:</td>
<td>Dev. reg. volume:</td>
<td>Anti-oxidation:</td>
</tr>
<tr>
<td>Developer:</td>
<td>Fixer:</td>
<td>Film type:</td>
</tr>
<tr>
<td>Changed by:</td>
<td>Date:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Developer temp.:</th>
<th>Dryer temp.:</th>
<th>Cycle time:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dev. reg. volume:</td>
<td>Dev. reg. volume:</td>
<td>Anti-oxidation:</td>
</tr>
<tr>
<td>Developer:</td>
<td>Fixer:</td>
<td>Film type:</td>
</tr>
<tr>
<td>Changed by:</td>
<td>Date:</td>
<td></td>
</tr>
</tbody>
</table>

#### Maintenance Performed (see page 17)

<table>
<thead>
<tr>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>Date:</td>
<td>Date:</td>
<td>Date:</td>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td>Name:</td>
<td>Name:</td>
<td>Name:</td>
<td>Name:</td>
<td>Name:</td>
<td></td>
</tr>
<tr>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>Date:</td>
<td>Date:</td>
<td>Date:</td>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td>Name:</td>
<td>Name:</td>
<td>Name:</td>
<td>Name:</td>
<td>Name:</td>
<td></td>
</tr>
<tr>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
<th>Maintenance performed work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>Date:</td>
<td>Date:</td>
<td>Date:</td>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td>Name:</td>
<td>Name:</td>
<td>Name:</td>
<td>Name:</td>
<td>Name:</td>
<td></td>
</tr>
<tr>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td>next maintenance:</td>
<td></td>
</tr>
</tbody>
</table>
Recommended Maintenance Work:

1. Functional check
   - film intake / film transport / replenishment / bath heating / dryer heating / water supply

2. Cleaning
   2.1. Switch off machine, remove cover
   2.2. Empty all three tanks
   2.3. Close drain cocks and fill tanks with water
   2.4. Install cover, switch machine on
   2.5. Fill two additional vessels with water, put suction pipes into these vessels and activate replenishment for at least two minutes (to remove residues of chemicals from replenishing hoses)
   2.6. Switch machine on for a few minutes
   2.7. Switch machine off
   2.8. Empty all tanks
   2.9. Prepare tank cleaning agent for developer and water tank according to manufacturer’s instructions

Attention:

Never start the machine up unless it is filled with liquid!

Attention:

Do not use chlorine containing cleaning agents!

2.10. Fill developer and water tank with tank cleaning agent (do not use the replenishment pumps to do so)
2.11. Fill fixer tank with water
2.12. Place suction pipes into empty tanks
2.13. Install cover, switch machine on
2.14. Wait until the operating temperature is reached, approx. 30 °C (observe information concerning temperature, time, cleaning procedure contained in the datasheet of the tank cleaning agent)
2.15. Activate manual programme and transport
2.16. After approx. 15 minutes (observe information concerning temperature, time, cleaning procedure contained in the datasheet of the tank cleaning agent) switch film transport off
2.17. Remove cover, neutralise developer tank (observe information concerning temperature, time, cleaning procedure contained in the datasheet of the tank cleaning agent)
2.18. Switch machine off
2.19. Empty all three tanks
2.20. Fill machine with water and switch it on
2.21. Put suction pipes into vessels with water
2.22. Activate regeneration pumps for at least five minutes
2.23. Check all pumps for tightness
2.24. Switch machine off
2.25. Drain tanks
2.26. Fill tanks 3/4 with water
2.27. Switch machine on
2.28. Activate replenishment pumps manually until tanks overflow
2.29. Activate film transport for a few minutes
2.30. Switch machine off and drain all three tanks
2.31. Repeat item 2.20 to 2.30 if required (observe information e. g. concerning temperature, time and cleaning procedure outlined in tank cleaner datasheet)

2.32. Remove roller racks from the machine and remove dirt under flowing water using a soft rag or sponge

2.33. Remove residual dirt particles in tanks and rinsing gutters.

2.34. Clean all toothed gear wheels, axles, bearings and rollers, check them for damage (replace if required)

2.35. Remove light protection flap and wipe its underside using a soft rag

2.36. Clean inlet plate using a soft rag

2.37. Reinstall light protection flap

2.38. Align roller racks and re-insert them in machine

2.39. Fill machine with chemicals

2.40. Switch machine on

2.41. Adjust bath temperature to previously adjusted value

2.42. Feed cleaning film (approx. 4 pieces)

2.43. Check function as described under item 1.

2.44. Approx. 15 minutes after reaching of the set bath temperature, measure it for confirmation and re-calibrate if required (see operating manual page 39)

2.45. Perform sensitometric test

---

Please dispose of all old devices in an environmentally friendly manner. Old devices contain materials which need to be recycled. Please have them collected separately and recycle appropriately.
Problems and Solutions

Troubleshooting Film Defects

Your processor has been constructed for long term use. However, if irregularities occur, the following information can help to solve the problem. Please check the following items before calling for service.

Films are too light, not enough density
- Bath temperature is too low.
- Developing time too short.
- Exposure time is too short.
- Replenishment rate of developer too low.
- Developer is exhausted or over-diluted: Drain and replace old developer with fresh developer.
- Fixer solution has been mixed into developer: Renew. Thoroughly clean and rinse the developer tank before refilling.
- Circulation system is not operating properly.

Films are too dark, too much density
- Developer temperature too high.
- Developing time too long.
- Exposure time is too long.
- Replenishment rate of developer too high.
- Developer chemicals are too concentrated, mix with new developer.
- After replacing the chemicals: Starter is missing.
- Circulation system is not operating properly.

Films will not dry
- If warm air comes out of air channel in the dryer, chemicals and film type should be checked.
- Fixer solution is exhausted or diluted.

Film has a yellow-green surface.
- Not fixed correctly. Check the film type and fixer chemistry.
- Fixer solution is exhausted or diluted. Replenishment rate of fixer is too low.

Scratches, pressure marks, dirt on film
- Prior to processing films, run cleaner films through the processor.
- Pressure marks caused by careless handling, finger nails etc.
- Rollers are dirty. Clean tanks and roller racks.

Cloudy film
- Level in developer is too low.
- First guide bar of fixer rack is dirty (condensation or crystals). Clean roller-racks.
- Developer is old or circulation not working.
- For single emulsion film, feed films emulsion (dull) side up.
Troubleshooting Machine Errors

Machine does not switch on
• Ensure that electrical plug is firmly inserted into socket.
• Ensure that electrical socket has power supply by testing with an appliance (e.g. tablelight).

Film will not feed in but the dyer fan works
• Place cover firmly on machine, ensuring that the cover switch on the right front side has been activated.

Machine does not start automatically
• Film switch, located on the left side of the feed tray, has not been pressed down. Feed in the film to activate the switch.

Developer temperature too low
• The temperature dial is set between two positions.

Replenishment pump does not pump
• Check whether the replenishment containers are full and that the end of the suction pipe is positioned under the liquid level.
• Check whether there is air in the replenishment pipes. If this is the case, then check the pipe connections.

Rinsing water does not flow
• Open water ball valve.
• Water pressure in the water system is too low: Minimum pressure 2 bar (29 psi).

Water tank overflows
• Water drainage hose (overflow) is bent. The hose end should be positioned above the drainage level in the syphon (see diagram on page 8).
• Water drainage in the tank, hoses and connections should be checked for blockage and dirt/residue build-up. The drainage hoses should have a constant fall.

The film does not transport correctly
• Film is fed in and gets caught in the machine: Check the positioning of the racks in the machine and make sure that the latches are closed.

Important notice:

Ensure that the racks are firmly installed and keep the securing latches on the drive shafts closed.

Don’t operate processor with empty replenishment tanks.

After a long machine shut down check developer and fixer levels and refill if necessary.
The PROMIX® A40 is a fully automatic chemical mixing machine for preparing developer and fixer bath chemicals of either powder form or liquid concentrates. All stages are guided and controlled by means of a microprocessor. Thanks to a large reserve tank, up to 3 machines can be connected and continue to operate, without having to interrupt the working process.

Due to its patented construction, the PROMIX® A40 is easy to operate, reliable, fast and virtually service free.

The PROMIX® A40 replaces the usual replenishment tanks in the darkroom.

Ask your local dealer for more information.

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank capacities</td>
<td>each 20, 25, 30 or 40 litres</td>
</tr>
<tr>
<td>Reserve tank</td>
<td>each 13 litres</td>
</tr>
<tr>
<td>Water connection</td>
<td>3/4&quot;, 2 - 10 bar (29 - 145 psi)</td>
</tr>
<tr>
<td>Pump capacity</td>
<td>38 l/min</td>
</tr>
<tr>
<td>Mixing times</td>
<td>variable, 2, 3, 5, 10, 15, 20, 25, 30 minutes</td>
</tr>
<tr>
<td>Power source</td>
<td>220-240 VAC, 200 W, 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>Fuse: sb 2 A / 250 V</td>
</tr>
<tr>
<td>Weight</td>
<td>28 kg empty, 108 kg full</td>
</tr>
<tr>
<td>Dimensions</td>
<td>(WxHxD) 65 x 93 x 44 cm</td>
</tr>
</tbody>
</table>
At last you can breathe again

AIRCLEAN® 200 cleans the air from your processor. Unpleasant chemical odors are absorbed through the large active charcoal filter. Allergies are prevented and you can breathe again freely.

Simple installation directly on to the processor (no breaking through the wall).
Filter exchange cheap and fast approx. every 3 months.

Ask your local dealer for more information.

Specifications

- Cleaning capacity: approx. 200 m³/hour
- Filter: Active charcoal
- Power consumption: 43 W
- Power source: 220-240 V, 50/60 Hz
- Weight: 7 kg
- Casing: Stainless steel, plastic coated
- Casing dimensions: (WxHxD) 21 x 63 x 17 cm
Service Manual

Table of Contents

Installation Data ........................................................................................................ 24
Trouble Shooting ...................................................................................................... 26
Spare Parts List ......................................................................................................... 31
Electric Diagrams ................................................................................................... 37
Installation Data

1. Wall socket
   220-240 V, 16 Aresp. 110 V, 15 A (depending on machine model). Power lead should be equipped with Earth-Leakage Switch, 25 A / 30 mA nominal error-current. In addition, a power control switch can be installed.

2. Fresh water connection 3/4” with stop cock, permissible pressure 2-10 bar, water temperature 5-25 °C.

3. Drainage plastic pipe (PVC) Ø 50 mm (2”) incl. syphon.

4. Drainage resp. collecting containers for used developer.

5. Drainage resp. collecting containers for used fixer.

6. Storing space for replenishment tanks: Below machine or externally.

7. Ventilation of darkroom is necessary.

8. Sink with freshwater and flexible hose. Inner dimensions minimum (LxWxH) 60x40x30 cm (24x16x12”).

Measures and positions are recommendations
Through the wall mounting “film output”
Film output to the light room for OPTIMAX® processor
Type 117x-y-6000

1. Wall opening according to drawing.
2. Fasten wallplate with enclosed eight screws (note markings).
3. Fix blind plate with screws and straps on the film outlet (Detail X).
4. Push processor up against wallplate and place foam rubber light protection between processor and wallplate.
5. Hang in film catch basket at wallplate from the backside.
6. Check mounting-set for light imper-meability and function.

Please notice:
Pull sealing wedge off before removing machine cover.

All dimensions refer to PROTEC® base table OPTIMAX® (1267-0-0000)
Dimensions in mm
Trouble Shooting

Summary

1 Algae ................................................................. 26
  1.1 Excessive algae growth in water tank ......................... 26
2 General ............................................................... 27
  2.1 Machine has no power ............................................ 27
3 Drive ................................................................. 27
  3.1 Filmfeed out of order, dryer-fan is working ................. 27
  3.2 Machine does not start automatically ....................... 27
  3.3 Machine doesn’t stop automatically .......................... 27
  3.4 Drive motor does not run ....................................... 27
  3.5 Transport stops before film comes out, changing the cycle time .................. 27
  3.6 Processing time and developer temperature relation ........ 28
  3.7 Changing the transport speed .................................. 28
4 Bath ................................................................. 28
  4.1 No circulation in bath ............................................. 28
  4.2 Developer temperature too high ............................... 28
  4.3 Developer temperature too low ............................... 29
  4.4 Developer temperature too low, fixer temperature too high ............ 29
  4.5 Removing the turning knob .................................... 29
  4.6 Calibration of developer temperature ....................... 29
5 Film defects ....................................................... 29
  5.1 Films will not dry ............................................... 29
  5.2 The film does not transport correctly ........................ 29
  5.3 Scratches, pressure marks, dirt on film ....................... 29
6 Replenishment .................................................... 30
  6.1 Replenishment pump does not pump or does not pump sufficiently .... 30
  6.2 Replenishment rates are too high or too low ................. 30
  6.3 Adjust replenishment pump .................................... 30
7 Dryer ................................................................. 30
  7.1 Dryer fan does not function or runs with reduced speed .... 30
8 Water ................................................................. 30
  8.1 Rinsing water does not flow .................................... 30
  8.2 Water tank overflows ........................................... 30

1 Algae

1.1 Excessive algae growth in water tank
  • Algae growth inside the water tank is not only annoying; it causes increased cleaning work and leaves residue on the films. When algae is present, corrective measures are required:
    • When work has been completed at the end of the day, drain water out of the machine.
    • Clean dryer-water rack regularly. Use soft sponge and soap to remove residue from the rollers.
    • Install a particle filter system in the fresh water supply for the processor.
    • If water tank overflows due to algae growth blocking the overflow hose, then the overflow hose can be attached directly to the connection at the water tank inside the machine.
    • If no other solutions can be found, then usage of Anti-Algae-Agents can be a great improvement (automatic dispensers work the best). However, it is known that cleaning agents containing chlorine may corrode rubber rollers and high-grade steel in the tank area (check before use).
Trouble Shooting

2 General

2.1 Machine has no power
• Ensure that electrical socket has power supply.
• Check machine fuse in main power switch.
• While power switch is on, check the following components: Voltage on contact of main switch - if no voltage - change main switch. Check input voltage at electronics. If the voltage is normal, exchange the electronics. If no voltage check the cable wiring harness.

3 Drive

3.1 Filmfeed out of order, dryer-fan is working
• When placing processor cover on, the cover switch should be activated, re-adjust if necessary.
• Cover switch has no current passage when activated: Replace.
• Check screwing of chain wheel on motor- and driveshaft.

3.2 Machine does not start automatically
• Film switch is not correctly positioned or operator wire is bent. Re-adjust film switch and operator wire.
• Check following parts: Film switch, wiring of film switch and microprocessor board.
• Check wiring from electronic to the connections of components (motor, fan, dryer heating, solenoid valve). If the connections have no fault then electronic is possibly defective.

3.3 Machine doesn’t stop automatically
• Display “film feed” is permanently illuminated: Wire band of film switch is jammed. Readjust wire.
• Check following parts: Film switch, wiring of film switch and microprocessor board.

3.4 Drive motor does not run
• Check cover switch.
• Check drive motor: If voltage can be detected on motor, then motor is defective.
• Dryer fan runs but no voltage on motor: Interruption in the wiring.

3.5 Transport stops before film comes out, changing the cycle time
The cycle time is the processing time which turns off after a film has passed the film switch. Activate the switch in the feed tray with a film and remove the film. Measure the time until the processor stops automatically.
Following times can be measured (+/- 5%):

<table>
<thead>
<tr>
<th></th>
<th>Time (s)</th>
<th>Jumper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard machine</td>
<td>125</td>
<td>2-3</td>
</tr>
<tr>
<td>Mammography</td>
<td>155</td>
<td>1-2</td>
</tr>
<tr>
<td>Optional type</td>
<td>190</td>
<td>Removed</td>
</tr>
</tbody>
</table>

Change cycle time if necessary. This can be accomplished by changing the position of the jumper on the upper side of the electronics.

As replacement fuses, please exclusively use PROTEC gold fuses. These fuses are optimally adapted to the existing conditions.
Trouble Shooting

3.6 Processing time and developer temperature relation
The following chart demonstrates guide value relations between developer temperatures and processing times. Variations are possible depending on the various films and chemicals. Changing the transport speed see 3.7.

<table>
<thead>
<tr>
<th>Processing time “Dry to Dry”</th>
<th>Developer temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>105 s</td>
<td>32 °C - 34 °C</td>
</tr>
<tr>
<td>118 s</td>
<td>32 °C - 34 °C</td>
</tr>
<tr>
<td>135 s</td>
<td>31 °C - 33 °C</td>
</tr>
<tr>
<td>143 s</td>
<td>30 °C - 32 °C</td>
</tr>
<tr>
<td>167 s</td>
<td>30 °C - 32 °C</td>
</tr>
</tbody>
</table>

3.7 Changing the transport speed
The processing speed can be changed by changing the gear wheels. To do this the tanks need to be emptied and the machine be turned over. After removing the drive motor the chain gears can be changed. Please note that the jumper on the PCB needs to be placed to the indicated position.

Following gear combinations are available:

<table>
<thead>
<tr>
<th>220-240 V, 50/60 Hz-Versions</th>
<th>110-120 V, 50 Hz-Versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>tGmGs Jumper position Developer time (s) Infeed speed (cm/min)</td>
<td>tGmGs Jumper position Developer time (s) Infeed speed (in/min)</td>
</tr>
<tr>
<td>105 t=17 t=16 2-3 29 48</td>
<td>105 t=17 t=16 2-3 29 18.9</td>
</tr>
<tr>
<td>118 t=16 t=17 1-2 32 43</td>
<td>113 t=16 t=17 1-2 31 17.6</td>
</tr>
<tr>
<td>135 t=14 t=17 1-2 37 37</td>
<td>124 t=14 t=17 1-2 34 16.0</td>
</tr>
<tr>
<td>143 t=14 t=18 removed 39 35</td>
<td>132 t=14 t=17 1-2 36 15.0</td>
</tr>
<tr>
<td>167 t=12 t=18 removed 46 30</td>
<td>139 t=12 t=18 1-2 38 14.3</td>
</tr>
</tbody>
</table>

4 Bath

4.1 No circulation in bath
- Circulation pump works but no circulation in bath: Air lock in heating and circulation system. Ventilate pump (see Page 9).
- Particles in the pump chamber. The pump chamber can be easily opened by removing the four clips. When closing again ensure that the rubber seal is positioned correctly and not damaged.
- Check connection of pump, circulation pump possibly defective.

4.2 Developer temperature too high
- Check attachment of temperature sensor. This should be firmly positioned on tube and completely covered with foam rubber.
- Check sensor: At ambient temperature voltage between pin 3 (green) and pin 2 (brown) must be between 0.1 and 0.5 V.
- If the sensor has no fault then the microprocessor board is defective.
4.3 Developer temperature too low
- Check circulation pump. Air lock in the circulation pump: Ventilate pump (see Page 9). If no circulation can be detected: Check wiring of circulation pump, pump possibly defective.
- Developer is not heated: Check temperature safety switch on heat-exchanger. Check heating element: Current flow resistance should read approx. 66 Ω (120 V-heating: 36 Ω).
- Check temperature sensor (see 4.2).
- If no error can be found then the microprocessor board is possibly defective.

4.4 Developer temperature too low, fixer temperature too high
- Air lock in the circulation pump: Ventilate circulation (see Page 9).

4.5 Removing the turning knob
- Using flat pliers pull the lever from the knob, while holding the bottom part (knob) down with the other hand.
- Open the screw of the collet (Attention: don’t open completely) and pull the knob out.
- When reinstalling the knob turn axis on PCB to end position counter clockwise. Fix the knob in that the pointer is at position of “Manual pumping”.

4.6 Calibration of developer temperature
Deviating temperatures within +/- 1.5 °C can be calibrated by a potentiometer on the PCB. It can be reached after removing the turning knob (see 4.5) from above. Turning clockwise decreases the temperature.

5 Film defects
5.1 Films will not dry
- No air comes out of air channel: Check wiring of dryer fan, fan is possibly defective.
- Cold air comes out of air channel: Check wiring of heating element in the air channel, heating element possibly defective.
- Hot air comes out of air channel, but the film is still not dried to satisfaction. Check chemicals and film type. If this leads to no solution then the transport speed of the machine can be reduced (see Changing the transport speed, page 28).

5.2 The film does not transport correctly
- Check the positioning of the racks in the machine and make sure that the latches are closed.
- Check the roller racks: Position of the guide elements, rollers are in correct position and are not loose, flat springs are not bent, all gears are in place.
- Motor runs: The worm gear of the drive shaft should be secured with a cotter pin (see page 29, pos. 38) to avoid twisting. Check the screws and positioning of the chain and chain wheel.

5.3 Scratches, pressure marks, dirt on film
- Straight scratches in the feed direction indicate faulty guide elements. Check each rack and straighten up the guide elements. If mechanically damaged, replace the guide elements.
- Pressure marks caused due to dirty or damaged rollers. Check rollers for visible damage. Rubber rollers sometimes swell. Exchange defective rollers.

Do not exchange PCB without removing knob!
6 Replenishment

6.1 Replenishment pump does not pump or does not pump sufficiently

- Clean valve inside connection tube.

**Install valve insert correctly: Pay attention to flow-through direction!**

- Check filter in the suction pipe (repl. container) and clean it if necessary.
- Replenishment pump sucks air in. Check hoses and connections.
- Check eccentric position. Capacity approx. 240 ml/min at setting to 100 %. (60 Hz: 240 ml/min at 85 %)
- Activate the "Manual pumping" and while on, check the voltage of connection X2 on the power PCB. If no voltage can be registered - exchange power PCB.

6.2 Replenishment rates are too high or too low

- The replenishment rate can be changed by adjusting the stroke of the pump. To do this, the eccentric on the replenishment pump must be adjusted. Maximum pump capacity is 240 ml/min (100 %).

6.3 Adjust replenishment pump

- For the adjustment of the eccentric first open the allan screw on the big eccentric with the red line. If the screw is not reachable, then start the "Manual pumping" (dial switch) for a short time. If the screw is not reachable, momentarily rotate the temperature switch to "Manual pumping". When the screw is reachable, quickly turn the temperature switch back to a temperature position.
- Turn the eccentric so that the red line will be at the desired position and fasten the allan screw.

**Minimum setting must not be below 75 %.**

7 Dryer

7.1 Dryer fan does not function or runs with reduced speed

- Check the correct connecting of the fan cables: bl = blue; bk = black; br = brown.
- If the fan is connected improperly, then the fan runs only half power.

8 Water

8.1 Rinsing water does not flow

- Water pressure in the water system is too low: Minimum pressure 2 bar (29 psi).
- Valve activates, no flow passage - filter at inflow is blocked.
- Check green water inlet hose inside the machine.

8.2 Water tank overflows

- Water drainage hose (overflow) should have a constant fall. The hose end should be positioned above the drainage level in the syphon.
- Check water drainage in the tank and hose for blockage and dirt/build-up.
- When extreme algae growth is present, the overflow can be connected directly onto the fitting of the water tank.
### Spare Parts List

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1170-0-0200</td>
<td>Cover complete</td>
</tr>
<tr>
<td>2</td>
<td>2006-0-0005</td>
<td>Drain stop cock 10 mm</td>
</tr>
<tr>
<td>3</td>
<td>1170-0-2000</td>
<td>Replenishment tank 12 l dev.</td>
</tr>
<tr>
<td></td>
<td>1170-0-2100</td>
<td>Replenishment tank 12 l fix.</td>
</tr>
<tr>
<td>4</td>
<td>1170-0-1750</td>
<td>Suction pipe w. filter f. 12 l tank</td>
</tr>
<tr>
<td>6</td>
<td>2004-0-0003</td>
<td>Electrical power lead 220-240 V</td>
</tr>
<tr>
<td></td>
<td>2004-0-0021</td>
<td>Electrical power lead 110-125 V</td>
</tr>
<tr>
<td>7</td>
<td>2018-0-0001</td>
<td>Water inlet tube</td>
</tr>
<tr>
<td>8</td>
<td>1267-0-0000</td>
<td>Processor stand</td>
</tr>
<tr>
<td></td>
<td>1267-0-0010</td>
<td>Closed base cabinet</td>
</tr>
<tr>
<td>9</td>
<td>1101-0-2000</td>
<td>Replenishment tank 25 l dev.</td>
</tr>
<tr>
<td></td>
<td>1101-0-2100</td>
<td>Replenishment tank 25 l fix.</td>
</tr>
<tr>
<td>10</td>
<td>1101-0-1700</td>
<td>Suction pipe w. filter f. 25 l tank</td>
</tr>
<tr>
<td>11</td>
<td>1101-0-4100</td>
<td>Floating cover, developer</td>
</tr>
<tr>
<td></td>
<td>2018-0-0012</td>
<td>Hose 10 x 2 mm, clear, reinforced</td>
</tr>
<tr>
<td></td>
<td>2018-0-0009</td>
<td>Hose 10 x 2 mm, blue, reinforced</td>
</tr>
<tr>
<td></td>
<td>2018-0-0008</td>
<td>Hose 10 x 2 mm, red, reinforced</td>
</tr>
<tr>
<td></td>
<td>2018-0-0005</td>
<td>Hose 4 x 1 mm, green</td>
</tr>
<tr>
<td></td>
<td>2018-0-0003</td>
<td>Hose 9 x 2 mm, clear</td>
</tr>
<tr>
<td></td>
<td>2022-0-0004</td>
<td>Tube clamp</td>
</tr>
<tr>
<td></td>
<td>2022-0-0019</td>
<td>Wire tube clamp</td>
</tr>
<tr>
<td></td>
<td>2022-0-0026</td>
<td>Wire tube clamp</td>
</tr>
<tr>
<td></td>
<td>2022-0-0028</td>
<td>Wire tube clamp</td>
</tr>
<tr>
<td></td>
<td>2015-0-0001</td>
<td>Floating balls</td>
</tr>
<tr>
<td>Pos.</td>
<td>Order No.</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>20</td>
<td>0202-1-0008</td>
<td>Replenishment pump 2KBA 220-240 V, 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>0202-6-0008</td>
<td>Replenishment pump 2KBA 115 V, 50/60 Hz</td>
</tr>
<tr>
<td>20a</td>
<td>0002-1-0008</td>
<td>Valve insertion f. pos. 20</td>
</tr>
<tr>
<td>21</td>
<td>2002-1-0013</td>
<td>Circulation pump 220-240 V, 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>2002-6-0013</td>
<td>Circulation pump 110 V, 50/60 Hz</td>
</tr>
<tr>
<td>22</td>
<td>1170-0-1400</td>
<td>Main switch combi 220-240 V UL</td>
</tr>
<tr>
<td>23</td>
<td>2010-0-0010</td>
<td>Fuse, slow blow in gold, 10 A / 250 V UL</td>
</tr>
<tr>
<td>22+23</td>
<td>2028-0-0036</td>
<td>Main switch 110-120 V UL</td>
</tr>
<tr>
<td>24</td>
<td>1170-0-0702</td>
<td>Angle connection (grey)</td>
</tr>
<tr>
<td>25</td>
<td>1170-5-1300</td>
<td>Electronic 220-240 V</td>
</tr>
<tr>
<td></td>
<td>0170-6-1300</td>
<td>Electronic 110-120 V</td>
</tr>
<tr>
<td>26</td>
<td>0170-0-2400</td>
<td>Micro-switch (cover)</td>
</tr>
<tr>
<td></td>
<td>0170-4-2400</td>
<td>Micro-switch (cover) UL</td>
</tr>
<tr>
<td>27</td>
<td>2007-0-0010</td>
<td>Operator for micro-switch</td>
</tr>
<tr>
<td>28</td>
<td>1101-0-0704</td>
<td>Angle fitting</td>
</tr>
<tr>
<td></td>
<td>0016-0-0002</td>
<td>PU - glue kit</td>
</tr>
<tr>
<td>29</td>
<td>2021-0-0001</td>
<td>Screw-in connector</td>
</tr>
<tr>
<td>29</td>
<td>1170-0-1250</td>
<td>Wiring harness V2 230 V</td>
</tr>
<tr>
<td></td>
<td>1170-0-1251</td>
<td>Wiring harness V2 115 V</td>
</tr>
</tbody>
</table>
## Spare Parts List

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>2001-0-0003</td>
<td>Main drive motor 220-240 V, 50 Hz</td>
</tr>
<tr>
<td></td>
<td>2001-2-0003</td>
<td>Main drive motor 220-240 V, 60 Hz</td>
</tr>
<tr>
<td></td>
<td>2001-6-0003</td>
<td>Main drive motor 120 V, 50/60 Hz</td>
</tr>
<tr>
<td>31</td>
<td>1170-0-1101</td>
<td>Motor bracket</td>
</tr>
<tr>
<td>32</td>
<td>1170-0-1501</td>
<td>Drive shaft worm-gear</td>
</tr>
<tr>
<td>33</td>
<td>1170-0-1503</td>
<td>Worm-gear</td>
</tr>
<tr>
<td>34</td>
<td>1170-0-1502</td>
<td>Bearing block</td>
</tr>
<tr>
<td>35</td>
<td>1170-0-1506</td>
<td>Chain wheel t=12</td>
</tr>
<tr>
<td></td>
<td>1170-0-1504</td>
<td>Chain wheel t=14</td>
</tr>
<tr>
<td></td>
<td>1170-0-1505</td>
<td>Chain wheel t=16</td>
</tr>
<tr>
<td></td>
<td>1170-0-1102</td>
<td>Chain wheel t=17</td>
</tr>
<tr>
<td></td>
<td>1170-0-1507</td>
<td>Chain wheel t=18</td>
</tr>
<tr>
<td>37</td>
<td>2037-0-0002</td>
<td>Chain 6 mm with coupler link</td>
</tr>
<tr>
<td>38</td>
<td>3000-9-4013</td>
<td>Cotter pin 2.0x20 mm, inox</td>
</tr>
</tbody>
</table>
### Spare Parts List

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>1170-0-1301</td>
<td>Air channel</td>
</tr>
<tr>
<td>51</td>
<td>2003-5-0006</td>
<td>Heating element 230 V, 1100 W</td>
</tr>
<tr>
<td></td>
<td>2003-6-0007</td>
<td>Heating element 110 V, 900 W standard model</td>
</tr>
<tr>
<td></td>
<td>2003-5-0008</td>
<td>Heating element 230 V, 1000 W</td>
</tr>
<tr>
<td>53</td>
<td>2008-5-0007</td>
<td>Dryer fan 220-240 V, 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>2008-6-0007</td>
<td>Dryer fan 115 V, 50/60 Hz</td>
</tr>
<tr>
<td>54</td>
<td>0170-5-1900</td>
<td>Solenoid valve 220-240 V, 50/60 Hz</td>
</tr>
<tr>
<td></td>
<td>0170-6-1900</td>
<td>Solenoid valve 115 V, 50/60 Hz</td>
</tr>
<tr>
<td>55</td>
<td>1101-0-0121</td>
<td>Securing bracket</td>
</tr>
<tr>
<td>56</td>
<td>0170-0-0800</td>
<td>Micro-rotary-switch for film-detection with operator</td>
</tr>
<tr>
<td>58</td>
<td>1170-0-0804</td>
<td>Bracket for micro-rotary-switch</td>
</tr>
<tr>
<td>59</td>
<td>1170-0-0105</td>
<td>Film feed tray</td>
</tr>
<tr>
<td></td>
<td>1172-0-0105</td>
<td>Film feed tray graphic arts</td>
</tr>
<tr>
<td>60</td>
<td>2003-5-0002</td>
<td>Heating element 230 V, 800 W</td>
</tr>
<tr>
<td></td>
<td>2003-6-0002</td>
<td>Heating element 120 V, 400 W</td>
</tr>
<tr>
<td>61</td>
<td>1130-0-2101</td>
<td>Heat exchanger</td>
</tr>
<tr>
<td>62</td>
<td>2005-0-0005</td>
<td>Temperature safety switch mounted on heat exchanger</td>
</tr>
<tr>
<td>63</td>
<td>0190-0-2200</td>
<td>Temperature sensor</td>
</tr>
<tr>
<td>64</td>
<td>1170-0-1303</td>
<td>Plate for air channel</td>
</tr>
<tr>
<td>65</td>
<td>1170-0-1302</td>
<td>Channel dryer heating</td>
</tr>
</tbody>
</table>
Standard roller racks
## Spare Parts List

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1171-0-0600</td>
<td>Roller rack, dryer</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Mammography Processor</td>
</tr>
<tr>
<td></td>
<td>1172-0-0300</td>
<td>Roller rack, developer</td>
</tr>
<tr>
<td></td>
<td>1172-0-0600</td>
<td>Roller rack, dryer</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Graphic Arts Processor</td>
</tr>
<tr>
<td></td>
<td>1170-0-0300</td>
<td>Roller rack, developer</td>
</tr>
<tr>
<td></td>
<td>1170-0-0400</td>
<td>Roller rack, fixer</td>
</tr>
<tr>
<td></td>
<td>1170-0-0600</td>
<td>Roller rack, dryer</td>
</tr>
<tr>
<td></td>
<td>0170-0-0301</td>
<td>Side plate dev. w. shafts (left)</td>
</tr>
<tr>
<td></td>
<td>1170-0-0301</td>
<td>Side plate dev. (right)</td>
</tr>
<tr>
<td></td>
<td>0170-0-0401</td>
<td>Side plate fix. w. shafts (left)</td>
</tr>
<tr>
<td></td>
<td>1170-0-0401</td>
<td>Side plate fix. (right)</td>
</tr>
<tr>
<td></td>
<td>1140-0-3800</td>
<td>Guide bar straight, short</td>
</tr>
<tr>
<td></td>
<td>1140-0-4500</td>
<td>Guide bar with nose</td>
</tr>
<tr>
<td></td>
<td>1140-0-3700</td>
<td>Guide bar, curved</td>
</tr>
<tr>
<td></td>
<td>1170-0-0304</td>
<td>Flat spring 55</td>
</tr>
<tr>
<td></td>
<td>3079-8-5013</td>
<td>Screw M4x10, A4</td>
</tr>
<tr>
<td></td>
<td>3009-3-4023</td>
<td>Hexagon nut M4, A4</td>
</tr>
<tr>
<td></td>
<td>1140-0-0301</td>
<td>PU-roller 35 ground</td>
</tr>
<tr>
<td></td>
<td>1170-0-0310</td>
<td>Drive shaft rack</td>
</tr>
<tr>
<td></td>
<td>1101-0-0302</td>
<td>Gear t = 16, D-hole</td>
</tr>
<tr>
<td></td>
<td>1101-0-0304</td>
<td>Gear t = 32, round hole</td>
</tr>
<tr>
<td></td>
<td>1101-0-0303</td>
<td>Gear t = 32, D-hole</td>
</tr>
<tr>
<td></td>
<td>1170-0-0302</td>
<td>Wormgear</td>
</tr>
<tr>
<td></td>
<td>1101-0-0305</td>
<td>Bearing bush</td>
</tr>
<tr>
<td></td>
<td>1101-0-0317</td>
<td>Bearing bush, black</td>
</tr>
<tr>
<td></td>
<td>2014-0-0001</td>
<td>Circlip</td>
</tr>
<tr>
<td></td>
<td>0170-0-0601</td>
<td>Dryer side plate left w. shafts</td>
</tr>
<tr>
<td></td>
<td>1170-0-0602</td>
<td>Dryer side plate right</td>
</tr>
<tr>
<td></td>
<td>1140-0-0302</td>
<td>Rubber roller 35</td>
</tr>
<tr>
<td></td>
<td>1140-0-0605</td>
<td>Air jet (35)</td>
</tr>
<tr>
<td></td>
<td>1170-0-0604</td>
<td>Dryer plate, large</td>
</tr>
<tr>
<td></td>
<td>1170-0-0603</td>
<td>Dryer plate, small</td>
</tr>
<tr>
<td></td>
<td>1170-0-0303</td>
<td>Flat spring 35</td>
</tr>
<tr>
<td></td>
<td>0170-0-0004</td>
<td>Maintenance set</td>
</tr>
</tbody>
</table>