

# ***Kodak Medical X-ray Processor 101/102***

## **Service Manual**



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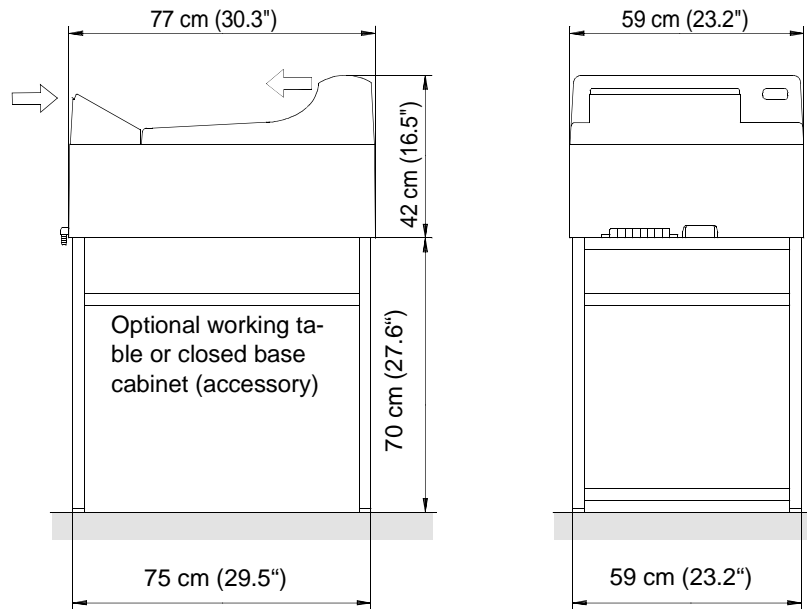
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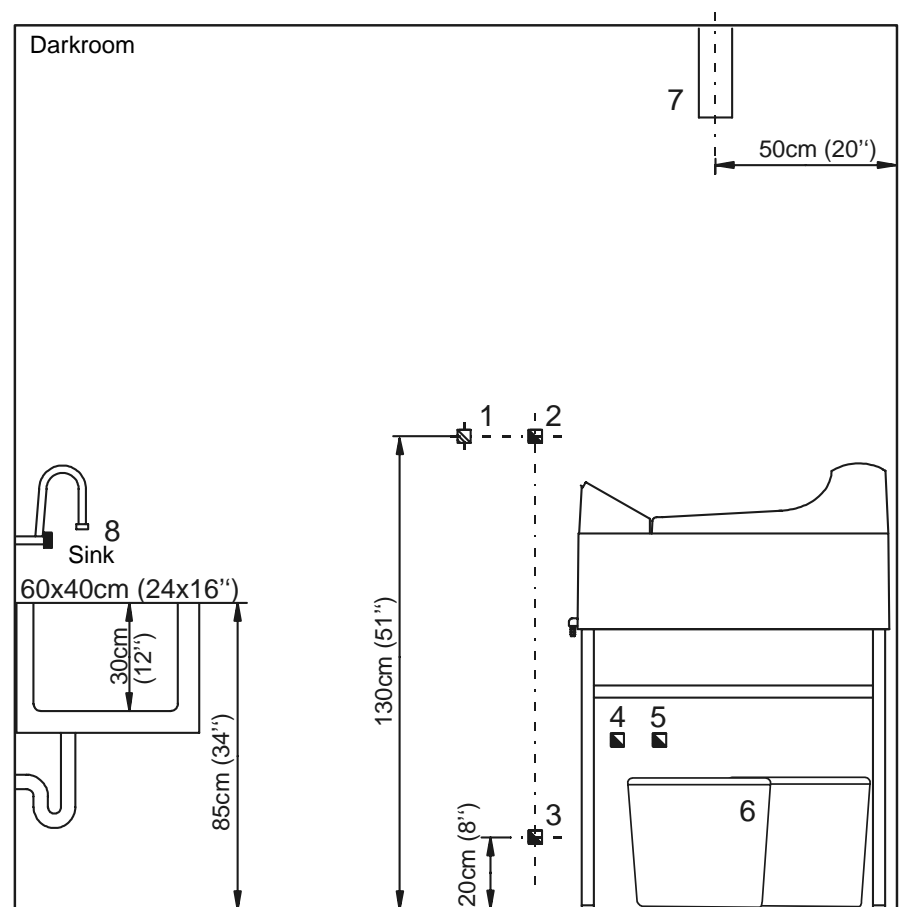
## To Order Parts or for Technical Support

Type	Number	Hours
Phone	+49 7062 9255 22	Normal Business Hours: Central European Time (Berlin, Paris, Rome)  Monday - Thursday: 8 am to 5 pm  Friday: 8 to 12 am (noon)
Direct Mail	PROTEC Medizintechnik GmbH & Co. KG  Lichtenberger Strasse 35 71720 Oberstenfeld Germany	
Fax	+49 7062 22685	
E-Mail	service@protec-med.com	

## Installation Data



1. Wall socket  
101: 110V, 20A, 102: 220-240 V, 16 A (depending on machine model). Power lead should be equipped with Earth-Leakage Switch, 25 A / 30 mA nominal error-current. In addition, a wall disconnect switch can be installed.
2. Fresh water connection 19 mm (3/4") with stop cock, permissible pressure 1-6 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

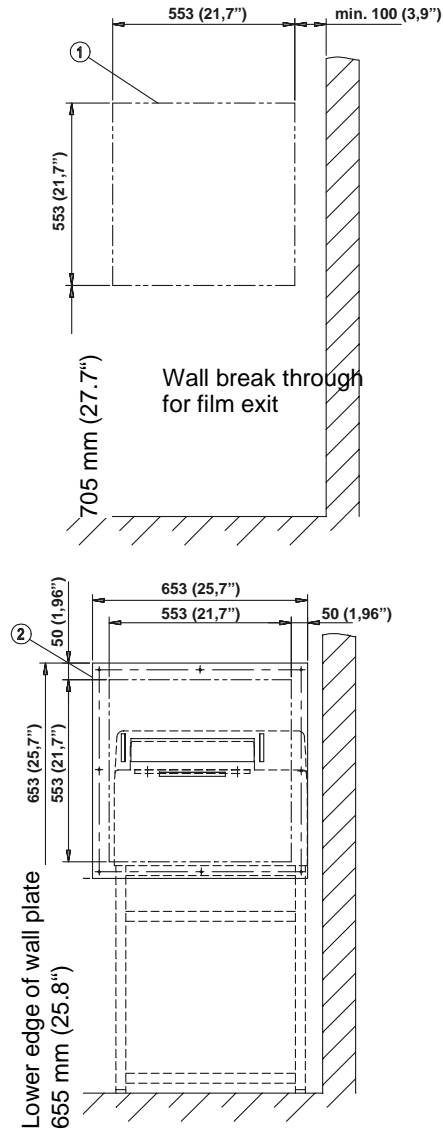
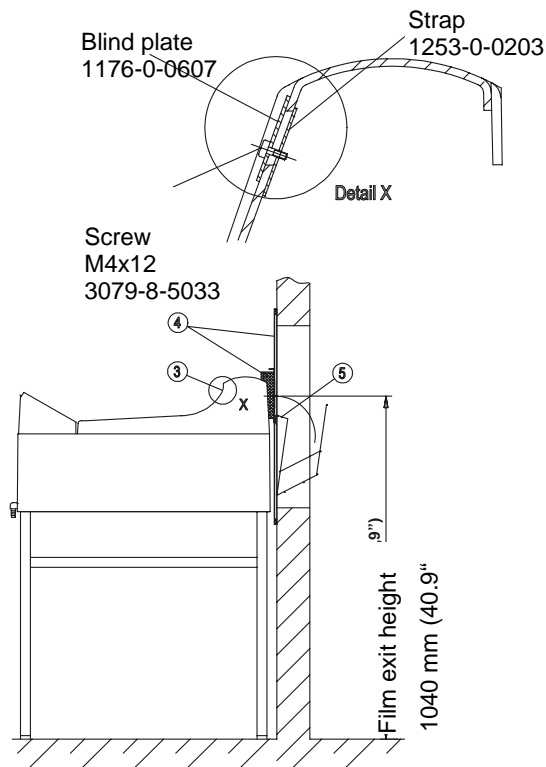
**Note: The processor needs to be ordered as through the wall ready to be able to install it through the wall.**

### Through the wall mounting "film output"

Film output to the light room for Kodak processor

All dimensions refer to Protec  
base table OPTIMAX  
(1267-0-0000)

Dimensions in mm



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.**

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## Trouble Shooting

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***The main components (circuit board, pumps, motors) of the processor are located underneath the tanks. To perform service you must drain the tanks, remove all racks, turn processor on side and remove bottom panel.***

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## 1 Algae

### 1.1 Excessive algae growth in water tank

Algae growth inside the water tank causes increased cleaning and can leave residue on the films. When algae growth increases, countermeasures are required or the processor wash water can overflow:

- When work has been completed at the end of the day, drain water out of the machine.
- Clean dryer-water rack regularly, use personal protective equipment recommended in the chemical's MSDS. Use soft sponge and soap to remove residue from the rollers.
- Install a particle filter system in the fresh water supply for the processor. Note: see page 19 of operator's manual.
- If water tank overflows due to algae growth blocking the overflow hose, then the overflow hose can directly be connected to the connection at the water tank inside the machine.

## 2 General

### 2.1 Machine has no power

- Ensure that electrical socket has power supply.
- Check machine fuse in main 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 cover switch 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 circuit board.
- Check wiring from circuit board to the connections of components (motor, fan, dryer heating, solenoid valve). If the connections have no fault then circuit board is possibly defective.

### 3.3 Machine doesn't stop automatically

- Display "Infeeding film" is permanently illuminated: Wire band of film switch is jammed. Readjust wire.
- Check following parts: Film switch, wiring of film switch and circuit board.

### 3.4 Drive motor does not run

- Check cover switch.
- Check for proper voltage at drive motor.
- 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 starts after a film has passed the film switch. Activate the switch in the infeed tray with a film and remove the film. Measure the time until the processor stops automatically.

Change cycle time if necessary. This can be accomplished by changing the position of the jumper on the upper side of the circuit board, which is located underneath the processor.

### 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.

Processing time "Dry to Dry"	Developer temperature
90 s	32 °C - 36 °C
105 s	32 °C - 34 °C
135 s	31 °C - 33 °C

### 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:

Film Size (cm)	Cycle Time <sup>1</sup> (seconds)	Drop Time <sup>2</sup> (seconds)	Transport Speed cm/min (in/min)	Motor and Driveshaft Gearing				Jumper position
				120 V or 220 V 50Hz		120 V 60 Hz		
				G <sub>M</sub>	G <sub>S</sub>	G <sub>M</sub>	G <sub>S</sub>	
24 x 30 <sup>3</sup>	90	116	55.5 (21.8)	17	14	16	16	2-3
	105	136	47.5 (18.7)	17	16	14	16	2-3
	135	174	37 (14.6)	14	17	12	18	1-2
35 x 43 <sup>4</sup>	90	136	55.5 (21.8)	17	14	16	16	2-3
	105	159	47.5 (18.7)	17	16	14	16	2-3
	135	204	37 (14.6)	14	17	12	18	1-2

1. Lead Edge In to Lead Edge Out

2. Dry to Dry

3. 30 cm edge fed into processor

4. 35 cm edge fed into processor

**G<sub>M</sub>** Motor Gear

**G<sub>S</sub>** Driveshaft Gear

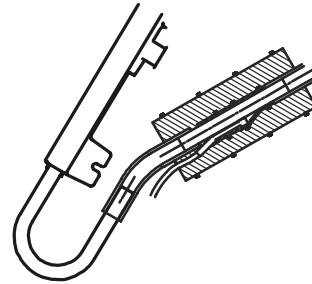
## 4 Bath

### 4.1 No circulation in bath

- Circulation pump works but no circulation in bath: Air lock in heating and circulation system. Ventilate the pump.
- 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 circuit board is defective.



### 4.3 Developer temperature too low

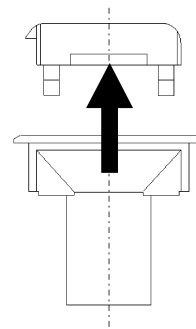
- Check circulation pump. Air lock in the circulation pump: Ventilate the pump. If no circulation can be detected: Check wiring of circulation pump, pump possibly defective.
- Bath is not heated: Check temperature safety switch on heat-exchanger. Check heating element: Current flow resistance: Model 101: 120V, 400W heater = 36 ohms, Model 102: 230V, 800W heater = 66 ohms.
- Check temperature sensor (see 4.2).
- If no error can be found then electronic is possibly defective.

### 4.4 Developer temperature too low, fixer temperature too high

- Air lock in the circulation pump: Ventilate circulation.

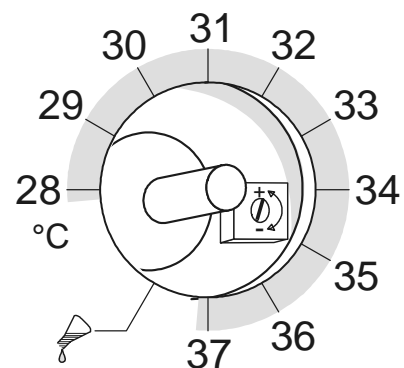
### 4.5 Removing the turning knob

- Pull the toggle off the knob by help of a flatnose pliers.
- Open the screw of the collet (Attention: don't loosen completely) and pull the knob out.
- When reinstalling the knob turn axis on circuit board 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  $\pm 1.5^{\circ}\text{C}$  can be calibrated by a potentiometer on the circuit board. It can be reached after removing the turning knob (see page on right hand side) 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. Check heating element current flow resistance: Model 101: 110V, 1100W heater = 11 ohms; 110V, 1000W heater = 12 ohms; Model 102: 230V, 1100W heater = 48 ohms; 230V, 1000W heater = 53ohms.
- 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.



## 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 splint 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 infeed 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 up. Replace defective rollers.

# 6 Replenishment

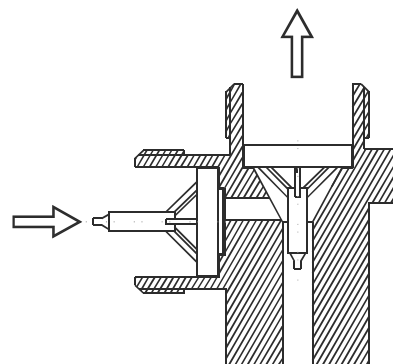
## 6.1 Replenishment pump does not pump or not sufficiently

- 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 allen screw on the big eccentric with the red line. If screw is not reachable, then start the "Manual pumping" (dial switch) for a short time. If the screw is reachable fastly turn back the dial switch on a temperature position.
- Turn the eccentric so that the red line will be at the desired position and fasten again the allen 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.

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## **8 Water**

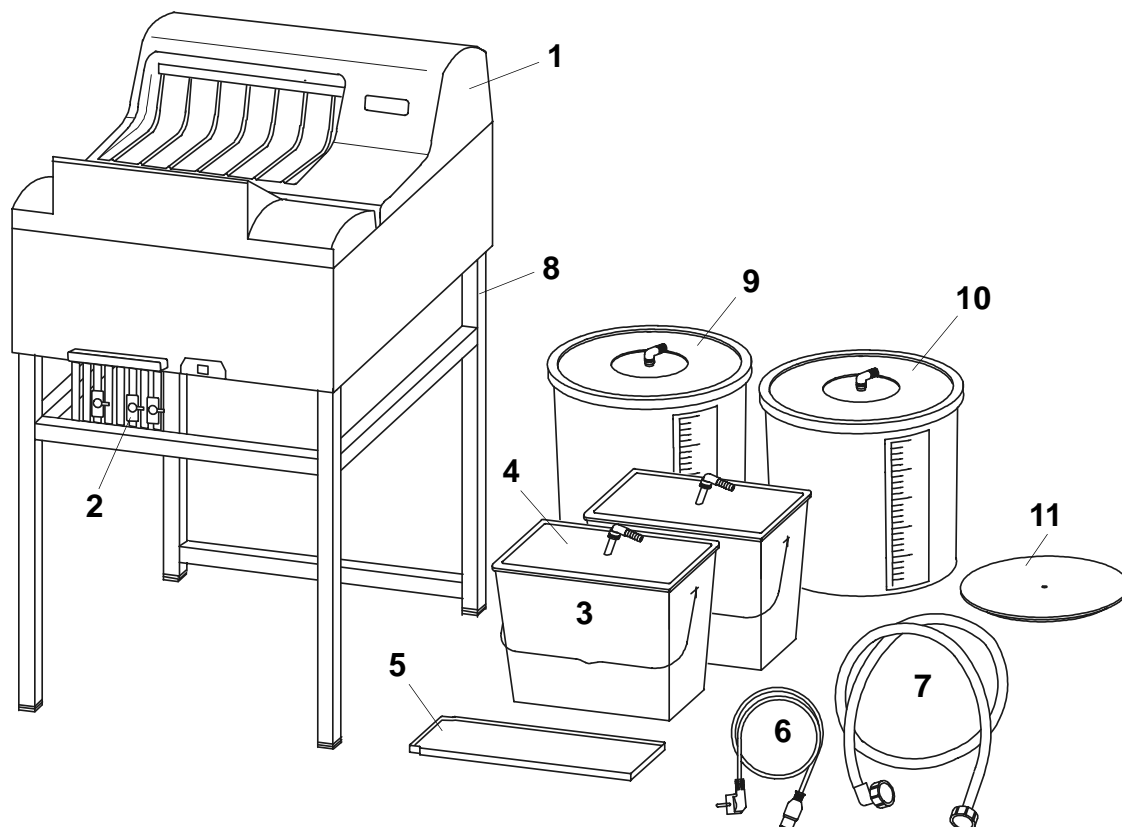
### **8.1 Rinsing water does not flow**

- Water pressure in the water system is too low: Minimum pressure 2 bar (20 psi).
- Valve activates, no flow passage - filter at inflow is blocked.
- Check green water inlet hose inside the machine.

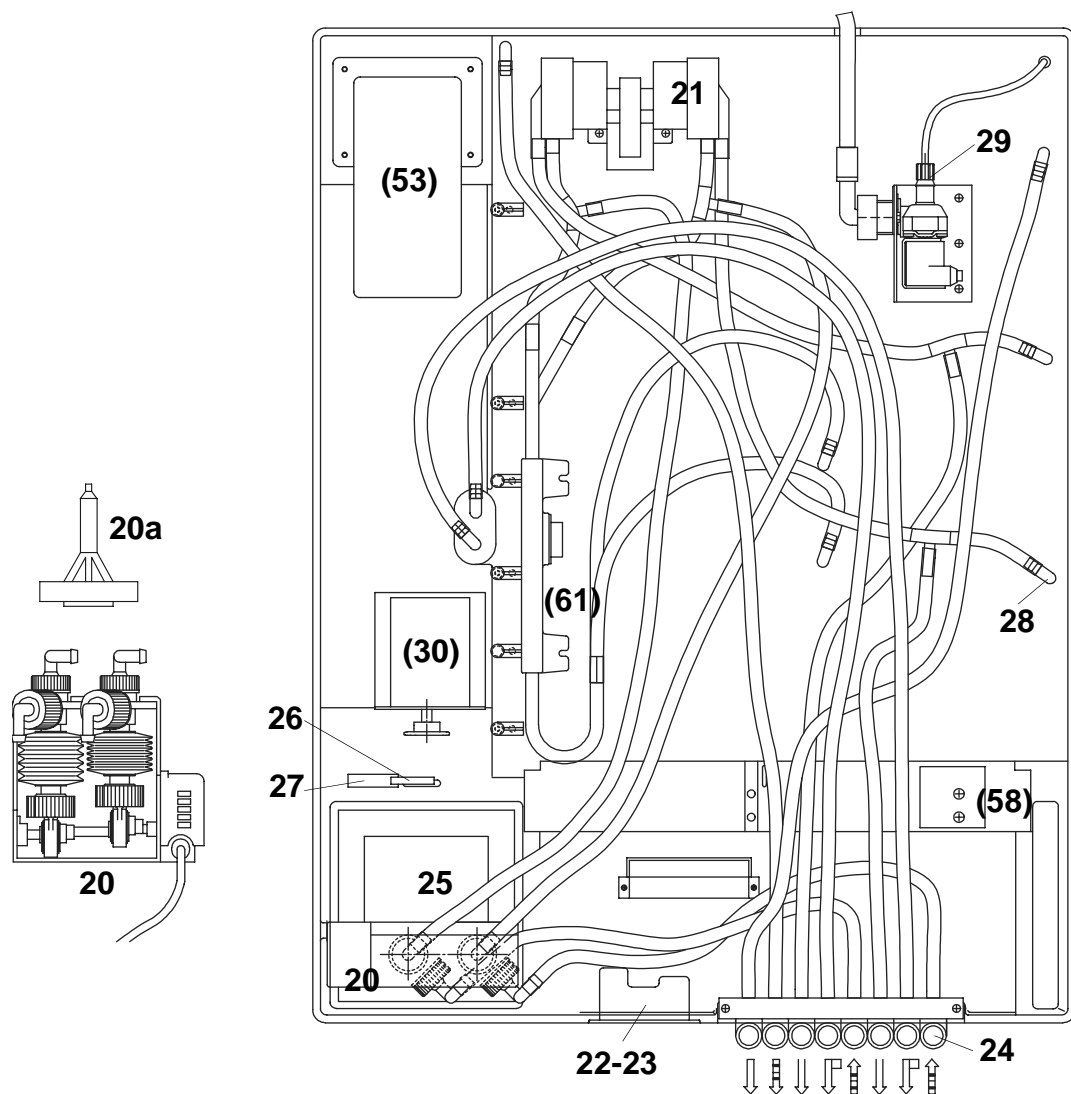
### **8.2 Water tank overflows**

- 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 or algae.
- When extreme algae growth is registered, the overflow can be connected directly onto the fitting of the water tank.

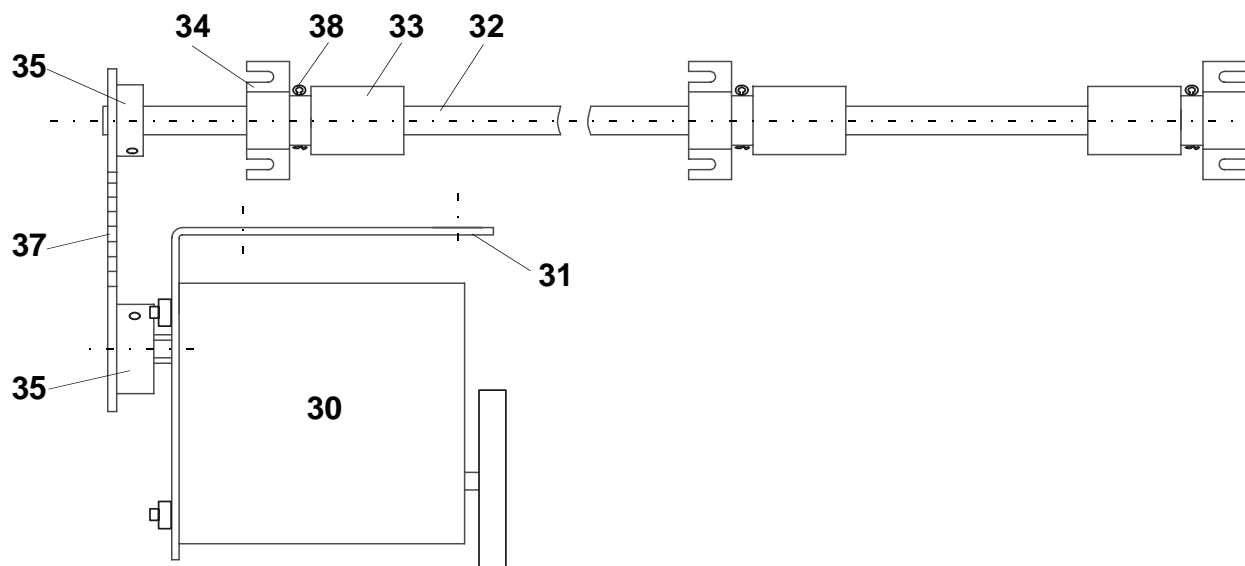
## Spare Parts



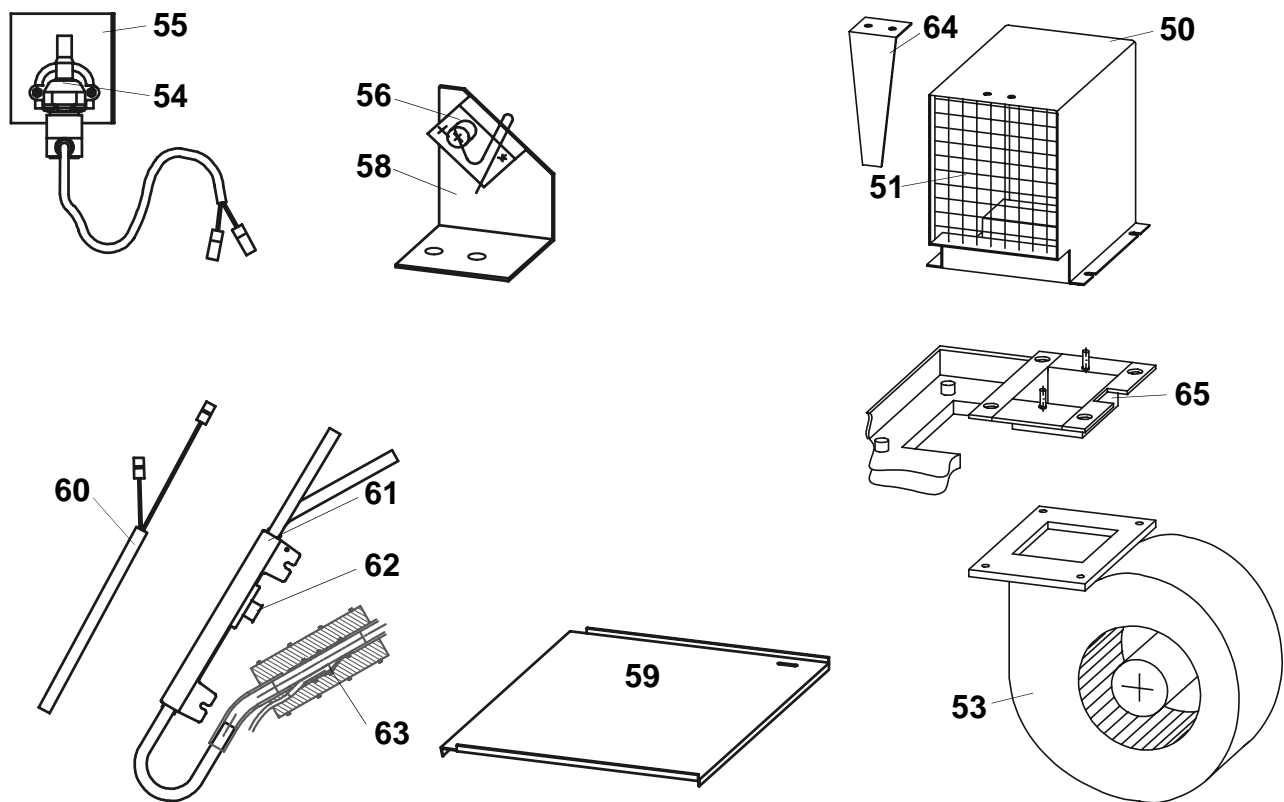
Pos.	Order No.	Description
1	1170-0-0200	Cover complete
2	2006-0-0005	Drain stop cock 10 mm
3	1170-0-2000	Replenishment tank 12 l dev.
	1170-0-2100	Replenishment tank 12 l fix.
4	1170-0-1750	Suction pipe w. filter f. 12 l tank
5	1170-0-4101	Drip catcher
6	2004-0-0003	Electrical power lead 220-240 V
	2004-0-0015	Electrical power lead 220-240 V
7	2018-0-0001	Water inlet tube
8	1267-0-0000	Processor stand
-	1267-0-0010	Closed base cabinet
9	1101-0-2000	Replenishment tank 25 l dev.
	1101-0-2100	Replenishment tank 25 l fix.
10	1101-0-1700	Suction pipe w. filter f. 25 l tank
11	1101-0-4100	Floating cover, developer
-	2018-0-0012	Hose 10 x 2 mm, clear, reinforced
-	2018-0-0009	Hose 10 x 2 mm, blue, reinforced
-	2018-0-0008	Hose 10 x 2 mm, red, reinforced
-	2018-0-0005	Hose 4 x 1 mm, green
-	2018-0-0003	Hose 9 x 2 mm, clear
-	2022-0-0004	Tube clamp
-	2022-0-0019	Wire tube clamp
-	2015-0-0001	Floating balls



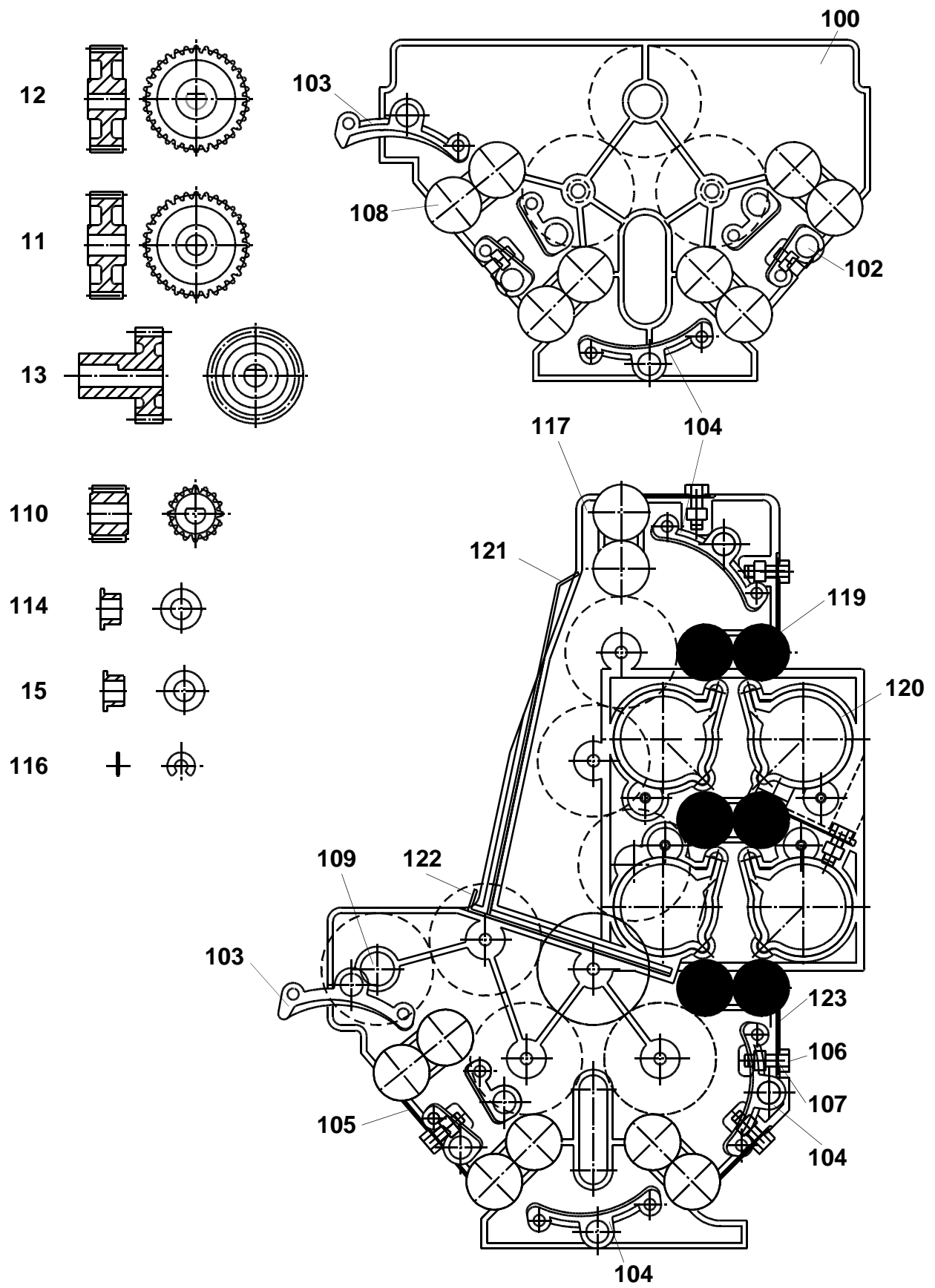
Pos.	Order No.	Description
20	0202-1-0008	Replenishment pump 2KBA 220-240 V, 50/60 Hz
	0202-6-0008	Replenishment pump 2KBA 115 V, 50/60 Hz
20a	0002-1-0008	Valve insertion f. pos. 20
21	2002-1-0013	Circulation pump 220-240 V, 50/60 Hz
	2002-6-0013	Circulation pump 110 V, 50/60 Hz
22	1170-0-1400	Main switch combi 220-240 V
23	2010-0-0001	Fuse, slow blow 10 A / 250 V
22+23	2028-0-0036	Main switch 110-120 V
24	1170-0-0702	Angle connection (grey)
25	1170-5-1300	Circuit Board 220-240 V
	0170-6-1300	Circuit Board 110-120 V
26	0170-0-2400	Micro-switch (cover) 230 V
	0170-4-2400	Micro-switch (cover) 115 V
27	2007-0-0010	Operator for micro-switch
28	1101-0-0704	Angle fitting
-	0016-0-0002	PU - glue kit
29	2021-0-0001	Screw-in connector
-	1170-0-1250	Wiring harness V2 230 V
-	1170-0-1251	Wiring harness V2 115 V



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



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



Pos.	Order No.	Description
<b>Standard Processor</b>		
-	1170-0-0300	Roller rack, developer
-	1170-0-0400	Roller rack, fixer
-	1170-0-0600	Roller rack, dryer
100	0170-0-0301	Side plate dev. w. shafts (left)
	1170-0-0301	Side plate dev. (right)
	0170-0-0401	Side plate fix. w. shafts (left)
	1170-0-0401	Side plate fix. (right)
102	1140-0-3800	Guide bar straight, short
103	1140-0-4500	Guide bar with nose
104	1140-0-3700	Guide bar, curved
105	1170-0-0304	Flat spring 55
106	3079-8-5013	Screw M4x10, A4
107	3009-3-4023	Hexagon nut M4, A4
108	1140-0-0301	PU-roller 35 ground
109	1170-0-0310	Drive shaft rack
110	1101-0-0302	Gear t = 16, D-hole
111	1101-0-0304	Gear t = 32, round hole
112	1101-0-0303	Gear t = 32, D-hole
113	1170-0-0302	Tooth gear, diagonal
114	1101-0-0305	Bearing bush
115	1101-0-0317	Bearing bush, black
116	2014-0-0001	Circlip
117	0170-0-0601	Dryer side plate left w. shafts
	1170-0-0602	Dryer side plate right
119	1140-0-0302	Rubber roller 35
120	1140-0-0605	Air jet (35)
121	1170-0-0604	Dryer plate, large
122	1170-0-0603	Dryer plate, small
123	1170-0-0303	Flat spring 35
-	0170-0-0004	Maintenance set



