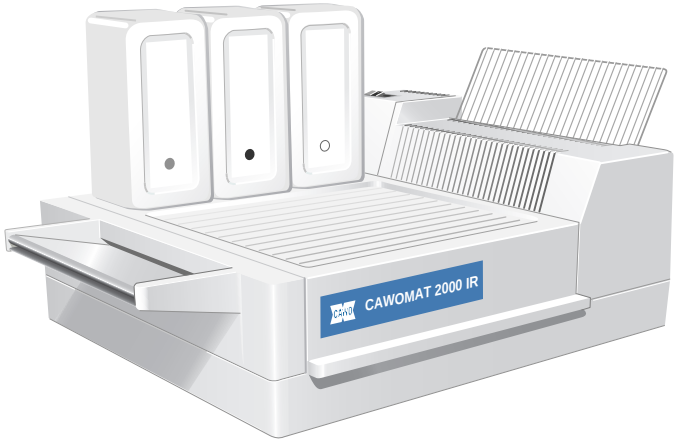
Cawomat 2000 IR

User manual



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Chapter 1

Introducing the Cawomat 2000 IR

This chapter introduces the Cawomat 2000 IR to the user and draws the attention to some important safety precautions.

Cawomat 2000 IR features

The Cawomat 2000 IR is a most up-to-date table-top processor designed to handle all types of medical X-Ray film (except for mammographic films) suitable for rapid processing. All operations are programmed and each step takes place automatically.

The complete throughput, drying included, takes only 125 seconds.

The Cawomat 2000 IR offers the following features:

- Automatic film processing;
- Easy to handle, compact in size, light in weight;
- No installation cost;
- Low operating costs;
- Easy maintenance and cleaning;
- Simplicity of use;
- Ease of servicing and environmental protection.

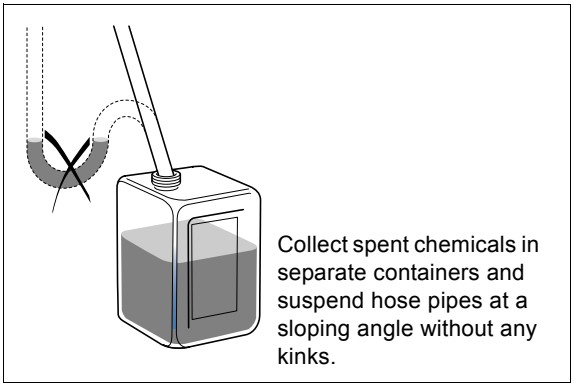
Safety precautions

General safety instructions

- The processor was designed for processing medical X-ray films (except for mammographic films and rollfilms), and should only be used for this purpose.
- The processor may only be operated by qualified staff, skilled on the machine.
- Make sure that only authorized personnel has access to the processor.
- Only trained and authorized service personnel can make repairs or changes to the processor.
- If there is visible damage to the machine casing, the processor should not be started or used.
- Do not override or disconnect the integrated safety features.
- Disconnect the processor from the mains before performing any maintenance activities.
- Like all technical devices, the processor must be operated, cared for and serviced correctly, as described in the documentation provided with the machine.
- If the processor is not operated correctly or if you do not have it serviced correctly, CAWO is not liable for resulting disturbances, damages or injuries.
- When installing the processor, care must be taken to ensure that there is either a mains plug or an all-cable disconnecting device in the internal installation fitted near the processor and that it is easily accessible.
- If connections with other components or assemblies are made, CAWO can guarantee safety only for combinations which are approved by CAWO.
- If you notice conspicuous smoke or noise, disconnect the processor immediately.
- An earth leakage breaker must be built into the electrical circuit ($I_N \leq 30$ mA).

Special instructions for the handling of chemicals

- When handling chemicals, you must observe safety and environmental regulations as well as the operating and warning instructions accompanying the chemicals.
- Wear stipulated protective clothing and safety goggles.
- When disposing of chemicals and waste water, you must comply with the local regulations concerning waste water and environmental protection.
- If chemicals get into your eyes, immediately rinse your eyes with cold water and consult a physician.
- Do not inhale vapor from chemicals. Make sure that there is sufficient ventilation where the processor is installed, i.e. air exchange that is at least ten times the space volume per hour.
- Always comply with the installation instructions.
- Regularly check all connections to the processor for tightness.
- If liquid gets into the inside of the processor (due to spills), disconnect the processor from the mains immediately and have the device cleaned thoroughly by service personnel.



Collect spent chemicals in separate containers and suspend hose pipes at a sloping angle without any kinks.

Make sure that the hose pipes do not come into contact with the liquid in the container!

Do not use additional chlorine or chlorine containing substances inside the processor. The use of additional chlorine or chlorine containing substances can lead to irreversible damage of the equipment. Using these substances may void the manufacturers warranty.

Safety compliance

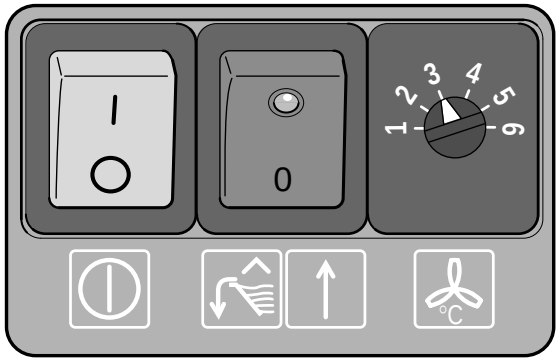
The Cawomat 2000 IR complies with the VDE 0805/EN 60950/IEC 950 safety regulations and with the European regulations on radio interference suppression EN 55022, Class B and CISPR Publication 22 (1990) Level B.

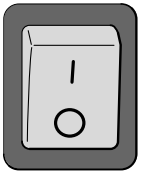
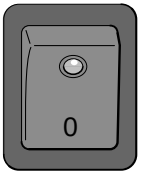
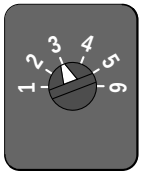
- The non-return water connection system complies with the DIN 1988 standards.
- The Cawomat 2000 IR carries the CE label.
- Only applicable to North America:
  The Cawomat 2000 IR has been constructed in accordance with the safety regulations UL Standard 1950 and UL 122, with CSA 22.2 N° 950 and with the regulations on radio interference suppression USA Standard FCC 47, Part 15, Class A.
- Only applicable to North America: The Cawomat 2000 IR is UL and cUL certified.

Warning

The Cawomat 2000 IR generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the user manual, may cause interference with radio communications. The Cawomat 2000 IR has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart B of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to take at his own expense whatever measures may be required to correct the interference.

The user interface



	Red ON/OFF power switch. Position ‘I’ turns the processor ON. Position ‘0’ switches the processor OFF.
	The manual replenishment key allows the user to initiate an additional replenishment cycle, during which a red indicator light is illuminated. The light is also illuminated during film feed.
	The 6 step-switch controls the dryer temperature. This enables the dryer temperature to be adjusted to particular environment conditions (humidity and ambient temperature). The normal setting is ‘3’.

Do not touch the switches with wet fingers!

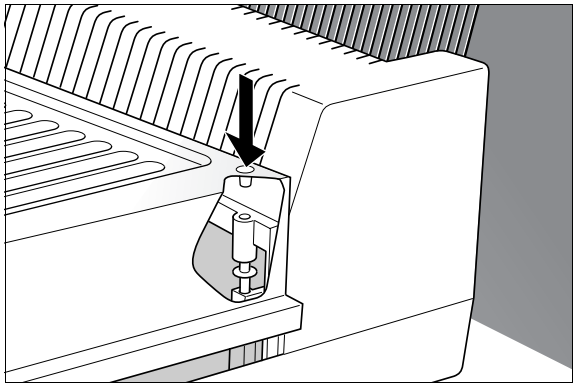
Switching the Cawomat 2000 IR on

Before starting up

Prior to starting up, ensure that

- the machine is connected to the local power supply,
- the machine cover and the dryer cover are attached,
- the feed table and exit tray are clean,
- the water and replenishment bottles are filled.

❖ *The processor will automatically be switched off if the dryer assembly cover or the processor cover is not properly closed.*



Safety pin for processor and dryer covers.

Switching the Cawomat 2000 IR on

⚠ ***Do not work with wet fingers!***

1 Plug the power cord into the wall outlet.

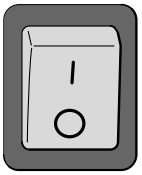
2 Check whether the replenishment bottles are full enough and examine the level in the waste bottles.

⚠ ***Only switch on the processor with full tanks.***

3 Turn off all lights but the darkroom safelight.

4 Switch the processor on by pressing the power switch (to position (I').

Do not touch the switch with wet fingers!

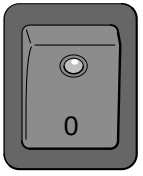
	Use this key to switch the Cawomat 2000 IR on.

❖ *The processor will automatically be switched off if the dryer assembly cover or the processor cover is not properly closed.*

5 Wait for about 7 minutes to achieve the appropriate operating temperature.

Additional replenishment

If the processor has been idle for more than 24 hours, press the manual replenishment key to initiate an additional replenishment period of 3 minutes.

	Use this key to activate an additional replenishment.

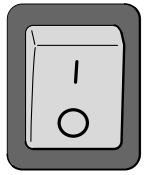
Switching the Cawomat 2000 IR off

After work, or at the end of the day, switch off the Cawomat 2000 IR as follows:

1 Switch off the processor and disconnect the power cord from the outlet.

Do not work with wet fingers!

❖ *Do not switch the machine off during film transport!*

	Use this key to switch the Cawomat 2000 IR off.

2 Remove the developer replenishment bottle (marked by a red dot) to stop unnecessary oxidation.

3 Remove the water replenishment bottle (marked by a white dot) and pour out the water to prevent the forming of algae.

4 Slightly raise the processor cover to prevent condensation of chemicals.

Chapter 2

Getting started

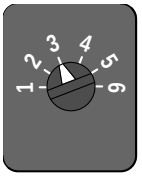
This chapter holds basic information on how to operate, clean or maintain the processor:

- Using the machine
- Replenishment
- Cleaning
- Troubleshooting
- Functional diagram

Using the machine

Selecting the dryer level

Set the multi-position switch to the desired drying level.

	Use this key to adjust the dryer.

The standard drying level position is 3.

Feeding a film to the Cawomat 2000 IR

Do not put films on or near the dryer! Films can get fogged when placed on the dryer.

❖ *You should first run a cleaning film if the machine has been standing idle for some time.*

1 Push a film into the feed slot until the LED in the replenishment key shows a red light.

- The maximum film width is 35 cm.
- The smallest size that can be processed is 10 x 10 cm or 9 x 12 cm. Films of this size have to be fed diagonally.

❖ *Do not process rollfilms nor mammographic films!*

2 You can feed the next film when the LED goes out.

Films are processed for about three minutes and then discharged at the front and placed on the receiving tray.

Replenishment

Preparation of chemicals

❖ *Only use ready-packed concentrates (G 153, G 353 or G 354) that are suitable for machine processing.*

1 Clean the replenishment bottles with tap water prior to filling them with fresh chemicals.

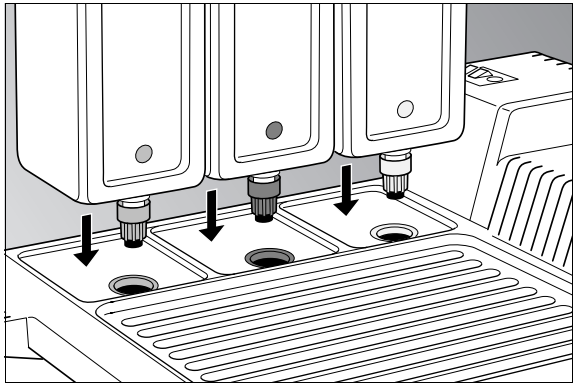
2 Carefully follow the preparation instructions on (or in) the packages.

3 Fill the replenishment bottles with freshly prepared solutions only.

The replenishment bottles are distinguished by valves of different colors:

- Developer : red
- Fixer : blue
- Water : white

4 Place the bottles in the identically colored openings.

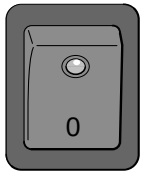


The tanks are filled automatically.

You are reminded to handle all chemicals with care, to wear protective gloves and an apron to protect your clothing, and to wear protective glasses for your safety. Always conform to local regulations regarding the disposal of chemicals.

Additional replenishment

If the machine has been left idle for more than about one day you should briefly press the replenishment key once.

	Use this key to activate an additional replenishment.

Wait about three minutes, until the LED goes out, before feeding the next film.

Replenishment rates

The Cawomat 2000 IR processor features an automatic replenishment system, in which the replenishment cycle is controlled by the length of the film. The replenishment pumps have been factory-set for average replenishment rates based on processing 240 x 300 mm films. If you will be processing either mainly larger or smaller sizes, it will be necessary to adjust the pumps.

Checking the replenishment rates is required in the following circumstances:

- After installation of the machine.
- After replacement of the pumps.
- If the standard film size is altered.

❖ *Each of the three replenishment bottles has its own replenishment rate. Refer to the Cawomat 2000 IR reference manual for detailed procedures on how to check and adjust the replenishment rates.*

⚠ ***You are reminded to handle all chemicals with care, to wear protective gloves and an apron to protect your clothing, and to wear protective glasses for your safety. Always conform to local regulations regarding the disposal of chemicals.***

Cleaning

Cleaning frequency

Cleaning according to the following routine is required:

Interval	Maintenance work
Each day	At the end of every day's work, remove the water replenishment bottle and pour out the water, remove the developer replenishment bottle and open the machine cover slightly.
Each week	Drain and clean the wash-water tank.
	If weekly processing is less than 80 films, drain and clean tanks and replace spent chemicals in the replenishment bottles.
	If weekly processing is more than 80 films, perform the above tasks every two weeks.
Each month	Clean the squeegee rollers (dryer assembly).

You are reminded to handle all chemicals with care, to wear protective gloves and an apron to protect your clothing, and to wear protective glasses for your safety. Always conform to local regulations regarding the disposal of chemicals.

General cleaning directions

❖ *We refer to the Reference manual for a description of the cleaning procedure.*

When cleaning the Cawomat 2000 IR, always take into account the following points:

- **Always disconnect the power cord from the outlet.**

⚠ ***Do not work with wet fingers!***

- Never use hot water. The highest temperature allowed is 40 °C.
- Avoid contact with chemicals.
- The electric wiring to the tank heaters is permanent. Do not disconnect the wires.
- Never clean the machine chassis and plastic parts of the tank heaters in running water. Always wipe off with a damp cloth!

⚠ ***Do not use additional chlorine or chlorine containing substances inside the processor. The use of additional chlorine or chlorine containing substances can lead to irreversible damage of the equipment. Using these substances may void the manufacturers warranty.***

The replenishment bottles, bottle valves, bottle receptacles, tank covers, pumps and tanks are color-coded to prevent contamination of the chemicals and for ease of assembly after cleaning. They must be returned to their proper location after cleaning.

	color	**Rollers**
Developer	Red	1 / 2
Fixer	Blue	3 / 4
Water	White	5 / 6

⚠ ***You are reminded to handle all chemicals with care, to wear protective gloves and an apron to protect your clothing, and to wear protective glasses for your safety. Always conform to local regulations regarding the disposal of chemicals.***

Troubleshooting

In this document only the basic troubleshooting actions are mentioned. We refer to the Cawomat 2000 IR Reference manual for a detailed overview of what to do in case of film or machine faults.

❖ *In case of faults it is advisable to turn the machine off briefly, and then on again. This may correct the problem.*

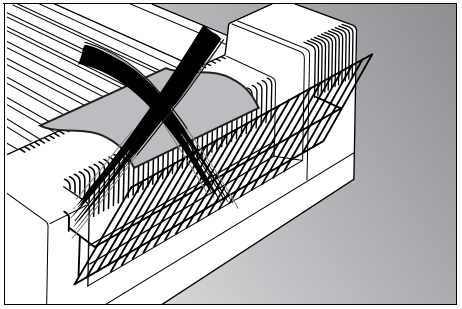
⚠ ***Do not work with wet fingers!***

Possible corrective actions for film and/or machine faults:

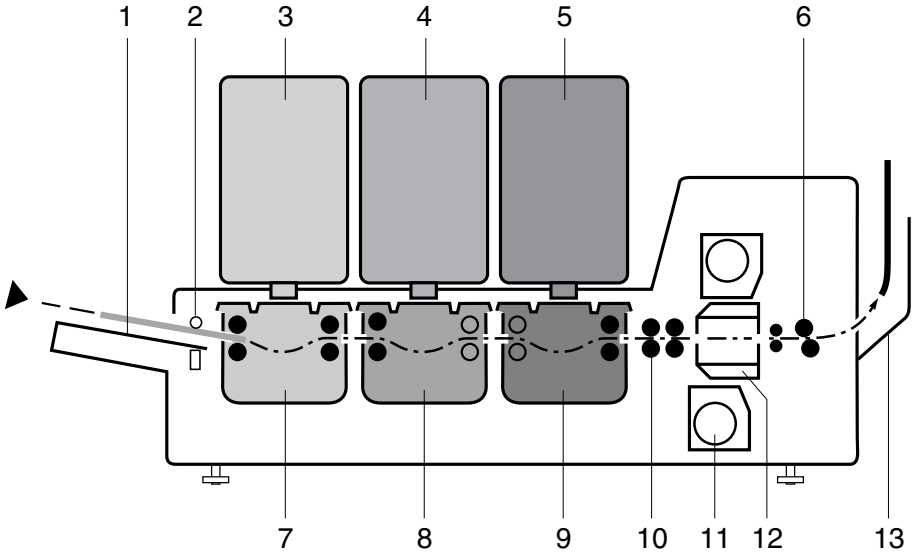
- Check that the dryer assembly cover and the processor cover are firmly in place.
- Check the replenishment bottles and tanks, and if necessary, replace the fixer and developer chemicals.
- Check and clean the feed tray, the exit tray, the tanks, the rollers, the pump drive system and the pumps.
- Check that the machine is level.
- Check and if necessary adjust the replenishment rates for the chemicals and the dryer temperature.

❖ *If necessary, call technical service.*

⚠ ***Do not put films on or near the dryer! Films can get fogged when placed on the dryer.***



Functional diagram



1	Feed tray	**8**	Fixer tank (0.9 l)
2	Film scanner for replenishment	**9**	Water tank (0.9 l)
3	Developer replenishment bottle (5 l)	**10**	Squeegee roller assembly
4	Fixer replenishment bottle (5 l)	**11**	Cross-blowing fan
5	Water replenishment bottle (5 l)	**12**	Infrared dryer
6	Dryer transport roller assembly	**13**	Exit tray
7	Developer tank (0.9 l)		

Exposed film is inserted directly into the feed slot at the left side of the processor. The film passes the film scanner regulating the replenishment and dryer systems, and then passes through the developer, the fixer and the wash-water tanks. After drying, the film leaves the dryer section and is deposited on the exit tray.

Appendix A

Equipment information sheet

Specifications

Product description	
Type of product	Medical film processor
Commercial name	Cawomat 2000 IR
Model number	9462/305/345
Type	Table-top model
Original seller/manufacturer	Agfa HealthCare NV - Mortsel
Labelling	
CE (Type 305)	93/42 EEC ‘Medical Devices’ (Europe)
TÜV (Type 305)	EN 60950; DIN 1988 (Germany)
ULc (Type 345)	UL 1950, CSA 22.2 No.950 (US)
Dimensions	
Length, receiving tray and feed table excluded	940 mm
Length, receiving tray and feed table included	1090 mm
Width	650 mm
Height, receiving tray excluded	370 mm
Height, receiving tray included	400 mm
Weight	
Unpacked & empty	56 kg
Packed (with accessories)	88.5 kg
Materials (refer to the recycling instructions manual for a complete overview of materials)	
Equipment does not contain as a constituent element: CFC or HCFC, Asbestos, PCB or PCT, Mercury, Cadmium, Lead as additive to plastic parts.	
Plastic parts > 50 g are marked in accordance with ISO 11469.	

Electrical connection	
ABC: 342XN (Type 9462/305)	200/208/230-240 V, 50 Hz, 60 Hz, 8 A (CE & TÜV)
ABC: 342ZR (Type 9462/345)	100/120 V, 60 Hz, 9 A (UL)
Power consumption	
Standby	180 W
During film processing	500 W (max. 1700 W)
Environmental conditions	
Relative humidity	10 % - 80 % (non-condensing)
Room temperature	15 °C - 30 °C
Recommended consumables[1]	
Developer	Agfa G 153 X-ray developer
Fixer	G 353 or G 354 X-ray fixer
Film	all general X-ray films
Water	tap water
Tank volumes	
Developer tank	0.9 l
Fixer tank	0.9 l
Water tank	0.9 l
Replenishment bottles	5 l each (optional 2.5 l)
Developer temperature (default value upon installation)	
Developer tank	34 °C
Fixer temperature (default value upon installation)	
Fixer tank	34 °C

Replenishment rates (default values upon installation)	
Developer	600 ml/m²
Fixer	750 ml/m²
Water	900 ml/m²
Film characteristics	
Smallest film size	100 x 100 mm or 90 x 120 mm
Max. film width	360 mm (max format 350 x 430 mm)
Physical emissions	
Noise emission (sound power level according to ISO 7779)	
• During film processing	55 dB(A)
• Standby	46 dB(A)
Magnetic field	1.5 mT max.
Radio frequency emission	according to CE requirement
Heat emission	
• During film processing	total: 1800 kJ/h; into the room: 1800 kJ/h
• Standby	total: 650 kJ/h; into the room: 650 kJ/h
Chemical emissions (equipment & consumables) Depending on processing conditions, and type of chemicals; in direct surroundings of equipment, when using recommended chemicals, and if installed according to instructions	
SO_2 (sulfur dioxide)	below TLV values[2]
CH_3COOH (acetic acid)	
Process data	
Output	60 films per hour (240 x 300 mm format)
Processing time	137 seconds from dry to dry
Film transport speed	280 mm/min.

Drying system	
Infrared drying (6 levels)	air throughput about 80 m³/h
End of Life	
Estimated product life (if regularly serviced and maintained according to CAWO instructions)	7 yrs
For re-use, recycling or disposal of used apparatus and for recycling instructions, please contact your local service organization.	

1. Take note of the relevant Material Safety Data Sheets.
2. Threshold limit value for chemical substances in the work environment as adopted by the ACGIH (American Conference of Governmental Hygienists).

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Printed in Belgium
Published by CAWO Photochemisches Werk GmbH, D-86521 Schrobenhausen, Germany
1221G EN 20070801